Appendix A. Included Studies

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Appendix B. List of Excluded Studies

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Appendix C. Risk of Bias

Table C1. Diagnostic Studies Risk of Bias

Author, Year	Random or Consecutive Sample	Avoidance of Case-control Design	Avoidance of Inappropriate Exclusions	Index Test Results Interpreted Without Knowledge of Reference Standard	Use of Pre-specified Threshold or Definition for a Positive Test	Credible Reference Standard	Reference Standard Interpreted Independently from the Test Under Evaluation	Appropriate Interval Between Index Test and Reference Standard	Same Reference Standard Applied to All Patients	Were all patients included in the analysis?	Overall Risk of Bias (Low, Moderate, High)
Addley, 2011[1]	Yes	Yes	Yes	Yes	Yes	Yes (explant)	Yes	Unclear (up to 5 months but the study did not report a mean length of time)	Yes	Yes	Moderate
Ahn, 2010[2]	Yes	Yes	Yes	Yes	Yes	Yes (varied)	Unclear	Unclear	No	Yes	High
Akai, 2011[3]	Yes	Yes	Yes	Yes	Yes	Yes (explant)	Unclear	Unclear	Yes	Yes	Moderate
Alaboudy, 2011[4]	Unclear	No (all cases)	Yes	Yes	Yes	Yes	Unclear	Unclear	Yes	Yes	Moderate
An, 2013[5]	Yes	No (all cases)	Yes	Yes	No	Yes	Unclear	Yes	Yes	No	Moderate
An, 2012[6]	Unclear	No (all cases)	No	Unclear	Yes	Yes	Unclear	Unclear	Yes	No	High
Baccarani U, 2006[7]	Unclear	Yes	Yes	Yes; imaging done prior to transplant; its interpretation is part of qualifier for transplant	Yes	Yes	Unclear	Unclear	Yes	Yes	Moderate
Baek, 2012[8]	Yes	No (all cases)	Unclear	Yes	Yes	Yes	Unclear	Unclear	No	No	High
Bartolozzi, 2000[9]	Unclear	No (all cases)	Yes	Yes	Unclear	Yes	Unclear	Unclear	No	Unclear	High
Bennett, 2002[10]	Unclear	Yes	Yes	Unclear	Yes	Yes (explant)	Unclear	Yes	Yes	Yes	Moderate

Author, Year	Random or Consecutive Sample	Avoidance of Case-control Design	Avoidance of Inappropriate Exclusions	Index Test Results Interpreted Without Knowledge of Reference Standard	Use of Pre-specified Threshold or Definition for a Positive Test	Credible Reference Standard	Reference Standard Interpreted Independently from the Test Under Evaluation	Appropriate Interval Between Index Test and Reference Standard	Same Reference Standard Applied to All Patients	Were all patients included in the analysis?	Overall Risk of Bias (Low, Moderate, High)
Bhattacharjya, 2004[11]	Unclear	No (all cases)	Yes	Unclear	Unclear	Yes (explant)	Unclear	Yes	Yes	Yes	High
Burrel, 2003[12]	Unclear	No (all cases)	Yes	Yes	Yes	Yes (explant)	Yes	Yes (mean 46 or 53 days)	Yes	No (3/29 excluded for CT)	High
Catala, 2007[13]	Unclear	Yes	Yes	Yes	Unclear	Yes	Unclear	Unclear	No	Yes	High
Cereser, 2010[14]	Yes	No (all cases)	Yes	Yes	Yes	Yes	Unclear	Unclear	No	Yes	Moderate
Chalasani, 1999[15]	Yes	Yes	Yes	Unclear	Yes	Yes	Unclear	Unclear	No	Yes	Moderate
Chen, 2005[16]	Unclear	No (25/26 cases)	Yes	Unclear	Yes	Yes (biopsy or clinical f/u)	Unclear	Unclear	No	Yes	High
Cheung, 2013[17]	Unclear	No (all cases)	Yes	Unclear	Yes	Yes	Unclear	Yes	No	Yes	High
Cheung, 2011[18]	Unclear	No (all cases)	Yes	Unclear	Yes	Unclear	Unclear	Unclear	Unclear	Yes	High
Choi, 2008[19]	Yes	Yes	Yes	Yes	Yesd	Yes	Unclear	Yes	Yes	Yes	Moderate
Choi, 2001[20]	Yes	No (all cases)	Yes	Yes	Yes	Yes	Unclear	Unclear	Yes	Yes	Moderate
Chou, 2011[21]	Unclear	Yes	Yes	Yes	Yes	Yes	Unclear	Yes	Yes	No (excluded nodules without histological diagnosis)	Moderate
Chung, 2011[22]	Unclear	Yes	Yes	Yes	Yes	Yes	Unclear	Unclear	No	Yes	Moderate
Chung, 2010[23]	Yes	Yes	Yes	Unclear	Unclear	Yes	Unclear	Unclear	No	Yes	Moderate
Colagrande, 2000[24]	Unclear	No (22/24 cases)	Yes	Yes	Yes	Unclear	Unclear	Unclear	No	No (patients who did not undergo lipiodol CT excluded)	High
Dai, 2008[25]	Yes	Yes	Yes	Yes	Yes	Yes	Unclear	Unclear	Yes	Yes	High
de Ledinghen, 2002[26]	Unclear	Yes	Yes	Yes	Yes	Yes (explant)	No	Yes (mean 44 days)	Yes	Yes	Moderate
Delbeke, 1998[27]	Yes	Yes	Yes	Yes	Yes	Yes (pathology)	Unclear	Yes (<2 months)	Yes	Yes	Moderate

