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Appendix A. Search Strategy

The search from the 2006 report was updated and run in MEDLINE, Cochrane, and Embase on July 21, 2014, December 31, 2014, and March 20, 2015:

1. exp Hypertension, Renal/
2. exp Renal Artery Obstruction/
3. renal arter$ stenosis.tw.
4. renal arter$ dis$.tw.
5. renovascular dis$.tw.
6. reno vascular dis$.tw.
7. renal vascular dis$.tw.
8. (arvd or "atherosclerotic renovascular dis$").tw.
9. renal steno$.tw.
10. steno$ kidney.tw.
11. renovascular steno$.tw.
12. or/1-11
13. limit 12 to humans
14. limit 13 to english language
15. limit 14 to (addresses or bibliography or biography or case reports or congresses or consensus development conference or consensus development conference, nih or dictionary or directory or editorial or festschrift or government publications or interview or lectures or legal cases or legislation or letter or news or newspaper article or patient education haout or periodical index or "review of reported cases")
16. 14 not 15
17. limit 16 to "all adult (19 plus years)"
18. 16 not 17
19. limit 18 to "all child (0 to 18 years)"
20. 16 not 19
21. limit 20 to (guideline or practice guideline or "review" or review, academic or "review literature" or review, multicase or review, tutorial)
22. limit 20 to meta analysis
23. 20 not (21 or 22)
24. follow-up studies/
25. (follow-up or followup).tw.
26. exp Case-Control Studies/
27. (case adj20 control).tw.
28. exp Longitudinal Studies/
29. longitudinal.tw.
30. exp Cohort Studies/
31. cohort.tw.
32. (Random$ or rct).tw.
33. exp Randomized Controlled Trials/

34. exp Random allocation/
35. exp Double-Blind Method/
36. exp Single-Blind Method/
37. randomized controlled trial.pt.
38. clinical trial.pt.
39. controlled clinical trial.pt.
40. (clin$ adj trial$).tw.
41. ((singl$ or doubl$ or trebl$ or tripl$) adj (bli$ or mask$)).tw.
42. exp PLACEBOS/
43. placebo$.tw.
44. exp Research Design/
45. exp Evaluation Studies/
46. exp Prospective Studies/
47. exp Comparative Study/
48. or/24-47
49. 23 and 48
50. (2007$ or 2008$ or 2009$ or 2010$ or 2011$ or 2012$ or 2013$ or 2014$).ed.
51. 49 and 50

At the suggestion of the Technical Expert Panel, we ran a separate search for a selection of case studies of more severe patients, who were likely to benefit from stenting and would have been excluded from the RCTs. This search was run only in MEDLINE on August 14, 2014.

1. exp Hypertension, Renal/
2. exp Renal Artery Obstruction/
3. renal arter$ stenosis.af.
4. renal arter$ dis$.af.
5. renovascular dis$.af.
6. reno vascular dis$.af.
7. renal vascular dis$.af.
8. (arvd or "atherosclerotic renovascular dis$").af.
9. renal steno$.af.
10. steno$ kidney.af.
11. renovascular steno$.af.
12. or/1-11
13. High risk.af.
14. Critical stenosis.af.
15. Critical lesion.af.
16. exp Acute Kidney Injury/
17. (Subacute and (renal failure or renal insufficiency or kidney failure)).af.
18. (Renovascular and crisis).af.
19. exp Kidney Failure, Chronic/
20. (Acute and ischemic nephropathy).af.
21. (Acute and (renal failure or renal insufficiency or kidney failure)).af.

22. ((chronic kidney disease or CKD) and (stage IV or stage V)).af.
23. Rescue.af. and (RRT.af. or exp renal replacement therapy/ or renal replacement therapy.af. or dialysis.af.)
24. Flash pulmonary edema.af.
25. (Acute adj diastolic dysfunction).af.
26. exp Heart Failure/
27. Acute heart failure.af.
28. Hypertensive crisis.af.
29. exp Hypertension, Malignant/
30. exp Hypertensive encephalopathy/
31. (Hospitalization adj10 hypertension).af.
32. (Bilateral and severe).af.
33. (Single and functioning and kidney).af.
34. hypertensive emergency.af.
35. or/13-34
36. 12 and 35
37. limit 36 to english language
38. limit 37 to humans
39. case.af.
40. 38 and 39

Appendix B. Excluded Studies

Rejection Reason	PMID	Authors	Title	Journal	Note
P: Not primarily ARAS treatment	9408615	Harjai	Effect of Geer on Outcomes Following Renal Artery Stent Placement for Renovascular Hypertension		Original report
P: Not primarily ARAS treatment	10658941	Johansson	Increased cardiovascular mortality in hypertensive patients with renal artery stenosis. Relation to sympathetic activation, renal function and treatment regimens.		Original report
P: Not primarily ARAS treatment	18472384	Modrall JG Rosero EB Smith ST Arko FR 3rd Valentine RJ Clagett GP Timaran CH	Operative mortality for renal artery bypass in the United States: Results from the National Inpatient Sample	Journal of Vascular Surgery	New
P: Not primarily ARAS treatment	19233600	Mohabbat W Greenberg RK Mastracci TM Cury M Morales JP Hernaez AV	Revised duplex criteria and outcomes for renal stents and stent grafts following endovascular repair of juxtarenal and thoracoabdominal aneurysms	Journal of Vascular Surgery	New
P: Not primarily ARAS treatment	19853403	Patel R Conrad MF Paruchuri V Kwolek CJ Cambria RP Comment in: J Vasc Surg. 2010 Feb;51(2):315-6; PMID: 20141955	Balloon expandable stents facilitate right renal artery reconstruction during complex open aortic aneurysm repair	Journal of Vascular Surgery	New
P: Not primarily ARAS treatment	22104341	Reed NR Kalra M Bower TC Oderich GS McKusick M Duncan AA Schleck CD Gloviczki P	Efficacy of combined renal and mesenteric revascularization	Journal of Vascular Surgery	New
P: Not primarily ARAS treatment	no PMID	Marone	Revascularization for renal function retrieval: which patients will benefit?	Pers Vasc Surg Endovasc Ther	Original report
Other: Restenosis	23538936	HS Itani	First use of a drug-eluting balloon in the treatment of acute renal artery occlusion and in-stent restenosis		New
Other: RCT protocol	19229814	Marcantoni C Zanoli L Rastelli S Tripepi G Matalone M Di Laro D Scaura S Tamburino C Zoccali C Castellino P	Stenting of renal artery stenosis in coronary artery disease (RAS-CAD) study: a prospective, randomized trial	Journal of Nephrology	New

Other: Protocol	19635148	Schwarzwalder U Hauk M Zeller T	RADAR - A randomized, multi-centre, prospective study comparing best medical treatment versus best medical treatment plus renal artery stenting in patients with haemodynamically relevant atherosclerotic renal artery stenosis	Trials [Electronic Resource]	New
Other: Not primary study	18670376	Henry M Henry I Polydorou A Hugel M	Embolic protection for renal artery stenting	Journal of Cardiovascular Surgery	New
Other: Not primary study	no PMID		Revascularization versus medical therapy for renal-artery stenosis. The ASTRAL investigators. The New Engla Journal of Medicine 2009; 361: 1953-1962	Vascular Medicine	New
Other: Not ARAS	17349328	Grigoryants V Henke PK Watson NC Upchurch GR Jr Wakefield TW Stanley JC	Iliorenal bypass: indications and outcomes following 41 reconstructions	Annals of Vascular Surgery	New
Other: Not ARAS	17453127	Lanzer P Weser R Prettin C	Intentional single-stage revascularization of two different vascular beds in patients with vascular multimorbidity; a feasibility study	Clinical Research in Cardiology	New
Other: Not ARAS	18760724	Cai S Ouyang YS Li JC Dai Q Tan L Xia Y Xu ZH Li HJ Jiang YX	Evaluation of acute renal artery thrombosis or embolism with color Doppler sonography		New
Other: Not an analysis of interest (CORAL)	no PMID	David A Folt1; Kaleigh L Evans1; Sravya Brahmaam1; Wencan He1; Pamela Brewster1; Timothy P Murphy2; Donald E Cutlip3; Lance Dworkin4; Kenneth Jamerson5; William Henrich6; Diane Reid7; Christopher J Cooper1	Abstract 14746: Region and physician specialty influence medical management of atherosclerotic renal artery stenosis	Circulation	New
Other: No new primary data (PMID 18490527)	no PMID	He W, Chen J, Zhang D et al	Abstract 14283: Time depeant changes in systolic blood pressure after renal artery stenting: Role of stenosis severity	Circulation	New
Other: No new primary data (ASTRAL abstract plus commentary)	no PMID		Should revascularisation be recommended for atherosclerotic renal artery stenosis?	Journal of the Royal College of Physicians of Edinburgh	New
Other: Natural Hx	8254782	Fergany	Management of atherosclerotic renal artery disease in younger patients		Original report

Other: Natural Hx	9507221	Caps	Risk of atrophy in kidneys with atherosclerotic renal artery stenosis.		Original report
Other: Natural Hx	11099684	Iglesias	The Natural History of Incidental Renal Artery Stenosis in Patients with Aortoiliac Vascular Disease		Original report
Other: Natural Hx	11576364	Conlon	Severity of renal vascular disease predicts mortality in patients undergoing coronary angiography		Original report
Other: Natural Hx	11752032	Cheung	Epidemiology of Renal Dysfunction and Patient Outcome in Atherosclerotic Renal Artery Occlusion		Original report
Other: Natural Hx	12027983	Pillay	Prospective multicentre study of the natural history of atherosclerotic renal artery stenosis in patients with peripheral vascular disease.		Original report
Other: Natural Hx	12358138	Uzu	Prevalence and outcome of renal artery stenosis in atherosclerotic patients with renal dysfunction.		Original report
Other: Natural Hx	15161949	Houston	Spiral laminar flow in the abdominal aorta: a predictor of renal impairment deterioration in patients with renal artery stenosis?		Original report
Other: Natural Hx	17713349	Cheung CM Patel A Shaheen N Cain S Eddington H Hegarty J Middleton RJ Cowie A Mamtora H Kalra PA	The effects of statins on the progression of atherosclerotic renovascular disease	Nephron	New
Other: Natural Hx	19667039	Wright JR Shurrab AE Cooper A Kalra PR Foley RN Kalra PA	Progression of cardiac dysfunction in patients with atherosclerotic renovascular disease	Qjm	New
Other: Natural Hx	25150754	Aboyans V and Tanguy and B. and Desormais and I. and Bonnet and V. and Chonchol and M. and Laskar and M. and Mohty and D. and Lacroix and P.	Prevalence of renal artery disease and its prognostic significance in patients undergoing coronary bypass grafting	American Journal of Cardiology	New
Other: Drive by stent	19952777	Rimoldi SF de Marchi SF Wiecker S Meier B Allemann Y	Screening renal artery angiography in hypertensive patients undergoing coronary angiography a 6-month follow-up after ad hoc percutaneous revascularization	Journal of Hypertension	New

Other: Case, not ARAS	17003541	Rehan A and Almanaseer and Yassar and Desai and Devang M. and Ali and Arshad and Yamasaki and Hiroshi	Complete resolution of acute renal failure after left renal artery angioplasty and stent placement for total renal artery occlusion		New
Other: Case, not acute decompensation	17022392	Mannebach PC and Dieter and Robert S. and Marks and David Scott	Use of gadolinium-based angiography for renal artery stenting in a patient with renal insufficiency: A case report	Angiology	New
Other: Case, not acute decompensation	17712213	Adriaenssens T and Kastrati and Adnan and Schomig and Albert	Successful stenting of bilateral multiple renal arteries in a patient with renovascular hypertension	Journal of Invasive Cardiology	New
O: No outcome of interest	17723005	Puchner S Stadler A Minar E Lammer J Bucek RA	Multidetector CT angiography in the follow-up of patients treated with renal artery stents: value of different reformation techniques compared with axial source images	Journal of Endovascular Therapy	New
O: No outcome of interest	18386125	Parenti GC Palmarini D Bilzoni M Campioni P Mannella P Ginevra A	Role of color-Doppler sonography in the follow-up of renal artery stenting	Radiologia Medica	New
O: No outcome of interest	18712043	Tanemoto M Abe M Uruno A Abe T Ito S	Angiographic index for angioplasty-treatable atheromatous renal artery stenosis	Hypertension Research - Clinical & Experimental	New
O: No outcome of interest	18922676	Giles H Lesar C Erdoes L Sprouse R Myers S	Balloon-expandable covered stent therapy of complex endovascular pathology	Annals of Vascular Surgery	New
O: No outcome of interest	20675902	Thalhammer C Ferriani V Husmann M Rufibach K Meier T Amann-Vesti BR	Predictive value of duplex ultrasound for restenosis after renal artery stenting	Clinical Hemorheology & Microcirculation	New
O: No outcome of interest	24746646	Crimmins JM	Validity of estimated glomerular filtration rates for assessment of renal function after renal artery stenting in patients with atherosclerotic renal artery stenosis	Jacc: Cardiovascular Interventions	New
O: No outcome of interest	no PMID		Determinants of angiotensin converting enzyme inhibitor/angiotensin receptor blocker use in patients with atherosclerotic renal artery stenosis and effects on blood pressure	Circulation	New

I: No specific intervention(s)	16892443	Jones NJ Bates ER Chetcuti SJ Lederman RJ Grossman PM	Usefulness of translesional pressure gradient and pharmacological provocation for the assessment of intermediate renal artery disease	Catheterization & Cardiovascular Interventions	New
I: No specific intervention(s)	17631082	de Silva R Loh H Rigby AS Nikitin NP Witte KK Goode K Bhaari S Nicholson A Clark AL Clela JG	Epidemiology, associated factors, and prognostic outcomes of renal artery stenosis in chronic heart failure assessed by magnetic resonance angiography	American Journal of Cardiology	New
I: No specific intervention(s)	17891347	Komea P Zalunardo N Burnett S Love J Buller C Taylor P Duncan J Djurdjev O Levin A	Conservative outpatient renoprotective protocol in patients with low GFR undergoing contrast angiography: a case series	Clinical & Experimental Nephrology	New
I: No specific intervention(s)	18569908	Onuigbo MA Onuigbo NT	Renal failure and concurrent RAAS blockade in older CKD patients with renal artery stenosis: an exteed Mayo Clinic prospective 63-month experience	Renal Failure	New
I: No specific intervention(s)	18670374	Bergqvist D Bjorck M Lugren F Troeng T	Invasive treatment for renovascular disease. A twenty year experience from a population based registry	Journal of Cardiovascular Surgery	New
I: No specific intervention(s)	18692990	Davies MG Saad WE Peden EK Mohiuddin IT Naoum JJ Lumsden AB	Implications of acute functional injury following percutaneous renal artery intervention	Annals of Vascular Surgery	New
I: No specific intervention(s)	19098012	Esteban C Perez P Fernaez-Llamazares J Surinach JM Camafort M Martorell A Monreal M Comment in: Angiology. 2010 May;61(4):415-6; PMID: 20483812	Clinical outcome in patients with peripheral artery disease and renal artery stenosis	Angiology	New
I: No specific intervention(s)	19754857	Dechering DG Kruis HM Adiyaman A Thien T Postma CT	Clinical significance of low-grade renal artery stenosis	Journal of Internal Medicine	New
I: No specific intervention(s)	21133827	Andersen UB Borglykke A Jorgensen T	Prevalence of renal artery stenosis in subjects with moderate hypertension. A population-based study	Blood Pressure	New

I: No specific intervention(s)	22771675	A. Eirin and Gloviczki and Monika L. and Tang and Hui and Gossl and Mario and Jordan and Kyra L. and Woollard and John R. and Lerman and Amir and Grae and Joseph P. and Textor and Stephen C. and Lerman and Lilach O.	Inflammatory and injury signals released from the post-stenotic human kidney		New
I: No specific intervention(s)	no PMID		Severity of renal artery lesions in patients enrolled into the CORAL trial	Journal of Vascular and Interventional Radiology	New
I: Angioplasty w/o stent (≥80%)	2939491	L. G. Martin and Casarella and W. J. and Alspaugh and J. P. and Chuang and V. P.	Renal artery angioplasty: increased technical success and decreased complications in the seco 100 patients		New
I: Angioplasty w/o stent (≥80%)	10924577	Baumgartner	Stent Placement in Ostial and Nonostial Atherosclerotic Renal Arterial Stenoses: A Prospective Follow-up Study		Original report
I: Angioplasty w/o stent (≥80%)	11172177	Radermacher	Use of Doppler ultrasonography to predict the outcome of therapy for renal-artery stenosis		Original report
I: Angioplasty w/o stent (≥80%)	12469977	Ziakka	Percutaneous transluminal renal artery angioplasty: who benefits most?		Original report
I: Angioplasty w/o stent (≥80%)	16897141	Lanzer P Weser R Prettin C	Coronary-like revascularization for atherosclerotic renal artery stenosis--results in 181 consecutive patients	Clinical Research in Cardiology	New
I: Angioplasty w/o stent (≥80%)	17491539	Mak G Tan CY Ben Khiaron O McEniff N Feely J	An evaluation of the effects of renal artery stenting in renovascular hypertension	Irish Medical Journal	New
I: Angioplasty w/o stent (≥80%)	18580055	Zalunardo N Rose C Starovoytov A Djurdjev O Fox R Taylor P Duncan JA Buller CE Levin A	Incidental atherosclerotic renal artery stenosis diagnosed at cardiac catheterization: no difference in kidney function with or without stenting	American Journal of Nephrology	New
I: Angioplasty w/o stent (≥80%)	18772602	Lekston A Chudek J Gasior M Wilczek K Wiecek A Kokot F Gierlotka M Niklewski T Fijalkowski M Szygula-Jurkiewicz B Wojnicz R Bialas B Osuch M Maciejewski B Polonski L	Angiographic and intravascular ultrasound assessment of immediate and 9-month efficacy of percutaneous transluminal renal artery balloon angioplasty with subsequent brachytherapy in patients with renovascular hypertension	Kidney & Blood Pressure Research	New

I: Angioplasty w/o stent (≥80%)	19217744	Davies MG Saad WE Bismuth JX Naoum JJ Peden EK Lumsden AB	Endovascular revascularization of renal artery stenosis in the solitary functioning kidney	Journal of Vascular Surgery	New
I: Angioplasty w/o stent (≥80%)	19337882	Jensen G Annerstedt M Klingenstierna H Herlitz H Aurell M Hellstrom M Comment in: Sca J Urol Nephrol. 2010 Feb;44(1):62-3; author reply 64; PMID: 19958074	Survival and quality of life after renal angioplasty: a five-year follow-up study	Scainavian Journal of Urology & Nephrology	New
I: Angioplasty w/o stent (≥80%)	19367240	Alhadad A Mattiasson I Ivancev K Liblad B Gottsater A	Predictors of long-term beneficial effects on blood pressure after percutaneous transluminal renal angioplasty in atherosclerotic renal artery stenosis	International Angiology	New
I: Angioplasty w/o stent (≥80%)	19413179	Lekston A Niklewski T Gasior M Chudek J Wilczek K Wiecek A Kokot F Fijalkowski M Gierlotka M Osuch M Maciejewski B Polonski L	Effects of short- and long-term efficacy of percutaneous transluminal renal angioplasty with or without intravascular brachytherapy on regression of left ventricular hypertrophy in patients with renovascular hypertension	Polskie Archiwum Medycyny Wewnetrznej	New
I: Angioplasty w/o stent (≥80%)	19950087	Lekston A Chudek J Wilczek K Gasior M Wiecek A Kokot F Fijalkowski M Gierlotka M Szygula-Jurkiewicz B Wojnicz R Bialas B Osuch M Maciejewski B Polonski L	Comparison of early and late efficacy of percutaneous transluminal renal angioplasty with or without subsequent brachytherapy: the effect on blood pressure in patients with renovascular hypertension	Cardiology Journal	New
I: Angioplasty w/o stent (≥80%)	19955827	Duranay M Kanbay M Akay H Unverdi S Surer H Altay M Kirbas I Covic A Zoccali C	Nebivolol improves renal function in patients who underwent angioplasty due to renal artery stenosis: a pilot study	Nephron	New
I: Angioplasty w/o stent (≥80%)	21613792	Nowakowska Fortuna E Herlitz H Saeed A Attman PO Jensen G Alaupovic P Guron G	Lipoprotein abnormalities in patients with atherosclerotic renovascular disease	Kidney & Blood Pressure Research	New
D: Surg retro cohort N<100	21636929	Kumar B Sinha PK Unnikrishnan M	Anesthetic management of patients undergoing extra-anatomic renal bypass surgery for renovascular hypertension	Annals of Cardiac Anaesthesia	New
D: Surg retro cohort N<100	21821380	Ghanami RJ, Rana H, Craven TE, Hoyle J, Edwards MS, Hansen KJ.	Diastolic function predicts survival after renal revascularization.	Journal of Vascular Surgery	New

D: Rx/Surg prosp cohort N<10	19631505	Corriere MA Hoyle JR Craven TE D'Agostino RB Jr Edwards MS Moore PS Hansen KJ	Changes in left ventricular structure and function following renal artery revascularization	Annals of Vascular Surgery	New
D: Plasty/Rx cohort, retrospective	2939491	Martin LG and Casarella and W. J. and Alspaugh and J. P. and Chuang and V. P.	Renal artery angioplasty: increased technical success and decreased complications in the seco 100 patients		New
D: Plasty/Rx cohort, retrospective	9774123	Tuttle	Treatment of Atherosclerotic Ostial Renal Artery Stenosis With the Intravascular Stent		Original report
D: Plasty/Rx cohort, retrospective	11479472	Lederman	Primary renal artery stenting: Characteristics and outcomes after 363 procedures		Original report
D: Plasty/Rx cohort, retrospective	14718831	Pizzolo	Renovascular disease: Effect of ACE gene deletion polymorphism and endovascular revascularization		Original report
D: Plasty/Rx cohort, retrospective	14743583	Bucek	Long-term follow-up after renal artery stenting		Original report
D: Plasty/Rx cohort, retrospective	17042665	Bates MC Rashid M Campbell JE Stone PA Broce M Lavigne PS	Factors influencing the need for target vessel revascularization after renal artery stenting	Journal of Endovascular Therapy	New
D: Plasty/Rx cohort, retrospective	17192944	Silva JA Potluri S White CJ Collins TJ Jenkins JS Subramanian R Ramee SR Comment in: Catheter Cardiovasc Interv. 2007 May 1;69(6):908-9; PMID: 17427206	Diabetes mellitus does not preclude stabilization or improvement of renal function after stent revascularization in patients with kidney insufficiency and renal artery stenosis	Catheterization & Cardiovascular Interventions	New
D: Plasty/Rx cohort, retrospective	17210392	Kashyap VS Sepulveda RN Bena JF Nally JV Poggio ED Greenberg RK Yadav JS Ouriel K	The management of renal artery atherosclerosis for renal salvage: does stenting help?	Journal of Vascular Surgery	New
D: Plasty/Rx cohort, retrospective	17400563	Tan J Filobbos R Raghunathan G Nicholson T Fowler R Wright M Eadington D	Efficacy of renal artery angioplasty and stenting in a solitary functioning kidney	Nephrology Dialysis Transplantation	New
D: Plasty/Rx cohort, retrospective	17488176	Zeller T Rastan A Schwarzwalder U Muller C Frank U Burgelin K Sixt S Schwarz T Noory E Neumann FJ	Regression of left ventricular hypertrophy following stenting of renal artery stenosis	Journal of Endovascular Therapy	New

D: Plasty/Rx cohort, retrospective	17525962	Bates MC Campbell JE Stone PA Jaff MR Broce M Lavigne PS Comment in: Catheter Cardiovasc Interv. 2007 Jun 1;69(7):1046-7; PMID: 17525963 Comment in: Catheter Cardiovasc Interv. 2007 Jun 1;69(7):1044-5; PMID: 17525995 Comment in: Catheter Cardiovasc Interv. 2007 Jun 1;69(7):1048-9; PMID: 17525964	Factors affecting long-term survival following renal artery stenting	Catheterization & Cardiovascular Interventions	New
D: Plasty/Rx cohort, retrospective	17606122	Edwards MS Corriere MA Craven TE Pan XM Rapp JH Pearce JD Mertaugh NB Hansen KJ	Atheroembolism during percutaneous renal artery revascularization	Journal of Vascular Surgery	New
D: Plasty/Rx cohort, retrospective	17673882	Tagle R Acevedo M Xu M Pohl M Vidt D	Use of endovascular stents in atherosclerotic renovascular stenosis: blood pressure and renal function changes in hypertensive patients	Journal of Clinical Hypertension	New
D: Plasty/Rx cohort, retrospective	17934918	Ovrehus KA Aersen PE Jacobsen IA Comment in: Blood Press. 2007;16(5):288-90; PMID: 17934915	Treatment of renovascular hypertension by transluminal angioplasty--13 years experience in a single centre	Blood Pressure	New
D: Plasty/Rx cohort, retrospective	18238866	Bates MC Campbell JE Broce M Lavigne PS Riley MA	Serum creatinine stabilization following renal artery stenting	Vascular & Endovascular Surgery	New
D: Plasty/Rx cohort, retrospective	18256017	Kane GC Stanson AW Kalnicka D Rosenthal DW Lee CU Textor SC Garovic VD	Comparison between gadolinium and iodine contrast for percutaneous intervention in atherosclerotic renal artery stenosis: clinical outcomes	Nephrology Dialysis Transplantation	New
D: Plasty/Rx cohort, retrospective	18620111	Suliman A Imhoff L Greenberg JI Angle N	Renal stenting for incidentally discovered renal artery stenosis: is there any outcome benefit?	Annals of Vascular Surgery	New
D: Plasty/Rx cohort, retrospective	18727962	Corriere MA Pearce JD Edwards MS Stafford JM Hansen KJ Comment in: Perspect Vasc Surg Endovasc Ther. 2009 Sep;21(3):201-2; PMID: 19602506	Endovascular management of atherosclerotic renovascular disease: early results following primary intervention	Journal of Vascular Surgery	New
D: Plasty/Rx cohort, retrospective	18760140	Hackam DG Duong-Hua ML Mamdani M Li P Tobe SW Spence JD Garg AX	Angiotensin inhibition in renovascular disease: a population-based cohort study	American Heart Journal	New

D: Plasty/Rx cohort, retrospective	18789723	Misra S Gomes MT Mathew V Barsness GW Textor SC Bjarnason H McKusick MA	Embolic protection devices in patients with renal artery stenosis with chronic renal insufficiency: a clinical study	Journal of Vascular & Interventional Radiology	New
D: Plasty/Rx cohort, retrospective	18829238	Klonaris C Katsargyris A Alexarou A Tsigris C Giannopoulos A Bastounis E	Efficacy of protected renal artery primary stenting in the solitary functioning kidney	Journal of Vascular Surgery	New
D: Plasty/Rx cohort, retrospective	19128271	Singer GM Setaro JF Curtis JP Remetz MS	Distal embolic protection during renal artery stenting: impact on hypertensive patients with renal dysfunction	Journal of Clinical Hypertension	New
D: Plasty/Rx cohort, retrospective	19172426	Eklof H Bergqvist D Hagg A Nyman R	Outcome after endovascular revascularization of atherosclerotic renal artery stenosis	Acta Radiologica	New
D: Plasty/Rx cohort, retrospective	19202165	Chrysochou C Cheung CM Durow M Middleton RJ Solomon LR Craig A Venning M Kalra PA	Proteinuria as a predictor of renal functional outcome after revascularization in atherosclerotic renovascular disease (ARVD)	Qjm	New
D: Plasty/Rx cohort, retrospective	19217748	Davies MG Saad WA Bismuth JX Peden EK Naoum JJ Lumsden AB	Outcomes of eoluminal reintervention for restenosis after percutaneous renal angioplasty and stenting	Journal of Vascular Surgery	New
D: Plasty/Rx cohort, retrospective	19328725	Thatipelli MR Misra S Sanikommu SR Schainfeld RM Sharma SK Soukas PA	Embolic protection device use in renal artery stent placement	Journal of Vascular & Interventional Radiology	New
D: Plasty/Rx cohort, retrospective	19595532	Corriere MA Edwards MS Pearce JD Arews JS Geary RL Hansen KJ	Restenosis after renal artery angioplasty and stenting: incidence and risk factors	Journal of Vascular Surgery	New
D: Plasty/Rx cohort, retrospective	19625262	Padigala KK Hartle JE Kirchner HL Schultz MF	Renal cortical thickness as a predictor of renal function and blood pressure status post renal artery stenting	Angiology	New
D: Plasty/Rx cohort, retrospective	19699353	Dieter RS Darki A Nanjuappa A Chhokar VS Khadim G Morshedi-Meibodi A Freihage JH Steen L Lewis B Leya F	Usefulness of wide pulse pressure as a predictor of poor outcome after renal artery angioplasty and stenting	American Journal of Cardiology	New
D: Plasty/Rx cohort, retrospective	19759030	Albertal M Nau G Padilla LT Cura FA Thierer J Belardi JA	Do men and women respo differently to percutaneous renal artery interventions?	Angiology	New
D: Plasty/Rx cohort, retrospective	19878369	Singer GM Remetz MS Curtis JP Setaro JF	Impact of baseline renal function on outcomes of renal artery stenting in hypertensive patients	Journal of Clinical Hypertension	New

D: Plasty/Rx cohort, retrospective	20022208	Davies MG Saad WE Bismuth J Naoum JJ Peden EK Lumsden AB	Impact of metabolic syndrome on the outcomes of percutaneous renal angioplasty and stenting	Journal of Vascular Surgery	New
D: Plasty/Rx cohort, retrospective	20150008	Dervisoglu E Ciftci E Selek A Sarisoy HT Kaleer B Yilmaz A Comment in: Anadolu Kardiyol Derg. 2010 Feb;10(1):66-8; PMID: 20150009	Percutaneous renal artery stenting reduces arterial blood pressure, but what about renal function? A single-center experience	Anadolu Kardiyoloji Dergisi	New
D: Plasty/Rx cohort, retrospective	20201707	Chang JH Kim BS Oh HJ Yoo TH Kang SW Lee HY Choi D Shim WH Choi KH	Effect of baseline glomerular filtration rate on renal function following stenting for atherosclerotic renal artery stenosis	Scainavian Journal of Urology & Nephrology	New
D: Plasty/Rx cohort, retrospective	20410427	Bommart S Cliche A Therasse E Giroux MF Vidal V Oliva VL Soulez G	Renal artery revascularization: predictive value of kidney length and volume weighted by resistive iex	AJR. American Journal of Roentgenology	New
D: Plasty/Rx cohort, retrospective	20619585	Fleming SH Davis RP Craven TE Deonanan JK Godshall CJ Hansen KJ	Accuracy of duplex sonography scans after renal artery stenting	Journal of Vascular Surgery	New
D: Plasty/Rx cohort, retrospective	21034349	A. Pelta and Aersen and Ulrik B. and Just and Sven and Baekgaard and Niels	Flash pulmonary edema in patients with renal artery stenosis--the Pickering Syndrome		New
D: Plasty/Rx cohort, retrospective	21316901	Modrall JG Rosero EB Leonard D Timaran CH Anthony T Arko FA 3rd Valentine RJ Clagett GP Trimmer C	Clinical and kidney morphologic predictors of outcome for renal artery stenting: data to inform patient selection	Journal of Vascular Surgery	New
D: Plasty/Rx cohort, retrospective	21803522	Modrall JG Timaran CH Rosero EB Chung J Arko FA 3rd Valentine RJ Clagett GP Trimmer C	Predictors of outcome for renal artery stenting performed for salvage of renal function	Journal of Vascular Surgery	New
D: Plasty/Rx cohort, retrospective	21992685	Hegde U Rajapurkar M Gang S Khanapet M Durugkar S Gohel K Aghor N Ganju A Dabhi M Comment in: Semin Dial. 2012 Jan-Feb;25(1):105-7; PMID: 21917001	Fifteen years' experience of treating atherosclerotic renal artery stenosis by interventional nephrologists in India	Seminars in Dialysis	New
D: Plasty/Rx cohort, retrospective	22097232	Wolak T Belkin A Ginsburg V Greenberg G Mayzler O Bolotin A Paran E Szero G	Does percutaneous transluminal renal artery angioplasty improve blood pressure control and renal function in patients with atherosclerotic renal artery stenosis?	Israel Medical Association Journal: Imaj	New
D: Plasty/Rx cohort, retrospective	22133456	Modrall JG Rosero EB Timaran CH Anthony T Chung J Valentine RJ Trimmer C	Assessing outcomes to determine whether symptoms related to hypertension justify renal artery stenting	Journal of Vascular Surgery	New

D: Plasty/Rx cohort, retrospective	22264697	Modrall JG Timaran CH Rosero EB Chung J Plummer M Valentine RJ Trimmer C	Longitudinal changes in kidney parenchymal volume associated with renal artery stenting	Journal of Vascular Surgery	New
D: Plasty/Rx cohort, retrospective	22613636	Liao CJ Yang BZ Wang ZG	Percutaneous transluminal renal angioplasty with stent is effective for blood pressure control and renal function improvement in atherosclerotic renal artery stenosis patients	Chinese Medical Journal	New
D: Plasty/Rx cohort, retrospective	22692467	Khosla A Misra S Greene EL Pflueger A Textor SC Bjarnason H McKusick MA	Clinical outcomes in patients with renal artery stenosis treated with stent placement with embolic protection compared with those treated with stent alone	Vascular & Endovascular Surgery	New
D: Plasty/Rx cohort, retrospective	23043033	Yuksel UC Anabtawi AG Cam A Poddar K Agarwal S Goel S Kim E Bajzer C Gornik HL Shishehbor MH Tuzcu EM Kapadia SR	Predictive value of renal resistive index in percutaneous renal interventions for atherosclerotic renal artery stenosis	Journal of Invasive Cardiology	New
D: Plasty/Rx cohort, retrospective	23057705	He Y Liu Y Wang M Sun Y Dong D Yuan H Wu X Chong Z Jin X	Clinical effect of endovascular treatment on blood pressure and kidney function for hypertensive patients with renal artery stenosis	Clinical & Experimental Hypertension (New York)	New
D: Plasty/Rx cohort, retrospective	23091375	Zhao J Cheng Q Zhang X Li M Liu S Wang X	Efficacy of percutaneous transluminal renal angioplasty with stent in elderly male patients with atherosclerotic renal artery stenosis	Clinical Interventions In Aging	New
D: Plasty/Rx cohort, retrospective	23645044	Su CS Liu TJ Tsau CR Liang KW Chang WC Ting CT Lee WL	The feasibility, safety, and mid-term outcomes of concomitant percutaneous transluminal renal artery stenting in acute coronary syndrome patients at high clinical risk of renal artery stenosis	Journal of Invasive Cardiology	New
D: Plasty/Rx cohort, retrospective	23688626	Simone TA Brooke BS Goodney PP Walsh DB Stone DH Powell RJ Cronenwett JL Nolan BW	Clinical effectiveness of secondary interventions for restenosis after renal artery stenting	Journal of Vascular Surgery	New
D: Plasty/Rx cohort, retrospective	23863797	Ginzburg V Volak T Grinberg G Maiizler O Leitsin A Saro G	Angioplasty and stenting of renal arteries: in search for prognostic criteria	AngiologIndia i Sosudistaia KhirurgIndia/Angiology & Vascular Surgery	New

D: Plasty/Rx cohort, retrospective	24502495	Kawarada O and Yokoi and Y. and Sakamoto and S. and Harada and K. and Ishihara and M. and Yasuda and S. and Ogawa and H.	Impact of aortorenal morphology on renal artery stent procedures: significance of aortic tortuosity and renal artery derivation	Journal of Endovascular Therapy	New
D: Plasty/Rx cohort, retrospective	25327064	Sathyamurthy I and Sudhakar and K. and Jayanthi and K. and Subramanyan and K. and Ramachandran and P. and Mao and R. and Samuel and K. M.	Renal artery stenting: one year outcome on BP control and antihypertensive medication	Journal of the Association of Physicians of India	New
D: Plasty/Rx cohort, retrospective	no PMID	Nau	Long-term outcome of atherosclerotic renovascular disease in patients treated with angioplasty	Revista Argentina de Cardiologia	New
D: Plasty cohort N<30	2996342	Franklin	Comparison of effects of enalapril plus hydrochlorothiazide versus standard triple therapy on renal function in renovascular hypertension.		Original report
D: Plasty cohort N<30	3018602	Franklin	A comparison of enalapril plus hydrochlorothiazide with standard triple therapy in renovascular hypertension		Original report
D: Plasty cohort N<30	6100883	Tillman	Enalapril in hypertension with renal artery stenosis: long-term follow-up and effects on renal function.		Original report
D: Plasty cohort N<30	12603580	S. Prasad and Bannister and K. and Taylor and J.	Is magnetic resonance angiography useful in renovascular disease?		New
D: Plasty cohort N<30	17351955	Mitchell JA Subramanian R White CJ Soukas PA Almagor Y Stewart RE Rosenfield K	Predicting blood pressure improvement in hypertensive patients after renal artery stent placement: renal fractional flow reserve	Catheterization & Cardiovascular Interventions	New
D: Plasty cohort N<30	18341947	Urbano J Manzarbetia F Caramelo C	Cholesterol embolism evaluated by polarized light microscopy after primary renal artery stent placement with filter protection	Journal of Vascular & Interventional Radiology	New
D: Plasty cohort N<30	18471677	Wierema TK Yaqoob MM	Renal artery stenosis in chronic renal failure: caution is advised for percutaneous revascularization	European Journal of Internal Medicine	New
D: Plasty cohort N<30	18954765	Thatipelli M Misra S Johnson CM Arews JC Stanson AW Bjarnason H McKusick MA	Renal artery stent placement for restoration of renal function in hemodialysis recipients with renal artery stenosis	Journal of Vascular & Interventional Radiology	New
D: Plasty cohort N<30	19084431	Brountzos EN Tavernaraki K Gouliamos AD Degiannis D Chaidaroglou A Panagiotou I Arsenis G Kelekis D Vlahakos D	Systemic inflammatory response to renal artery percutaneous angioplasty with stent placement and the risk for restenosis: a pilot study	Journal of Vascular & Interventional Radiology	New

D: Plasty cohort N<30	19463314	Mahmud E Smith TW Palakodeti V Zaidi O Ang L Mitchell CR Zafar N Bromberg-Marin G Keramati S Tsimikas S Comment in: JACC Cardiovasc Interv. 2008 Jun;1(3):293-4; PMID: 19463315	Renal frame count and renal blush grade: quantitative measures that predict the success of renal stenting in hypertensive patients with renal artery stenosis	Jacc: Cardiovascular Interventions	New
D: Plasty cohort N<30	19493475	Li CJ Wu Z Yan HB Wang J Zhao HJ	Safety and efficacy of coronary drug eluting stent for atherosclerotic stenosis of the small renal artery	Chinese Medical Journal	New
D: Plasty cohort N<30	19647181	Pellerin O Garcon P Beyssen B Raynaud A Rossignol P Jacquot C Plouin PF Sapoval M	Spontaneous renal artery dissection: long-term outcomes after endovascular stent placement	Journal of Vascular & Interventional Radiology	New
D: Plasty cohort N<30	21805607	Laird JR Tehrani F Soukas P Joye JD Ansel GM Rocha-Singh K Comment in: Catheter Cardiovasc Interv. 2012 Feb 15;79(3):437-8; PMID: 22328234	Feasibility of FiberNet embolic protection system in patients undergoing angioplasty for atherosclerotic renal artery stenosis	Catheterization & Cardiovascular Interventions	New
D: Plasty cohort N<30	22134935	Takumi T Mathew V Barsness GW Kataoka T Rubinshtein R Rihal CS Gulati R Eeckhout E Lennon RJ Lerman LO Lerman A	The association between renal atherosclerotic plaque characteristics and renal function before and after renal artery intervention	Mayo Clinic Proceedings	New
D: Plasty cohort N<30	22785108	Koivuviita N Liukko K Kudomi N Oikonen V Tertti R Manner I Vahlberg T Nuutila P Metsarinne K	The effect of revascularization of renal artery stenosis on renal perfusion in patients with atherosclerotic renovascular disease	Nephrology Dialysis Transplantation	New
D: Plasty cohort N<30	23207915	Kok HK Leong S Goveer P Browne R Torreggiani WC	Percutaneous renal artery angioplasty and stenting: indications, technique and results	Irish Journal of Medical Science	New
D: Plasty cohort N<30	24434389	Labidi J Touat D Abdelghanim K Ajili F Ariba YB Abdelhafidh NB Louzir B Othmani S	Renovascular hypertension: a report of 21 cases	Saudi Journal of Kidney Diseases & Transplantation	New
D: Plasty cohort N<30	No PMID	Adel SMH	Clinical efficacy of percutaneous renal revascularization with stent placement in hypertension among patients with atherosclerotic renovascular diseases	Journal	New

D: No analysis of interest	no PMID	Yu MSM and A. H.; Pencina and K.; Tuttle and K.; He and W.; Evans and K.; Ren and K.; Folt and D. A.; Brewster and P. S.; Murphy and T. P.; Cutlip and D. E.; Dworkin and L. D.; Jaff and M. R.; Steffes and M.; Shapiro and J. I.; Henrich and W.; Cooper and C. J.	Stenosis severity and kidney function in atherosclerotic renal artery stenosis	Circulation	New
D: No analysis of interest	no PMID	He WE and K. L.; Ren and K.; Folt and D. A.; Brewster and P. S.; Murphy and T. P.; Cutlip and D. E.; Dworkin and L. D.; Shapiro and J. I.; Henrich and W.; Cooper and C. J.; Steffes and M.; Jaff and M. R.	Albuminuria determines event-free survival in atherosclerotic renal-artery stenosis	Circulation	New
D: Comparative N<10/arm	18375475	Onuigbo MA Onuigbo NT	Worsening renal failure in older chronic kidney disease patients with renal artery stenosis concurrently on renin angiotensin aldosterone system blockade: a prospective 50-month Mayo-Health-System clinic analysis	Qjm	New
D: Comparative N<10/arm	18503896	Misra S Thatipelli MR Howe PW Hunt C Mathew V Barsness GW Pflueger A Textor SC Bjarnason H McKusick MA	Preliminary study of the use of drug-eluting stents in atherosclerotic renal artery stenoses 4 mm in diameter or smaller	Journal of Vascular & Interventional Radiology	New
D: Comparative N<10/arm	22134468	Mazza A Rigatelli G Piva M Rampin L Cardaioli P Giordan M Roncon L Zattoni L Zuin M Al-Nahhas A Rubello D Ramazzina E Ravenni R Casiglia E	In high risk hypertensive subjects with incidental and unilateral renal artery stenosis percutaneous revascularization with stent improves blood pressure control but not glomerular filtration rate	Minerva Cardioangiologica	New
D: <6 mo follow-up (and no AE/comp)	no PMID	Kanjwal K, Haller S. Steffes M. Virmani R. Shapiro J. I. Burket M. W. Cooper C. J. Colyer W. R.	Complete versus partial distal embolic protection during renal artery stenting	Catheterization and cardiovascular interventions	New
D: <6 mo follow-up (a no AE/comp)	2009147	Ogihara	Clinical evaluation of delapril in Japan. Report from the Japan Study Group on Delapril.		Original report

D: <6 mo follow-up (a no AE/comp)	19261820	Tanemoto M Suzuki T Abe M Abe T Ito S	Hemodynamic index of atheromatous renal artery stenosis for angioplasty	Clinical Journal of The American Society of Nephrology: CJASN	New
D: <6 mo follow-up (a no AE/comp)	20209644	Kanjwal K Cooper CJ Virmani R Haller S Shapiro JI Burket MW Steffes M Brewster P Zhang H Colyer WR Jr Comment in: Catheter Cardiovasc Interv. 2010 Jul 1;76(1):24-5; PMID: 20578189	Predictors of embolization during protected renal artery angioplasty and stenting: Role of antiplatelet therapy	Catheterization & Cardiovascular Interventions	New
D: <6 mo follow-up (a no AE/comp)	21078879	Mangiacapra F Trana C Sarno G Davidavicius G Protasiewicz M Muller O Ntalianis A Misonis N Van Vlem B Heyrickx GR De Bruyne B Comment in: Circ Cardiovasc Interv. 2010 Dec;3(6):526-7; PMID: 21078878	Translesional pressure gradients to predict blood pressure response after renal artery stenting in patients with renovascular hypertension	Circulation: Cardiovascular Interventions	New
D: <6 mo follow-up (a no AE/comp)	21389959	Pokrovskii AV Kokov LS Suntsov DS	[Surgical management of atherosclerotic-aetiology vasorenal hypertension]	AngiologIndia i Sosudistaia KhirurgIndia/Angiology & Vascular Surgery	New
D: <6 mo follow-up (a no AE/comp)	22407515	Paul TK Lee JH White CJ Comment in: Catheter Cardiovasc Interv. 2012 Nov 15;80(6):1023-4; PMID: 23166103	Renal embolic protection devices improve blood flow after stenting for atherosclerotic renal artery stenosis	Catheterization & Cardiovascular Interventions	New
D: <6 mo follow-up (a no AE/comp)	23853222	McBride J Schueler B Oderich G Misra S	An analysis of the factors influencing radiation dose and fluoroscopic time during renal artery stent placement	Vascular & Endovascular Surgery	New
D: <6 mo follow-up (a no AE/comp)	24135303	Protasiewicz M Kadziela J Poczatek K Poreba R Podgorski M Derkacz A Prejbisz A Mysiak A Januszewicz A Witkowski A	Renal artery stenosis in patients with resistant hypertension	American Journal of Cardiology	New
Case report, old	424606	B. T. Katzen and Chang and J. and Lukowsky and G. H. and Abramson and E. G.	Percutaneous transluminal angioplasty for treatment of renovascular hypertension	Radiology	Case report
Case report, old	496100	M. H. Weinberger and Yune and H. Y. and Grim and C. E. and Luft and F. C. and Klatte and E. C. and Donohue and J. P.	Percutaneous transluminal angioplasty for renal artery stenosis in a solitary functioning kidney	Annals of Internal Medicine	Case report
Case report, old	786649	N. Serrallach and Sole-Balcells and F. and de Torres and J. A. and de Blas and A. and Serrate and R. and Brulles and A.	Severe renal insufficiency and renovascular hypertension	European Urology	Case report

Case report, old	839607	B. Jackson and Clarkson and A. R. and Jamieson and G. G. and Marshall and V. R. and Seymour and A. E.	Persistent acute renal failure with renal artery stenosis: cure following reconstructive arterial operation	Journal of Urology	Case report
Case report, old	856104	D. Heaney and Kupor and L. R. and Noon and G. P. and Suki and W. N.	Bilateral renal artery stenosis causing acute oliguric renal failure. Report of a case corrected by renovascular surgery	Archives of Surgery	Case report
Case report, old	946990	A. Besarab and Brown and R. S. and Rubin and N. T. and Salzman and E. and Wirthlin and L. and Steinman and T. and Atlia and R. R. and Skillman and J. J.	Reversible renal failure following bilateral renal artery occlusive disease. Clinical features, pathology, and the role of surgical revascularization	JAMA	Case report
Case report, old	1463668	J. R. Schneider and Wright and A. and Mitchell and R. S.	Successful percutaneous balloon catheter treatment of renal artery occlusion and anuria	Annals of Vascular Surgery	Case report
Case report, old	1865575	T. Koga and Okuda and S. and Takishita and S. and Shigematsu and A. and Komota and T. and Fujishima and M. and Matsukuma and A.	Renal failure due to cholesterol embolization following percutaneous transluminal renal angioplasty	Japanese Journal of Medicine	Case report
Case report, old	2234255	M. K. O'Donohoe and Donohoe and J. and Corrigan and T. P.	Acute renal failure of renovascular origin: cure by aortorenal reconstruction after 25 days of anuria	Nephron	Case report
Case report, old	2398582	R. A. McCready and Siderys and H. and Foster and P. R. and Goens and B. M.	Combined coronary artery bypass grafting and bilateral renal revascularization for unstable angina and impeding renal failure	Journal of Vascular Surgery	Case report
Case report, old	2523265	J. E. Scoble and Maher and E. R. and Hamilton and G. and Dick and R. and Sweny and P. and Moorhead and J. F.	Atherosclerotic renovascular disease causing renal impairment--a case for treatment	Clinical Nephrology	Case report
Case report, old	2532661	J. J. Beraud and Calvet and B. and Dura and A. and Mimran and A.	Reversal of acute renal failure following percutaneous transluminal recanalization of an atherosclerotic renal artery occlusion	Journal of Hypertension	Case report
Case report, old	3158624	D. Modai and Cohen and N. and Weissgarten and J. and Segal and B. and Pik and A.	Symptomatic renal artery stenosis superimposed on chronic glomerulonephritis	Israel Journal of Medical Sciences	Case report
Case report, old	3218663	A. Cases and Campistol and J. M. and Abad and C. and Botey and A. and Torras and A. and Revert and L.	Reversal of renal failure after revascularization in atheromatous renovascular disease. Report of two cases	American Journal of Nephrology	Case report

Case report, old	3336930	R. D. MacMillan and Uldall and R. and Lipton and I. H.	Simultaneous aortic and renal artery reconstruction for acute arterial occlusion in solitary kidney	Urology	Case report
Case report, old	3688666	B. A. Perler	Emergency gastroduodenal-renal artery bypass. An extra-anatomic approach for salvage of the solitary kidney	American Surgeon	Case report
Case report, old	6223006	J. P. Sheehan	Percutaneous transluminal renal artery angioplasty (PTRA) in hypertensive encephalopathy	Irish Medical Journal	Case report
Case report, old	6368463	F. Mosca and Brai and L. S. and Carmellini and M. and Ferrari and M. and Cei and A. and Giulianotti and P. C. and Medi and F.	Successful treatment of recurrent renovascular hypertension by solitary kidney autotransplantation	Italian Journal of Surgical Sciences	Case report
Case report, old	6650591	A. G. Ramsay and D'Agati and V. and Dietz and P. A. and Svahn and D. S. and Pirani and C. L.	Renal functional recovery 47 days after renal artery occlusion	American Journal of Nephrology	Case report
Case report, old	6986478	J. Stessman and Drukker and A. and Dolberg and M. and Pfau and A. and Merin and G.	Orthotopic renal autotransplantation in the treatment of renovascular hypertension	Journal of Urology	Case report
Case report, old	7015851	N. E. Madias and Ball and J. T. and Millan and V. G.	Percutaneous transluminal renal angioplasty in the treatment of unilateral atherosclerotic renovascular hypertension	American Journal of Medicine	Case report
Case report, old	7035691	J. Kawamura and Okada and Y. and Nishibuchi and S. and Yoshida and O.	Transient anuria following administration of angiotensin I-converting enzyme inhibitor (SQ 14225) in a patient with renal artery stenosis of the solitary kidney successfully treated with renal autotransplantation	Journal of Urology	Case report
Case report, old	7469726	R. J. Manly and Belzer and F. O.	Spontaneous reversal of renal failure by renal artery recanalization	Archives of Surgery	Case report
Case report, old	7629207	M. Wengrovitz and Healy and D. A. and Diamo and J. R. and Atnip and R. G.	Renal revascularization in patients on dialysis	Journal of Cardiovascular Surgery	Case report
Case report, old	7703578	C. P. Harker and Steed and M. and Althaus and S. J. and Coldwell and D.	Flash pulmonary edema: an acute and unusual complication of renal angioplasty	Journal of Vascular & Interventional Radiology	Case report

Case report, old	8099389	C. G. Missouris and Buckenham and T. and Vallance and P. J. and MacGregor and G. A.	Renal artery stenosis masqunderading as congestive heart failure	Lancet	Case report
Case report, old	8238011	Z. Roche and Rutecki and G. and Cox and J. and Whittier and F. C.	Reversible acute renal failure as an atypical presentation of ischemic nephropathy	American Journal of Kidney Diseases	Case report
Case report, old	8264029	E. Ascer and Gennaro and M. and Rogers and D.	Unilateral renal artery revascularization can salvage renal function and terminate dialysis in selected patients with uremia	Journal of Vascular Surgery	Case report
Case report, old	8285186	L. E. Schlanger and Haire and H. M. and Zuckerman and A. M. and Loscalzo and C. E. and Mitch and W. E.	Reversible renal failure in an elderly woman with renal artery stenosis	American Journal of Kidney Diseases	Case report
Case report, old	8596600		Case records of the Massachusetts General Hospital. Weekly Clinicopathological Exercises. Case 11-1996. A 69-year-old man with progressive renal failure and the abrupt onset of dyspnea	New Engla Journal of Medicine	Case report
Case report, old	8862385	J. M. Reilly and Rubin and B. G. and Thompson and R. W. and Allen and B. T. and Flye and M. W. and Aerson and C. B. and Sicard and G. A.	Revascularization of the solitary kidney: a challenging problem in a high risk population	Surgery	Case report
Case report, old	9230557	D. M. Little and Burke and P. E. and O'Callaghan and J. and Vella and J. and Donoghue and J. and Sami and T. and Hickey and D. P.	Renal revascularisation by gastroduodenal-renal bypass as treatment of renal artery stenosis	Irish Medical Journal	Case report
Case report, old	9247781	D. Ducloux and Jamali and M. and Chalopin and J. M.	Chronic congestive heart failure associated with bilateral renal artery stenosis	Clinical Nephrology	Case report
Case report, old	9497208	T. M. Sullivan and Hertzer and N. R.	Stenting of the renal artery to improve renal function prior to thoracoabdominal aneurysm repair	Journal of Endovascular Surgery	Case report
Case report, old	9507232	S. C. Textor	Revascularization in atherosclerotic renal artery disease	Kidney International	Case report
Case report, old	9713602	D. J. Goldsmith and Hamilton and G.	Hypertension and renal failure	Postgraduate Medical Journal	Case report
Case report, old	10648486	C. G. Missouris and Belli and A. M. and MacGregor and G. A.	Apparent heart failure: a syndrome caused by renal artery stenoses	Heart	Case report

Case report, old	10742424	D. Eton and Terramani and T. T. and Katz and M.	Staged thoracic and abdominal aortic aneurysm repair using stent graft technology and surgery in a patient with acute renal failure	Annals of Vascular Surgery	Case report
Case report, old	11032259	R. L. Yue and Collins and T. J. and Sternbergh and W. C. and 3rd and Ramee and S. R. and White and C. J.	Acute renal failure after redo thoracoabdominal aortic aneurysm repair in a patient with a solitary kidney: successful percutaneous treatment	Journal of Endovascular Therapy	Case report
Case report, old	11136196	D. L. Cohen and Townse and R. R. and Kobrin and S. and Genega and E. M. and Tomaszewski and J. E. and Fairman and R.	Dramatic recovery of renal function after 6 months of dialysis depeence following surgical correction of total renal artery occlusion in a solitary functioning kidney	American Journal of Kidney Diseases	Case report
Case report, old	11274271	J. R. Wright and Duggal and A. and Thomas and R. and Reeve and R. and Roberts and I. S. and Kalra and P. A.	Clinicopathological correlation in biopsy-proven atherosclerotic nephropathy: implications for renal functional outcome in atherosclerotic renovascular disease	Nephrology Dialysis Transplantation	Case report
Case report, old	12025924	H. Takakuwa and Shimizu and Kazuaki and Izumiya and Yoshiaki and Kato and Tamayo and Yokoyama and Hitoshi and Kobayashi and Ken-ichi and Matsui and Osamu and Ise and Takuyuki	Unilateral stent implantation for renal function in bilateral atherosclerotic renovascular hypertension--a case report	Angiology	Case report
Case report, old	12082500	B. Agroyannis and Chatziioannou and A. and Mourikis and D. and Patsakis and N. and Katsenis and K. and Kalliafas and S. and Dimakakos and P. and Vlachos and L.	Abdominal aortic aneurysm and renal artery stenosis: renal function and blood pressure before and after endovascular treatment	Journal of Human Hypertension	Case report
Case report, old	12087578	K. M. Dwyer and Vrazas and John I. and Lodge and Robert S. and Humphery and Timothy J. and Schlicht and Stephen M. and Murphy and Brean F. and Mossop and Peter J. and Goodman and David J.	Treatment of acute renal failure caused by renal artery occlusion with renal artery angioplasty	American Journal of Kidney Diseases	Case report

Case report, old	12611127	G. Tarantini and Romano and Silvia and Cardaioli and Paolo and Ramoo and Angelo	Effect of renal artery stenting on the progression of renovascular renal failure: a case of intravascular ultrasound-confirmed renovascular disease	Italian Heart Journal: Official Journal of the Italian Federation of Cardiology	Case report
Case report, old	12943603	D. C. Choo and Fisher and Daniel Z.	Renal artery stenosis: when to intervene?	Cardiology in Review	Case report
Case report, old	14685757	A. A. Kiykim and Boz and Murat and Ozer and Caner and Camsari and Ahmet and Yildiz and Altan	Two episodes of anuria and acute pulmonary edema in a losartan-treated patient with solitary kidney	Heart & Vessels	Case report
Case report, old	14989566	M. Rajacharan and Altin and Robert	The Goldblatt kidney revisited	Vascular Medicine	Case report
Case report, old	15065618	R. J. Cook and Young and Timothy J. and McDonald and Furman S.	81-year-old woman with nausea, fatigue, and shortness of breath	Mayo Clinic Proceedings	Case report
Case report, old	15150371	B. G. Han and Kim and Jang Young and Choi and Jong Uk and Lee and Seung Hwan and Choi and Seung Ok	An acute renal failure patient successfully stented for bilateral renal artery occlusion with a distal embolism protection device	Nephrology Dialysis Transplantation	Case report
Case report, old	15960152	E. Svarstad and Urheim and L. and Iversen and B. M.	Critical renal artery stenoses may cause a spectrum of cardiorenal failure and associated thromboembolic events	Clinical Nephrology	Case report

Appendix C. Summary Tables

C.1: Study Design

Author, date PMID country study dates	Study Design	Eligibility Criteria	Inclusion criteria: % stenosis	Inclusion criteria: Other	Exclusion criteria
Alhadad, 2004 14718896 Sweden 1987-1996	nRCS, retrospective	ARAS undefined undergoing any revascularization	Surgical or endovascular procedures		
Arthurs, 2007 17398382 US 1/2001-6/2006	nRCS, retrospective	≥60% ostial ARAS with >6 mo HTN >140/90 and CKD≥1.5	Duplex ultrasound evidence of renal artery stenosis	hypertension requiring multiple medications or worsening renal function. [5/40 had previous angioplasty; 1 in RAS arm and 4 in medication arm]	
Balzer, 2009 19135837 Germany 1/1998-12/2004	RCT	>70% ostial ARAS with HTN	>70% diameter reduction in angiography		fibromuscular dysplasia, dissection or stenosis in combination with renal artery aneurysms, as well as simultaneous reconstructions for aortic aneurysm or aorto/mesenteric/iliac occlusive disease
Baril, 2007 17391902 US 1/1999-12/2005	Single arm, prospective	>70% stenosis ARAS with HTN and CKD or >90% asymptomatic ARAS undergoing EVAR for AAA	>70% renal artery stenosis on selective arteriography	clinical hypertension or renal insufficiency	

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Bax, 2009 19414832 Netherlands, France 6/2000-12/2005	RCT	>50% ostial ARAS with CKD CrCl<80	Ostial ARAS was defined as a reduction in the luminal diameter of the renal artery of 50% or more within 1 cm of the aortic wall in the presence of atherosclerotic changes in the aorta, detected by computed tomographic angiography, magnetic resonance angiography, or digital subtraction angiography performed as part of routine clinical care by the patients physicians.	Impaired renal function was defined as an estimated creatinine clearance less than 80 mL/min per 1.73 m2 according to the Cockcroft and Gault formula, based on the mean of 2 fasting serum creatinine values measured within 1 month of each other.	
Beck, 2010 19939607 US 2001-2007	Single arm, prospective	>60% ARAS and refractory RVH with or without CKD	>60%	Stenosis 60% or a pressure gradient 15 mm Hg, or both, was considered an indication for intervention.	There were no specific guidelines for exclusion from intervention. General considerations included evidence of a nonviable or minimally functioning kidney on the preprocedural work-up or an elevated renal parenchymal resistive index 0.8. No patient in this database was treated for asymptomatic renal artery stenosis, and patients with purely ischemic nephropathy without concomitant hypertension were excluded.

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Bersin, 2013 22581488 US 2/2008-5/2009	Single arm, prospective	>70% ostial denovo or restenotic (after PTRA) ARAS excluding high renal risk patients	de novo or restenotic atherosclerotic ostial renal artery lesions with a stenosis >70%	Stent were placed (in the same setting) after suboptimal PTRA result was defined as either >=50% residual stenosis by visual angiographic assessment, and translesional pressure gradient >=20 mm Hg systolic or >=10 mm Hg mean utilizing a> =4 Fr catheter or pressure wire, or by the presence of a flow-limiting dissection	The major exclusion criteria included: occlusion of the target or contralateral renal artery, previous stenting of the target lesion, lesions within or beyond a bypass graft, lesions that extend into the arterial branches, multiple ipsilateral lesions, fibromuscular dysplasia, and previous kidney transplant, one functioning kidney or past nephrectomy, pole-to-pole length of the affected kidney =8 cm, serum creatinine (SCr) =3.0 mg/dl, or hemodialysis or chronic peritoneal dialysis.
Blum, 1997 9017938 Germany 3/1989-3/1996	Single arm, prospective	>50% ostial denovo or restenotic (after PTRA) ARAS	Stenoses of 50% of the diameter of the renal artery, caused by atherosclerosis (by color duplex sonogram or intraarterial angiography and transstenotic pressure gradient >20 mm Hg)	Failure of balloon angioplasty (see comments to description of intervention) Ostial lesion within 5 mm of the aortic lumen. Received conventional balloon angioplasty. All patients had a history of sustained hypertension resistant to intensive antihypertensive treatment.	
Bruno, 2014, 24555729 Italy 1990-2008	Single arm, prospective	>60% unilateral ARAS; HTN and with or without CKD (stages 1-4)	Unilateral atherosclerotic renal artery stenosis >60% defined by a renal to aortic ratio greater than 3.5 at duplex ultrasound examination, confirmed by angio-magnetic resonance or spiral computed tomography as recommended	Diagnosis of arterial hypertension according to current Guidelines, with or without chronic kidney disease	fibromuscolar dysplasia; bilateral renal artery stenosis; age > 80 years; KDOQI stage 5 chronic kidney disease (glomerular filtration rate <15 ml/min or dialysis); history of severe adverse reaction to iodinated contrast; technical limitations to revascularization procedure; severe comorbidities that contraindicated the intervention according to clinical judgment
Cherr, 2002 11854720 US 1987-1999	Single arm, retrospective	≥80% ostial ARAS with severe HTN and with or without CKD	80% ostial stenosis or occlusion	Surgical repair, Severe or uncontrolled hypertension	

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Christie, 2012 23083664 US 9/2003-7/2010	Single arm, prospective	>60% ostial ARAS with HTN and CKD	60% stenosis on arteriography	All patients had the indication of severe multidrug hypertension or observed decreases in renal function manifested by decreasing estimated glomerular filtration rate or increasing creatinine. Each ostial stenosis was treated with primary endoluminal stenting.	Patients with RA-PTAS performed for nonostial stenosis, restenosis of previously stented atherosclerotic disease or for treatment of fibromuscular dysplasia.
Chrysant, 2014 24909590 US no dates given	Single arm, prospective	≥60% ostial denovo or restenotic (after PTRA) ARAS with uncontrolled HTN and CKD<2.5 mg/dL	>= 60% stenosis	Eligible patients included those with uncontrolled HTN defined as systolic BP (SBP) 140 mm Hg or diastolic BP (DBP) 90 mm Hg despite maximal doses of at least 2 antihypertensive agents in appropriate combinations	
Chrysochou, 2012 21993376 UK 1999-2009	Single arm, prospective	% stenosis nd, ARAS	RAS < 60%, significant RAS > 60%	unilateral or bilateral renovascular disease	
Cianci, 2011 20547539 Italy 2004-2009	nRCS, prospective	% stenosis nd, PWV >250 cm/s with uncontrolled HTN and CKD		Revascularization was decided in the presence of peak wave velocity >250 cm/s and uncontrolled hypertension with drugs or an increase in serum creatinine after starting reninangiotensin- aldosterone system (RAAS) blockers. Patients were assigned to medical therapy if the peak wave velocity was < 250 cm/s or >250 cm/s in the presence of drugcontrolled blood pressure (BP) or unchanged serum creatinine after starting RAAS blockers.	
Cianci, 2013 23467950 Italy 2007 -12/2009	Single arm, prospective	≥70% stenosis ARAS and without diabetes	at least 70%) atherosclerotic, mono or bilateral, RAS to undergo RPTAs	-	non significant stenosis (< 70%), non atherosclerotic or dysplastic stenosis and restenosis. Diabetic patients were not selected for this study to exclude other causes of proteinuria. Patients with atrial fibrillation, aortic valve insufficiency, nephritis, and other diseases

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Cooper, 2008 18490527 US no dates given	RCT	≥50% to <100% ARAS with HTN, CKD, CHF, or angina + HTN	The presence of 1 renal artery stenoses 50% and <100% treatable with the embolic protection device.	History of hypertension, renal insufficiency, heart failure, or angina with poorly controlled hypertension.	age <18 years, pregnancy, life expectancy 6 months, dialysis, kidney transplant, stenosis not amenable to stent, allergy to study agents, unrelated renal disease, untreated aortic aneurysm, kidney size 8 cm, restenosis, vessel dimensions out of range for study devices, treatment of a side branch or distal stenosis, active bleeding, stroke within 2 years or with a significant residual neurological deficit, INR >1.2 times control, thrombocytopenia, major surgery or trauma within 6 weeks, intracranial neoplasm, arteriovenous malformation or aneurysm, vasculitis, or a nonstudy procedure within 24 hours.
Cooper, 2014 24245566 US 5/2005-1/2010	RCT	≥60% ARAS with uncontrolled HTN and CKD GFR<60	angiographic stenosis >= 80% to < 100% of the diameter or stenosis of >= 60% to <80% of the diameter of an artery, with a systolic pressure gradient of at least 20 mm Hg and criteria for diagnosis varied by the use of duplex ultrasonography, magnetic resonance angiography, or computed tomographic angiography.	Adults diagnosed with severe HTN with a systolic BP >= 155 mm Hg while receiving two or more antihypertensive medications or CKD with GFR <60 mL/min/m2	fibromuscular dysplasia, CKD from a cause other than ischemic nephropathy or associated with a SCr level > 4.0 mg per dL (354 mol per liter), kidney length < 7 cm, an index lesion that cannot be treated with the use of a single stent (>18 mm in length), h/o stroke within 6 mo; pregnant women; untreated aneurysm of the abdominal aorta >5.0 cm;