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Denecke, 2009[28]	Yes	No (all cases)	Yes	Unclear	Yes	Yes	Unclear	Yes	Yes	Yes	Moderate
Di Martino, 2013[29]	Yes	Yes	Yes	Yes	Yes	Yes	Unclear	Unclear	No	No (34 excluded due to loss to f/u or insufficient proof of tumor burden; 140 excluded due to >1 month between CT and MRI)	Moderate
Di Martino, 2010[30]	Yes	Yes	Yes	Yes	Yes	Yes	Unclear	Unclear	No	No (37 excluded due to incomplete imaging or follow-up)	Moderate
D'Onofrio, 2005[31]	Yes	Yes	Yes	Yes	Yes	Unclear	Unclear	Unclear	No	Yes	Moderate
Doyle, 2007[32]	Unclear	No (case-control)	Yes	Unclear	Yes	Yes	Unclear	Unclear	No	Yes	High
Eckel, 2009[33]	Unclear	No (cases only)	Yes	Unclear	Yes	Yes	Unclear	Unclear	No	Yes	High
Forner, 2008[34]	Unclear	Yes	Yes	Unclear	Yes	Yes	Unclear	Unclear	Yes	Yes	Moderate
Freeman, 2006[35]	Yes	Yes	Yes	No	Yes	Yes	Unclear	Unclear	Yes	Yes	Moderate
Freeny, 2003[36]	Yes	Yes	Yes	Yes	Yes	Yes (explant)	Unclear	No (mean 249 or 168 days)	Yes	Yes	High
Furuse, 2000[37]	Yes	No (all cases)	Yes	Unclear	Unclear	Yes	Unclear	Unclear	Yes	Yes	Moderate