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Crutchley, 2009 18951751 US 1997-2005	nRCS, retrospective	% stenosis nd, FPE, uncontrolled HTN, CKD		Selection criteria for renal artery intervention in the open repair group included (1) patients with severe hypertension taking multiple medications, (2) hypertension complicated by flash pulmonary edema or malignant hypertension, and (3) patients with ischemic nephropathy in the setting of bilateral RVD or RVD in a solitary kidney. In contrast, all percutaneous interventions were performed by nonsurgeons reflect patient selection criteria particular to those physician groups. Doppler derived data were available for analysis.	
Dangas, 2001 11491257 US no dates given	Single arm, prospective	% stenosis nd, ARAS, with DM, HTN, CKD/ESRD	Established by renal artery angiography or results of non invasive imaging studies	Consecutive patients who underwent renal artery stenting over a 2 yr period and referred by their primary physicians. Included pts with DM, HTN, scr >1.5 mg/dL, dialysis (HD, PD), hyperlipidemia if treated medically or if sr cholesterol >240 mg/dL	
de Donato, 2007 17653002 Italy 1/1998-7/2006	nRCS, retrospective	>=80% stenosis with uncontrolled HTN>140/90	>80%	renovascular hypertension, at least three medications including a diuretic at near-maximum doses	
Dichtel, 2010 20630131 US 1/1999-6/2007	nRCS, retrospective	>75% stenosis	> 75% stenosis by magnetic resonance angiography or by renal aortic ratio > 3.5 on duplex ultrasound	chronic kidney disease (defined as eGFR 15-60 ml/min/1.73m^2)	

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Dorros, 2002 11835644 US 1990-1997	Single arm, prospective	ARAS with >50 years of age onset HTN uncontrolled or malignant, and CKD≥1.5		Patients with RAS had hypertension and/or chronic renal insufficiency and met one or more of the following inclusion criteria: onset of hypertension after age 50 years; accelerated, severe, or malignant hypertension; inadequate response to appropriate antihypertensive therapy; poorly controlled hypertension; declining renal function after blood pressure control with pharmacologic agents; and stenosis of one or both main renal arteries. Patients who underwent the procedure to reserve renal function had a documented serum creatinine 1.5 mg/dl on two separate measurements.	No patient had fibromuscular dysplasia or longitudinal kidney length of <7.0 cm (as measured by ultrasound or renal laminography)
Galaria, 2005 15735947 US 1/1984-1/2004	nRCS, retrospective	≥60% ARAS with HTN or CKD		Presence of clinical criteria defined by Ruback et al and a >= 60% stenosis on US or MRA or a positive renal scan, angiography was performed	Patients with hypertension and/or elevated serum creatinine levels had a diagnostic study to identify the presence of RAS.
Gill, 2003 12601202 UK 6/1993-7/1999	Single arm, prospective	>50% ARAS with HTN or CKD	>50% stenosis (intervention limited to these stenoses) Subjects had severe HTN resistant to multiple medications (n=25); CKD, SCr>130 mcmol/L (n=50); resistant HTN and CKD (n=25)	Angiographically proven ARAS referred to Radiology Dept for endovascular treatment.	
Gill-Leertouwer, 2002 12466252 Netherlands 9/1996-12/1998	Single arm, prospective	>50% ARAS	>50% atherosclerotic stenosis		
Girt, 2007 17164562 Germany 5/1997-11/2002	Single arm, retrospective	>70% ARAS	angiographically proven stenosis > 70%		patients with stenosis of artery of a renal transplant

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Gonçalves, 2007 17364124 Brazil 5/1999-10/2003	Single arm, prospective	≥70% ARAS with uncontrolled HTN or CKD<6 mo	Atherosclerotic stenosis of one or both renal arteries ≥70% occlusion and/or systolic gradient >20 mmHg in the lesion	High blood pressure of difficult management (or refractory hypertension) and presenting recent deterioration (< 6 months) of renal function. ARAS identified during coronary angiography and followed at the study recruitment center.	Valve diseases, neoplastic diseases, degenerative diseases (diseases of the connective tissue), patients with CKD with severe renal atrophy (kidney size <7 cm), non-atherosclerotic RAS (fibromuscular dysplasia, arteritis), ARAS < 50% identifiable with renal arteriography, or lesion <50% a gradient <20 mmHg, and patients on dialysis.
Gray, 2002 12710843 US 1991-1997	Single arm, prospective	>70% ARAS with CHF and FPE	Definition of severe RAS: >70% diameter reduction with pressure gradient > 20 mm Hg. Unclear if all patients had severe RAS.	Must have recurrent CHF and/or flash pulmonary edema preop to be included in this report.	
Gross, 1998 9736342 Germany no dates given	Single arm, prospective	>50% ostial ARAS with HTN or CKD	Ostial lesions were defined as stenoses of more than 50% of diameter of the renal artery within 5 mm of the aortic lumen. A lesion was designated atherosclerotic if it did not demonstrate the characteristic appearance of fibromuscular dysplasia	All patients had been referred to the Franz Volhard Clinic because of known or suspected CAD. The authors routinely search for renal artery stenoses in patients with a history of hypertension with or without serum creatinine level above the normal range.	Patients with stenoses of the renal artery distal to the ostium were excluded from evaluation and were treated separately.
Hackam, 2011 21156722 Canada 7/1994-7/2007	nRCS, retrospective	% stenosis nd ARAS		We included consecutive patients older than 65 years with codes identifying renal artery stenosis or RVD in the CIHI-DAD, CIHI-SDS, and OHIP databases	
Hanzel, 2005 16253607 US no dates given	nRCS, prospective	≥70% ostial ARAS with non-proteinuric CKD scr≤2.0 mg/dL	angiographically confirmed unilateral or bilateral atherosclerotic RAS (diameter stenosis ≥ 70%)	RAS involving the ostium or proximal 2 cm of the main renal artery and baseline serum creatinine 2.0 mg/dl.	Patients were excluded if there was known renal parenchymal disease, proteinuria 1.0 g in 24 hours, severe peripheral arterial disease precluding safe access to the central arterial circulation, or anticipated life expectancy 2 years.

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Harden, 1997 9113012 UK 04/1992-12/1995	Single arm, prospective	>50% ostial ARAS or flow-limiting dissection or occlusion	Patients who had hemodynamically significant (>50% diametric narrowing) ostial stenoses, restenoses (>50%) after percutaneous renal-artery angioplasty (PTRA), or flow-limiting dissection or occlusion underwent renal-stent placement.		
Henry, 2003 14571477 France, India, and Greece 1/1999-11/2002	Single arm, prospective	>50% ostial ARAS with HTN	ostial lesion with stenosis > 50% within 5 mm of the aortic lumen by arteriography	All have HTN; all have atherosclerotic RAS	Renal artery diameter > 6 mm excluded for occlusion balloon; diameter > 5.5 mm excluded for filters; bifurcated or trifurcated renal arteries in which the lesion was positioned < 2 cm from the division also excluded
Holden, 2006 16837918 New Zeala no dates given	Single arm, prospective	% stenosis nd ARAS with high risk patients or CKD		High risk patients with ischemic nephropathy	
Iannone, 1996 8974797 US 8/1992-12/1993	Single arm, prospective	≥60% ARAS	60% stenosis or atherosclerotic with 40 mm Hg transtenotic gradient, by angiography	RAS, receiving angioplasty	
Jaff, 2012 22511402 US 8/2007-10/2009	Single arm, prospective	≥60% ARAS with uncontrolled HTN ≥140/90	>=50% residual stenosis, persistent translesional pressure gradient, flow limiting dissection, or thrombolysis in myocardial infarction (TIMI) flow <3.	Eligible patients included those with uncontrolled HTN defined as systolic blood pressure (SBP) >=140 mm Hg or diastolic blood pressure >=90 mm Hg, despite maximal doses of at least two antihypertensive agents in appropriate combinations in association with renal artery stenosis >=60% via angiographic visual estimate a suboptimal PTA result	Patients who underwent successful primary renal artery stent deployment or successful PTA were not eligible.

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Jokhi, 2009 19668788 Canada 6/2000 - 3/2007	Single arm, prospective	≥70% ARAS with uncontrolled or severe HTN or CKD or FPE	>70% ARAS inpatients	identified from iividuals with with iividuals with resistant or severe hypertension, unexplained renal dysfunction (or induced by angiotensin-converting enzyme [ACE] inhibitors or angiotensin receptor blockers [ARBs]), pulmonary edema with preserved systolic function; or the presence of clinically evident atherosclerosis in two vascular territories	-
Kalra, 2010 19937777 UK and Germany 1995-2007	nRCS, prospective	>50% ARAS with a subset with decompensation	UK: > 60% (or 50 60% if there was evidence of poststenotic dilatation or dephasing (MRA)) Germany: significant RAS indicated by renal-aortic flow velocity ratio > 3.5 a, in unilateral RAS, when the difference in resistance index between the two main renal arteries was > 0.05; in cases of bilateral RAS an acceleration time > 0.07 sec was required for diagnosis of hemodynamic significance	UK: renal artery revascularization after enrolment into the multicenter ASTRAL trial	UK: patients with insignificant disease (RAS < 50%), those with bilateral RAO and all patients who had undergone previous revascularization. Germany: no ARVD patients excluded.
Kane, 2010 19666661 US no dates given	nRCS, retrospective / Single arm, retrospective	>70% stenosis and uncontrolled HTN or CKD	Presence of a high-grade (>70%) stenosis of at least one renal artery on magnetic resonance angiography or conventional angiography	accelerated or medically resistant systemic hypertension and/or ischaemic nephropathy stage 3 5 chronic, non-dialysis depeent, kidney disease	
Kawarada, 2010 20884436 Japan no dates given	Single arm, prospective	% stenosis nd and uncontrolled HTN or CKD or CAD or CHF		patients satisfied at least one of the following: suboptimal control of hypertension by at least two antihypertensive agents, renal impairment, renal atrophy, cardiac symptoms including "unstable coronary syndrome" or "congestive heart failure."	

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Kennedy, 2003 14582036 US 7/1993-11/2001	Single arm, prospective	≥60% and/or a translesional systolic pressure gradient of ≥20 mm Hg.	>=60% diameter stenosis and/or a translesional systolic pressure gradient of >= 20 mm Hg. By digital caliper.	-	-
Kobo, 2010 20684176 Israel 2001-2007	Single arm, prospective	≥70% ARAS with CVD or uncontrolled HTN or CKD or FPE	>=70%	Patients undergoing coronary angiography were selected for renal angiography if they also had at least one of the following predetermined criteria: Multiple atherosclerotic diseases: at least two of the following: Coronary artery disease, Peripheral vascular disease, Carotid diseases; Hypertension resistant to medical therapy or controlled by multiple (3) drugs, Chronic renal failure (serum creatinine levels > 1.5 mg/dl), Flash pulmonary edema. Bilateral selective renal angiography was performed in patients selected as described above. Patients with significant renal artery stenosis were referred for renal artery stenting.	
Leesar, 2009 19539148 US 12/2004-08/2006	Single arm, prospective	50% to 90% unilateral ARAS with uncontrolled HTN ≥140/90 mmHg with or without CKD <3.0 mg/dL	A diameter stenosis of 50% to 90% by visual estimation	Hypertension was defined as systolic blood pressure 140 mm Hg and/or diastolic blood pressure 90 mm Hg. Patients with accelerated or refractory hypertension on 2 or 3 antihypertensive medications, respectively, were enrolled into the study. Unilateral RAS.	Exclusion criteria were severe renal dysfunction as evidenced by serum creatinine 3.0 mg/dl or kidney length 8.0 cm, and presence of accessory renal arteries.
Lekston, 2008 19006027 Poland no dates given	RCT	≥50% ARAS with uncontrolled HTN or progressive CKD	50%stenosis 2/2 ARAS and clinical signs suggesting RVH refractory to medical therapy, patients at risk for renal failure development due to progressive ischaemia with diameter of stenotic artery 3 mm were selected.	-	contraindications to angiography
Losito, 2005 15870215 Italy 1992-2000	nRCS, prospective	>50% ARAS	ARAS >50%, by arteriogram		

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Mannarino, 2012 22260219 Italy 1/2003-12/2008	nRCS, prospective	>70% ARAS with CKD stage 3 or 4.	>70% assessed by visual angiographic estimation	CKD stages 3 4, patients selected for stent placement: Kidney size 9 cm plus Normal or near normal cortical echogenicity plus PSV >300 cm/s or RAR >3.8 or intrarenal tardus parvus pattern plus Intrarenal resistive index <0.80	less than 6 months followup, instent restenosis
Marcantoni, 2012 22495466 Italy 2006-2009	RCT	>50% and ≤80% ARAS with CKD ≤4 mg/dL and incident IHD, but without AMI	Patients with renal artery stenosis >50% and =<80% in at least one renal artery were considered eligible for the study	-	Patients were not eligible if they had any of the following conditions: (1) renal artery stenosis >80%, (2) acute myocardial infarction (AMI), (3) a single functioning kidney and serum creatinine level >4 mg/dL, (4) severe aortic valve stenosis, (5) neoplastic disease, (6) aortic aneurysm necessitating surgery, or (7) renal artery stenosis secondary to fibromuscular dysplasia. Patients with renal artery stenosis >80% were excluded because at the time the study was designed, authoritative reviews held that although the benefits of renal revascularization in patients with severe renal artery stenosis still remained to be tested in specific clinical trials, a protective effect of renal revascularization seemed fairly probable.

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Murphy, 2014, 24325931 US 3/2005-11/2009	Single arm, prospective	>60% ARAS with uncontrolled HTN with SBP ≥160 mmHg with or without CKD < 60 mL/min/1.73 m^2	>60% stenosis	Either a systolic blood pressure of at least 160 mm Hg while receiving two blood pressure medications from different classes of drugs or chronic kidney disease with an estimated glomerular filtration rate (eGFR) rate of < 60 mL/min/1.73 m^2. Roll-in enrollment inclusion criteria included patients with an atherosclerotic renal artery stenosis o 2 cm in length, with the reference artery being 3.5–8 mm.	
Patel, 2009, 9497511 US 1/2002-12/2006	nRCS, retrospective	≥75% ARAS and underwent revascularization either due to uncontrolled HTN with CKD ≥ 1.5 mg/dL or due to severe stenosis with single functioning kidney	≥ 75% stenosis	Underwent PTRAS or OR. Indications for revascularization included hypertension (HTN) in patients with uncontrolled blood pressure in the setting of multiple antihypertensive agents or escalating blood pressure in the setting of previously controlled hypertension on three or more agents. The indication for renal revascularization was RS in the setting of ischemic nephropathy with Cr >= 1.5 mg/dL or significant stenosis to a single functioning kidney or if revascularization was required to the entire functioning renal mass irrespective of baseline renal function. Indications for revascularization vary and in many instances include a combination of HTN and RS, however we defined the indication as HTN or RS depending on the more pressing clinical indication at the time of revascularization or as defined by the operative note.	Secondary interventions for previously treated vessels were excluded from analysis. In the OR group, patients undergoing renal artery revascularization in the context of concomitant aortic reconstruction or aortic de-branching procedures and without specific indications for renal artery revascularization were excluded.
Ramos, 2003 12472793 Argentina no dates given	Single arm, prospective	≥70% stenosis with technical success and at least 3 mo followup	≥ 70% stenosis	Follow-up at least 100 days; only pts with primary technical success were included	
Rastan, 2008 19110785 Germany 6/2005-6/2006	Single arm, prospective	≥70% bilateral or ≥50% unilateral ARAS with HTN and/or CKD and a baseline Scr<4.0 mg/dL	≥70% stenosis confirmed by angiography, and reference target vessel diameter of 4.0-7.0 mm	HTN and/or CKD and a baseline scr<4.0 mg/dL	non-ARAS, RAS<70% stenosis and scr >=4.0 mg/dL

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Ritchie, 2014 24074824 UK 1995-7/2011	nRCS, prospective	>50% unilateral ARAS without occlusion	baseline data and a minimum 50% unilateral renal artery stenosis	-	unilateral occlusion and insignificant contralateral stenosis were excluded
Rivolta, 2005 16358234 Italy 1997-2004	Single arm, prospective	≥50% to <100% ARAS with or without FPE, AKI, and refractory HTN	>70% luminal diameter established by angiography	All patients with ARAS presenting to nephrology and radiology clinic with CKD (scr >1.5 mg/dL)	
Rocha-Singh, 1999 10376497 US 1/1993-12/1995	Single arm, prospective	≥75% ARAS and transstenotic peak-to-peak gradient ≥ 20mmHg	Angiographic documentation of visually estimated ≥75% atherosclerotic renal artery stenosis with an associated transstenotic peak-to-peak gradient ≥ 20mmHg	Patients with clinically suspected renovascular hypertension referred by family practitioners, internists, nephrologists, and general cardiologists for screening renal angiography	

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Rocha-Singh, 2005 16139124 US 12/1997-5/1999	Single arm, prospective	≥70% de novo or restenotic ARAS with uncontrolled HTN and CKD (≤ 3.0 mg/dL) and and persistent peak-to peak translesional pressure gradient of ≥20 mm Hg	Unilateral or bilateral stenoses within 10 mm of the aorto-renal border	Patients enrolled had uncontrolled hypertension, serum creatinine concentrations 3.0 mg/dl, 70% de novo or restenotic renal artery atherosclerotic stenoses, and persistent peak-to-peak translesional pressure gradient of 20 mm Hg, flow-limiting dissections, or residual 50% stenoses after PTRAattempts.	a successful renal angioplasty, sequential stenoses in a single renal artery, a renal artery diameter <4 mm or >8 mm, an occluded renal artery, the need for more than two stents, a major vascular complication after PTRA, stenosis of a transplant or bypass graft anastomosis, non-atherosclerotic disease, serum creatinine 3.0 mg/dl, kidney length <8.0 cm, intolerance to aspirin, a life expectancy of fewer than two years, known hemorrhagic diathesis or hypercoagulable state, contraindication to receiving heparin, myocardial infarction within 30 days, an abdominal aortic aneurysm measuring >4.0 cm in diameter, current pregnancy, inability to grant informed consent, or patient refusal to undergo surgery to repair the renal artery or vascular access site in the event of a complication.

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Rocha-Singh, 2008 19006254 US 1/2004-8/2004	Single arm, prospective	≥70% de novo or restenotic ARAS with uncontrolled HTN and CKD (≤ 3.0 mg/dL)	≥ 70% by angiographic visual estimate	Patients were eligible for inclusion if they had a de novo or restenotic lesion [Prior renal percutaneous intervention 4.0% (4/99); Percutaneous transluminal renal artery angioplasty (PTRA) 1.0% (1/96); Stenting 4.0% (4/99)] in the ostium of the renal artery. Lesions were required to be 15 mm in length, and between 4.0 mm and 7.0 mm in diameter. In addition, patients were required to have hypertension, renal dysfunction, recurrent flash pulmonary edema, or any combination thereof. Unilateral or bilateral renal artery stenoses were eligible for inclusion.	Accessory (polar) renal arteries were excluded. Patients with an occluded renal artery, a requirement for more than two stents, patients with stenosis in a transplant renal artery or bypass graft anastomosis, nonatherosclerotic etiologies (i.e., fibromuscular dysplasia), serum creatinine 3.0 mg/dl, renal hypoplasia (with a pole-pole renal length 8.0 cm), intolerance to aspirin, or with known bleeding or thrombotic disorders.
Rocha-Singh, 2011 21648052 US no dates given	Single arm, prospective	≥50% ARAS with uncontrolled HTN (SBP ≥ 155 mmHg)	≥ 50% stenosis	hypertensive patients (≥ 155 mm Hg)	
Ruchin, 2007 17317314 Australia 9/1997-12/2003	Single arm, prospective	% stenosis nd with uncontrolled HTN or FPE, ARF with ACEIs or ARBs	Patients referred for stenting of one or both renal arteries	Uncontrolled hypertension or intolerance of multiple antihypertensive agents, flash pulmonary edema or unexplained renal failure, especially associated with the use of ACEIs or ARBs.	
Rzeznik, 2011 21129903 Poland 1/2005-5/2009	Single arm, prospective	>60% ARAS with HTN	> 60% lumen reduction	hypertension (5/84 had balloon angioplasty alone for fibromuscular dysplasia)	
Safak, 2013 23321402 Germany 1995-2010	Single arm, prospective	>50% ARAS with HTN	>50% diameter stenosis in semiquantitative vascular analysis in at least one renal artery	hypertensive patients referred for elective coronary catheterization to our institution beginning	

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Sapoval, 2005 16151060 multi-center Europe 2001-2002	Single arm, prospective	>50% ARAS with clinical indications for renal revascularization and CKD (Scr <5.0 mg/dL)	Clinical indication for renal artery revascularization of atherosclerotic renal artery stenosis 50% as measured by operator or estimated original vessel diameter, based on healthy vessel segment and contralateral side	Age over 30 years; If female patient with child bearing potential, must have a documented negative pregnancy test within 3 days prior to inclusion; The reference vessel renal artery must be 4mm and 8 mm by visual estimate; The patient must have a baseline serum creatinine of 5.0 mg/dL; Patient is willing and able to comply with the specified follow-up evaluation; The patient or legally authorized representative must provide written informed consent prior to the procedure.	More than one index lesion in a renal artery, including tandem lesions; however, bilateral artery stenosis are allowed (If the patient requires treatment of the contralateral renal artery, this is allowed during the same procedure, as long as this is done prior to the index procedure, and with a successful outcome.); Total occlusion of the renal artery; Lesions that would require more than two stents; Any known complication (eg, guide wire perforation) following balloon angioplasty; Lesions which are in arteries to transplanted or bypassed kidneys; Any patient allergic or intolerant to aspirin and/or sirolimus (Rapamycin); Any patient with a co-existing condition with a life expectancy of less than 2 years; Patients with a known bleeding or hypercoagulation disorder; Absolute contraindication to administration of intravenous contrast material, heparin, or known allergy to 316 L stainless steel or any of its components; bdominal aortic aneurysm > 4 cm in diameter; Major surgical or interventional procedures within 30 days prior to this study or planned surgical or interventional procedures within 30 days of entry into this study; Patients with ASA classification 4; Life expectancy of less than 2 years or factors making clinical follow-up difficult; Imprisoned persons; Patients enrolled in this or other clinical trial or anticipated to be included into a trial which may

Author, date PMID country study dates	Study Design	Eligibility Criteria	Inclusion criteria: % stenosis	Inclusion criteria: Other	Exclusion criteria
Sapoval, 2010 19908091 Many 2/2005-2/2007	Single arm, prospective	>50% ARAS with clinical indications for renal revascularization	Patients, at least 18 years old, with atherosclerotic renal artery stenosis of more than 50%, judged by the clinicians as indicated for renal revascularization, were enrolled in the study.		Excluded were patients with fibromuscular dysplasia, total occlusion, spontaneous dissection or in-stent restenosis of renal artery, stenosis of a transplant or bypass graft anastomosis, aneurysm of abdominal aorta larger than 45 mm in diameter, current pregnancy, a contraindication to contrast media, aspirin, thienopyridines, heparin or any other therapy as required for elective intervention.
Silva, 2008 18670414 Brazil 1/1996-3/2007	nRCS, retrospective	≥80% ARAS	≥80%	angiographically confirmed ARD causing at least a 60% reduction in renal artery diameter, which corresponds to an 80% stenosis of the lumen of one or both main arteries	
Sofroniadou, 2012 22127407 UK 6/1997-2/2003	nRCS, prospective	>70% unilateral ARAS and/or FPE, AKI, and refractory HTN were eligible for PTRAS >50% unilateral ARAS with or without HTN and without AKI or FPE were eligible for medical therapy	>70% stenosis ARAS unilaterally	Single functional kidney, acute kidney injury (AKI), flash pulmonary oedema (FPO) and untreatable hypertension were the indications for renal arterial intervention. Unilateral ARAS between 50 and 95%, with or without HTN underwent medical therapy.	-
Staub, 2010 20739200 Switzerland 8/2004-12/2007	Single arm, prospective	≥50% unilateral or bilateral ARAS with HTN ≥140/90 mmHg	unilateral or bilateral RAS 50% and arterial hypertension (systolic BP >=140 mmHg and/or diastolic BP >=90 mmHg or on any anti- hypertensive drug therapy).	RAS was classified as haemodynamically relevant if the renal/ aortal velocity ratio was >=2.5. unilateral RAS, the side- to-side difference in intrarenal resistance index (RI Z 1 e (e-diastolic velocity/peak systolic velocity)) between the two kidneys >0.05 was also used to classify haemodynamically relevant RAS	-

Author, date PMID country study dates	Study Design	Eligibility Criteria	Inclusion criteria: % stenosis	Inclusion criteria: Other	Exclusion criteria
Trani, 2010 20578190 Italy 6/2002-6/2007	nRCS, prospective	≥70% ARAS with uncontrolled HTN or CKD (SCr >1.2 mg/dL) but not on hemodialysis	≥70% stenosis (angiographic, visual estimation)	Stenosis suspected at noninvasive testing or due to severe HTN and/or renal insufficiency at time of coronary angiography. Chronic ischemic heart disease (previous AMI or coronary stenosis >=50% or inducible ischemia at noninvasive testing). Severe HTN (grade 2 or 3) or renal insufficiency (SCr >1.2 mg/dL)	Hemodialysis, interventions on chronically occluded arteries, kidney size <7 cm longitudinally.
Trani, 2013 22503569 Italy 6/2002-6/2007	Single arm, prospective	>70% ARAS with CKD stage ≥3, but not on hemodialysis and/or uncontrolled HTN	>70%	Main inclusion criteria were CKD stage 3 according to the NKF DOQUI classification and/or severe hypertension (defined as hypertension not controlled despite administration of 3 antihypertensive drugs). CKD staging was based on estimated glomerular filtration rate (eGFR) according to the simplified MDRD method.	Patients who had been on a hemodialysis program and those who did not provide informed consent to participate were excluded. Our institutional ethics committee approved the study.
Tsao, 2005 16394602 Taiwan 6/2001-1/2004	Single arm, prospective	≥70% ARAS and eligible for PTRAS with CKD <4.0 mg/dL	70% stenosis.	Primarily admitted for PTRA and treated during admission for severe RAS. Suitable for PTRAS	Second session PTRAS & the first session attempt failed recently. ≥200 mL contrast medium administered for other causes within 3 days Lesion <70% stenotic or signs of renal irreversibililty (SCr≥4.0 mg/dL, renal size <7 cm, no late phase nephrogram, severely impaired cortical blood flow, seriously abnormal intrarenal arteries) PTRAS performed by an inexperienced operator or improvisational intervention

Author, date PMID country study dates	Study Design	Eligibility Criteria	Inclusion criteria: % stenosis	Inclusion criteria: Other	Exclusion criteria
Uzzo, 2002 12009679 US no dates given (over an 8 yr period)	RCT	>75% ARAS with CKD>1.5 to <=4 mg/dL and without uncontrolled HTN	Bilateral RAS involving >75% of the luminal diameter, high-grade (>75%) disease involving a solitary kidney, or unilateral high grade (>75%) stenosis	Angiographically confirmed RAS and those with azotemia (scr >1.5mg/dL and GFR <70 ml/min	Patients were considered ineligible if their baseline serum creatinine was >4.0 mg/dL, if their blood pressure was poorly controlled despite adequate medical management [diastolic blood pressure (DBP) > 100 mm Hg] or if they had comorbid conditions that would prohibit their ability to tolerate surgical revascularization.
Valluri, 2012 21765186 UK 2003-2007	Single arm, prospective	≥70% ARAS referred for renal revascularization	Angiographically significant stenosis (70 to 90%) with >7 8 cm kidney length	Referred for renal revascularization and had primary stent placement with satisfactory angiographic result	Those who underwent revascularization as part of the ASTRAL protocol (n = 10)
van de Ven, 1999 9929021 Netherlands 12/1993-3/1997	RCT	50% ostial ARAS with HTN >160 / 95 mmHg with or without medication	Ostial RAS: reduction 50% in luminal diameter within the first 10 mm of the aortic lumen as shown in angiography in association with atherosclerotic changes of the abdominal aorta	HTN (BP>160 / 95 mmHg with or without medication); stenosis shown to affect renal function by positive captopril renography or by an increase 20% in SCr during standardized use of an ACE inhibitor	Hx cholesterol embolism; pole to pole distance of affected kidney 8 cm on US plus 25% renal function in renography; renal tumor
Webster, 1998 9655655 UK no dates given	RCT	50% ARAS with HTN (DBP 95 mm Hg on 2 drugs) or CKD <5.6 mg/dL and without recent stroke or MI	50% stenosis	DBP 95 mm Hg on 2 drugs	< 40 yo > 75 yo sCr > 500 mcmol/L (5.6 mg/dL) Stroke or MI within 3 months
Wheatley, 2009 19907042 UK 9/2000-10/2007	RCT	% stenosis nd, ARAS with uncontrolled HTN or unexplained CKD	substantial anatomical atherosclerotic stenosis in at least one renal artery that is suitable for balloon angioplasty and/or stent	uncontrolled or refractory hypertension or unexplained renal dysfunction; not previously undergone and revascularization procedure for ARVD; and decision based on medical team	A partial nephrectomy to treat renal carcinoma was excluded from analysis
White, 1997 9362400 US 6/1992-12/1994	Single arm, prospective	>50% ARAS with uncontrolled HTN (SBP >150 mmHg or DBP >90 mmHg or both)	>50% diameter stenosis by angiographic visual estimation of renal aorto-ostial lesion or restenosis (8%) or after a suboptimal PTA	Consecutive series of all patients treated with stents for poorly controlled HTN (SBP >150 mmHg or DBP >90 mmHg or both)	

Author, date PMID country study dates	Study Design	Eligibility Criteria	Inclusion criteria: % stenosis	Inclusion criteria: Other	Exclusion criteria
Zahringer, 2007 17696619 Germany 11/2001-6/2003	nRCS, prospective	>50% ARAS with HTN or CKD ≤5.0 mg/dL	>50% by visual estimation	Consecutive patients with hypertension or renal insufficiency and concomitant renovascular disease	Excluded from the trial were patients with totally occluded renal arteries, lesions requiring >2 stents, lesions located in arteries to transplanted kidneys, or arteries already bypassed by surgical grafts and those with severe renal insufficiency (serum creatinine .5.0 mg/dL).
Zeller, 2004 15056029 Germany 10/1996-11/2002	Single arm, prospective	70% unilateral or bilateral ostial ARAS with HTN and CKD (men Scr >1.2 mg/dL, in women >1.1 mg/dL)	Unilateral or bilateral RAS and ostial RAS 70% diameter by duplex ultrasound and confirmed by angiography	Consecutive patients undergoing stent placement for ARAS lesion located within 1 cm of the ostium. Pts had hemodynamically sig RAS+HTN and/or impaired kidney fuxn (men scr >1.2 mg/dL, in women >1.1 mg/dL)	
Zeller, 2005 16212462 Germany 7/2002-7/2004	Single arm, prospective	70% ARAS	70% by Doppler and subsequent angiogram	Radix carbofilm-coated or Palmaz-Genesis bare stent used	
Ziakka, 2008 19016147 Greece no dates given	RCT	Mean stenosis 74% ARAS		We enrolled 82 patients who had atherosclerotic renal artery stenosis demonstrated by an angiogram (average lumen narrowing 74.2 17.4%). Angiograms of all patients were reviewed by two radiology consultants and were assessed for lumen narrowing and sites of stenosis (right or left renal artery; ostial, proximal or distal; unilateral or bilateral).	

C.2 Arm Details

C.2.1 Arm Details: Comparative Studies PTRAS/Medication Only

Author, date PMID country study dates	Medication: Anti-hypertensive (% in medication only cohort) {mean number of Anti HTN meds} [ACEi/ARB (% in medication only cohort)]; BP goal	Medication: Statins (%) [other anti-lipids]	Medication: Clopidogrel [other anti-platelet]	Other Medication (%) [Aspirin dose (%)]	Stent, %	Stent: Stent description, including bra	Stent: Distal protection device, type (%)	Stent: Peri-procedure medications	Stent: Other (%)
Arthurs, 2007 17398382 US 1/2001-6/2006	beta-blocker (73) diuretic (68) {4} [(ACE (59); ARB(43)]				100	transluminal			
Bax, 2009 19414832 Netherlands, France 6/2000-12/2005	Angiotensin II-receptor antagonists [yes]; < 140/90	Atorvastatin titrated 10 mg		[yes 75-100 mg/d]	100	A Palmaz- Corinthian IQ/Palmaz-Genesis stent (Johnson & Johnson Medical, Miami Lakes, Florida) was placed in every ostial stenosis, according to a standardized protocol (14).		Yes (aspirin, 75 to 100 mg/d, the day before admission.)	Truncal stenoses were treated by balloon angioplasty; Patients in the stent group received the same medical treatment as patients in the medication group

Author, date PMID country study dates	Medication: Anti-hypertensive (% in medication only cohort) {mean number of Anti HTN meds} [ACEi/ARB (% in medication only cohort)]; BP goal	Medication: Statins (%) [other anti-lipids]	Medication: Clopidogrel [other anti-platelet]	Other Medication (%) [Aspirin dose (%)]	Stent, %	Stent: Stent description, including bra	Stent: Distal protection device, type (%)	Stent: Peri-procedure medications	Stent: Other (%)
Cianci, 2011 20547539 Italy 2004-2009	alpha blockers, beta blockers (11) calcium channel blockers (49) [yes, (ACEis 23/53, ARBs 20/53)] < 140/90 mm Hg	Yes (25)	yes [yes]	[Yes (32)]	100	Express Vascular SD Monorail 5.5-6-15/20 mm premounted on a balloon catheter on Choice extra support 014 inch guide			In all patients who underwent revascularization, the renal artery was approached through the femoral artery. A 6F guiding catheter (Cobra or Bates) was used for selective renal artery angiography and for positioning the stent. All stenotic lesions were repaired using stainless stent. In these cases, primary stenting was performed. The procedure usually requires an injection of a 30-mL of 50-50 mixture of isotonic contrast and normal saline

Author, date PMID country study dates	Medication: Anti-hypertensive (% in medication only cohort) {mean number of Anti HTN meds} [ACEi/ARB (% in medication only cohort)]; BP goal	Medication: Statins (%) [other anti-lipids]	Medication: Clopidogrel [other anti-platelet]	Other Medication (%) [Aspirin dose (%)]	Stent, %	Stent: Stent description, including bra	Stent: Distal protection device, type (%)	Stent: Peri-procedure medications	Stent: Other (%)
Cooper, 2014 24245566 US 5/2005-1/2010	hydrochlorothiazide and amlodipine {2.1} [yes, caesartan] ; <140/90 without coexisting conditions and < 130/80 mm Hg in patients with diabetes or CKD	atorvastatin			95	Genesis TM		325 mg of aspirin, and clopidogrel or ticlopidine in doses determined	Short-tip Angioguard device or a list of FDA approved devices listed in the protocol- N is at the discretion of operator
Dichtel, 2010 20630131 US 1/1999-6/2007 (nRCS					100	bare metal stents	Yes, used in a small number of cases at the discretion of the intervention alist		
Hackam, 2011 21156722 Canada 7/1994-7/2007	Yes								
Hanzel, 2005 16253607 US no dates given	As necessary {2.2} [yes]	to achieve a low-density lipoprotein cholesterol level <100 mg/dl		[yes 325 mg/day]	100			After intervention, patients received ticlopidine 250 mg twice daily or clopidogrel 75 mg/day for >= 30 days.	