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Gaiani, 2004[38]	Yes	No (all cases)	Yes	Unclear	Yes	Unclear (US evaluated and Doppler US used as part of reference standard)	Unclear	Unclear	Yes	Yes	High
Gambarin-Gelwan, 2000[39]	Yes	Yes	Yes	Unclear	Yes	Yes (explant)	Unclear	Unclear (within 6 months)	Yes	Yes	Moderate
Giorgio, 2007[40]	Yes	Yes	Yes	Yes	Yes	Unclear	Unclear	Unclear	No	Yes	Moderate
Giorgio, 2004[41]	Yes	No (all cases)	Yes	Unclear	Yes	Yes	Unclear	Yes	Yes	Yes	Moderate
Golfieri, 2009[42]	Yes	Yes	Yes	Unclear	Yes	Yes	Unclear	Unclear	No	Yes	Moderate
Goshima, 2004[43]	Yes	No (all cases)	Yes	Unclear	Yes	Unclear	Unclear	Unclear	No	Yes	Moderate
Goto, 2012[44]	Yes	No (all cases)	Yes	Yes	Yes	Unclear (CT only including lesions <2 cm)	Yes	Yes	Yes	Yes	Moderate
Guo, 2012[45]	Unclear	No (all cases)	No (excluded difficult to dx patients)	Yes	Yes	Yes	Unclear	Unclear	No	Yes	Moderate
Haradome, 2011[46]	Yes	Yes	Yes	Unclear	Yes	Yes	Unclear	Unclear	Yes	Yes	Moderate
Hardie, 2011[47]	Yes	Yes	Yes	Yes	Unclear	Yes	Unclear	Yes	Yes	Yes	High
Hardie, 2011 (2)[48]	Unclear	Yes	Yes	Unclear	Unclear	Yes	Unclear	Yes	Yes	Yes	High
Hardie, 2011 (3)[49]	Yes	Yes	Yes	Yes	Unclear	Yes (explant)	Unclear	Yes	Yes	Yes	Moderate
Hatanaka, 2008[50]	Yes	Yes	Yes	Yes	Yes	Yes	Unclear	Unclear	No	Yes	Moderate
Hecht, 2006[51]	Yes	Yes	Yes	Unclear	Yes	Yes (explant)	Yes	Yes	Yes	Yes	Moderate

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Hidaka, 2013[52]	Unclear	No (all cases)	Unclear	Yes	Yes	Yes	Unclear	Unclear	Yes	Yes	High
Higashihara, 2012[53]	Unclear	No (all cases)	Yes	Unclear	Yes	Unclear	Unclear	Yes	No	Yes	High
Hirawaka, 2011[54]	Unclear	No	Yes	Unclear	Yes	Yes	Unclear	Yes	Yes	Yes	Moderate
Ho, 2003[55]	Unclear	Yes	Yes	Yes	Yes	Yes	Unclear	Unclear	Yes	No (7/39 patients with HCC excluded)	Moderate
Ho, 2007[56]	Yes	Yes	Yes	Unclear	Yes	Yes (multiple criteria)	Unclear	Unclear	No	Yes	Moderate
Hori, 2002[57]	Unclear	No (90% had HCC)	Yes	Unclear	Yes	Unclear	Unclear	Unclear	No	No (16 patients excluded due to no reference standard)	High
Hori, 1998[58]	Unclear	No (all cases)	Yes	Yes	Unclear	Unclear	Unclear	Yes	No	Yes	High
Hwang, 2012[59]	Yes	No (all cases)	Yes	Unclear	Yes	Yes	Unclear	Unclear	No	Yes	Moderate
Hwang, 2009[60]	Unclear	No (90% had HCC)	Yes	Unclear	Unclear	Unclear	Unclear	Unclear	No	No	High
Iannaccone, 2005[61]	Unclear	Yes	Yes	Yes	Yes	Yes	Unclear	Unclear	Yes	Yes	Moderate
Iavarone, 2010[62]	Yes	No (all cases)	Yes	Yes	Yes	Yes	Unclear	Unclear	Yes	Yes	Moderate
Ichikawa, 2010[63]	Unclear	Yes	Yes	Yes (for blinded readers)	Unclear	Unclear	Unclear	Yes	No	No (denominators varied)	Moderate
Ichikawa, 2002[64]	Unclear	No (all cases)	Yes	Yes	Yes	Yes	Unclear	Unclear	Unclear	Yes	Moderate
Imamura, 1998[65]	Yes	No (all cases)	Yes	Yes	Yes	Yes	Unclear	Unclear	Yes	Yes	Moderate
Inoue, 2012[66]	Unclear	Unclear	Yes	Unclear	Yes	Yes	Unclear	Unclear	Yes	Yes	Moderate

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Inoue, 2009[67]	Yes	Yes	Yes	Yes	Yes	Yes	Unclear	Unclear	Yes	Yes	Moderate
Inoue, 2008[68]	Unclear	No (all cases)	Yes	Yes	Unclear	Yes	Unclear	Unclear	No	Yes	High
Ito, 2004[69]	Unclear	No (all cases)	Yes	Unclear	Unclear	Unclear	Unclear	Unclear	No	Yes	Moderate
Iwazawa, 2010[70]	Yes	No (all cases)	Yes	Yes	Yes	Unclear	Unclear	Unclear	No	Yes	Moderate
Jang, 2000[71]	Yes	No (all cases)	Yes	Yes	Yes	Yes	Unclear	Unclear	Yes	No (7/59 excluded due to no pathologic proof and 18 excluded due to follow-up with spiral CT <12 months)	Moderate
Jeng, 2003[72]	Unclear	Yes	Yes	Yes	Yes	Yes	Unclear	Unclear	Yes	Yes	Moderate
Jeng, 2002[73]	Unclear	No (all cases)	Yes	Unclear	Unclear	Unclear	Unclear	Unclear	Yes	Yes	High
Jeong, 2011[74]	Unclear	No (all cases)	Yes	Unclear	Yes	Unclear	Unclear	Unclear	No	No	High
Jeong, 1999[75]	Unclear	No (cases and controls)	Yes	Yes	No (post-hoc)	Yes	Unclear	Unclear	No	Yes	High
Jin, 2013[76]	Yes	Yes	Yes	Unclear	Yes	Unclear	Unclear	Unclear	No	Yes	Moderate
Kamura, 2002[77]	Unclear	No (case-control)	Unclear	Unclear	Yes	Unclear	Unclear	Unclear	No	Yes	High
Kang, 2003[78]	Yes	No (all cases)	Yes	Unclear	Yes	Yes	Unclear	Unclear	Yes	Yes	Moderate
Kawada, 2010[79]	Unclear	No (all cases)	Yes	Unclear	Yes	Yes	Unclear	Unclear	Yes	Yes	High
Kawaoka, 2009[80]	Yes	Yes	Yes	Unclear	No	Unclear	Unclear	Unclear	No	Yes	High
Kawata, 2002[81]	Yes	No (only analyzed cases)	Yes	Yes	Yes	Yes	Unclear	Unclear	No	Yes	Moderate

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Khalili, 2011[82]	Yes	Yes	Yes	Yes	Yes	Yes	Unclear	Unclear	No	Yes	Moderate
Khan, 2000[83]	Yes	No (all cases)	Yes	Yes	Yes	Yes (histology or cytology)	Yes	Unclear	No	Yes	High
Kim AY, 2012[84]	Unclear	No (all cases)	Yes	Unclear (for PET)	Yes	Yes	Unclear	Unclear	No	Yes	Moderate
Kim CK, 2001[85]	Yes	Yes	Yes	Yes	Yes	Yes (explant)	Unclear	Yes	Yes	Yes	Moderate
Kim DJ, 2012[86]	Yes	Yes	Yes	Unclear	Yes	Yes	Unclear	Unclear	No	Yes	Moderate
Kim KW, 2009[87]	Yes	No (case-control)	Yes	Yes	Yes	Yes	Unclear	Unclear	No	Yes	Moderate
Kim MJ, 2012[88]	Unclear	No (all cases)	Yes	Yes	Yes	Yes	Unclear	Yes	Yes	Yes	Moderate
Kim PN, 2012[89]	Unclear	No (all cases)	Yes	Yes	Unclear	Yes	Yes	Yes	Yes	Yes	Moderate
Kim SE, 2011[90]	Yes	Yes	Yes	No	Yes	Yes	Unclear	Unclear	Yes	Yes	Moderate
Kim SH, 2009[91]	Yes	No (all cases)	Yes	Yes	Yes	Yes	Unclear	Unclear	Yes	Yes	Moderate
Kim SH, 2005[92]	Yes	No (all cases)	Yes	Yes	Yes	Yes	Unclear	Unclear	Yes	Yes	Moderate
Kim SJ, 2008[93]	Unclear	No (all cases)	Yes	Yes	Yes	Yes	Unclear	Yes	Yes	Yes	High
Kim SK, 2002 (2)[94]	Yes	No (all cases)	Unclear (excluded 25 patients with HCC with unresectable distribution)	Unclear	Yes	Yes	Unclear	Unclear	Yes	Yes	Moderate
Kim T, 2002[95]	Yes	Yes	Yes	Yes	Yes	Yes	Unclear	Unclear	No	Yes	Moderate
Kim TK, 2011[96]	Yes	Yes	Yes	Yes	No	Yes	Unclear	Unclear	No	Yes	Moderate
Kim YK, 2011[97]	Unclear	No (all cases)	Yes	Yes	Yes	Yes	Unclear	Unclear	No	Yes	Moderate
Kim YK, 2011 (2)[98]	Unclear	No (all cases)	Yes	Yes	Yes	Yes	Unclear	Unclear	No	Yes	Moderate