Author, date PMID country study dates	Medication: Anti-hypertensive (% in medication only cohort) {mean number of Anti HTN meds} [ACEi/ARB (% in medication only cohort)]; BP goal	Medication: Statins (%) [other anti-lipids]	Medication: Clopidogrel [other anti-platelet]	Other Medication (%) [Aspirin dose (%)]	Stent, %	Stent: Stent description, including bra	Stent: Distal protection device, type (%)	Stent: Peri-procedure medications	Stent: Other (%)
Kalra, 2010 19937777 UK and Germany 1995-2007	[yes both 47.3%]	Yes (53%)			100	Various types of bare metal balloon expandable stents		UK: the majority of patients received antiplatelet therapy in the form of 75 mg aspirin. In both centers, statins were given to all patients who could tolerate them, and angiotensin converting enzyme inhibitors (ACE inhibitors) and/or angiotensin receptor blockers (ARB) used as tolerated; other antihypertensive medication was used if required. Germany: Antiplatelet therapy was started at least the day before intervention and routinely consisted of 75 mg of clopidogrel daily or ticlopidine 250 mg bid for 4 weeks, and then 100 mg of aspirin given indefinitely. Immediately before the intervention, and bolus dose of 5,000 IU of heparin was administered.	

Author, date PMID country study dates	Medication: Anti-hypertensive (% in medication only cohort) {mean number of Anti HTN meds} [ACEi/ARB (% in medication only cohort)]; BP goal	Medication: Statins (%) [other anti-lipids]	Medication: Clopidogrel [other anti-platelet]	Other Medication (%) [Aspirin dose (%)]	Stent, %	Stent: Stent description, including bra	Stent: Distal protection device, type (%)	Stent: Peri-procedure medications	Stent: Other (%)
Kane, 2010 19666661 US no dates given	{3.4} [yes 60%]							Heparin infusion to keep clotting time at least 200 during stent placement	
Losito, 2005 15870215 Italy 1992-2000	beta-blockers, CCBs [yes]				100	A Palmaz (Cordis Corp., Warren, New Jersey) balloon expandable stent (P104, P154, P204)			Transfemoral or brachial approach
Marcantoni, 2012 22495466 Italy 2006-2009	beta blockers, alpha blockers, calcium channel blockers, diuretic [yes]	Yes		nitroglycerin	100			Diuretic, calcium channel blocker, beta blocker, ACEi, ARB, alpha blocker, antiplatelet drug, statin, nitroglycerin	
Ritchie, 2014 24074824 UK 1995-7/2011	[yes]	yes		yes					
Sofroniadou, 2012 22127407 UK 6/1997-2/2003	[Yes ACEi (60) ARB (10)]; Yes < 140/80 mm Hg	same as ASTRAL (89%)		yes					2 from stent group also underwent surgical revascularization

Author, date PMID country study dates	Medication: Anti-hypertensive (% in medication only cohort) {mean number of Anti HTN meds} [ACEi/ARB (% in medication only cohort)]; BP goal	Medication: Statins (%) [other anti-lipids]	Medication: Clopidogrel [other anti-platelet]	Other Medication (%) [Aspirin dose (%)]	Stent, %	Stent: Stent description, including bra	Stent: Distal protection device, type (%)	Stent: Peri-procedure medications	Stent: Other (%)
Wheatley, 2009 19907042 UK 9/2000-10/2007	Any antihypertensive medication (99) diuretic (67); calcium channel blocker (68); beta-blocker (52); alpha blocker (37) [Yes (38)]; Yes "optimal BP"	yes (95) [any anti-lipid agent other than statin (80)]	[any anti-platelet (78)]	Warfarin (11) [Yes (93)]	95		distal protection devices were not used.		
Ziakka, 2008 19016147 Greece no dates given	beta blockers, alpha blockers, calcium channel blockers [yes]; DBP 90-110	yes			100				

C.2.2 Arm Details: Comparative Studies Surgery/Medication Only

Author, date PMID country study dates	Medication: Anti-hypertensive (% in medication only cohort) {mean number of Anti HTN meds} [ACEi/ARB (% in medication only cohort)]; BP goal	Surgery: Description	Surgery: Aortic repair (%)
Uzzo, 2002 12009679 US no dates given (over an 8 yr period)	DBP < 100	Aortic replacement with renal artery reimplantation	Yes (100)

C.2.3 Arm Details: Comparative Studies PTRAS/Surgery

Author, date PMID country study dates	Stent, %	Stent: Stent description, including bra	Stent: Distal protection device, type (%)	Stent: Peri-procedure medications	Surgery: Description	Surgery: Aortic repair (%)
Balzer, 2009 19135837 Germany 1/1998-12/2004	100	Palmaz-Stent, Johnson & Johnson, Langhorne, Pa, Wallstent, Boston Scientific, Natick, Mass, Jostent, Abbott, Abbott Park, Ill/Herkulink-Stent, Boston Scientific, Natick, Mass		Yes (hypertensive drugs)	22/27 bilateral reconstruction, 5/27 unilateral reconstruction (transaortic renal thromboendarterectomy with subsequent direct suture of the aorta was performed for reconstruction) periprocedureal medications: alprostadil)	
Crutchley, 2009 18951751 US 1997-2005	87				56 patients had open operative repair consisting of renal artery repair alone in 39 or renal artery repair combined with aortic procedures in 17. Renal artery repairs included anatomic in 15 and extra-anatomic renal artery bypass in 2, transaortic endarterectomy in 3, and renal endarterectomy in 19. Combined aortic procedures included renal artery bypass in 11 or endarterectomy in 7 in addition to aneurysm repair in 10, aortic endarterectomy in 4, and aortoiliac/aortofemoral bypass for occlusive disease in 3.	renal artery repair combined with aortic procedures (30)
de Donato, 2007 17653002 Italy 1/1998-	83			70 U/kg heparin, 100 mg/die acetylsalicylic acid, 75 mg/die clipidogrel or 500 mg/die ticlopidine for at least 4-5 days prior to admission	11/15 (73.3%) renal endarterectomies, 4/15(26.7%) aortorenal bypasses #of kidneys endarterectomy was performed for atherosclerotic ostial lesions, which bypass was performed for long or trunk lesions	abdominal aortic reconstruction due to aneurysm (67) or Leriche's Syndrome (33)
Patel, 2009, 9497511 US 1/2002-12/2006	97				Endarterectomy 21/47 (47%); Bypass 26/47 (53%): Aortorenal (17/26), Hepatorenal (6/26); Splenorenal (2/26); Iliorenal (1/26)	15/47 (32%)

C.2.4 Arm Details: PTRAS Single-Arm Studies

Author, date PMID country study dates	Stent, %	Stent: Stent description, including bra	Stent: Distal protection device, type (%)	Stent: Other (%)	Stent periprocedural medications
Baril, 2007 17391902 US 1/1999-12/2005	100	Balloon-expandable stainless steel renal artery stents were used. Initially, the Corinthian 0.035-inch (Cordis/Johnson & Johnson, Warren, NJ) system was used, and later, the Genesis 0.014-inch (Cordis/Johnson and Johnson) system.			
Beck, 2010 19939607 US 2001-2007	100	Stent diameters were < 6mm in 52% and >= 6 mm in 48%, and stent size selection was based on the adjacent normal vessel diameter size.		Embolic protection devices, including the Guardwire (Medtronic, Minneapolis, MN) a Spider (ev3 Endovascular Inc, Plymouth, Minn) 20%	Patients with a creatinine level 1.3 mg/dL underwent pretreatment with N-Acetylcysteine (600 mg orally twice daily on the day before the procedure and for 48 hours after the procedure) along with periprocedural bicarbonate (150 mL bicarbonate in 850 mL of D5W at 3 mL/kg for 1 hour and then 1 mL/kg until 5 hours after completion of the procedure)
Bersin, 2013 22581488 US 2/2008-5/2009	100	FormulaTM balloon-expandable renal stent system consists of a low-profile 316L stainless steel stent premounted on a balloon catheter delivery system between two radiopaque marker bas. ... Hybrid open-closed cell design with alternating ring geometry with peak valley and peak connections			Clopidogrel or other thienopyridone 24 hr prior or loading dose day of surgery, continues for 30 days post-procedure
Blum, 1997 9017938 Germany 3/1989-3/1996	91	Palmaz stent 10 or 15 mm		4.8 F angioplasty balloon catheter (Olbert catheter), passed through a valved 8F introducer sheath with a femoral approach	Heparin 5000 IU, then for 2 days to PPT=60. ASA 100 mg or ticlopidine 250 mg daily
Bruno, 2014, 24555729 Italy 1990-2008	58			168/168 balloon catheters	
Christie, 2012 23083664 US 9/2003-7/2010	100	Balloon-mounted stents were used in all patients and sized to match the diameter of the distal, normal-caliber (RA) as measured by angiography at the time of treatment, while ensuring areas of poststenotic dilatation were not used for sizing			

Author, date PMID country study dates	Stent, %	Stent: Stent description, including bra	Stent: Distal protection device, type (%)	Stent: Other (%)	Stent periprocedural medications
Chrysant, 2014 24909590 US no dates given	100	RX Herculink Elite Renal Stent System [Abbott Vascular, Santa Clara, CA]			All patients received aspirin 325 mg orally once daily, and clopidogrel either 75 mg orally once daily for 4 days prior to the procedure, or as a single loading dose of 300 mg orally within 24 hours prior to the procedure. Heparin was used as the procedural anticoagulant agent. Following stent placement, aspirin 325 mg orally once daily was continued for a minimum of 12 months and clopidogrel 75 mg orally once daily for at least 4 weeks
Chrysochou, 2012 21993376 UK 1999-2009		Palmaz-Schatz stents, 4-9 mm diameter, 10 or 15 mm length			
Cianci, 2013 23467950 Italy 2007 -12/2009	100	stainless steel Palmaz-Schatz stents (AVE, Bard Saxx Palmaz 6-15/20, Miami Lakes, FL, USA) pre-mounted on a balloon catheter			Acetylsalicylic or ticlopidine + clopidogrel
Cooper, 2008 18490527 US no dates given (RCT of PTRAS)	100	Genesis stent	Angioguard (47)	A bolus of 0.25 mg/kg abciximab (or placebo) was administered 5 minutes before crossing the lesion (50)	Acetylcysteine, sodium bicarbonate, or other agents to prevent contrast nephropathy and study medication abciximab
Dangas, 2001 11491257 US no dates given	100	Palmaz stent (P104 or P154)		Hand-crimped on predilated balloon Guiding catheter Intra-arterial nitroglycerin; stent deployed at 10 to 12 atmospheres	Heparin 5000U IV Hydration if creatinine increased

Author, date PMID country study dates	Stent, %	Stent: Stent description, including bra	Stent: Distal protection device, type (%)	Stent: Other (%)	Stent periprocedural medications
Dorros, 2002 11835644 US 1990-1997	100	Palmaz or Palmaz-Schatz		The methodology of determining balloon diameter size used for stent deployment was made by comparing the angiographic catheter s diameter with the angiographic renal artery size; usually a 5 mm balloon was used for small arteries and the arteries of women and a 6 mm balloon was used for the vast majority of the arteries in men.	
Gill, 2003 12601202 UK 6/1993-7/1999	100	Balloon-mounted (Medtronic AVE) or Palmaz		Femoral approach (99), brachial approach (1)	Heparin 5000 IU intra-procedure, then ASA 75-300 mg qD
Gill-Leertouwer, 2002 12466252 Netherlands 9/1996-12/1998	100	Palmaz			5000 IU heparin & continued for 48 h after procedure; ASA 100 mg daily for the entire f/u period
Girt, 2007 17164562 Germany 5/1997-11/2002	100	Among the 64 arteries, 63 were treated with balloon-expandable stainless steel stents (48 Herkulink, Guidant, I., USA; 12 Jo-Stent, JOMED, Rangeingen, Germany; 2 Palmaz and 1 Corinthian, both Johnson & Johnson Interventional Systems, Warren, N.J., USA) and 1 was treated with a self-expandable nitinol stent (Sinus-stent, Optimed, Karlsruhe, Germany). Tube length varied from 10 to 20 mm. After deployment a mean stent diameter of 5.9 8 0.7 (range 4.0 7.0, median 6.0) mm was reached		balloon expandable stents (94)	During the procedure, a bolus dose of 5,000 IU unfractionated heparin was administered intra-arterially. The post-interventional treatment included low molecular weight heparin in therapeutic doses for 2 days a low dose acetylsalicylic acid (100 mg/day) as a regular medication. Additional clopidogrel 75 mg/day for 6 weeks was given in 6 patients
Gonçalves, 2007 17364124 Brazil 5/1999-10/2003	100				
Gray, 2002 12710843 US 1991-1997	100	Palmaz			Heparin

Author, date PMID country study dates	Stent, %	Stent: Stent description, including bra	Stent: Distal protection device, type (%)	Stent: Other (%)	Stent periprocedural medications
Gross, 1998 9736342 Germany no dates given	100	PalmazTM stent (Johnson & Johnson, Warren, NJ) in 20 patients, an Inflow stent (InFlow Dynamics, Munich, Germany) in 13 patients, a Sito stent (Jomed, Rangeingen, Germany) in 8 patients, and a be-Stent (Medtronic, Minneapolis, MN) in 3 patients		Predilation and femoral approach	Heparin (10,000 U intra arterially) was given before the procedure and was then continued with low-molecular-weight heparin after removal of the sheaths until discharge of the patient. Because of the CAD of these patients, 100 mg of aspirin once daily was added
Harden, 1997 9113012 UK 04/1992-12/1995	100	Palmaz; Johnson & Johnson Interventional Systems, Warren, NJ, USA			All patients routinely received low-dose aspirin but no other anticoagulation after stent insertion
Henry, 2003 14571477 France, India, and Greece 1/1999-11/2002	100	Cordis P154, Corinthian, Genesis, M3, Medtronic AVE, NIR, Herculink, Biotronik, Stentec		GuardWire system (Medtronic), EPI Filter (Boston Scientific), Angioguard (Cordis)	Ticlopidine 500 mg or clopidogrel 75 mg/d and ASA 100 mg/d; IV bolus of 5,000 u of heparin and 3 mg of cefamaole; ASA 100 mg/d indefinitely and ticlopidine 250 mg/d or clopidogrel 75 mg/d for 1 mo
Holden, 2006 16837918 New Zeala no dates given	100	Balloon expandable stainless steel stent	Embolic filter		
Iannone, 1996 8974797 US 8/1992-12/1993		Palmaz-Schatz stents, 4-9 mm diameter, 10 or 15 mm length			
Jaff, 2012 22511402 US 8/2007-10/2009	100	The RX Herculink Elite Renal Stent System features a balloon expandable stent composed of L605 Cobalt Chromium. The stent design is based on a series of zig-zagging rings with multiple links per ring. The study stent included 12, 15, and 18 mm lengths with diameters ranging from 4 to 7 mm.			All patients received aspirin 325 mg orally once daily, and clopidogrel either 75 mg orally once daily for 4 days before the procedure, or as a single loading dose of 300 mg orally within 24 hr before the procedure. Heparin was used as the procedural Anticoagulant agent. Following stent placement, aspirin 325 mg orally once daily was continued for a minimum of 12 months and clopidogrel 75 mg orally once daily for at least 4 weeks

Author, date PMID country study dates	Stent, %	Stent: Stent description, including bra	Stent: Distal protection device, type (%)	Stent: Other (%)	Stent periprocedural medications
Jokhi, 2009 19668788 Canada 6/2000 - 3/2007	100	All bare metal stents - Express Biliary (Boston Scientific; 14.3%), Genesis (Cordis Corporation; 2.9%), Herculink (Guidant, USA; 20%), Racer (Medtronic, USA; 4.3%), Ross (evYsio Medical Devices, Canada [investigational stent used in the unpublished ROSSE study]; 32.9%), Tetra (Guidant Corporation, USA; 1.4%), Ultra (Abbott Laboratories, USA; 7.1%) or Liberte (Boston Scientific Corporation; 17.1%). Coronary stents used when estimated reference vessel diameter less than 5 mm.		Angio-Seal (St Jude Medical Inc, USA) and Perclose (Abbott) 6.5%	Acetylsalicylic acid (ASA) 325 mg and clopidogrel (300mg more than 6h or 600 mg more than 2h before the procedure). prehydrated for at least 6h w/ 1 mL/kg/h intravenous saline. N-actetyl cysteine at discretion of responsible physician
Kawarada, 2010 20884436 Japan no dates given	100	Use of a 5- to 6-mm x 15- to 18-mm Genesis or Palmaz stent was attempted.			Aspirin, clopidogrel, ticlopidine or ciloztazol was administered for a minimum of 2 days before the procedure (61/61)
Kennedy, 2003 14582036 US 7/1993-11/2001	100	Through 2/98*: Palmaz:94%; Palmaz-Schartz:5%; Wallstent:1%		IV hydration if renal insufficiency (CKD)); Through 2/98: Vessels >= 4 mm were treated with Palmaz stents; vessels < 4 mm were treated with Palmaz-Schatz stents	Heparin pre-procedure ASA 325 mg/d indefinitely Warfarin for 1 mo in procedures performed up to 09/94 (target INR:2)
Kobo, 2010 20684176 Israel 2001-2007	100			Predilatation before stent placement: (54)	Acetylcysteine 600 mg twice a day and 0.9% normal saline 2 L/day for 2 days before the procedure
Lekston, 2008 19006027 Poland no dates given (RCT of PTRAS)	88			brachytherapy; compatible self-centering PARIS catheter by the Guidant company, iridium source was approximately 10 C	Oral ASA (150mg) oral Ticlopidine (250 mg) 2 days prior to procedure. IV heparin 10, 000U immediately prior to procedure. Continued on anti-platelet agents.
Leesar, 2009 19539148 US 12/2004-08/2006	100				
Mannarino, 2012 22260219 Italy 1/2003-12/2008 (NRCS of PTRAS)	100	Transluminal			
Murphy, 2014, 24325931 US 3/2005-11/2009	100	Genesis	67		

Author, date PMID country study dates	Stent, %	Stent: Stent description, including bra	Stent: Distal protection device, type (%)	Stent: Other (%)	Stent periprocedural medications
Ramos, 2003 12472793 Argentina no dates given	100	Palmaz Schatz			
Rastan, 2008 19110785 Germany 6/2005-6/2006	100	The Hippocampus TM .014 Balloon Expanding Rapid Exchange Renal Stent System (Invatec Corp., Concesio Brescia, Italy)			Aspirin 100 mg/d for life; clopidogrel 75 mg/d x 4wks after a loading dose of 600 mg; heparin 2500 to 5000 IU
Rivolta, 2005 16358234 Italy 1997-2004	100	Palmaz stents; Corinthian or and Genesis premounted stent			Aspirin 325 mg/d
Rocha-Singh, 1999 10376497 US 1/1993-12/1995	100	Palmaz			Aspirin 325mg; shorter acting anti-HTN medications; warfarin (INR 2-3)
Rocha-Singh, 2005 16139124 US 12/1997-5/1999	100	A Palmaz (Cordis Corp., Warren, New Jersey) balloon expandable stent (P104, P154, P204)		Transfemoral or brachial approach	Aspirin 81 to 500 mg and intra-arterial heparin 3000 to 10000 U bolus before procedure
Rocha-Singh, 2008 19006254 US 1/2004-8/2004	100	The ExpressTM Renal Premounted Stent System consists of a stainless steel stent loaded on a monorail delivery balloon catheter. The stent is centered on a high-pressure balloon between two radiopaque marker bas to aid in positioning the system during the procedure and to ensure full expansion of the stent. The ExpressTM Renal Stent has an asymmetric design along its length, allowing for greater scaffolding and smaller cell area on the proximal e to counteract the greater recoil forces commonly noted with aortorenal ostial disease. The stent has a maximum length of 19 mm and a maximum diameter of 7.0 mm, and is intended to treat vessels 4.0 mm and 7.0 mm in diameter.			All patients received aspirin at a dosage of 81 mg at least one day prior to the index procedure. Aspirin use was required for 9 months after stent placement and recommended indefinitely thereafter. In addition, intravenous heparin was administered during the procedure at the discretion of the investigator
Rocha-Singh, 2011 21648052 US no dates given	100	(PalmazTM Stent, Cordis Corporation, New Brunswick, NJ [6]; Double StrutTM XS Stent (IDE #G990224), ev3, Inc. Plymouth [10]; BridgeTM Extra Support Stent (PMA #P020007), Medtronic, Inc. Santa Rosa, CA [8])			

Author, date PMID country study dates	Stent, %	Stent: Stent description, including bra	Stent: Distal protection device, type (%)	Stent: Other (%)	Stent periprocedural medications
Ruchin, 2007 17317314 Australia 9/1997-12/2003	100			Type of stents was at the discretion of the interventionalist	Prehydration with 0.9% Saline N-acetylcysteine 600mg orally; 5000 IU of unfractionated heparin intravenously or intra-arterially preprocedure; Post-procedure: aspirin 300mg x 3 months then 150mg indefinitely and clopidogrel 75mg daily x 1 month. Ticlopidine 250mg bd was used prior to the availability of clopidogrel
Rzeznik, 2011 21129903 Poland 1/2005-5/2009	94			Direct stenting (82%), predilation (18)	Yes, but no details given
Safak, 2013 23321402 Germany 1995-2010	83				
Sapoval, 2005 16151060 multi-center Europe 2001-2002	100	Palmaz Genesis stent (Cordis) Low profile balloon expandable stent		Commonly femoral arterial route was used; occasional use of brachial artery when needed	
Sapoval, 2010 19908091 Multiple 2/2005-2/2007	100	Tsunami peripheral stent is a stainless-steel, laser cut, open-cells stent mounted on a rapid exchange delivery balloon catheter compatible with 0.01400 and 0.01800 guidewire. The stent design comprises 12 cells with a triple link in diameters 5 and 6 mm, and 14 cells with quadruple link in 7 mm diameter, with a strut thickness of 0.007100 (0.18 mm). All stents are compatible with 5 Fr long sheath or 6 Fr guiding catheter. Stents were available in diameters of 5, 6 and 7 mm and in lengths of 12 and 18 mm.			
Staub, 2010 20739200 Switzerland 8/2004-12/2007	100	as Hippocampus" (Invatec), Dynamic renal" (Biotronik) or Pal- maz blue" (J&J Cordis)			Anti-platelet therapy was started at least 1 day before the intervention and routinely consisted of 75 mg of clopidogrel daily for 4 weeks and 100 mg of aspirin indefinitely

Author, date PMID country study dates	Stent, %	Stent: Stent description, including bra	Stent: Distal protection device, type (%)	Stent: Other (%)	Stent periprocedural medications
Trani, 2010 20578190 Italy 6/2002-6/2007 (NRCS of PTRAS)	100	Coronary stent 22% (when stent <=5 mm required) [ML/Ultra 14, Express 4, Other 1], dedicated renal stent 78% [Hippocampus 23, Herculink 19, Radix 18, Other 7]		Adjuntive postdilation with a different balloon (14)	ASA 160 mg and (clopidogrel 75 mg or ticlopidine 500 mg), 48 pre & for at least 1 month. N-acetyl-cysteine 1200 mg 24 hr pre & for at least 48 hr; IV hydration (sodium bicarbonate)
Trani, 2013 22503569 Italy 6/2002-6/2007	100				
Tsao, 2005 16394602 Taiwan 6/2001-1/2004	100			Minimal amount of low-osmolality contrast medium and the least number of injections possible. PTRAS performed by qualified interventional cardiologist well experienced in PCI and familiar with PTRAS. Delicate PTRAS: efforts made to minimize trauma and exposure.	Aspirin plus ticlopidine or clopidogrel. clinically optimized including adequate hydration, no diuretics or nephrotoxic agents
Valluri, 2012 21765186 UK 2003-2007	100				
van de Ven, 1999 9929021 Netherlands 12/1993-3/1997 (RCT of PTRAS)	97	Palmaz			Heparin iv (5000 IU); warfarin pos
White, 1997 9362400 US 6/1992-12/1994	100	Palmaz (balloon mounted)		Predilation	Heparin 3000 to 5000 IU Aspirin 325 mg preop Warfarin 1-3 mo for an INR 2.0 to 2.5

Author, date PMID country study dates	Stent, %	Stent: Stent description, including bra	Stent: Distal protection device, type (%)	Stent: Other (%)	Stent periprocedural medications
Zahringer, 2007 17696619 Germany 11/2001-6/2003 (NRCS of PTRAS)	100	Palmaz-Genesis peripheral stent. Diameters of 5.0 and 6.0 mm and lengths of 15 or 18 mm. The SES were coated with an elastomeric copolymer of ,5 mm thickness bleed with sirolimus. The total sirolimus content was 210 mg for a 15-mm-long stent and 256 mg for an 18-mm-long stent.		Standard introducer sheaths, guiding catheters, and standard 0.018-inch guidewires were used during the index procedure.	The routine antithrombotic and antiplatelet drug regimen of each catheter laboratory was used in the trial without general standardization. Predilation, postdilation, and antihypertensive and general cardiac medication prescriptions were left to the discretion of the individual investigators according to the observational nature of the trial
Zeller, 2004 15056029 Germany 10/1996-11/2002	100	14 different stents (gold coated and non coated stents)	-	Ostial stenoses were treated with or without predilation.	One day before the intervention clopidogrel 75 mg/d until 4 wk; immediately before heparin bolus 2500- 10,000 IU, aspirin 100 mg indefinitely
Zeller, 2005 16212462 Germany 7/2002-7/2004	100	Radix carbofilm-coated or Palmaz-Genesis bare			Aspirin 100 mg/d Loading and postop dose clopidogrel

C.2.5 Arm Details: Medication Only Single-Arm Studies

Author, date PMID country study dates	Medication: Anti-hypertensive (% in medication only cohort) {mean number of Anti HTN meds} [ACEi/ARB (% in medication only cohort)]; BP goal	Medication: Statins (%) [other anti-lipids]	Medication: Clopidogrel [other anti-platelet]	Other Medication (%) [Aspirin dose (%)]
Chrysochou, 2012 21993376 UK 1999-2009	[yes]	yes (62)		[yes (52)]
Safak, 2013 23321402 Germany 1995-2010	Any antihypertensive drug (99) beta blockers (72) diuretics (58) calcium channel blockers (24) {3.2} [ACEi or AT1 receptor blockers]	yes		yes
Silva, 2008 18670414 Brazil 1/1996-3/2007 (NRCS of medication)	Antihypertensive drug classes, beta-blockers [yes (81)]	Yes (based BP and lipid profile, as recommended by guidelines.)	use of platelet antiaggregant	folic acid
Webster, 1998 9655655 UK no dates given (RCT of medication)	atenol, beroflumethiazide, CCB [no]			furosemide, methyldopa or prazosin (alternatives to ACEi)

C.2.3 Arm Details: Surgical Revascularization Single-Arm Studies

Author, date PMID country study dates	Surgery: Description	Surgery: Aortic repair (%)
Alhadad, 2004 14718896 Sweden 1987-1996 (NRCS of surgery)	Transverse arteriotomy, endartectomy and a patch closure if not aortic surgery was needed when a 5-6 mm dacron or PFTE by-pass with e-to-e anastomosis to the renal artery was used. The remainder underwent nephrectomy (11), division on the crus diaphragma (1) a correction of a venous malformation (1)	yes (31)
Cherr, 2002 11854720 US 1987-1999	Aortorenal bypass graft; splanchnorenal bypass graft; reimplantation; endarterectomy; nephrectomy (primary and contralateral)	Yes (41)
Galaria, 2005 15735947 US 1/1984-1/2004 (NRCS of surgery)	Aorto renal bypass; Hepatorenal bypass; Splenorenal bypass; Endarterectomy; Concomitant aortic aneurysm repair; Operations following failed endoluminal repair	Aorto renal bypass (56)

C.3 Baseline Data

Author, date PMID	Arm	N	Arteries, N	Age*	Male, %	Stenosis, %*	Bilateral†, %	SBP, mm Hg*	DBP, mm Hg*	HTN, %	GFR/CrCl, mL/min*	SCr mean mg/dL*	Kidney disease, % (definition)	Post-PTRAS MLD (SD) [length (SD)]	CVD, %
Alhadad, 2004 14718896	Surgical	106		64 {9-84}	65		37	180 {160-202}	100 {90-110}						
Arthurs Z, 2007 17398382	Medication only	22	34	67 (13)			55	142 (21)	73 (13)			1	22 (CRI)		CAD 50; CeVD 27; PAD 36
	PTRAS	18	29	72 (9)			61	162 (17)	75 (13)			1.5	52 (CRI)		CAD 47; CeVD 29; PAD 35
Balzer, 2009 19135837	PTRAS	22	28	66 (9) {44-84}		{70-100}	73	169 {95% CI 161-178}	87 {95% CI 82-92}			1.6 {95% CI 1.4-1.8}			Aortic dz 55
	Surgical	27	49	62 (8) {49-77}		{70-100}	19	171 {95% CI 163-178}	88 {95% CI 84-92}			1.3 {95% CI 1.0-1.6}			Aortic dz 52
Baril 2007 17391902	PTRAS	56	62	77 (7)	79		11			63; 7 (uncontrolled)	53 (25)		38 (SCr > 1.5 mg/dL)		Aortic dz 100
Bax, 2009 19414832	Medication only	76		67 (9)	59		46	163 (26)	82 (12)			1.6 (0.6)			
	PTRAS	64		66 (8)	67		50	160 (25)	83 (13)			1.7 (0.7)			
Beck, 2010 19939607	PTRAS	129	179	68 (11)	53		30	161 (31)	80 (15)		46 (14)				CAD 52; AAA 29

Author, date PMID	Arm	N	Arteries, N	Age*	Male, %	Stenosis, %*	Bilateral†, %	SBP, mm Hg*	DBP, mm Hg*	HTN, %	GFR/CrCl, mL/min*	SCr mean mg/dL*	Kidney disease, % (definition)	Post-PTRAS MLD (SD) [length (SD)]	CVD, %
Bersin, 2013 22581488	PTRAS		114	72 (10)	44	100	100	150 (21) {102-202}	74 (13) {43-112}	31 (140-159/90-99); 52 (≥160/≥100)	61 (29)	1.3 (0.1) {0.5-2.9}	49 (CKD stage III); 10 (CKD stage IV)	2.2 (0.8) [7.7 (3.6)]	MI 30; LVH 28; CHF 26; PAD 56; CVA 18; TIA 11
Blum, 1997 9017938	PTRAS	68	82	60 (10)	65		9	188 (28)	105 (11)			1.2 (0.6)			
Bruno, 2014, 24555729	PTRAS	97		61 (11)	65			162 (21)	90 (14)		67.2 (29)	1.33 (0.61)			26
Cherr, 2002 11854720	Surgical	500	776	65 (9)	49		59	200 (35)	104 (21)	[Duration mean (SD) 10 (9); range 0-57 y]		2.6			CVD 90
Christie, 2012 23083664	PTRAS	83	91	70 (10)	41		8.4	196 (29)	100 (23)	[Duration mean (SD) 15 (15) y]	51 (24)	1.5 (0.6)		5.6 [15.7]	CAD 31; CHF 6; MI/angina 26; LVH 30; AAA 7
Chrysant, 2014 24909590	PTRAS	202	241	72		65.9 (11.4)		162 (19)	78 (12)		58 (21)	1.2 (0.4)		5.4 (1.1) [1.8 (0.7)]	
Chrysochou, 2012 21993376	Medication only	621		71 (9) {40-92}	66			150 (27) {75-220}	78 (14) {33-130}	84	36 (18) {5-120}	2.3 (1.4) {0.4-9.7}}			CHF 14; FPE 4

Author, date PMID	Arm	N	Arteries, N	Age*	Male, %	Stenosis, %*	Bilateral†, %	SBP, mm Hg*	DBP, mm Hg*	HTN, %	GFR/CrCl, mL/min*	SCr mean mg/dL*	Kidney disease, % (definition)	Post-PTRAS MLD (SD) [length (SD)]	CVD, %
Cianci R, 2013 23467950	PTRAS	55		66 (8)	62		15	170 (23)	89 (15)	98	42 (25)	2.0 (0.9)			PAD 64
Cianci, 2011 20547539	Medication only	40		70 {26-85}	43	{50-100}	20								
	PTRAS	53		64 {24-86}	58	{70-100}	28								
Cooper, 2008 18490527	PTRAS	100	139	73	44	67		159	74		59	1.2		2.0	CAD 25; AAA 0
Cooper, 2014 24245566	Medication only	480		69 (9)	49	66.9 (11.9)	18	150 (23)		75	57		50 (GFR<60 mL/min)		MI 30; CHF 15
	PTRAS	467	434	69 (9)	51	67.3 (11.4)	22	150 (23)		71	58		50 (GFR<60 mL/min)		MI 27; CHF 12
Crutchley, 2009 18951751	PTRAS	30		71 (11)	57		37	186 (31)	92 (17)		51 (23)	1.8 (1.3)	0 (RRT)		CAD 77; PAD 27
	Surgical	56		67 (9)	41		80	181 (31)	92 (17)		47 (33)	1.6 (0.8)	4 (RRT)		CAD 66; PAD 40

Author, date PMID	Arm	N	Arteries, N	Age*	Male, %	Stenosis, %*	Bilateral†, %	SBP, mm Hg*	DBP, mm Hg*	HTN, %	GFR/CrCl, mL/min*	SCr mean mg/dL*	Kidney disease, % (definition)	Post-PTRAS MLD (SD) [length (SD)]	CVD, %
Dangas, 2001 11491257	PTRAS	131	153	71	48	74 (10)		170 (25)	84 (14)	95		1.9 (1.3)	50 (SCr >1.5 mg/dL); 2 (RRT)		MI 55; Stroke 25; Angina 26; CABG 44; Aortic repair 46; PAD 60
de Donato, 2007 17653002	PTRAS		82												
	Surgical		15												AAA 67
	Total	83	97	62 (9)	84		14.3	165 (17)	92 (12)	100		1.4 (0.7)			CAD 39; CABG/PCI 0
Dichtel, 2010 20630131	Medication only	71	100	73 (8)	96		41	141 (20)	70 (10)		37 (11)				CAD 67; CHF 27; PAD 38
	PTRAS	47	74	73 (8)	100		57	145 (19)	75 (11)		38 (13)				CAD 46; CHF 13; PAD 26
Dorros, 2002 11835644	PTRAS	1058		69 (10)	49			168 (27)	84 (15)	85 (poorly controlled)		1.7 (1.2)	41 (CRI)		CHF 15

Author, date PMID	Arm	N	Arteries, N	Age*	Male, %	Stenosis, %*	Bilateral†, %	SBP, mm Hg*	DBP, mm Hg*	HTN, %	GFR/CrCl, mL/min*	SCr mean mg/dL*	Kidney disease, % (definition)	Post-PTRAS MLD (SD) [length (SD)]	CVD, %
Galaria, 2005 15735947	Surgical	109		66 (10)	43		19	171 (17)	82 (11)	34	51 (29)	1.7 (0.7)	12 (CRI)		CAD 53; CVD 26
Gill, 2003 12601202	PTRAS	100	120	68 {43-86}	60		51								Sxic CAD 47; Claudication 36; CeVD 25; CHF 25
Gill-Leertouwer, 2002 12466252	PTRAS	41		60 (9)	66			177 (21)	96 (11)	34			34 (CRI)		
Girt, 2007 17164562	PTRAS	64	64	67 (9) {39-84}	61	{70-100}		155 (20)	83 (10)		57 (23) {25-23}	1.4 (0.5) {0.6-2.8}		5.5 (0.7) [range 10-20]	
Gonçalves, 2007 17364124	PTRAS	46		[59] {33-84}	57		33	177 (30) {124-248}	98 (17) {80-170}			2.3 (1.3) {1.0-6.1}			CAD 46; CHF 14
Gray, 2002 12710843	PTRAS	39		70 {50-85}	41		46	174 (32)	85 (23)						CABG 28
Gross, 1998 9736342	PTRAS	30	37	66 {45-85}	63	75 (15)	23	163 (30) {normal-230}	93 (18) {normal-130}			1.47 (0.7)			CAD 100; CHF 20; PAD 23

Author, date PMID	Arm	N	Arteries, N	Age*	Male, %	Stenosis, %*	Bilateral†, %	SBP, mm Hg*	DBP, mm Hg*	HTN, %	GFR/CrCl, mL/min*	SCr mean mg/dL*	Kidney disease, % (definition)	Post-PTRAS MLD (SD) [length (SD)]	CVD, %
Hackam, 2011 21156722	Medication only	2113													
Hanzel, 2005 16253607	Medication only	40		70 (9)			20	154 (5)	77 (3)		61 (4)	1.3 (0.6)			
	PTRAS	26		66 (9)			50	162 (4)	82 (3)		56 (3)	1.5 (0.1)			
Harden, 1997 9113012	PTRAS	32		67 {49-79}			78	[169] {153-175}	[95] {85-103}						CAD 70; CeVD 44; PAD 50
Henry, 2003 14571477	PTRAS	56		66 (12) {22-87}	57	84.5 (8.3)	14	169 (15)	104 (13)			1.3 (0.5)			CAD 35/56 (62.5 %); Aortic dz 66; CeVD 25; PAD 39
Holden, 2006 16837918	PTRAS	63	73	70	63		92	153	101	70		1.9	76 (CKD stage 3); 24 (CKD stage 4)		
Iannone, 1996 8974797	PTRAS	63	83	70 {51-83}	49	67 {23-94}	22	160	80	100		1.8 {0.1-6.1}	46 (SCr>1.5 mg/dL); 3 (RRT)		CHF 37%, CAD 94%; PAD 48
Jaff, 2012 22511402	PTRAS	202	241	72	62	{50-100}		162 (19)	78 (12)		58 (21)	1.2 (0.4)		5.5 [15]	Aortic dz 67

Author, date PMID	Arm	N	Arteries, N	Age*	Male, %	Stenosis, %*	Bilateral†, %	SBP, mm Hg*	DBP, mm Hg*	HTN, %	GFR/CrCl, mL/min*	SCr mean mg/dL*	Kidney disease, % (definition)	Post-PTRAS MLD (SD) [length (SD)]	CVD, %
Jokhi, 2009 19668788	PTRAS	106	108	72 (9) {38-91}	61		32	166 (28)	74 (14)	69 (uncontrolled)	47 (19)	1.6 (0.7)	61 (GFR<60 mL/min)	5.6 (0.7) [17.6 (2.8)]	CAD 93; PAD 37
Kalra, 2010 19937777	Medication only [UK]	347	347	71 (9) {40-90}	58			156 (27) {90-240}	80 (15) {33-134}		35 (19)		8 (CKD stage 1-2); 46 (CKD stage 3); 44 (CKD stage 4-5)		Angina 28; CAD 28; CeVD 27
	PTRAS [Germany]	472		67 (9) {33-90}	62			144 (19) {100-218}	78 (11) {49-134}		60 (26)		48 (CKD stage 1-2); 36 (CKD stage 3); 14 (CKD stage 4-5)		Angina 80; CAD 80; CeVD 51
	PTRAS [UK]	89	89	69 (7) {42-81}	62			157 (29) {95-220}	81 (14) {58-130}		34 (17)		8 (CKD stage 1-2); 47 (CKD stage 3); 44 (CKD stage 4-5)		Angina 40; CAD 38; CeVD 25
Kalra, 2010 19937777	Total	908		69 {33-90}	60			151 {90-240}	80 {33-134}		48		29 (CKD stage 1-2); 41 (CKD stage 3); 29 (CKD stage 4-5)		Angina 56; CAD 55; CeVD 39

Author, date PMID	Arm	N	Arteries, N	Age*	Male, %	Stenosis, %*	Bilateral†, %	SBP, mm Hg*	DBP, mm Hg*	HTN, %	GFR/CrCl, mL/min*	SCr mean mg/dL*	Kidney disease, % (definition)	Post-PTRAS MLD (SD) [length (SD)]	CVD, %
Kane, 2010 19666661	Medication only	50		78 (7)	54		38	148 (30)			37 (18)				CHF 84; CAD 78; NYHA III or IV 62; CeVD 48; PAD 52
	PTRAS (comparative)	50		74 (8)	54		53	154 (29)			40 (21)				CHF 94; CAD 74; NYHA III or IV 66; CeVD 54; PAD 36
	PTRAS (prevalence)	163		73	55		50	156				3.0			CAD 68; CHF 31
Kawarada, 2010 20884436	PTRAS	61	73	72 (7) {56-82}	59		21	152 (26) {96-224}	81 (12) {51-107}	97; 31 (resistant)		1.1 (0.5) {0.4-2.9}		5.5 [16.5]	
Kennedy, 2003 14582036	PTRAS	261		70	41	70	38	168	82		51				CAD 80; CHF 32; MI 34

Author, date PMID	Arm	N	Arteries, N	Age*	Male, %	Stenosis, %*	Bilateral†, %	SBP, mm Hg*	DBP, mm Hg*	HTN, %	GFR/CrCl, mL/min*	SCr mean mg/dL*	Kidney disease, % (definition)	Post-PTRAS MLD (SD) [length (SD)]	CVD, %
Kobo, 2010 20684176	PTRAS	41/41	49	70 (9)	36		20	164 (17)	82 13)	100		1.2 (0.2)	54 (RF)		CAD 72; Carotid dz 22; PAD 28
Leesar, 2009 19539148	PTRAS	62	62	62 (10)		61 (10)	0	170 (12)	91 (13)			1.2 (0.3)		2.4 (0.7)	CAD 48
Lekston, 2008 19006027	PTRAS	62		52 (8)	62							1.3			
Losito, 2005 15870215	Medication only	54		68	73	73.5 (SE 17.5)	26	160 (SE 17)	89 (SE 10)			1.7 (SE 0.8)			
Mannarino, 2012 22260219	PTRAS	30	37	73 (7)	70		57	156 (31)	89 (13)	96	34 (14)		100 (CKD stage 3- 4)		
Marcantoni, 2012 22495466	Medication only	41	41	69 (9)	66	58 (6)		131 (16)	74 (18)		58 (22)		24 (CKD)		
	PTRAS	43	43	69 (8)	53	60 (7)		133 (20)	73 (11)		65 (25)		12 (CKD)		
Murphy, 2014, 24325931	PTRAS	239		70 (9)	49		27	154 (24)			50 (21)	1.41 (0.51)	3.8 (CKD)		CAD 40; stroke 8
Patel, 2009, 9497511	PTRAS	203	247	72 (9)	58		22	150 (24)	75 (13)	95		1.8 (1)	50 (CKD)		CAD 51; PVD 38
Patel, 2009, 9497511	Surgical	47	67	65 (11)	55		43	155 (26)	77 (13)	94		2.2 (1.6)	51 (CKD)		CAD 64; PVD 75

Author, date PMID	Arm	N	Arteries, N	Age*	Male, %	Stenosis, %*	Bilateral†, %	SBP, mm Hg*	DBP, mm Hg*	HTN, %	GFR/CrCl, mL/min*	SCr mean mg/dL*	Kidney disease, % (definition)	Post-PTRAS MLD (SD) [length (SD)]	CVD, %
Ramos, 2003 12472793	PTRAS	105		59 (10)	60		43	160 (26)	91 (12)	25 (uncontrolled)	54 (26)	1.7 (0.9)	51 (GFR<50 mL/min)		
Rastan, 2008 19110785	PTRAS	50	55	66 (12) {41-88}	58	82 (9)	10	148 (17)	78 (10)		51 (26) {18-134}	1.4 (0.6) {0.6-3.2}	12 (CKD I); 34 (CKD II); 54 (CKD III)	6.0 (0.3) [13.3 (2.1)]	CAD 44; PAD 44; CVA 6
Ritchie, 2014 24074824	Medication only	340	0	71 (9)				155 (30)	79 (17)		35 (20)				Angina 34; MI 30; PAD 38
Ritchie, 2014 24074824	PTRAS	127	127	68 (9)				163 (30)	83 (16)		37 (21)				Angina 39; MI 39; PAD 43
Ritchie, 2014 24074824	Total	467	127												
Rivolta, 2005 16358234	PTRAS	52		69 (8)	58		37	161 (7)	86 (7)			2.9 (1.8)			
Rocha-Singh, 1999 10376497	PTRAS	150		67	44			MAP 110				1.5 (0.6)			CAD 73; CABG 32; PAD 49; CeVD 23

Author, date PMID	Arm	N	Arteries, N	Age*	Male, %	Stenosis, %*	Bilateral†, %	SBP, mm Hg*	DBP, mm Hg*	HTN, %	GFR/CrCl, mL/min*	SCr mean mg/dL*	Kidney disease, % (definition)	Post-PTRAS MLD (SD) [length (SD)]	CVD, %
Rocha-Singh, 2005 16139124	PTRAS	208	208	70 {40-88}	37		21	168 (25)	82 (13)			1.4 (0.5)			CAD 63; CeVD 39; PAD 44
Rocha-Singh, 2008 19006254	PTRAS	100	117	71 (9) {41-85}	48	68.4 (11) {46.4-93}	17	157 (21) {106-233}	75 (12) {43-109}	99	51 (21) {16-116}	1.4		4.7 (0.8)	CAD 73; MI 21; Unstable angina 3; PCI 37; CABG 37; PAD 9; CVA 4; TIA 4
Rocha-Singh, 2011 21648052	PTRAS	286	327	71 (9) {33-89}	47	68.1 (10.8) {50-100}		179 (19) {155-288}	83 (13) {49-131}			1.3 (0.5) {0.5-3.9}			Aortic dz 47; CeVD 47; PAD 23
Ruchin, 2007 17317314	PTRAS	89	102	70 (9) {37-86}	60	84.3 (10.8) {50-100}	16	162 (30) {110-270}	78 (14) {44-120}		50 (20) {11-110}	1.6 (0.7) {0.7-4.3}			CAD 62
Rzeznik, 2011 21129903	PTRAS	84	104	64	50		40	135 (19)	75 (11)	39 (HTN crisis)	58 (26)		57 (GFR<60)		CAD 63; FPE 6

Author, date PMID	Arm	N	Arteries, N	Age*	Male, %	Stenosis, %*	Bilateral†, %	SBP, mm Hg*	DBP, mm Hg*	HTN, %	GFR/CrCl, mL/min*	SCr mean mg/dL*	Kidney disease, % (definition)	Post-PTRAS MLD (SD) [length (SD)]	CVD, %
Safak, 2013 23321402	Medication only	171		67 (9)	65			137	78		66 (28)				Angina 75%; CAD 80; PAD 36
Sapoval, 2005 16151060	PTRAS	52		64	46	68.2		172 (25)	92 (15)	92		1.2 (0.1)	19 (CrCl <= 50)		PAD 39
Sapoval, 2010 19908091	PTRAS	251	276	70 (10)	57		11.2	171 (26)	89 (14)		54 (33)	1.7 (1.4)		5.9 (0.7) [14.9 (3.8)]	
Silva, 2008 18670414	Medication only	104	146	65	54		40	167	95		33 {14-56}				CAD 60%; Angina 36; CABG/PCI 35; PAD 60
Sofroniadou, 2012 22127407	Medication only	10		72 (5)	90			146 (32)	77 (10)		42 (15)				CAD 70; Carotid dz 50; PAD 60; CVA 40

Author, date PMID	Arm	N	Arteries, N	Age*	Male, %	Stenosis, %*	Bilateral†, %	SBP, mm Hg*	DBP, mm Hg*	HTN, %	GFR/CrCl, mL/min*	SCr mean mg/dL*	Kidney disease, % (definition)	Post-PTRAS MLD (SD) [length (SD)]	CVD, %
	PTRAS	26		68 (8)	58		77	177 (38)	90 (20)		32 (15)				CAD 65; Carotid dz 15; PAD 58; CVA 15
Staub, 2010 20739200	PTRAS	120		63 (13)	52	100	11	148 (17)	81 (13)		66 (28)		43 (GFR<60 mL/min)		CAD 37
Trani, 2010 20578190	PTRAS	70	86	70 (8)	39		28			96 (ESH/EHC Grade 2 or 3)			83 (SCr >1.2 mg/dL)	5.7 (0.9) [16.3 (3.9)]	CAD 100
Trani, 2013 22503569	PTRAS	57	69	69 (8)	58	84.9 (8.4)	21				51 (22)	[3.1] {IQR 2.9-7}	19 (CKD stage 4-5)	[17 (range 13-18)]	
Tsao, 2005 16394602	PTRAS	54		71	83	86	22	146	78	[Duration mean 12 y]	36	2.0	63 (SCr >1.6 mg/dL)	5.9 (0.3) [17 (1)]	Angina 24; CHF 19; CABG/PCI 15
Uzzo, 2002 12009679	Medication only	27													
	Surgical	25													
Valluri, 2012 21765186	PTRAS	127	162	[74] {IQR 66-79}	46	77	31					1.8 {IQR 1.5-2.4}			
van de Ven, 1999 9929021	PTRAS	40		65 (8)	55	76 (15)	21	186 (24)	103 (12)			[1.6] {IQR 1.2-2.2}			CAD 39; CeVD 24; PAD 55

Author, date PMID	Arm	N	Arteries, N	Age*	Male, %	Stenosis, %*	Bilateral†, %	SBP, mm Hg*	DBP, mm Hg*	HTN, %	GFR/CrCl, mL/min*	SCr mean mg/dL*	Kidney disease, % (definition)	Post-PTRAS MLD (SD) [length (SD)]	CVD, %
Webster, 1998 9655655	Medication only, bilateral (randomized)	81		63	50	{50-100}						1.8			
Wheatley, 2009 19907042	Medication only	403		71 {43-88}	63	75 {20-99}		152 {90-241}	76 {46-130}		40 {7-122}	2.0 {0.7-8.5}			CAD 48; PAD 40; CVA 19
	PTRAS	403	335	70 {42-86}	63	76 {40-100}		149 {87-270}	76 {45-120}		40 {5-125}	2.0 {0.7-6.2}			CAD 50; PAD 41; CVA 18
White, 1997 9362400	PTRAS	100	133	67 (10)	42		33	173 (25)	88 (17)	100		2.4 (1.6)	44 (CKD)		
Zahringer, 2007 17696619	PTRAS	105	105	66	50	68.9		166	89			1.4		5.5 [10.1]	PAD 55
Zeller, 2004 15056029	PTRAS	354		66 (10) {44-84}	66							1.5 (0.9)			CAD 83; PAD 68; CeVD 57
Zeller, 2005 16212462	PTRAS	125		67 {42-90}	55	80	18			100					
Ziakka, 2008 19016147	Medication only	46	62	61 (14)	83		30	175 (32)	90 (18)			2.2 (1.8)			
	PTRAS	36	48	69 (8)	67		39	178 (27)	88 (17)			2.0 (1.1)			

CHF: congestive heart failure; PAD: peripheral artery disease; CeVD: cerebrovascular disease; CVA: stroke; CABG/PCI: coronary revascularization; CABG: CABG; dz: disease; AAA: AAA; MI: MI. † Bilateral or solitary kidney stenosis. * mean [median] (SD) {range}

C.4. Results

C.4.1 Results: Mortality

Author, year, PMID	Outcome and description	Timepoint	Arm	n/N % (95% CI)	Between-Arm Comparison
PTRAS vs. Medication RCT					
Bax, 2009, 19414832	Death: All cause	2 years	Medication only	6/74 8.1 (1.9, 14)	
			PTRAS	5/62 8.1 (1.3, 15)	HR 0.99 (0.30, 3.24)
	Death: cerebrovascular disease	2 years	Medication only	1/74 1.4 (0.2, 9.9)	
			PTRAS	0/62 0 (0, 13)	--
	Death: coronary artery disease	2 years	Medication only	3/74 4.1 (1.3, 13)	
			PTRAS	3/62 4.8 (1.6, 16)	HR 1.16 (0.23, 5.73)
	Death: CV	2 years	Medication only	4/74 5.4 (0.3, 11)	
			PTRAS	2/62 3.2 (0.8, 14)	HR 0.59 (0.11, 3.25)
Cooper, 2014, 24245566	Death: All cause	3.6 years	Medication only	76/472 16 (13, 19)	
			PTRAS	63/459 14 (11, 17)	HR 0.80 (0.58, 1.12) P = 0.2
	Death: cerebrovascular disease	1 year	Medication only	45/472 9.5 (6.9, 12)	
		2 years		79/472 17 (13, 20)	
		3 years		193/472 41 (36, 45)	
		4 years		307/472 65 (61, 69)	
		5 years		399/472 85 (81, 88)	
		1 year	PTRAS	44/459 9.6 (6.9, 12)	
		2 years		68/459 15 (12, 18)	
		3 years		148/459 32 (28, 37)	
		4 years		266/459 58 (53, 62)	
		5 years		375/459 82 (78, 85)	
	Death: CV	3.6 years	Medication only	45/472 9.5 (6.9, 12)	
			PTRAS	41/459 8.9 (6.3, 12)	
	Death: renal	3.6 years	Medication only	1/472 0 (0, 1.5)	
			PTRAS	2/459 0 (0.1, 1.8)	HR 1.89 (0.60, 1.89)
Marcantoni, 2012, 22495466	Death: All cause	1 year	Medication only	2/35 5.7 (1.5, 25)	
			PTRAS	2/38 5.3 (1.3, 23)	OR 0.92 (0.12, 6.88)

Author, year, PMID	Outcome and description	Timepoint	Arm	n/N % (95% CI)	Between-Arm Comparison
Wheatley, 2009, 19907042	Death: All cause	5 years	Medication only	106/403 26 (22, 31)	
			PTRAS	103/403 26 (21, 30)	HR 0.90 (0.69, 1.18) P=0.46
	Death: CV	5 years	Medication only	45/403 11 (8.1, 14)	
			PTRAS	42/403 10 (7.4, 13)	OR 0.93 (0.59, 1.44)
	Death: renal	5 years	Medication only	17/383 4.4 (2.9, 7.6)	
			PTRAS	10/383 2.6 (1.4, 5.0)	OR 0.58 (0.26, 1.28)
PTRAS vs. Medication NRCS					
Arthurs, 2007, 17398382	Death: All cause	1 year	Medication only	0/22 0 (0, 0.4)	
		1.92 years		0/22 0 (0, 0.4)	
		2.92 years		2/22 9 (2.9, 54)	
		1 year	PTRAS	2/18 11 (2.9, 54)	
		1.92 years		2/18 11 (2.9, 54)	
		2.92 years		2/18 11 (2.9, 54)	HR 0.02 (0, 15.16) P=0.62 OR (calculated) 1.25 (0.16, 9.88)
Dichtel, 2010, 20630131	Death: All cause	3 years	Medication only	17/71 24 (14, 34)	
			PTRAS	20/47 43 (28, 57)	OR 2.35 (1.06, 5.21)
Kalra, 2010, 19937777	Death: All cause	4 years	PTRAS vs. Medication only	nd	OR 0.55 (0.34, 0.88) P = 0.013
Kane, 2010, 19666661	Death: All cause	1 year	PTRAS (comparative) vs. Medication only	nd	HR 1.2 (0.60, 2.60) P=0.60
Sofroniadou, 2012, 22127407	Death: All cause	5 years	Medication only	1/10 10 (1.4, 88)	
			PTRAS	5/26 19 (4.1, 34)	OR 2.14 (0.22, 21.05)
	Death: CV	7.4 years	Medication only	3/10 30 (1.6, 58)	
			PTRAS	6/26 23 (6.9, 39)	OR 0.70 (0.14, 3.58)
Surgery vs. Medication RCT					
Uzzo, 2002, 12009679	Death: All cause	6.17 years	Surgical vs. Medication only		P = 0.31
Surgery vs. PTRAS RCT					
Balzer, 2009, 19135837	Death: CV	4 years	PTRAS	4/22 18 (7.5, 66)	OR 0.63 (0.16, 2.53) P=0.80
			Surgical	7/27 26 (15, 83)	

Author, year, PMID	Outcome and description	Timepoint	Arm	n/N % (95% CI)	Between-Arm Comparison
Surgery vs. PTRAS NRCS					
Crutchley, 2009, 18951751	Death: All cause	1 year	PTRAS	1/30 3.3 (0.5, 25)	
		2 years		4/30 13 (1.2, 25)	
		3 years		5/30 17 (3.3, 30)	
		4 years		5/30 17 (3.3, 30)	
		5 years		6/30 20 (5.7, 34)	
		6 years		8/30 27 (11, 42)	OR 0.99 (0.36, 2.71)
		1 year	Surgical	2/56 3.6 (0.9, 15)	
		2 years		4/56 7.1 (0.4, 14)	
		3 years		8/56 14 (5.1, 23)	
		4 years		14/56 25 (14, 36)	
		5 years		15/56 27 (15, 38)	
		6 years		15/56 27 (15, 38)	
Patel, 2009, 9497511	Death: All cause	1 year	PTRAS	22/178 12 (9, 22)	
		2 years		31/178 17 (14, 31)	
		3 years		38/178 21 (19, 39)	OR 0.93 (0.41, 2.13) P=0.9
		1 year	Surgical	4/40 10 (4, 31)	
		2 years		7/40 17.5 (9, 48)	
		3 years		9/40 22.5 (14, 61)	
PTRAS only					
Beck, 2010, 19939607	Death: All cause	2 years	PTRAS	13/129 10 (4.9, 15)	
Bersin, 2013, 22581488	Death: All cause	9 months	PTRAS	4/100 4.0 (0.2, 7.8)	
Blum, 1997, 9017938	Death: All cause	2.25 years	PTRAS	3/68 4.4 (1.5, 15)	
Cianci, 2013, 23467950	Death: All cause	6 months	PTRAS	1/53 1.9 (0.3, 14)	
Dangas, 2001, 11491257	Death: All cause	1.25 years	PTRAS	13/131 9.9 (4.8, 15)	
Dorros, 2002, 11835644	Death: All cause	4 years	PTRAS	275/1058 26 (23, 29)	
Gill, 2003, 12601202	Death: All cause	0.5 years	PTRAS	22/100 22 (14, 30)	
		1 year		23/100 23 (15, 31)	
		2 years		26/100 26 (17, 35)	
		4.1 year		28/100 28 (19, 37)	
Gill-Leertouwer, 2002, 12223011	Death: All cause	1 year	PTRAS	1/41 2.4 (0.3, 18)	
Gray, 2002, 12710843	Death: CV	1 year	PTRAS	8/39 21 (7.8, 33)	
		1.78 years		9/31 29 (13, 45)	
Gross, 1998, 9736342	Death: All cause	0.5 years	PTRAS	1/30 3.3 (0.5, 25)	
Harden, 1997, 9113012	Death: All cause	15.25 years	PTRAS	17/32 53 (36, 70)	

Author, year, PMID	Outcome and description	Timepoint	Arm	n/N % (95% CI)	Between-Arm Comparison
Henry, 2003, 14571477	Death: CV [Death from MI]	0.5 years	PTRAS	2/56 3.4 (0.9, 15)	
		1 year		3/56 5.4 (1.8, 18)	
Iannone, 1996, 8974797	Death: All cause	1 year	PTRAS	9/61 15 (5.9, 24)	
Jokhi, 2009, 19668788	Death: All cause	12 months	PTRAS	2/106 1.9 (0.5, 7.8)	
Kane, 2010, 19666661	Death: All cause	1 year	PTRAS (prevalence)	76/163 46 (39, 54)	
Kennedy, 2003, 14582036	Death: All cause	21 months	PTRAS	73/261 28 (23, 33)	
Leesar, 2009, 19539148	Death: All cause	1 year	PTRAS	0/62 0 (0, 13)	
Mannarino, 2012, 22260219	Death: All cause	2.75 years	PTRAS	2/30 6.7 (1.7, 30)	
Murphy, 2014, 24325931	Death: All cause	9 months	PTRAS	1/181 0.6 (0.1, 4.0)	
Rastan, 2008, 19110785	Death: All cause	1 year	PTRAS	1/50 2.0 (0.3, 15)	
Ritchie, 2014, 24074824	Death: All cause	3.8 years	PTRAS	66/127 52 (43, 61)	
Rivolta, 2005, 16358234	Death: CV	0.5 years	PTRAS	2/52 3.8 (1.0, 16)	
Rocha-Singh, 1999, 10376497	Death: All cause	1.1 year	PTRAS	4/154 2.6 (0.1, 5.1)	
Rocha-Singh, 2005, 16139124	Death: All cause	2 years	PTRAS	1/208 0.5 (0.1, 3.4)	
Rocha-Singh, 2008, 19006254	Death: All cause	9 months	PTRAS	1/92 1.1 (0.2, 7.9)	
		2 years		5/85 5.9 (0.9, 11)	
		3 years		8/56 14 (5.1, 23)	
Ruchin, 2007, 17317314	Death: All cause	2.3 years	PTRAS	9/89 10 (3.8, 16)	
	Death: CV			3/89 3.4 (1.1, 11)	
	Death: renal			3/89 3.4 (1.1, 11)	
Rzeznik, 2011, 21129903	Death: CV	1 year	PTRAS	3/84 3.6 (1.2, 12)	
Sapoval, 2010, 19908091	Death: All cause	1 year	PTRAS	11/251 4.4 (1.8, 6.9)	
	Death: CV			4/251 1.6 (0, 3.1)	
	Death: renal			3/251 1.2 (0.4, 3.8)	
Staub, 2010, 20739200	Death: All cause	6 months	PTRAS	2/122 1.6 (0.4, 6.7)	
Trani, 2010, 20578190	Death: All cause	3.7 (mean) years	PTRAS	9/70 13 (5.0, 21)	
	Death: CV	3.7 (mean) years	PTRAS	7/70 10 (3.0, 17)	
Valluri, 2012, 21765186	Death: All cause	2.2 (median) years	PTRAS	46/127 44 (28, 45)	
White, 1997, 9362400	Death: CV	0.5 years	PTRAS	3/100 3.0 (1.0, 9.8)	

Author, year, PMID	Outcome and description	Timepoint	Arm	n/N % (95% CI)	Between-Arm Comparison
Zahringer, 2007, 17696619	Death: All cause	2 years	PTRAS	3/105 2.9 (0.9, 9.3)	
Zeller, 2004, 15056029	Death: All cause	2.67 (mean) years	PTRAS	44/140 31 (24, 39)	
Medication only					
Chrysochou, 2012, 21993376	Death: All cause	3.1 (median) years	Medication only	212/621 34 (30, 38)	
Ritchie, 2014, 24074824	Death: All cause	3.8 years	Medication only	189/340 56 (50, 61)	
Safak, 2013, 23321402	Death: All cause	9 years	Medication only	58/171 34 (27, 41)	
Silva, 2008, 18670414	Death: CV	3 years	Medication only	17/104 16 (9.2, 23)	
Surgery only					
Alhadad, 2004, 14718896	Death: All cause	5 years	Surgical	38/106 36 (27, 45)	
		10 years		30/36 83 (71, 96)	
Cherr, 2002, 11854720	Death: All cause	5 years	Surgical	146/500 29 (25, 33)	
		10 years		171/500 34 (30, 38)	

C.4.2 Results: Kidney Function, Within-Arm Change, Angioplasty with Stent

Author, Year, PMID	N Baseline	Baseline SCr, Mean, mg/dL [GFR*]	Years	SCr Change (95% CI), mg/dL	GFR Change (95% CI), mL/min*
Arthurs, 2007, 17398382	18	[0.72, dL/mg (1/SCr)]	0.5		0 (nd) dL/mg
			1		0 (nd) dL/mg
			2		0.1 (nd) dL/mg
			4		-0.1 (nd) dL/mg
Balzer, 2009, 19135837	22	1.6	1	-0.2 (-0.5, 0.03)	
			4	-0.2 (-0.5, 0.02)	
Baril, 2007, 17391902	56	[53]	1.5 (mean)		4.2 (-19, 27)
Bax, 2009, 19414832	64	1.7 (0.68)	2	0.1 (-0.07, 0.35)	
Beck, 2010, 19939607	129	[46]	1.5 (mean)		-2 (-20, 16)
Bersin, 2013, 22581488	100	1.3 [61]	0.75	0 (-0.1, 0.1)	-0.1 (-5.9, 5.7)
Blum, 1997, 9017938	68	1.2	0.5	0.1 (-1.0, 1.2)	
			1	0.1 (-1.0, 1.1)	
			2	0 (-1.1, 1.0)	
			3	-0.1 (-1.2, 0.9)	
			4	-0.2 (-1.3, 0.9)	
			5	-0.1 (-1.2, 0.9)	
Christie, 2012, 23083664	83	[51]	2		4.1 (nd)
Chrysant, 2014, 24909590	202	[58]	0.75		-1 (-4.1, 2.0)
			2		0 (-3.2, 3.2)
			3		-1 (-4.1, 2.1)
Cianci, 2011, 20547539	53	1.5	1	-0.3 (-0.4, -0.1)	
Dichtel, 2010, 20630131	47	[38]	1		-1.4 (-4.4, 1.5)
			2		1.5 (-0.1, 3.1)
			3		0.1 (-2.3, 2.5)
Dorros, 2002, 11835644	1058	1.7	1	0 (-0.1, 0.1)	
			4	-0.4 (-0.5, -0.3)	

Author, Year, PMID	N Baseline	Baseline SCr, Mean, mg/dL [GFR*]	Years	SCr Change (95% CI), mg/dL	GFR Change (95% CI), mL/min*
Gill, 2003, 12601202	65	2.7	0.5	-0.1 ()	
			1.5	-0.3 ()	
			2	-0.6 ()	
			3	-0.7 ()	
Girt, 2007, 17164562	64	1.4 [57]	1	0.4 (0.1, 0.6)	-3.6 (-9.7, 2.5)
Gonçalves, 2007, 17364124	39	2.3	2	-0.4 (-0.8, 0.04)	
Gray, 2002, 12710843	39	3.2	1.8 (mean)	-0.5 (-1.0, 0.02)	
Gross, 1998, 9736342	30	1.5	0.5	-0.1 (-0.1, -0.03)	
Hanzel, 2005, 16253607	26	1.5 [61]	1.75	0 (-0.2, 0.2)	-4.0 (-7.6, -0.4)
Henry, 2003, 14571477	56	1.3	0.5	-0.2 (-0.3, -0.1)	
			2	-0.2 (-0.3, -0.1)	
			3	-0.1 (-0.3, 0.1)	
Holden, 2006, 16837918	63	1.9	0.5	-0.1 (-0.1, -0.1)	
Jaff, 2012, 22511402	202	[58]	0.75		-1 (-3.2, 1.2)
Kalra, 2010, 19937777 [Germany]	472	[60]	1		0.7 (-1.0, 2.4)
Kalra, 2010, 19937777 [UK]	89	[34]	1		-1 (-4.1, 2.5)
Kane, 2010, 19666661	50	[40]	2.8 (median)		-9 (-9.8, -8.3)
Kawarada, 2010, 20884436	61	1.1	0.6 (mean)	0 ()	
Kennedy, 2003, 14582036	261	[37]	1.75		-2 (-4.8, 0.8)
Kobo, 2010, 20684176	41	1.2	2	-0.1 (-0.2, -0.04)	
Leesar, 2009, 19539148	62	1.2	0.5	0 (-0.2, 0.1)	
			1	-0.1 (-0.2, 0.04)	

Author, Year, PMID	N Baseline	Baseline SCr, Mean, mg/dL [GFR*]	Years	SCr Change (95% CI), mg/dL	GFR Change (95% CI), mL/min*
Lekston, 2008, 19006027 [w/o Brachytherapy]	29	1.3 [74]	1	-0.1 (-0.4, 0.2)	3 (0.1, 5.9)
Lekston, 2008, 19006027 [w/Brachytherapy]	32	1.3 [75]	1	-0.2 (-0.3, -0.1)	9 (3.6, 14.4)
Mannarino, 2012, 22260219	30	[37]	2.75		-15 (nd)
Marcantoni, 2012, 22495466	38	[68]	1		-2 (-7.7, 3.3)
Patel, 2009, 9497511	199	1.8	1	0 (-0.16, 0.16)	
			1.68	0.1 (-0.98, 0.298)	
Ramos, 2003, 12472793	105	1.7 [54]	1	-0.3 (-0.5, -0.1)	8 (2.2, 13.8)
Rastan, 2008, 19110785	50	1.4 [51]	1	-0.1 (-0.3, 0.03)	10 (2.5, 17.5)
Rivolta, 2005, 16358234	52	[-0.0008, dL/mg (1/SCr) per month]	1.7 (mean)		0.001 (-0.006, 0.008) dL/mg per month
Rocha-Singh, 1999, 10376497	132	1.5	1.1	0 (-0.1, 0.2)	
Rocha-Singh, 2005, 16139124	208	1.4	0.75	0.0 (-0.04, 0.1)	
			2	0.1 (0.00, 0.2)	
Rocha-Singh, 2008, 19006254	100	1.4 [51]	0.75	0.1 (-0.1, 0.2)	0.7 (-2.1, 3.5)
			2	0.09 (0.002, 0.18)	-3.0 (-6.4, 0.4)
			3	0.1 (-0.01, 0.2)	-2.4 (-6.7, 2.0)
Rocha-Singh, 2011, 21648052	241	1.3	0.75	0.1 (-0.03, 0.1)	
Ruchin, 2007, 17317314	89	1.6 [50]	2.3 (mean)	-0.1 (-0.2, 0.02)	2 (-2.3, 6.3)
Rzeznik, 2011, 21129903	84	[58]	1		2 (-46.2, 49.8)
Sapoval, 2005, 16151060	52	1.2	0.5	-0.1 (-0.2, 0.1)	
Sapoval, 2010, 19908091	248	[55]	0.5		1.7 (0.8, 2.5)
			1		-5.3 (-8.0, -2.6)

Author, Year, PMID	N Baseline	Baseline SCr, Mean, mg/dL [GFR*]	Years	SCr Change (95% CI), mg/dL	GFR Change (95% CI), mL/min*
Sofroniadou, 2012, 22127407	26	[37]	1 to 3		-4 (-6.9, -1.1)
			3 to 6		-5 (-8.5, -1.5)
			≥6		-6 (-10.7, -1.3)
Trani, 2010, 20578190	70	1.5	2	-0.1 (-0.3, 0.1)	
Trani, 2013, 22503569	57	1.4 (median)	0.5	-0.1 (chg median)	
Tsao, 2005, 16394602	54	1.9 [35.8]	0.5	-0.1 (-0.2, -0.02)	0.7 (0.1, 1.2)
Valluri, 2012, 21765186	127	[-0.044 dL/mg (1/SCr) per year (median)]	2.9 (mean)		0.042 dL/mg per year (chg median)
van de Ven, 1999, 9929021	40	1.8	0.5	-0.2 ()	
Wheatley, 2009, 19907042	403	2.0 [0.57, dL/mg (1/SCr)]	1	0.2 (0.1, 0.3)	
			5	0.3 (0.1, 0.6)	-0.006 (nd) dL/mg per year
Zahringer, 2007, 17696619	105	1.4	0.5	0 (-0.4, 0.4)	
			1	0 (-0.4, 0.3)	
			2	0 (-0.4, 0.3)	
Zeller, 2004, 15056029	330	1.5 [59]	2.7 (mean)	-0.1 (-0.2, 0.1)	3 (-1.2, 7.2)

* Unless otherwise indicated

C.4.3 Results: Kidney Function, Within-Arm Change, Medication

Author, Year, PMID	N Baseline	Baseline SCr, Mean, mg/dL [GFR*]	Years	SCr Change (95% CI), mg/dL	GFR Change (95% CI), mL/min*
Arthurs, 2007, 17398382	22	[0.96, dL/mg (1/SCr)]	0.5		-0.1 (nd) dL/mg
			1		-0.1 (nd) dL/mg
			2		0.0 (nd) dL/mg
			3		0.1 (nd) dL/mg
			4		-0.3 (nd) dL/mg
Bax, 2009, 19414832	76	1.6 (0.58)	2	0.3 (0.14, 0.54)	
Cianci, 2011, 20547539	40	1.5	1	-0.1 (-0.2, -0.02)	
Dichtel, 2010, 20630131	71	[37]	1		-1.6 (-3.6, 0.4)
			2		-0.5 (-2.4, 1.4)
			3		-0.2 (-2.3, 1.9)
Hanzel, 2005, 16253607	40	1.3	1.75	0.1 (0.01, 0.2)	
Kalra, 2010, 19937777 [UK]	350	[35]	1		-2.7 (-4.4, -1.0)
Kane, 2010, 19666661	50	[37]	2.8 (median)		-7 (nd)
Losito, 2005, 15870215	54	1.7	4.5 (mean)	1.3 (0.6, 2.0)	
Marcantoni, 2012, 22495466	35	[60]	1		-0.7 (-5.4, 4.0)
Silva, 2008, 18670414	104	[33]	2		-1.0 (nd)
Sofroniadou, 2012, 22127407	10	[44]	1 to 3		1.0 (-7.8, 9.8)
			3 to 6		-9 (-50, 31)
			≥6		-8 (-31, 15)
Webster, 1998, 9655655 [Bilateral]	16	1.7	4.5	0 (-0.2, 0.3)	
Webster, 1998, 9655655 [Nonrandomized]	47	1.6	4.5	0 (-0.2, 0.3)	
Webster, 1998, 9655655 [Unilateral]	14	1.9	4.5	0 (-0.6, 0.6)	

Author, Year, PMID	N Baseline	Baseline SCr, Mean, mg/dL [GFR*]	Years	SCr Change (95% CI), mg/dL	GFR Change (95% CI), mL/min*
Wheatley, 2009, 19907042	403	2.0 [0.57, dL/mg (1/SCr)]	1	0.2 (0.04, 0.3)	
			5	0.1 (-0.2, 0.4)	-0.012 (nd) dL/mg per year

* Unless otherwise indicated

C.4.4 Results: Kidney Function, Within-Arm Change, Surgery

Author, Year, PMID	N Baseline	Baseline SCr, Mean, mg/dL [GFR*]	Years	SCr Change (95% CI), mg/dL	GFR Change (95% CI), mL/min*
Balzer, 2009, 19135837	27	1.3	1	0.1 (-0.2, 0.4)	
			4	0.1 (-0.2, 0.3)	
Cherr, 2002, 11854720	472	[41]	4.7 (mean)		7.1 (3.5, 10.7)
Patel, 2009, 9497511	45	2.2	1	-0.5 (-6.2, 5.2)	
			2.12	-0.5 (-0.926, -0.074)	

C.4.5 Results: Kidney Function, Between-Arm Differences

Author, Year, PMID	N Baseline	Years	SCr Net Change* [est, CI, P]	GFR Net Change*
PTRAS vs. Medication RCT				
Marcantoni, 2012 22495466	73	1		nd
Wheatley, 2009, 19907042	403	5	Mean slope: -3.05 mol/liter/year (-6.75, 0.65 P=0.11	Mean slope: 0.06 x 10^{-3} mol/liter/year (-0.002, 0.13 P=0.06
		1	3.53 (-12, 19.06) P=0.656	0 liter/mol (x1000) (-0.352, 0.352) P=1
		5	24.09 (-10.489, 58.669) P=0.172	
PTRAS vs. Medication NRCS				
Dichtel, 2010, 20630131	118	1		P=0.137
		2		P=0.655
		3		P=0.548
Hanzel, 2005, 16253607	66		Nd	
Kalra, 2010 19937777	911			nd
Kane, 2010, 19666661	100	2.8		-2 (SE 3.55)
Sofroniadou, 2012 22127407	36			nd
PTRAS vs. Surgery RCT				
Balzer, 2009 19135837	49		Nd	
PTRAS vs. Surgery NRCS				
Patel, 2009, 9497511	262	1	P=0.6	Nd

C.4.6 Results: Kidney Function, Categorical Outcomes, Simple

Author, year, PMID	Outcome and description	Timepoint	Arm	N/N % (95% CI) n/N % (95% CI)	Between-Arm Comparison
PTRAS vs. Medication RCT					
Bax, 2009, 19414832	RRT	2 years	Medication only	0/68 0 (0, 12)	
			PTRAS	1/57 1.8 (0.2, 13)	
Cooper, 2014, 24245566	ESRD/RRT	1 year	Medication only	40/472 8.5 (6.0, 11)	
		2 years		73/472 15 (12, 19)	
		3 years		183/472 39 (34, 43)	
		3.6 years		8/472 1.7 (0.5, 2.9)	
		4 years		301/472 64 (59, 68)	
		5 years		397/472 84 (81, 87)	
		1 year	PTRAS	47/459 10 (7.5, 13)	
		2 years		69/459 15 (12, 18)	
		3 years		155/459 34 (29, 38)	
		3.6 years		16/459 3.5 (1.8, 5.2)	1.98 (0.85, 4.62) P=0.119
		4 years		271/459 59 (55, 64)	
		5 years		377/459 82 (79, 86)	
Wheatley, 2009, 19907042	Acute kidney failure	5 years	Medication only	23/392 5.9 (3.5, 8.2)	
			PTRAS	25/383 6.5 (4.1, 9.0)	OR 1.12 (0.62, 2.01) P=0.70
	ESRD/RRT	5 years	Medication only	31/392 7.9 (5.2, 11)	
			PTRAS	30/383 7.8 (5.1, 11)	OR 0.99 (0.59, 1.67)
Ziakka, 2008, 19016147	RRT	4 years	Medication only	8/46 17 (9.8, 45)	
			PTRAS	8/36 22 (13, 63)	OR 1.36 (0.45, 4.06)
PTRAS vs. Medication NRCS					

Author, year, PMID	Outcome and description	Timepoint	Arm	N/N % (95% CI) n/N % (95% CI)	Between-Arm Comparison
Dichtel, 2010, 20630131	ESRD/RRT	3 years	Medication only	9/71 13 (4.9, 20)	
			PTRAS	10/47 21 (9.6, 33)	OR 1.86 (0.69, 5.0)
Hanzel, 2005, 16253607	10% increase in total GFR	1.75	PTRAS vs. Medication only	nd	OR 7.94 (2.29, 27.6)
Kane, 2010, 19666661	ESRD/RRT [Progression to RRT]	2.8 years	Medication only	4/50 8.0 (0.5, 16)	
			PTRAS (comparative)	7/50 14 (4.4, 24)	OR 1.87 (0.51, 6.85) P=0.2
Ritchie, 2014, 24074824	ESRD/RRT	3.8 years	Medication only	60/340 18 (14, 22)	
			PTRAS	23/127 18 (11, 25)	OR 1.03 (0.61, 1.75)
Sofroniadou, 2012, 22127407	ESRD/RRT	5 years	Medication only	1/10 10 (1.4, 88)	
			PTRAS	3/26 12 (3.9, 43)	OR 1.17 (0.11, 12.82)
Arthurs, 2007, 17398382	Dialysis	15 months	Medication only	0/22 0 (0, 39)	
			PTRAS	0/18 0 (0, 48)	
Surgery vs. Medication RCT					
Uzzo, 2002, 12009679	Dialysis-free survival	6.2 years	Surgical vs. Medication only		P=0.64
PTRAS vs. Surgery NRCS					
Patel, 2009, 19497511	Dialysis	3 years	PTRAS	40/65 61 (49, 72)	OR 1.12 (0.38, 3.32) P=0.7
			surgical	10/17 59 (36, 78)	
PTRAS only					

Author, year, PMID	Outcome and description	Timepoint	Arm	N/N % (95% CI) n/N % (95% CI)	Between-Arm Comparison
Bersin, 2013, 22581488	Acute kidney failure [acute renal failure and worsening chronic kidney disease]	9 months	PTRAS	4/97 4.1 (0.2, 8.1)	
Cianci, 2013, 23467950	Acute kidney failure	1 year	PTRAS	1/53 1.9 (0.3, 14)	
Dangas, 2001, 11491257	ESRD/RRT	1.25 years	PTRAS	3/131 2.3 (0.7, 7.4)	
Kennedy, 2003, 14582036	Renal Event	21 months	PTRAS	32/230 14 (9.4, 18)	
Mannarino, 2012, 22260219	ESRD/RRT [ESRD]	2.75 years	PTRAS	7/30 23 (8.2, 38)	
Rzeznik, 2011, 21129903	Acute kidney failure [eGFR 60 mL/min]	0 years	PTRAS	48/84 57 (47, 68)	
		1 year	PTRAS	35/84 42 (31, 52)	
Trani, 2010, 20578190	ESRD/RRT	2 years	PTRAS	3/70 4.3 (1.4, 14)	
		3.7 years	PTRAS	3/70 4.3 (1.4, 14)	
Valluri, 2012, 21765186	ESRD/RRT [RRT]	2.9 years	PTRAS	19/127 15 (8.8, 21)	
Zeller, 2004, 15056029	RRT	2.7 years	PTRAS	4/330 1.2 (0.5, 3.3)	
	Rescue from RRT	2.7 years	PTRAS	8/nd	
Medication only					
Chrysochou, 2012, 21993376	ESRD/RRT	3.1 (median) years	Medication only	50/621 8.1 (5.9, 10)	
Losito, 2005, 15870215	ESRD/RRT	54.4 (mean) months	Medication only	7/54 13 (4.0, 22)	
Silva, 2008, 18670414	ESRD/RRT [ESRD or doubling creatinine]	3 years	Medication only	19/104 18 (11, 26)	

Author, year, PMID	Outcome and description	Timepoint	Arm	N/N % (95% CI) n/N % (95% CI)	Between-Arm Comparison
Webster, 1998, 9655655	ESRD/RRT	0 months	Medication only	0/30 0 (0, 28)	
		3-54 months	Medication only	2/30 6.7 (1.7, 30)	
Surgery only					
Cherr, 2002, 11854720	ESRD/RRT	4.67 years	Surgical	84/500 17 (14, 20)	

C.4.7 Results: Kidney Function, Categorical Outcomes, Multiple

Author, year, PMID	Time point	Arm	IMPROVED	NO CHANGE	STABILIZED	WORSE/STABLE	WORSE	Between-Arm Comparison
PTRAS vs. Medication RCT								
Cooper, 2014, 24245566	3.6 years	Medication only				89/472 (19%)		
		PTRAS				77/459 (17%)		OR worse 1.15 (0.82, 1.61)
Wheatley, 2009, 19907042	1 year	Medication only	89/343 (26%)	121/343 (35%)			132/343 (38%)	
		PTRAS	95/329 (29%)	112/329 (34%)			122/329 (37%)	OR improved 1.16 (0.83, 1.63) OR worse 0.94 (0.69, 1.29)
Ziakka, 2008, 19016147	3.96 years	Medication only	0/46 (0%)	30/46 (65%)			16/46 (35%)	
		PTRAS	11/36 (31%)	12/36 (33%)			13/36 (36%)	OR worse 1.06 (0.43, 2.64)
Bax, 2009, 19414832	2 years	Medication only					16/74 (22%)	HR worse 0.73 (0.33, 1.61)
		PTRAS					10/62 (16%)	
PTRAS vs. Medication NRCS								
Kalra, 2010, 19937777	1 year	Medication only [UK]	48/257 (19%)	123/257 (48%)			86/257 (33%)	
		PTRAS [Germany]	91/348 (26%)	190/348 (55%)			67/348 (19%)	OR improved 1.54 (1.04, 2.29) OR worse 0.47 (0.33, 0.69)
		PTRAS [UK]	22/80 (28%)	37/80 (46%)			21/80 (26%)	OR improved 1.65 (0.92, 2.96) OR worse 0.71 (0.40, 1.24)
Kane, 2010, 19666661	2.8 years	Medication only	4/50 (8.0%)	29/50 (58%)			17/50 (34%)	

Author, year, PMID	Time point	Arm	IMPROVED	NO CHANGE	STABILIZED	WORSE/STABLE	WORSE	Between-Arm Comparison
		PTRAS (comparative)	13/50 (26%)	23/50 (46%)			14/50 (28%)	OR improved 22.22 (6.88, 71.79) OR worse 0.28 (0.12, 0.65) P=NS
PTRAS vs. Surgery NRCS								
Patel, 2009, 9497511	1 year	PTRAS	35/147 (24%)	86/147 (59%)		26/147 (18%)		OR improved 0.29 (0.13, 0.66) OR worse 1.34 (0.43, 4.19) P=0.009
		Surgical	15/29 (52%)	10/29 (35%)		4/29 (14%)		
Patel, 2009, 9497511	1.68 years	PTRAS	17/90 (19%)	51/90 (57%)		22/90 (24%)		OR improved 0.31 (0.10, 1.01) OR worse 1.94 (0.40, 9.35) P=1.0
	2.12 years	Surgical	6/14 (43%)	6/14 (43%)		2/14 (14%)		
PTRAS only								
Beck, 2010, 19939607	1.5 years	PTRAS	21/129 (16%)	77/129 (60%)			31/129 (24%)	
Bruno, 2014, 24555729	1 year	PTRAS	89/97 (92%)			8/97 (8%)		
Cianci, 2013, 23467950	1 year	PTRAS	18/53 (34%)	18/53 (34%)			17/53 (32%)	
Dangas, 2001, 11491257	1.25 years	PTRAS	27/131 (21%)	80/131 (61%)			24/131 (18%)	
Gonçalves, 2007, 17364124	2 years	PTRAS	32/39 (82%) [improved or unchanged]				4/39 (10%)	
Gray, 2002, 12710843	1.78 years	PTRAS	20/39 (51%)	10/39 (26%)			9/39 (23%)	
Harden, 1997, 9113012	1.42 years	PTRAS			18/23 (78%)			
Holden, 2006, 16837918	0.5 years	PTRAS	25/63 (40%)	2/63 (3.2%)	36/63 (57%) [put together with No Change]			
Mannarino, 2012, 22260219	2.75 years	PTRAS	14/30 (47%)	6/30 (20%)			10/30 (33%)	
Rastan, 2008, 19110785	1 year	PTRAS	30/50 (60%)	11/50 (22%)			9/50 (19%)	
Sapoval, 2005, 16151060	0.5 years	PTRAS					2/48 (3.8%)	
Sapoval, 2010, 19908091	0.5 years	PTRAS	44/154 (29%)		87/154 (57%)		23/154 (15%)	
	1 year	PTRAS	22/97 (23%)		57/97 (59%)		18/97 (19%)	

Author, year, PMID	Time point	Arm	IMPROVED	NO CHANGE	STABILIZED	WORSE/STABLE	WORSE	Between-Arm Comparison
Trani, 2013, 22503569	0.5 years	PTRAS				17/30 (57%)		
Valluri, 2012, 21765186	2.9 years	PTRAS	79/127 (62%)			48/127 (38%)		
Zahringer, 2007, 17696619	0.5 years	PTRAS				7/107 (6.5%)		
	2 years	PTRAS				6/105 (5.7%)		
van de Ven, 1999, 9929021	0.5 years	PTRAS	5/40 (13%)	26/40 (65%)			8/40 (20%)	
Rivolta, 2005, 16358234	1.67 years	PTRAS	8/52 (15.5%)	31/52 (59.5%)			13/52 (25%)	
Tsao, 2005, 16394602	0.5 years	PTRAS	8/53 (15%)	42/53 (79%)			3/53 (5.7%)	
Bersin, 2013, 22581488	9 months	PTRAS	10/84 (12%)				6/84 (7.1%)	
Henry, 2003, 14571477	2 years	PTRAS	6/28 (21%)	20/28 (71%)			2/28 (7.1%)	
	3 years	PTRAS	5/19 (26%)	12/19 (63%)			2/19 (11%)	
Surgery only								
Cherr, 2002, 11854720	4.67 years	Surgical	203/472 (43%)	222/472 (47%)			47/472 (10%)	

C.4.8 Results: Blood Pressure, Within-Arm Change, Angioplasty with Stent

Author, Year, PMID	N Baseline	Baseline SBP/DBP [MAP], Mean, mmHg	Followup, Years	SBP Change (95% CI), mmHg	DBP Change (95% CI), mmHg	MAP Change (95% CI), mmHg
Arthurs, 2007, 17398382	18	162/75	0.5	9 (-0.6, 18.5)	3 (-2.3, 8.2)	
			1	-10 (-19.3, -0.8)	3 (-2.3, 8.2)	
			2	-16 (-22.9, -9.1)	1 (-4.4, 6.4)	
			3	5 (-7.8, 17.7)	3 (-3.6, 9.6)	
			4	4 (-19, 27)	5 (-11, 20)	
Balzer, 2009, 19135837	22	170/88	1	-22 (-41, -3)	-5.1 (-14, 3.6)	
			4	-27 (-46, -8)	-10 (-19, -1.5)	
Bax, 2009, 19414832	64	160/83	2	-9 (-15, -2.1)	-6(-9.1, -2.8)	
Beck, 2010, 19939607	129	161/80	1.5 (mean)	-17 (-22, -12)	-7 (-9.3, -4.7)	
Bersin, 2013, 22581488	100	150/	0.75	-9.8 (-14.1, -5.6)	-2 (-3.9, -0.1)	
Blum, 1997, 9017938	68	[133]	0.5			-24 (-49, 1)
			1			-21 (-46, 4)
			2			-20 (-45, 5)
			3			-25 (-51, 1)
			4			-28 (-53, -3)
			5			-29 (-54, -4)
Christie, 2012, 23083664	83	196/100	2	-51 ()	-30 ()	
Chrysant, 2014, 24909590	202	162/78	0.75	-17 (-19.8, -14.2)	-3 (-4.7, -1.3)	
			2	-18 (-20.9, -15.1)	-4 (-5.7, -2.3)	
			3	-16 (-24.1, -7.9)	-3 (-5.5, -0.5)	
Cianci, 2011, 20547539	53	160/	1	-4.9 (-8.3, -1.5)		
Cooper, 2014, 24245566	459	150/	3.6 (mean)	-17 (-58, 25)		
Dangas, 2001, 11491257	131	170/84	1.25	-25 (-38, -12)	-10 (-15.1, -5.0)	

Author, Year, PMID	N Baseline	Baseline SBP/DBP [MAP], Mean, mmHg	Followup, Years	SBP Change (95% CI), mmHg	DBP Change (95% CI), mmHg	MAP Change (95% CI), mmHg
Dichtel, 2010, 20630131	47	145/75	1	-9 (-14.5, -3.6)	-3 (-6.4, 0.4)	
			2	-11 (-16.5, -5.6)	-4 (-7.2, -0.9)	
			3	-3 (-8.7, 2.7)	-1 (-4.4, 2.4)	
Dorros, 2002, 11835644	1058	168/84	1	-22 (-23.6, -20.5)	-9 (-9.8, -8.2)	
			4	-21 (-22.5, -19.5)	-6 (-6.8, -5.2)	
Gill-Leertouwer, 2002, 12223011	40	177/96	1	-19 (-27, -11)	-12 (-15.5, -8.5)	
Gill, 2003, 12601202	48	191/98	0.5	-26 (-46, -6)	-11 ()	
			1.5	-35 (-62, -8)	-15 ()	
			2	-27 (-48, -6)	-12 ()	
			3	-28 (-52, -4)	-16 ()	
			4	-39 (-69, -9)	-19 ()	
Girt, 2007, 17164562	64	155/83	1	-13 (-17.8, -8.4)	-4.9 (-7.3, -2.5)	
Gonçalves, 2007, 17364124	44	177/98	2	-42 (-51, -33)	-15 (-19, -10)	
Gray, 2002, 12710843	39	174/85	1.8 (mean)	-26 (-35, -17)	-13 (-19.3, -6.7)	
Gross, 1998, 9736342	30	163/93 [117]	0.5	-18 (-23, -13)	-10 (-12.9, -7.1)	-18 (-22, -14)
Hanzel, 2005, 16253607	26	162/82	1.75	-15 (-26, -4)	-8 (-15.3, -0.8)	
Harden, 1997, 9113012	32	169/95	1.4 (mean)	-6 (-15.9, 4.3)	-8 (-13.9, -2.3)	
Henry, 2003, 14571477	56	169/104	1.9 (mean)	-19.3 (-20.0, -18.6)	-11 (-13, -10)	
Holden, 2006, 16837918	44	164/108	1.3 (mean)	-32 ()	-10 ()	
Iannone, 1996, 8974797	63	160/80	0.5	-10 (-19.1, -1.0)	0 ()	
			1	-15 (-25.3, -4.8)	0 ()	
Jaff, 2012, 22511402	202	162/78	0.75	-17 (-19.7, -14.3)	-3 (-6, 0)	

Author, Year, PMID	N Baseline	Baseline SBP/DBP [MAP], Mean, mmHg	Followup, Years	SBP Change (95% CI), mmHg	DBP Change (95% CI), mmHg	MAP Change (95% CI), mmHg
Kalra, 2010, 19937777 [Germany]	292	144/78	1	-9.9 (-12.2, -7.6)	-3.8 (-5.1, -2.5)	
Kalra, 2010, 19937777 [UK]	80	157/81	1	-13 (-20, -6)	-8.6 (-12.8, -4.4)	
Kane, 2010, 19666661	163	154/163	2.8 (median)	-28 (-35, -21)		
Kawarada, 2010, 20884436	61	152/81	0.6 (mean)	-13 (-19.0, -7.0)	-6 (-8.8, -3.2)	
Kennedy, 2003, 14582036	261	168/82	1.75	-19 (-22.2, -15.8)	-6 (-7.8, -4.2)	
Kobo, 2010, 20684176	41	164/82	2	-22 (-36, -8)	-5 (-8.7, -1.3)	
Leesar, 2009, 19539148	62	170/91	0.5	-32 (-36, -28)	-18 (-22, -14)	
			1	-31 (-36, -26)	-20 (-24, -16)	
Marcantoni, 2012, 22495466	38	134/74	1	-6 (-13.1, 1.1)	-2 (-5.3, 0.7)	
Patel, 2009, 9497511	217	150/74	1	-20 (-23.1, -16.8)	-5 (-6.7, -3.3)	
			1.68	-20 (-23.7, -16.2)	-5 (-7.1, -3.0)	
Ramos, 2003, 12472793	105	160/91	1	-15 (-23, -7)	-8 (-12.0, -4.0)	
Rastan, 2008, 19110785	50	148/78	1	-15 (-19, -11)	-6 (-8.7, -3.4)	
Rivolta, 2005, 16358234	52	161/86	1.7 (mean)	-18 (-32, -4)	-7 (-8.8, -5.2)	
Rocha-Singh, 1999, 10376497	127	[110]	1.1 (mean)			-14 (-22, -6)
Rocha-Singh, 2005, 16139124	208	168/82	0.75	-19 (-30, -8)	-5 (-8.0, -2.0)	
			2	-19 (-30, -8)	-5 (-8.0, -2.0)	
Rocha-Singh, 2008, 19006254	100	157/75	0.75	-8.6 (-13.4, -3.7)	-0.9 (-3.7, 1.9)	
			2	-14 (-20, -8)	-4.3 (-7.5, -1.0)	
			3	-16 (-23, -8)	-4.1 (-8.0, -0.3)	

Author, Year, PMID	N Baseline	Baseline SBP/DBP [MAP], Mean, mmHg	Followup, Years	SBP Change (95% CI), mmHg	DBP Change (95% CI), mmHg	MAP Change (95% CI), mmHg
Rocha-Singh, 2011, 21648052	248	179/83	0.75	-25 (-28, -22)	-7.0 (-8.5, -5.6)	
Ruchin, 2007, 17317314	89	162/78	2.3 (mean)	-23 (-28, -18)	-1.7 (-4.3, 0.9)	
Rzeznik, 2011, 21129903	84	135/	1	-6.6 (-11.4, -1.8)	-7.8 (-17.7, 2.1)	
Sapoval, 2005, 16151060	52	172/92	0.5	-20 (-27, -13)	-7 (-11.1, -2.9)	
Sapoval, 2010, 19908091	251	171/89	0.5	-29 (-44, -14)	-11 (-17, -5.5)	
			1	-30 (-45, -15)	-9 (-14, -4.5)	
Sofroniadou, 2012, 22127407	26	177/90	7.4 (mean)	-28 (-42, -13)	-13 (-20, -5)	
Staub, 2010, 20739200	120	148/81 [103]	0.5	-11 (-14.0, -8.0)	-26 (-28, -24)	-6 (-8.2, -3.8)
Tsao, 2005, 16394602	54	146/78	0.5	-15 (-17, -13)	-7 (-8.0, -6.0)	
van de Ven, 1999, 9929021	40	180/105	0.5	-20 ()	-15 ()	
Wheatley, 2009, 19907042	385	149/76	1	-3.1 (-5.6, -0.6)	-3 (-4.2, -1.7)	
			5	-7.6 (-12.8, -2.4)	-3 (-5.8, -0.9)	
White, 1997, 9362400	100	173/88	0.5	-27 (-37, -17)	-2 (-4.8, 0.4)	
Zahringer, 2007, 17696619	105	166/89	0.5	-19	-8	
			1	-24	-8	
			2	-27	-2	
Zeller, 2004, 15056029	340	[102]	0.5			-9 (-10.4, -7.6)
			1			-9 (-10.3, -7.7)
			2			-11 (-12.5, -9.5)
			3			-10 (-11.6, -8.4)
			2.7 (mean)			-8 (-12.0, -4.0)

C.4.9 Results: Blood Pressure, Within-Arm Change, Medication

Author, Year, PMID	N Baseline	Baseline SBP/DBP [MAP], Mean, mmHg	Followup, Years	SBP Change (95% CI), mmHg	DBP Change (95% CI), mmHg	MAP Change (95% CI), mmHg
Arthurs, 2007, 17398382	22	142/73	0.5	-10 (-18, -2.4)	-11 (-17, -5)	
			1	-6 (-14, 2)	-4 (-10, 2)	
			2	4 (-7, 15)	0 (-6, 6)	
			3	-25 (-33, -17)	-7 (-15, 0.7)	
			4	-5 (-38, 28)	5 (-20, 30)	
Bax, 2009, 19414832	76	163/82	2	-8 (-14, -2)	-3 (-5.6, -0.3)	
Cianci, 2011, 20547539	40	155/	1	-7 (-9, -5)		
Cooper, 2014, 24245566	472	150/	3.6 (mean)	-16 (-66, 35)		
Dichtel, 2010, 20630131	71	141/70	1	-4 (-10, 2.3)	-1 (-4, 2)	
			2	-4 (-9, 1)	0 (-3, 3)	
			3	-7 (-14, -0.3)	-1 (-4, 2)	
Hanzel, 2005, 16253607	40	154/77	1.75	-11 (-19, -2.9)	-5 (-9.7, -0.3)	
Kalra, 2010, 19937777 [UK]	245	156/80	1	-5.9 (-9.4, -2.4)	-4.8 (-6.6, -3.0)	
Kane, 2010, 19666661	163	148/163	2.8 (median)	-9 (-16, -1)		
Losito, 2005, 15870215	54	160/89	4.5 (mean)	-11 (-15, -7)	-7.7 (-10.0, -5.4)	
Marcantoni, 2012, 22495466	35	132/75	1	-6 (-12, -0.5)	-6 (-10, -2)	
Safak, 2013, 23321402	171	137/78	9	-7 ()	-2 ()	
Silva, 2008, 18670414	104	167/95	2	-22 (-31, -13)	-13 (-18, -8)	
Sofroniadou, 2012, 22127407	26	147/77	7.4 (mean)	-18 (-30, -5)	-9 (-15, -3)	
Webster, 1998, 9655655 [Bilateral]	16	179/93	4.5	-8 ()	-2 ()	
Webster, 1998, 9655655 [Unilateral]	79	175/98	4.5	-11 ()	-12 ()	

Author, Year, PMID	N Baseline	Baseline SBP/DBP [MAP], Mean, mmHg	Followup, Years	SBP Change (95% CI), mmHg	DBP Change (95% CI), mmHg	MAP Change (95% CI), mmHg
Wheatley, 2009, 19907042	388	152/76	1	-3.9 (-6.4, -1.3)	-1.2 (-2.5, 0.1)	
			5	-10.8 (-16.3, -5.2)	-5.5 (-8.4, -2.7)	

C.4.10 Results: Blood Pressure, Within-Arm Change, Surgery

Author, Year, PMID	N Baseline	Baseline SBP/DBP [MAP], Mean, mmHg	Followup, Years	SBP Change (95% CI), mmHg	DBP Change (95% CI), mmHg	MAP Change (95% CI), mmHg
Balzer, 2009, 19135837	27	169/87	1	-21 (-38, -4)	-3.0 (-5.5, -0.4)	
			4	-31 (-49, -13)	-4.0 (-13.8, 5.7)	
Cherr, 2002, 11854720	472	201/104	4.7 (mean)	-53 (-80, -26)	-23 (-35, -11)	
Patel, 2009, 9497511	45	160/77	1	-30 (-36.7, -23.3)	-7 (-10.7, -3.3)	
			2.12	-30 (-39, -21)	-12 (-16.2, -7.8)	

C.4.11 Results: Blood Pressure, Between-Arm Differences

Author, Year, PMID	N Baseline	Years	SBP Net Change* [est, CI, P]	DBP Net Change*	MAP Net Change*
PTRAS vs. Medication RCT					
Cooper, 2014, 24245566	931	3.6	-2.3 (-4.4, -0.2) P=0.03	nd	
Marcantoni, 2012 22495466	73	1	0 (-8.7, 8.7) NS	3.7 (-1.3, 8.7) NS	
Bax, 2009, 19414832	125	2	-0.5 (-11, 10) NS	-3.0 (-8.1, 2.1) NS	
Wheatley, 2009, 19907042	672	1	0.72 (-2.84, 4.28) P=0.69	-1.71 (-3.52, 0.10) P=0.064	
		5	3.16 (-4.43, 10.75) P=0.415	2.16 (-1.61, 5.93) P=0.261	
PTRAS vs. Medication NRCS					
Dichtel, 2010, 20630131	118	1	-5 (-15, 5) P=0.329	-2 (-7, 3) P=0.428	
		2	-7 (-16, 2) P=0.146	-4 (-10, 2) P=0.182	
		3	4 (-15, 23) P=0.682	0 (-4, 4) P=0.946	
Hanzel, 2005, 16253607	40	1.75	-6 (-19, 7) NS	-3 (--11, 5) NS	
Kalra, 2010 19937777 [UK cohorts]	325	1	-7.1 (-13.4, -0.8)	-3.8 (-7.5, -0.1)	
Kane, 2010, 19666661	100	2.8 (median)	-19 (-26, -12)	nd	
Sofroniadou, 2012 22127407	36	7.4	Final values: 19.6 (4.0, 35.2) P=0.014	Final values: 8.8 (1.6, 16.0) P=0.016	
Arthurs, 2007, 17398382	36	0.5	19 (6, 32)	14 (6, 22)	
	33	1	-4 (-17, 9)	7 (-1, 15)	
	29	2	-20 (-33, -7)	1 (-7, 9)	
	21	3	30 (13, 46)	10 (-1, 21)	
PTRAS vs. Surgery RCT					

Author, Year, PMID	N Baseline	Years	SBP Net Change* [est, CI, P]	DBP Net Change*	MAP Net Change*
Balzer, 2009 19135837	49	1 and 4	nd	nd	
PTRAS vs. Surgery NRCS					
Patel, 2009, 9497511	262	1	P=NS	nd	

C.4.12 Results: Blood Pressure /Hypertension, Categorical Outcomes, Simple

Author, year, PMID	Outcome description	Timepoint	Arm	N/N % (95% CI)	Between-Arm Comparison
PTRAS vs. Medication RCT					
Bax, 2009, 19414832	HTN [Therapy-refractory hypertension]	2 years	Medication only	3/74 4.1 (1.3, 13)	
			PTRAS	0/62 0 (0, 13)	
	Malignant HTN/HTNsive crisis	2 years	Medication only	0/74 0 (0, 11)	
			PTRAS	0/62 0 (0, 13)	
Surgery vs. Medication RCT					
Uzzo, 2002, 12009679	Uncontrollable HTN	6.2 years	Surgical vs. Medication only		P=0.20
PTRAS only					
Kennedy, 2003, 14582036	HTN	21 months	PTRAS	9/230 3.9 (1.4, 6.4)	

C.4.13 Results: Blood Pressure /Hypertension, Categorical Outcomes, Multiple

Author, year. PMID	Timepoint	Arm	CURED	IMPROVED	NO CHANGE	STABILIZED	WORSE/ STABLE	WORSE	Between-Arm Comparison
PTRAS vs. Medication RCT									
Ziakka, 2008, 19016147	4 years (mean)	Medication only	0/46 (0.0%)	33/46 (72%)			13/46 (28%)		
Ziakka, 2008, 19016147	4 years (mean)	PTRAS	4/36 (11%)	24/36 (67%)			8/36 (22%)		OR cured/improved 1.38 (0.31, 2.03) OR worse/stable 0.11 (0.04, 0.31)
Bax, 2009, 19414832	2 (years)	Medication only	20/68 (29%)						P=0.95
		PTRAS	18/57 (32%)						
Surgery vs. PTRAS RCT									
Balzer, 2009, 19135837	1 and 4 years	PTRAS	2/22 (9%)	14/22 (64%)			6/22 (27%)		OR cured/improved 0.61 (0.16, 2.34) OR worse/stable 1.65 (0.43, 6.37)
		Surgical	2/27 (7%)	20/27 (74%)			5/27 (19%)		
Surgery vs. PTRAS NRCS									
de Donato, 2007, 17653002	3.1 years	PTRAS	15/83 (18%)	33/83 (40%)	20/83 (25%)			14/83 (17%)	OR cured 0.88 (0.22, 3.52) OR worse 0.81 (0.20, 3.26) P=NS
		Surgical	3/15 (20%)	5/15 (33%)	4/15 (27%)			3/15 (20%)	
Patel, 2009, 9497511	1 year	PTRAS	12/138 (9%)	90/138 (65%)			36/138 (26%)		OR cured/improved 0.35 (0.12, 1.07) OR worse/stable 2.82 (0.93, 8.54)
		Surgical	3/36 (8%)	29/36 (81%)			4/36 (11%)		
	1.68 years	PTRAS	4/75 (5%)	51/75 (68%)			20/75 (27%)		OR cured/improved 0.37 (0.08, 1.75) OR worse/stable 2.73 (0.57, 13.0)

Author, year. PMID	Timepoint	Arm	CURED	IMPROVED	NO CHANGE	STABILIZED	WORSE/ STABLE	WORSE	Between-Arm Comparison
	2.12years	Surgical	0/17 (0%)	15/17 (88%)			2/17 (12%)		
PTRAS only									
Beck, 2010, 19939607	2 years	PTRAS		68/129 (53%)					
Beck, 2010, 19939607.	1 year	PTRAS		66/129 (51%)					
Beck, 2010, 19939607.	4 years	PTRAS		76/129 (59%)					
Blum, 1997, 9017938	2.25 years	PTRAS	11/68 (16%)	42/68 (62%)	15/68 (22%)				
Bruno, 2014, 24555729	1 year	PTRAS		32/97 (33%)			65/97 (67%)		
Gill, 2003, 12601202	2.1 year	PTRAS	2/48 (4.2%)	38/48 (79%)	8/48 (17%)				
Gonçalves, 2007, 17364124	2 years	PTRAS		19/44 (44%)	4/44 (9.1%)				
Gray, 2002, 12710843	1.78 years	PTRAS		28/39 (72%)				11/39 (28%)	
Gross, 1998, 9736342	0.5 years	PTRAS		20/29 (69%)	9/29 (31%)				
Henry, 2003, 14571477	1.88 years	PTRAS	10/56 (19%)	33/56 (62%)	13/56 (25%)				
Iannone, 1996, 8974797	1 year	PTRAS	2/54 (3.7%)	19/54 (35%)	29/54 (54%)			4/54 (7.4%)	
Kobo, 2010, 20684176	2 years	PTRAS	9/41 (22%)	27/41 (64%)	6/41 (14%)				
Leesar, 2009, 19539148	1 year	PTRAS		39/62 (63%)					
Leesar, 2009, 19539148	0.5 years	PTRAS		42/62 (68%)					
Rastan, 2008, 19110785	1 year	PTRAS		32/50 (64%)	17/50 (33%)				
Rzeznik, 2011 21129903	1 year	PTRAS		32/84 (38%)	40/84 (48%)			12/84 (14%)	
Sapoval, 2005, 16151060	6 months	PTRAS	29/48 (61%)	2/48 (4.2%)			16/48 (34%)		
Sapoval, 2010, 19908091	6 months	PTRAS	8/164 (4.9%)	127/164 (77.4%)					

Author, year. PMID	Timepoint	Arm	CURED	IMPROVED	NO CHANGE	STABILIZED	WORSE/ STABLE	WORSE	Between-Arm Comparison
	1 year	PTRAS	6/111 (5.7%)	79/111 (70.8%)					
Staub, 2010, 20739200	6 months	PTRAS		65/120 (54%)					
van de Ven, 1999, 9929021	0.5 years	PTRAS	6/40 (15%)	17/40 (43%)			17/40 (43%)		
Zahringer, 2007, 17696619	0.5 years	PTRAS	2/53 (3.8%)	28/53 (53%)	23/53 (43%)				
Zahringer, 2007, 17696619	0.5 years	PTRAS	3/52 (5.8%)	32/52 (61%)	17/52 (34%)				
Zahringer, 2007, 17696619	0.5 years	PTRAS	5/105 (4.8%)	60/105 (57%)	40/105 (38%)				
Zeller, 2004, 15056029	2.67 years (mean)	PTRAS		152/330 (46%)	142/330 (43%)			36/330 (11%)	

C.4.13 Results: Number of Medications

Author, Year, PMID	Arm	N baseline	Mean baseline, No. Rx	Years	Within arm Change, No. Rx	Between arm Change, No. Rx
PTRAS vs. Medication RCT						
Cooper, 2014, 24245566	Medication only	472	2.1	3.6	1.4 (1.3, 1.5)	
	PTRAS	83	2.8	3.6	1.2 (1.1, 1.3)	-0.2 (-0.397, -0.003) P=0.046
Wheatley, 2009, 19907042	Medication only	403	2.8	1	0.17	
	PTRAS	403	2.79	1	-0.02	-0.19 (nd)
PTRAS vs. Medication NRCS						
Arthurs, 2007, 17398382	Medication only	22	4 (median)	1	1 (chg median)	
				2	2 (chg median)	
				3	3 (chg median)	
				4	4 (chg median)	
	PTRAS	18	3.5 (median)	0.5	-0.5 (chg median)	
				1	0.5 (chg median)	
				2	0.5 (chg median)	
				3	0.5 (chg median)	
				4	0.5 (chg median)	
Dichtel, 2010, 20630131	Medication only	71	4.7	1	-0.3 (-0.9, 0.3)	
				2	-0.1 (-0.8, 0.6)	
				3	-0.7 (-1.6, 0.2)	
	PTRAS	47	3.9	1	-0.2 (-0.9, 0.5)	P=0.048
				2	0.5 (-0.05, 1.0)	P=0.581
				3	1.2 (0.2, 2.2)	P=0.291
Hanzel, 2005, 16253607	Medication only	40	2.2	1.75	0 (-0.4, 0.4)	
	PTRAS	26	3.1	1.75	-0.4 (-0.9, 0.1)	
Kane, 2010, 19666661	Medication only	50	3.5	2.8	0.2 (0.01, 0.4)	
	PTRAS (comparative)	50	3.6	2.8	-0.6 (-0.9, -0.3)	P<0.01
PTRAS only						
Beck, 2010, 19939607	PTRAS	129	3.1	1.49	-0.3 (-0.6, -0.02)	

Author, Year, PMID	Arm	N baseline	Mean baseline, No. Rx	Years	Within arm Change, No. Rx	Between arm Change, No. Rx
PTRAS vs. Medication RCT						
Cooper, 2014, 24245566	Medication only	472	2.1	3.6	1.4 (1.3, 1.5)	
	PTRAS	83	2.8	3.6	1.2 (1.1, 1.3)	-0.2 (-0.397, -0.003) P=0.046
Wheatley, 2009, 19907042	Medication only	403	2.8	1	0.17	
	PTRAS	403	2.79	1	-0.02	-0.19 (nd)
PTRAS vs. Medication NRCS						
Arthurs, 2007, 17398382	Medication only	22	4 (median)	1	1 (chg median)	
				2	2 (chg median)	
				3	3 (chg median)	
				4	4 (chg median)	
Bersin, 2013, 22581488	PTRAS	100	2.5	0.75	-0.2 (-0.4, 0.03)	
Christie, 2012, 23083664	PTRAS	83	2.8	2	-0.2 (nd)	
Dangas, 2001, 11491257	PTRAS	131	2.2	1.25	-0.2 (-0.2, -0.2)	
Dorros, 2002, 11835644	PTRAS	1058	2.4	1	-0.5 (-0.6, -0.4)	
				4	-0.4 (-0.5, -0.3)	
Gill-Leertouwer, 2002, 12223011	PTRAS	40	3.4	1	-0.6 (-1.0, -0.2)	
Girt, 2007, 17164562	PTRAS	64	2.6	1	-0.1 (-0.5, 0.3)	
Gonçalves, 2007, 17364124	PTRAS	40	3.075	2	-0.8 (-1.2, -0.5)	
Gray, 2002, 12710843	PTRAS	39	3.0	1.78	-0.2 (-0.3, -0.1)	
Gross, 1998, 9736342	PTRAS	30	3.2	0.5	-0.4 (-0.4, -0.4)	
Harden, 1997, 9113012	PTRAS	32	1.6	1.42	-1.4 (-4.7, 1.9)	
Henry, 2003, 14571477	PTRAS	56	2.31	1.88	-1.12 (-1.15, -1.09)	
Iannone, 1996, 8974797	PTRAS	63	2.5	1	-0.3 (-0.6, -0.04)	
Kawarada, 2010, 20884436	PTRAS	61	2.2	0.6	-0.1 (-0.2, 0.00)	
Kennedy, 2003, 14582036	PTRAS	261	2.3	1.75	0.1 (-0.04, 0.2)	
Kobo, 2010, 20684176	PTRAS	41	3.0	2	-0.7 (-1.0, -0.3)	
Leesar, 2009, 19539148	PTRAS	62	2.76	0.5	0 (-0.2, 0.2)	
				1	0.2 (-0.01, 0.5)	

Author, Year, PMID	Arm	N baseline	Mean baseline, No. Rx	Years	Within arm Change, No. Rx	Between arm Change, No. Rx
PTRAS vs. Medication RCT						
Cooper, 2014, 24245566	Medication only	472	2.1	3.6	1.4 (1.3, 1.5)	
	PTRAS	83	2.8	3.6	1.2 (1.1, 1.3)	-0.2 (-0.397, -0.003) P=0.046
Wheatley, 2009, 19907042	Medication only	403	2.8	1	0.17	
	PTRAS	403	2.79	1	-0.02	-0.19 (nd)
PTRAS vs. Medication NRCS						
Arthurs, 2007, 17398382	Medication only	22	4 (median)	1	1 (chg median)	
				2	2 (chg median)	
				3	3 (chg median)	
				4	4 (chg median)	
Rastan, 2008, 19110785	PTRAS	50	3.0	1	-0.3 (-0.7, 0.1)	
Rivolta, 2005, 16358234	PTRAS	52	2.28	1.67	-0.3 (-0.5, -0.03)	
Rocha-Singh, 1999, 10376497	PTRAS	140	2.9	1.1	-1.0 (-1.8, -0.2)	
Rocha-Singh, 2005, 16139124	PTRAS	208	2.8	0.75	-0.4 (-0.6, -0.2)	
				2	-0.5 (-0.8, -0.2)	
Ruchin, 2007, 17317314	PTRAS	89	3.14	2.3	-0.5 (-0.8, -0.2)	
Rzeznik, 2011, 21129903	PTRAS	84	3.2	1	-0.4 (-0.6, -0.2)	
Staub, 2010, 20739200	PTRAS	120	2.9	0.5	-0.3 (-0.5, -0.1)	
Trani, 2010, 20578190	PTRAS	70	2.2	2	-0.5 (-0.8, -0.2)	
Tsao, 2005, 16394602	PTRAS	54	2.8	0.5	0 (nd)	
van de Ven, 1999, 9929021	PTRAS	40	1.8	0.5	-0.3 (nd)	
White, 1997, 9362400	PTRAS	100	2.6	0.5	-0.6 (-0.8, -0.4)	
Zahringer, 2007, 17696619	PTRAS	105	2.06	0.5	-0.5 (nd)	
				2	-0.4 (nd)	
Zeller, 2004, 15056029	PTRAS	340	3.06	2.67 (mean)	-0.3 (-0.4, -0.2)	

C.4.14 Results: Medications, Categorical Outcomes, Simple

Author, year, PMID	Outcome and description	Timepoint	Arm	N/N % (95% CI)	Between-Arm Comparison
PTRAS vs. Medication RCT					
Marcantoni, 2012, 22495466	Rx: ACEi/ARB use	0 years	Medication only	33/42 79 (66, 91)	
		1 year		29/35 83 (70, 95)	
		0 years	PTRAS	34/43 79 (67, 91)	OR 1.03 (0.36, 2.92) P=0.9
		1 year		31/38 82 (69, 94)	OR 0.92 (0.28, 3.05) P=0.8
Wheatley, 2009, 19907042	Rx: ACEi/ARB dose	0 years	Medication only	146/383 38 (33, 43)	
		1 years		nd 43 (nd)	
		0 years	PTRAS	174/373 47 (42, 52)	P = 0.02
		1 year		nd 50 (nd)	P = 0.05
PTRAS only					
Chrysant, 2014, 24909590	Rx: >=3 Anti-HTN drugs	9 months	PTRAS	133/202 66 (59, 72)	
		3 years		138/202 68 (62, 75)	
		2 years		141/202 70 (63, 76)	
		0 months		143/202 71 (65, 77)	
	Rx: ACEi/ARB use	3 years		141/202 70 (63, 76)	
		2 years		150/202 74 (68, 80)	
		0 months		154/202 76 (70, 82)	
		9 months		154/202 76 (70, 82)	
Gray, 2002, 12710843	Rx: ACEi/ARB use	0 years	PTRAS	6/39 15 (4.1, 27)	
		1.78 years		19/39 49 (33, 64)	
Rzeznik, 2011, 21129903	Rx: ACEi/ARB use	0 years	PTRAS	52/84 62 (52, 72)	
		1 year		50/84 60 (49, 70)	

C.4.15 Results: Medications, Categorical Outcomes, Multiple

Author, year. PMID	Time point	Arm	IMPROVED	NO CHANGE	STABILIZED	WORSE/ STABLE	WORSE
Dangas, 2001, 11491257	1.25 years	PTRAS	17/131 (13%)	30/131 (40%)			63/131 (48%)
Rzeznik, 2011, 21129903	1 year	PTRAS	6/84 (7.1%)				26/84 (31%)

C.4.16 Results: Cardiovascular Events

Author, year, PMID	Outcome and description	Timepoint	Arm	N/N % (95% CI)	Between-Arm Comparison
PTRAS vs. Medication RCT					
Cooper, 2014, 24245566	MI	1 year	Medication only	47/472 10 (7.3, 13)	
		2 years		83/472 18 (14, 21)	
		3 years		187/472 40 (35, 44)	
		4 years		296/472 63 (58, 67)	
		5 years		391/472 83 (79, 86)	
		1 year	PTRAS	56/459 12 (9.2, 15)	
		2 years		82/459 18 (14, 21)	
		3 years		174/459 38 (33, 42)	
		4 years		283/459 62 (57, 66)	
		5 years		378/459 82 (79, 86)	OR 0.97 (0.69, 1.36)
	MI [presence of clinical symptoms or electrocardiographic changes and elevated cardiac markers]	3.6 years	Medication only	37/472 7.8 (5.4, 10)	
		3.6 years	PTRAS	40/459 8.7 (6.1, 11)	HR 1.09 (0.70, 1.71) P=0.7
	Stroke [focal neurological deficit defined by imaging or clinical characteristics]	1 year	Medication only	44/459 9.6 (6.9, 12)	
		2 years		24/459 5.2 (3.2, 7.3)	
		3 years		85/459 19 (15, 22)	
		3.6 years		16/459 3.5 (1.8, 5.2)	

Author, year, PMID	Outcome and description	Timepoint	Arm	N/N % (95% CI)	Between-Arm Comparison
		4 years		118/459 26 (22, 30)	
		5 years		105/459 23 (19, 27)	
		1 year	PTRAS	45/472 9.5 (6.9, 12)	
		2 years		34/472 7.2 (4.9, 9.5)	
		3 years		114/472 24 (20, 28)	
		3.6 years		23/472 4.9 (2.9, 6.8)	OR 0.71 (0.37, 1.35)
		4 years		114/472 24 (20, 28)	
		5 years		92/472 19 (16, 23)	
Wheatley, 2009, 19907042	Angina [Hospitalization]	5 years	Medication only	34/395 8.6 (5.8, 11)	
			PTRAS	29/386 7.5 (4.9, 10)	OR 0.86 (0.51, 1.45)
	Coronary artery procedure (e.g. CABG or PCTA)	5 years	Medication only	16/395 4.1 (2.1, 6.0)	
			PTRAS	15/386 3.9 (2.0, 5.8)	OR 0.96 (0.47, 1.97)
	MI	5 years	Medication only	37/395 9.4 (6.5, 12)	
			PTRAS	36/386 9.3 (6.4, 12)	OR 1.00 (0.61, 1.61)
	Stroke	5 years	Medication only	23/395 5.8 (3.5, 8.1)	
			PTRAS	24/386 6.2 (3.8, 8.6)	OR 1.07 (0.59, 1.93)
PTRAS vs. Medication NRCS					
Arthurs, 2007, 17398382	Stroke	2 years	Medication only	0/22 0 (0, 39)	
			PTRAS	1/18 5.6 (0.8, 44)	
	MI	2 years	Medication only	1/22	
			PTRAS	3/18	HR 0.338 (0.069, 1.668) P=0.183
Kane, 2010, 19666661	Coronary revascularization	2.8 years	Medication only	11/50 22 (11, 33)	
			PTRAS (comparative)	7/50 14 (4.4, 24)	OR 0.58 (0.20, 1.64)
Sofroniadou, 2012, 22127407	Angina	7.4 years	Medication only	0/10 0 (0, 93)	
			PTRAS	1/26 3.8 (0.5, 30)	
	MI	7.4 years	Medication only	0/10 0 (0, 93)	

Author, year, PMID	Outcome and description	Timepoint	Arm	N/N % (95% CI)	Between-Arm Comparison
			PTRAS	2/26 7.7 (2.0, 35)	
	AAA rupture	7.4 years	Medication only	1/10 10 (1.4, 88)	
			PTRAS	0/26 0 (0, 33)	
PTRAS only					
Dangas, 2001, 11491257	Coronary artery procedure (e.g. CABG or PCTA) [CABG]	1.25 years	PTRAS	5/131 3.8 (0.5, 7.1)	
	MI	1.25 years	PTRAS	6/131 4.6 (1.0, 8.2)	
Hanzel, 2005, 16253607	MI	1.75 years	PTRAS	1/26 3.8 (0.5, 30)	
	Stroke	1.75 years	PTRAS	2/26 7.7 (2.0, 35)	
Kennedy, 2003, 14582036	MI	21 months	PTRAS	24/230 10 (6.5, 14)	
Kennedy, 2003, 14582036	Stroke	21 months	PTRAS	15/230 6.5 (3.3, 9.7)	
Murphy, 2014, 24325931	Stroke	9 months	PTRAS	1/181 0.6 (0.1, 4.0)	
Rzeznik, 2011, 21129903	MI	1 year	PTRAS	3/84 3.6 (1.2, 12)	
	Stroke	1 year	PTRAS	1/84 1.2 (0.2, 8.7)	
Staub, 2010, 20739200	MI	6 months	PTRAS	2/122 1.6 (0.4, 6.7)	
Trani, 2010, 20578190	MI	2 years	PTRAS	0/70 0 (0, 12)	
		3.7 mean years	PTRAS	2/70 2.9 (0.7, 12)	
	Stroke	2 years	PTRAS	0/70 0 (0, 12)	
		3.7 years	PTRAS	0/70 0 (0, 12)	
Zahringer, 2007, 17696619	MI	2 years	PTRAS	1/105 1.0 (0.1, 6.9)	
Medication only					
Hanzel, 2005, 16253607	MI	1.75 years	Medication only	1/40 2.5 (0.4, 19)	
	Stroke	1.75 years	Medication only	1/40 2.5 (0.4, 19)	
Webster, 1998, 9655655	Stroke	3-54 months	Medication only	4/30 13 (1.2, 25)	
Surgery only					
Alhadad, 2004, 14718896	Cardiac event	1 month years	Surgical	4/106 3.8 (0.1, 7.4)	
	Cardiac event	1 month years	Surgical	1/106 0.9 (0.1, 6.8)	

Author, year, PMID	Outcome and description	Timepoint	Arm	N/N % (95% CI)	Between-Arm Comparison
Cherr, 2002, 11854720	Angina	10 years	Surgical	49/500 9.8 (7.2, 12)	
	Coronary artery procedure (e.g. CABG or PCTA)	10 years	Surgical	41/500 8.2 (5.8, 11)	
	MI	10 years	Surgical	29/500 5.8 (3.8, 7.8)	
	Stroke	10 years	Surgical	22/500 4.4 (2.6, 6.2)	

C.4.17 Results: Congestive Heart Failure

Author, year, PMID	Outcome and description	Timepoint	Arm	N/N % (95% CI)	Between-Arm Comparison
PTRAS vs. Medication RCT					
Bax, 2009, 19414832	Flash pulmonary edema	2 years	Medication only	1/74 1.4 (0.2, 9.9)	
			PTRAS	0/62 0 (0, 13)	
Cooper, 2014, 24245566	CHF event	1 year	Medication only	50/472 11 (7.8, 13)	
		2 years		89/472 19 (15, 22)	
		3 years		195/472 41 (37, 46)	
		4 years		314/472 67 (62, 71)	
		5 years		406/472 86 (83, 89)	
		1 year	PTRAS	53/459 12 (8.6, 14)	
		2 years		79/459 17 (14, 21)	
		3 years		165/459 36 (32, 40)	
		4 years		282/459 61 (57, 66)	
		5 years		383/459 83 (80, 87)	OR 0.82 (0.57, 1.17)
	CHF: Hospitalization [if the patient was hospitalized for 12 hours or longer because of documented signs and symptoms of heart failure and received intravenous therapy (vasodilators, diuretics, or inotropes) during the hospital stay]	3.6 years	Medication only	39/459 8.5	
			PTRAS	39/472 8.3	OR 1.03 (0.64, 1.56) P=0.99
PTRAS vs. Medication NRCS					
Kane, 2010, 19666661	CHF Hospitalization	2.8 years	Medication only	23/50 46	
			PTRAS	11/50 22	OR 0.33 (0.14, 0.79) P<0.005
Sofroniadou, 2012, 22127407	CHF event	7.4 years	Medication only	1/10 10 (1.4, 88)	
			PTRAS	1/26 3.8 (0.5, 30)	OR 0.36 (0.02, 6.38)
PTRAS only					

Author, year, PMID	Outcome and description	Timepoint	Arm	N/N % (95% CI)	Between-Arm Comparison
Kennedy, 2003, 14582036	CHF event	21 months	PTRAS	46/230 20 (15, 25)	
Murphy, 2014, 24325931	CHF event	9 months	PTRAS	6/181 3.3 (1.5, 7.7)	
Medication only					
Webster, 1998, 9655655	CHF event	0 months	Medication only	0/30 0 (0, 28)	
		3-54 months	Medication only	4/30 13 (1.2, 25)	

C.4.18 Results: Composite Major Adverse Events

Author, year, PMID	Outcome and description	Timepoint	Arm	N/N % (95% CI)	Between-Arm Comparison
PTRAS vs. Medication RCT					
Cooper, 2014, 24245566	Composite: MACE [Events from composite MAE]	1 year	Medication only	101/472 21 (18, 25)	
		2 years		158/472 33 (29, 38)	
		3 years		258/472 55 (50, 59)	
		4 years		357/472 76 (72, 80)	
		5 years		432/472 92 (89, 94)	
		1 year	PTRAS	97/459 21 (17, 25)	
		2 years		141/459 31 (26, 35)	
		3 years		235/459 51 (47, 56)	
		4 years		328/459 71 (67, 76)	
		5 years		400/459 87 (84, 90)	
	Composite: MACE [death from cardiovascular or renal causes, stroke, myocardial infarction, hospitalization for congestive heart failure, progressive renal insufficiency, or permanent renal-replacement therapy (Primary endpoint)]	3.6 years	Medication only	169/472 36 (31, 40)	
			PTRAS	161/459 35 (31, 39)	HR 0.94 (0.76, 1.17) P=0.58
Wheatley, 2009, 19907042	CVD: CV event (composite) [MI, stroke, CV death, hospitalization for angina, fluid overload or cardiac failure, coronary-artery revascularization, or another peripheral arterial procedure.]	5 years	Medication only	145/395 37 (32, 41)	
			PTRAS	141/386 37 (32, 41)	HR 0.94 (0.75, 1.19) P=0.61
PTRAS vs. Medication NRCS					
Ritchie, 2014, 24074824	CVD: CV event (composite)	3.8 years	Medication only	110/340 32 (27, 37)	
			PTRAS	45/127 35 (27, 44)	OR 1.15 (0.75, 1.76)
PTRAS only					
Bersin, 2013, 22581488	Composite: MACE [Death, Q-wave myocardial infarction, clinically-driven target lesion revascularization, significant embolic events]	1 months	PTRAS	0/100 0 (0, 8.1)	

Author, year, PMID	Outcome and description	Timepoint	Arm	N/N % (95% CI)	Between-Arm Comparison
		9 months	PTRAS	2/92 2.2 (0.5, 9.0)	
Gill-Leertouwer, 2002, 12223011	Overall: BP & SCr improvement [Clinical success defined as 1) normalization or a >= 10 mm decrease in DBP with the same or fewer defined daily doses of antihypertensive medication in pts treated for HTN, 2) normalization (<1.25 mg/dL) or a >= 20% decrease of serum creatinine in pts treated for renal function impairment, and 3) in pts treated for both HTN and renal impairment, normalization of or a >= 10 mm decrease in DBP with the same or fewer defined daily doses of antihypertensive medication and/or normalization (<1.25 mg/dL) or a >=20% decrease of serum creatinine in pts treated for renal function impairment]	1 year	PTRAS	27/40 68 (53, 82)	
Gonçalves, 2007, 17364124	CVD: any outcome	2 years	PTRAS	0/46 0 (0, 18)	
Murphy, 2014, 24325931	Composite: MAE	9 months	PTRAS	16/181 9 (6, 16)	
Rocha-Singh, 2005, 16139124	Composite: MAE	2 years	PTRAS	41/208 20 (14, 25)	
Rzeznik, 2011, 21129903	CVD: CV event (composite)	1 year	PTRAS	12/84 14 (6.8, 22)	
Sapoval, 2010, 19908091	Composite: MAE [Not defined]	1 year	PTRAS	16/251 6.4 (3.4, 9.4)	
Trani, 2010, 20578190	Composite MAE	3.7 mean years	PTRAS	11/70 16 (7.2, 24)	
		2 years	PTRAS	5/70 7.1 (1.1, 13)	
Medication only					
Chrysochou, 2012, 21993376	Composite: Death, CV event, RRT [ACE-I/ARB as time-varying covariate]	3.1 (median) years	Medication only	259/621 42 (38, 46)	
		3.1 (median) years	Medication only	259/621 42 (38, 46)	
	CVD: CV event (composite) [ACE-I/ARB as time-varying covariate]	3.1 (median) years	Medication only	73/621 12 (9.2, 14)	
		3.1 (median) years	Medication only	73/621 12 (9.2, 14)	
Webster, 1998, 9655655	Composite: Death, CV event, RRT [Death, MI, Dialysis]	3-54 months	Medication only	4/30 13 (1.2, 25)	
Surgery only					
Alhadad, 2004, 14718896	deterioration or death	1 month years	Surgical	19/106 18 (11, 25)	

C.4.19 Results: Periprocedural Adverse Events

Author, year, PMID	Outcome description	Timepoint	Arm	N/N % (95% CI)	Notes	Between-Arm Comparison
PTRAS vs. Medication RCT						
Bax, 2009, 19414832	Death	30 (within) (days)	Medication only	0/74 0 (0, 11)		
			PTRAS	2/62 3.2 (0.8, 14)		
	Major periprocedural event: femoral artery false aneurysms	30 (within) (days)	PTRAS	2/62 3.2 (0.8, 14)		
	Major periprocedural event: cholesterol embolization	30 (within) (days)	PTRAS	1/62 1.6 (0.2, 11.8)		
Cooper, 2008, 18490527	Bleed, major	1 month	PTRAS [4 arms of PTRAS]	28/91 31 (21, 40)		
Wheatley, 2009, 19907042	Major periprocedural event	1 month	PTRAS	30/280 11 (7.1, 14)		
	Major periprocedural event: Renal artery occlusion	1 month	PTRAS	1/280 0 (0.1, 2.6)		
	Major periprocedural event: Renal arterial thrombosis or occlusion	1 day	PTRAS	4/335 1.2 (0, 2.4)		
Surgery vs. PTRAS RCT						
Balzer, 2009, 19135837	Major periprocedural event [local dissection]	0 years	Surgical	1/27 3.7 (0.5, 28.3)		
	Major periprocedural event [stent dislocation]	0 years	PTRAS	2/22 9.1 (2.3, 42.8)		OR 2.60 (0.22, 30.75)
PTRAS vs. Medication NRCS						
Arthurs, 2007, 17398382	Death	0 years	Medication only	0/22 0 (0, 0.4)		
			PTRAS	2/18 11 (2.9, 54)		
Ritchie, 2014, 24074824	Major periprocedural complication	3.8 years	PTRAS	6/127 4.7 (1.0, 8.4)		
Surgery vs. PTRAS NRCS						

Author, year, PMID	Outcome description	Timepoint	Arm	N/N % (95% CI)	Notes	Between-Arm Comparison
de Donato, 2007, 17653002	Death	1 month	PTRAS	0/82 0 (0, 9.9)		
			Surgical	0/15 0 (0, 59)		
Patel, 2009, 19497511	Death	0 years	PTRAS	1/203 0.5 (0.1, 3.5)		OR 0.23 (0.01, 3.71)
			Surgical	1/47 2 (0.3, 15.8)		
Patel, 2009, 19497511	Major periprocedural event [Hematoma]	0 years	PTRAS	8/203 3.9 (2, 8)		OR 1.89 (0.23, 15.47)
			Surgical	1/47 2 (0.3, 15.8)		
Patel, 2009, 19497511	Major periprocedural event [Contrast nephropathy, Pseudoaneurysm]	0 years	PTRAS	12/203 6 (3, 11)		
	Major periprocedural event [Pneumonia, HIT, Re-exploration for bleeding, Wound infection]		Surgical	7/47 15 (8, 39)		
PTRAS only						
Beck, 2010, 19939607	Major periprocedural event [Acute renal insufficiency]	0 years	PTRAS	3/129 2.3 (0.8, 7.5)		
	Major periprocedural event [Acute thrombosis]	0 years	PTRAS	3/129 2.3 (0.8, 7.5)		
	Major periprocedural event [Renal artery dissection]	0 years	PTRAS	5/129 3.9 (0.5, 7.2)		
	Major periprocedural event: Renal hemorrhage	0 years	PTRAS	2/129 1.6 (0.4, 6.4)		
Blum, 1997, 9017938	Major periprocedural event	0 years	PTRAS	0/68 0 (0, 12)	No major complications	
Cianci, 2013, 23467950	Death	0 years	PTRAS	1/53 1.9 (0.3, 14)		
Dangas, 2001, 11491257	Major periprocedural event: Emergency Surgical	0 years	PTRAS	0/131 0 (0, 6.2)		

Author, year, PMID	Outcome description	Timepoint	Arm	N/N % (95% CI)	Notes	Between-Arm Comparison
	Post-procedure dialysis	0 years	PTRAS	2/131 1.5 (0.4, 6.3)		
	Death	0 years	PTRAS	1/131 0.8 (0.1, 5.5)	Had aortocoronary bypass during same hospitalization	
Gill, 2003, 12601202	Major periprocedural event: femoral artery false aneurysm requiring US guided compression (1) or surgery (1), acute on chronic kidney disease requiring 1 week of HD (1), removal of stent with femoral artery trauma requiring surgery (2), surgical retrieval of a migrating stent (1)	0 years	PTRAS	6/100 6.0 (1.3, 11)		
	Death	0 years	PTRAS	2/100 2.0 (0.5, 8.3)		
Gonçalves, 2007, 17364124	Major periprocedural event: renal artery dissection	2 years	PTRAS	1/46 2.2 (0.3, 16)		
Gross, 1998, 9736342	Major periprocedural event	0 years	PTRAS	3/30 10 (3.4, 37)	Dissection after predilatation	
Hanzel, 2005, 16253607	Bleed, major: blood transfusion	0 years	PTRAS	1/26 3.8 (0.5, 30)	blood transfusion was required in 1 patient	
Harden, 1997, 9113012	Major periprocedural event	0 years	PTRAS	0/32 0 (0, 26)	(3 femoral-artery pseudoaneurysms, which were successfully treated with ultrasound-guided compression)	
	Bleed, major	0 years	PTRAS	3/32 9.4 (3.2, 34)	hemorrhage, which required transfusion. Despite surgical intervention, 1 patient died 3 days after stent placement from circulatory collapse due to uncontrolled hemorrhage from a brachial puncture site.	
Henry, 2003, 14571477	Major periprocedural event	0 years	PTRAS	0/56 0 (0, 15)	(2 had arterial spasm at site of protection devices)	
	Death	3 days	PTRAS	1/56 1.8 (0.3, 13)		

Author, year, PMID	Outcome description	Timepoint	Arm	N/N % (95% CI)	Notes	Between-Arm Comparison
Holden, 2006, 16837918	Major periprocedural event	0 years	PTRAS	1/44 2.3 (0.3, 17)	One patient with mild CKD at baseline suffered acute deterioration of kidney function after the procedure. Partial response was seen after repeated boluses of NTG	
Iannone, 1996, 8974797	Bleed, major, requiring transfusion	0 years	PTRAS	10/63 16 (6.8, 25)		
	Major periprocedural event	0 years	PTRAS	21/63 33 (22, 45)	Bleed requiring transfusion (10), renal artery perforation (3), acute renal failure (8).	
	Death	0 years	PTRAS	2/63 3.2 (0.8, 13)	1 after heart surgery after stent; 1 temporary dialysis, perinephric bleed and multi-system organ failure	
Jokhi, 2009, 19668788	Death	0 years	PTRAS	0/106 0 (0, 7.7)		
	Major periprocedural complications	1 month	PTRAS	0/106 0 (0, 7.7)		
Leesar, 2009, 19539148	Bleed, major	0 years	PTRAS	2/62 3.2 (0.8, 14)	femoral artery pseudoaneurysm	
Murphy, 2014, 24325931	Dissection	9 months	PTRAS	11/239 4.6 (2.6, 8.8)		
	Embolus			9/239 4 (2, 8)		
	Occlusion			9/239 4 (2, 8)		
	pseudoaneurysm			1/239 0.4 (0.1, 3.0)		
	Thrombus			3/239 1.3 (0.4, 4)		
	Vessel rupture			2/239 0.8 (0.2, 3.4)		
Ramos, 2003, 12472793	Bleed, major	0 years	PTRAS	3/105 2.9 (0.9, 9.3)	2 cases of bleeding and 1 case of right peri-renal hematoma	
Rastan, 2008, 19110785	Major periprocedural event	1 month	PTRAS	0/50 0 (0, 16)		

Author, year, PMID	Outcome description	Timepoint	Arm	N/N % (95% CI)	Notes	Between-Arm Comparison
Rocha-Singh, 1999, 10376497	Major periprocedural event: Restenosis; renal parenchymal guidewire perforations; death(renal parenchymal; guidewire perforation); massive GI hemorrhage; contrast induced nephropathy	1.1 years	PTRAS	30/154 19 (13, 26)		
Rocha-Singh, 2008, 19006254	Death	1 month	PTRAS	0/100 0 (0, 8.1)		
Ruchin, 2007, 17317314	Bleed, major: periprocedural complication	0 years	PTRAS	2/89 2.2 (0.6, 9.3)		
	Major periprocedural complication	0 years	PTRAS	4/89 4.5 (0.2, 8.8)		
Rzeznik, 2011 21129903	Bleed, major	0 years	PTRAS	2/84 2.4 (0.6, 9.9)	Transfusion 1, renal hematoma 1	
	Emergency procedure	0 years	PTRAS	1/84 1.2 (0.2, 8.7)	acute lower limb ischemia requiring urgent surgery	
Sapoval, 2005, 16151060	Major periprocedural event	0 years	PTRAS	1/52 1.9 (0.3, 14)	cerebrovascular event	
Staub, 2010, 20739200	Major periprocedural event: procedural complications	0 years	PTRAS	4/122 3.3 (0.1, 6.4)		
Trani, 2010, 20578190	Major periprocedural event	0 years	PTRAS	0/70 0 (0, 12)		
Tsao, 2005, 16394602	Death	0 years	PTRAS	1/54 1.9 (0.3, 14)	One patient died of acute renal failure on day 3 due to contrast overdose	
Valluri, 2012, 21765186	Bleed, major: hematoma at the puncture site leading to infection and lower limb amputation	1 month	PTRAS	1/127 0.8 (0.1, 5.7)		
	Post-procedure dialysis	1 month	PTRAS	4/127 3.1 (0.1, 6.2)	AKI leading to permanent HD	
	Death	0 years	PTRAS	1/127 0.8 (0.1, 5.7)		

Author, year, PMID	Outcome description	Timepoint	Arm	N/N % (95% CI)	Notes	Between-Arm Comparison
van de Ven, 1999, 9929021	Major periprocedural event: Cholesterol embolism; femoral artery aneurysm (arteriovenous fistula); renal artery injury (dissection; occlusion / thrombosis); transient decrease in renal function due to radiography contrast agent	0 years	PTRAS	10/85 12 (4.9, 19)	Femoral artery aneurysm (arteriovenous fistula) (n=5); renal artery injury (dissection; occlusion / thrombosis) (n=5). Also minor: Cholesterol embolism (n=8); transient decrease in renal function due to radiography contrast agent (n=1)	
White, 1997, 9362400	Major periprocedural event	0 years	PTRAS	0/100 0 (0, 8.1)	In 1: Subacute stent thrombosis occurred 3 d after stent placement (but no clinical sequelae described)	
	Death, CV	2 days	PTRAS	1/100 1.0 (0.1, 7.2)	Sudden ischemic cardiac death 2 days after hospital discharge	
Zahringer, 2007, 17696619.	Major periprocedural event	0 years	PTRAS	1/105 1.0 (0.1, 6.9)	One patient in the SES group had a severe flow-obstructing renal artery dissection and lost his single functional kidney despite all reasonable interventional and surgical efforts to re-establish flow.	
Zeller, 2005, 16212462.	Bleed, major: large hematomas	0 years	PTRAS	2/125 1.6 (0.4, 6.6)		
	Death	0 years	PTRAS	1/125 0.8 (0.1, 5.8)	due to pulmonary embolism after immobilization for compression of false aneurysm	
Medication only						
Hanzel, 2005, 16253607	Bleed, major: blood transfusion	0 years	Medication only	0/40 0 (0, 21)		
Surgery only						
Alhadad, 2004, 14718896	Death	1 month	Surgical	10/106 9.4 (3.9, 15)		

Author, year, PMID	Outcome description	Timepoint	Arm	N/N % (95% CI)	Notes	Between-Arm Comparison
Cherr, 2002, 11854720	Major periprocedural event	0 years	Surgical	83/500 17 (13, 20)	Peri-operative morbidity: 16%, MI (15 pts), stroke (5 pts), significant arrhythmia (22 pts), pneumonia (36 pts). 5 pts had worsening renal function within 1 month that required permanent dialysis	
	Death	1 month	Surgical	23/500 4.6 (2.8, 6.4)		

Appendix D. Risk of Bias Assessment

D.1 Randomized controlled trials

Author, Year, PMID	1a*	1c*	2a*	2b*	3b*	3c*	3d*	3e*	3f*	3g*	3h*	4a*
Balzer, 2009, 19135837	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Bax, 2009, 19414832	Low	Low	Low	Low	Low	High	Low	High	Low	High	Low	Low
Cooper, 2014, 24245566	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	High (multiple protocol changes)
Marcantoni, 2012, 22495466	Uncle ar	Low	Low	Low	Low	Low	Low	High	Low	High	Low	Low
Uzzo, 2002, 12009679	Low	Low	Unclear	Unclear	Low	Low	Unclear	Low	Low	Low	Low	Low
Wheatley, 2009, 19907042	Low	Low	Low	Low	Low	Low	Low	High	Low	Low	Low	High (specific interventions at physician discretion)
Ziakka, 2008, 19016147	Uncl ear	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low

1b. Sampling: Comparability of cohorts on the basis of the design or analysis

1c. Sampling: Group similarity at baseline (selection bias): Selection bias due to dissimilarity at baseline for the most important prognostic indicators

1d. Sampling: Selection of the comparator (Medicine) cohort

2a. Selection: Random sequence generation (selection bias): Selection bias (biased allocation to interventions) due to inadequate generation of a randomized sequence

2b. Selection: Allocation concealment (selection bias): Selection bias (biased allocation to interventions) due to inadequate concealment of allocations prior to assignment

3a. Measurement: Ascertainment of exposure

3b. Measurement: Co-interventions (performance bias): Performance bias because co-interventions were different across groups

3c. Measurement: Blinding of outcome assessor (detection bias): Detection bias due to knowledge of the allocated interventions by outcome assessors

3d. Measurement: Intention-to-treat-analysis: Bias due to incomplete reporting and analysis according to group allocation

3e. Measurement: Incomplete outcome data (attrition bias): Attrition bias due to amount, nature or handling of incomplete outcome data

3f. Measurement: Timing of outcome assessments (detection bias): Detection bias because important outcomes were not measured at the same time across groups

3g. Measurement: Do the analyses adjust for different lengths of follow-up of patients?

3h. Measurement: Selective Reporting (reporting bias): Reporting bias due to selective outcome reporting

4a. Additional Bias: Bias due to problems not covered elsewhere in the table.

D.2 Nonrandomized comparative studies

Author, Year, PMID	Study Design	1a*	1b*	1c*	1d*	3a*	3b*	3c*	3e*	3f*	3g*	3h*	4a*
Arthurs, 2007, 17398382	Retrospective	Low	Low	High	Low	Low	Low	Low	High	Low	Low	Low	Low
Cianci, 2011, 20547539	Prospective	Low	High	Low	Low	N/A	Low	Low	Low	Low	Low	High	Low
Crutchley, 2009, 18951751	Retrospective	Unclear	High	Unclear	Low	Low	Unclear	Low	High	Low	Low	Unclear	Low
de Donato, 2007, 17653002	Prospective	Low	Low	Unclear	Low	Low	Low	High	Low	Low	Low	Low	Low
Dichtel, 2010, 20630131	Retrospective	Low	High	Low	Low	Low	Unclear	Low	Low	High	High	Low	Low
Hackam, 2011 21156722	Retrospective	Low	N/A	N/A	N/A	Low	N/A	N/A	Low	N/A	High	Low	Low
Hanzel, 2005, 16253607	Retrospective	Low	High	High	Low	N/A	Low	Low	Low	Low	Low	Low	Low
Kane, 2010, 19666661	Retrospective	Low	Low	Low	Low	Low	Low	High	Low	Low	High	Low	Low
Losito, 2005 15870215	Prospective	Low	Low	Low	Low	N/A	Unclear	Low	Low	Low	Low	Low	Low

Author, Year, PMID	Study Design	1a*	1b*	1c*	1d*	3a*	3b*	3c*	3e*	3f*	3g*	3h*	4a*
Patel, 2009, 19497511	Retrospective	Low	Low	High	Low	Unclear	Unclear	Low	High	High	Low	Low	Low
Ritchie, 2014, 24074824	Prospective	Low	Low	High	Low	Low	Low	Low	High	Low	Low	High	Low
Sofroniadou, 2012, 22127407	Prospective	Low	High	High	Low	N/A	Low	Low	High	High	High	High	Low

1a. Sampling: Were the subjects in the study representative of the entire population from which they were recruited?

1b. Sampling: Comparability of cohorts on the basis of the design or analysis

1c. Sampling: Group similarity at baseline (selection bias): Selection bias due to dissimilarity at baseline for the most important prognostic indicators

1d. Sampling: Selection of the comparator (Medicine) cohort

2a. Selection: Random sequence generation (selection bias): Selection bias (biased allocation to interventions) due to inadequate generation of a randomized sequence

2b. Selection: Allocation concealment (selection bias): Selection bias (biased allocation to interventions) due to inadequate concealment of allocations prior to assignment

3a. Measurement: Ascertainment of exposure

3b. Measurement: Co-interventions (performance bias): Performance bias because co-interventions were different across groups

3c. Measurement: Blinding of outcome assessor (detection bias): Detection bias due to knowledge of the allocated interventions by outcome assessors

3d. Measurement: Intention-to-treat-analysis: Bias due to incomplete reporting and analysis according to group allocation

3e. Measurement: Incomplete outcome data (attrition bias): Attrition bias due to amount, nature or handling of incomplete outcome data

3f. Measurement: Timing of outcome assessments (detection bias): Detection bias because important outcomes were not measured at the same time across groups

3g. Measurement: Do the analyses adjust for different lengths of follow-up of patients?

3h. Measurement: Selective Reporting (reporting bias): Reporting bias due to selective outcome reporting

4a. Additional Bias: Bias due to problems not covered elsewhere in the table.

D.3 Single Arm Studies

Author, Year, PMID	Study Design	1a*	3e*	3g*	3h*	4a*
Alhadad, 2004, 14718896	NRCS of surgery	Low	Low	High	Low	Low
Baril, 2007, 17391902	Prospective	Low	Low	Low	Unclear	Low
Beck, 2010, 19939607	Retrospective	Low	Low	Low	Low	Low
Bersin, 2013, 22581488	Prospective	Low	Low	Low	Low	Low
Blum, 1997, 9017938	Prospective	Low	High	High	Low	Low
Bruno, 2014, 24555729	Prospective	Low	Low	Low	Low	Low
Cherr, 2002, 11854720	Prospective	Low	Low	Low	Low	Low
Christie, 2012, 23083664	Prospective	High	Low	Low	Unclear	Low
Chrysant, 2014, 24909590	Prospective	Low	Low	Low	Low	Low

Author, Year, PMID	Study Design	1a*	3e*	3g*	3h*	4a*
Chrysochou, 2012, 21993376	Prospective	Low	High	Low	Low	Low
Cianci, 2013, 23467950	Prospective	High	High	Low	High	Low
Cooper, 2008, 18490527	RCT of PTRAS	Low	Low	Low	Low	Low
Dangas, 2001, 11491257	Prospective	Low	High	High	High	Low
Dorros, 2002, 11835644	Prospective	Low	High	Low	High	Low
Galaria, 2005, 15735947	Retrospective NRCS of surgery	Low	High	Low	High	Low
Gill, 2003, 12601202	Prospective	Low	High	High	Low	Low
Gill-Leertouwer, 2002, 12466252	Prospective	Low	Low	Low	Low	Low
Girt, 2007, 17164562	Prospective	High	High	High	Low	Low
Gonçalves, 2007, 17364124	Prospective	Low	High	High	High	High

Author, Year, PMID	Study Design	1a*	3e*	3g*	3h*	4a*
Gray, 2002, 12710843	Prospective	Low	High	High	Unclear	Low
Gross, 1998, 9736342	Prospective	Low	Low	Low	High	Low
Harden, 1997, 9113012	Prospective	Low	High	Low	Low	Low
Henry, 2003, 14571477	Prospective	Low	High	High	Low	Low
Holden, 2006, 16837918	Prospective	Low	Low	High	Low	Low
Iannone, 1996, 8974797	Prospective	Unclear	Low	High	Low	Low
Jaff, 2012, 22511402	Prospective	Low	Low	Low	Low	Low
Jokhi, 2009, 19668788	Prospective	Low	Unclear	Low	High	Low
Kalra, 2010, 19937777	Prospective	High	Low	Low	Unclear	Low
Kawarada, 2010, 20884436	Prospective	Low	Low	High	Low	Low
Kennedy, 2003, 14582036	Prospective	Low	High	Low	Low	Low

Author, Year, PMID	Study Design	1a*	3e*	3g*	3h*	4a*
Kobo, 2010, 20684176	Prospective	High	Low	Low	Low	Low
Leesar, 2009, 19539148	Prospective	Unclear	Low	High	High	Low
Lekston, 2008, 19006027	RCT of PTRAS	Unclear	High	High	High	High
Mannarino, 2012, 22260219	Prospective NRCS of PTRAS	High	Low	High	Low	Low
Murphy, 2014, 24325931	Prospective	Low	High	Low	Low	High
Ramos, 2003, 12472793	Prospective	High	Low	Low	Low	Low
Rastan, 2008, 19110785	Prospective	Low	Low	High	Low	Low
Rivolta, 2005, 16358234	Prospective	Low	High	Low	High	Low
Rocha-Singh, 1999, 10376497	Prospective	Low	Low	Low	Low	Low
Rocha-Singh, 2005, 16139124	Prospective	Low	Low	High	Low	Low

Author, Year, PMID	Study Design	1a*	3e*	3g*	3h*	4a*
Rocha-Singh, 2008, 19006254	Prospective	Low	High	Low	High	Low
Rocha-Singh, 2011, 21648052	Prospective	Low	Low	High	Low	Low
Ruchin, 2007, 17317314	Retrospective	Low	Low	High	Low	Low
Rzeznik, 2011 21129903	Prospective	Low	Low	Low	Low	Low
Safak, 2013, 23321402	Prospective	Low	Low	High	Unclear	Low
Sapoval, 2005, 16151060	Prospective	Low	Low	Low	Low	Low
Sapoval, 2010, 19908091	Prospective	Low	High	High	Low	High
Silva, 2008, 18670414	Retrospective NRCS of medication	Low	Low	Low	Unclear	Low
Staub, 2010, 20739200	Prospective	Low	Low	Low	Low	Low
Trani, 2010, 20578190	Prospective NRCS of PTRAS	Low	Low	Low	Low	Low
Trani, 2013, 22503569	Prospective	Low	Low	Low	Low	Low

Author, Year, PMID	Study Design	1a*	3e*	3g*	3h*	4a*
Tsao, 2005, 16394602	Prospective	Low	Low	Low	High	Low
Valluri, 2012, 21765186	Prospective	High	Low	High	Low	Low
van de Ven, 1999, 9929021	RCT of PTRAS	Low	Low	Low	Low	Low
Webster, 1998, 9655655	RCT of medication	Low	High	High	Low	Low
White, 1997, 9362400	Prospective	Low	High	High	High	Low
Zahringer, 2007, 17696619	Prospective NRCS of PTRAS	Low	Low	Low	Low	High
Zeller, 2004, 15056029	Prospective	Low	High	High	Low	Low
Zeller, 2005, 16212462	Prospective	Low	Low	High	High	High

1a. Sampling: Were the subjects in the study representative of the entire population from which they were recruited?

1b. Sampling: Comparability of cohorts on the basis of the design or analysis

1c. Sampling: Group similarity at baseline (selection bias): Selection bias due to dissimilarity at baseline for the most important prognostic indicators

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3a. Measurement: Ascertainment of exposure

3b. Measurement: Co-interventions (performance bias): Performance bias because co-interventions were different across groups

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3f. Measurement: Timing of outcome assessments (detection bias): Detection bias because important outcomes were not measured at the same time across groups

3g. Measurement: Do the analyses adjust for different lengths of follow-up of patients?

3h. Measurement: Selective Reporting (reporting bias): Reporting bias due to selective outcome reporting

4a. Additional Bias: Bias due to problems not covered elsewhere in the table.

Figure D.1. Risk of Bias in RCTs

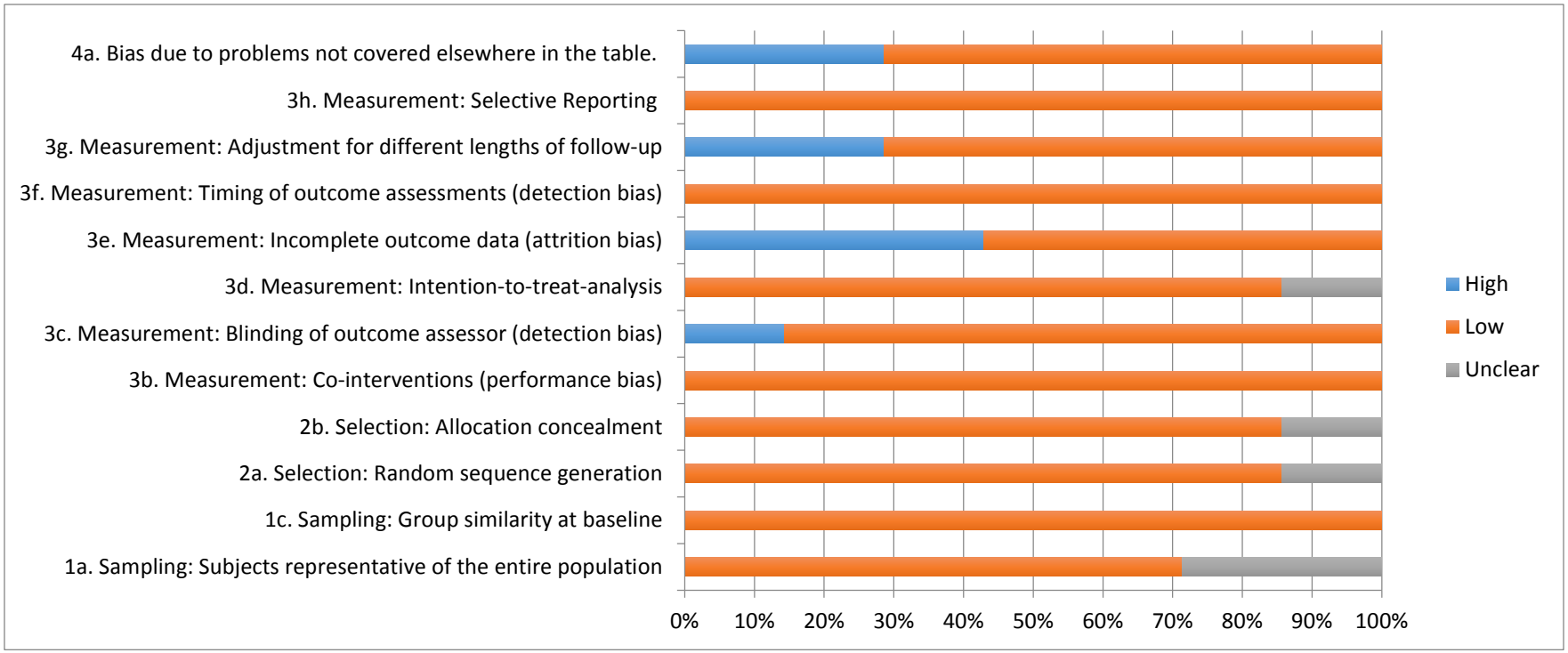

Figure D.2. Risk of Bias in NRCS

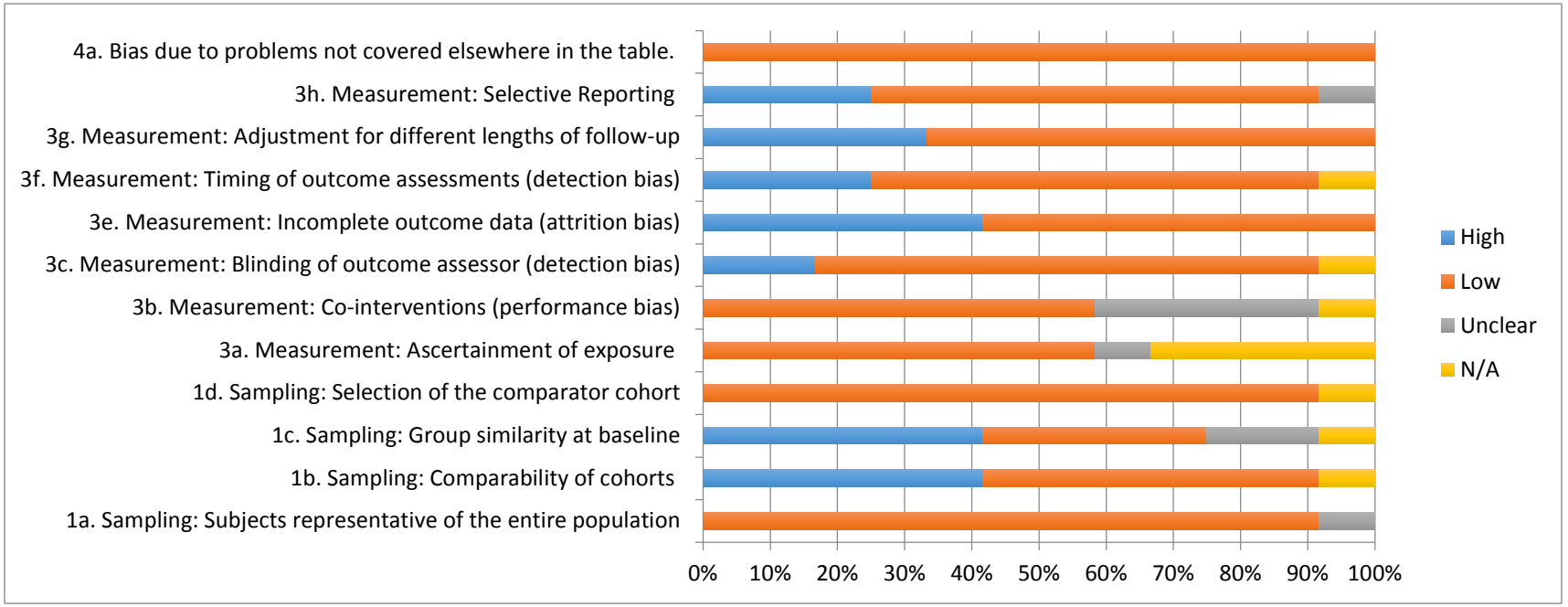

Figure D.3. Risk of Bias in Single Arm Studies of PTRAS

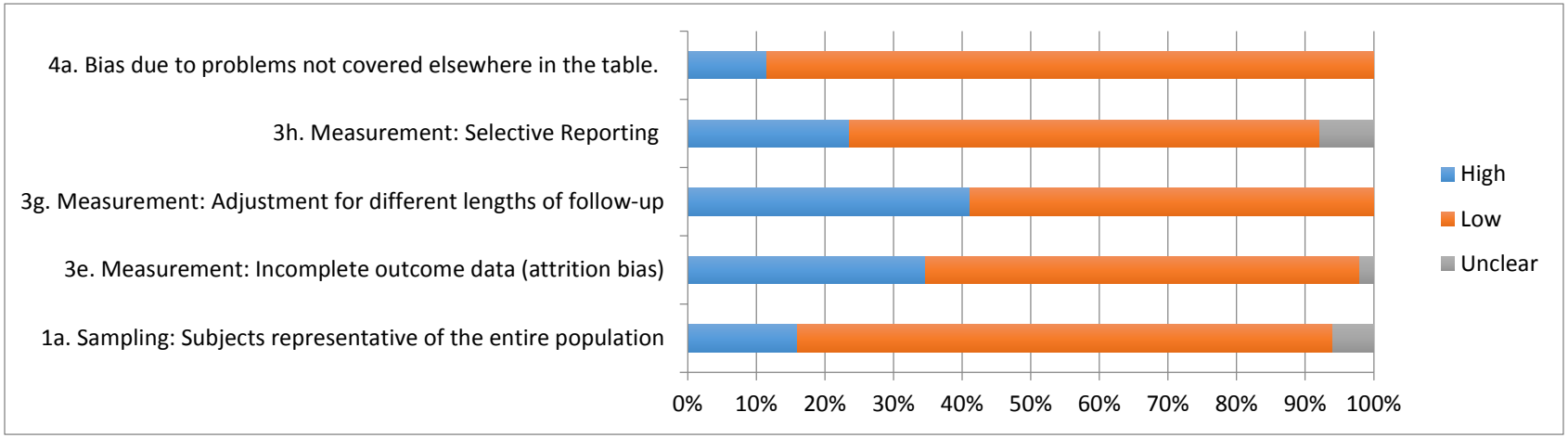

Figure D.4. Risk of Bias in Single Arm Studies of Medication

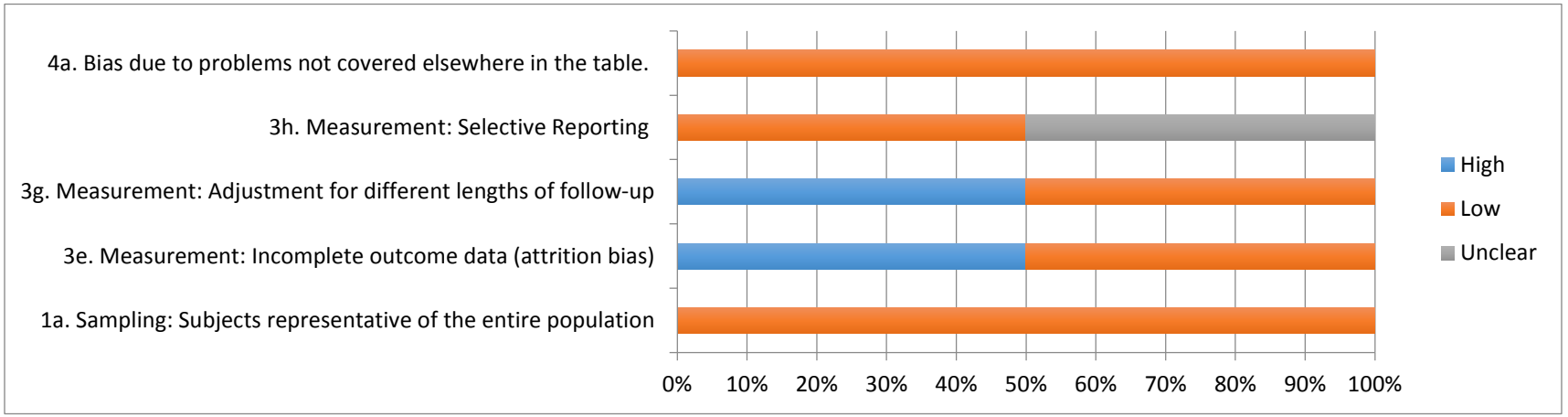

Figure D.5. Risk of Bias in Single Arm Studies of Surgery