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Kim YK, 2010[99]	Unclear	No (all cases)	Yes	Yes	Yes	Unclear	Unclear	Unclear	No	Yes	High
Kim YK, 2010 (2)[100]	Unclear	No (all cases)	Yes	Yes	Yes	Unclear	Unclear	Unclear	No	Yes	High
Kim YK, 2010 (3)[101]	Yes	No (all cases)	Yes	Yes	Yes	Unclear	Unclear	Unclear	Unclear	Yes	High
Kim YK, 2009 (2)[102]	Unclear	No (all cases)	Yes	Yes	Yes	Unclear	Unclear	Unclear	No	Yes	High
Kim YK, 2008[103]	Unclear	No (all cases)	Unclear	Yes	Yes	Yes	Unclear	Unclear	No	Yes	Moderate
Kim YK, 2008 (2)[104]	Unclear	No (all cases)	Yes	Yes	Yes	Yes	Unclear	Unclear	No	Yes	High
Kim YK, 2007[105]	Unclear	No (all cases)	Yes	Yes	Yes	Yes	Unclear	Unclear	No	No (excluded 8 patients without reference exam diagnosis)	Moderate
Kim YK, 2006[106]	Unclear	No (all cases)	Yes	Yes	Yes	Yes	Unclear	Unclear	No	Yes	Moderate
Kim YK, 2006[107]	Unclear	No (all cases)	Yes	Yes	Yes	Unclear (for lesions after the first HCC in each patient)	Unclear	Unclear	No	Yes	High
Kim YK, 2004[108]	Yes	No (all cases)	Yes	Yes	Yes	Unclear	Unclear	Unclear	No	No (excluded 20 patients without reference exam diagnosis)	High
Kitamura, 2008[109]	Unclear	No (all cases)	Yes	Yes	Yes	Unclear	Unclear	Unclear	No	Yes	Moderate
Kondo, 2005[110]	Yes	No (all cases)	Yes	Yes	Yes	Yes	Unclear	Unclear	Yes	Yes	Moderate

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Korenaga, 2009[111]	Yes	No (all cases)	Yes	Yes	Only AUROC reported	Yes	Unclear	Unclear	Yes	Yes	Moderate
Koushima, 2002[112]	Unclear	No (case-control)	Yes	Unclear	Only AUROC reported	Yes	Unclear	Unclear	Yes	No	High
Krinsky, 2002[113]	Yes	No (all cases)	Yes	Yes	Yes	Yes	Unclear	Yes	Yes	Yes	Moderate
Krinsky, 2001[114]	Unclear	Yes	Yes	Unclear	Yes	Yes (explant)	Unclear	Yes	Yes	Yes	Moderate
Kumano, 2009[115]	Yes	No (all cases)	Yes	Unclear	Yes	Yes	Unclear	Unclear	No	Yes	Moderate
Kunishi, 2012[116]	Unclear	No (all cases)	Yes	Yes	Yes	Yes	Yes	Unclear	No	Yes	Moderate
Kwak, 2005[117]	Yes	No (all cases)	Yes	Unclear	Yes	Unclear	Unclear	Unclear	Yes	Yes	Moderate
Kwak, 2004[118]	Unclear	No (all cases)	Yes	Yes	Yes	Unclear	Unclear	Unclear	Unclear	Yes	Moderate
Laghi, 2003[119]	Yes	Yes	Yes	Yes	Yes	Yes	Unclear	Unclear	Yes	Yes	Moderate
Lauenstein, 2007[120]	Yes	Yes	Yes	Yes	Yes	Yes	Unclear	Yes	Yes	Yes	Moderate
Lee CH, 2012[121]	Yes	No (all cases)	Yes	Yes	Yes	Unclear	Unclear	Unclear	No	Yes	Moderate
Lee DH, 2009[122]	Yes	Yes	Yes	Yes	Yes	Yes	Unclear	Yes	Yes	Yes	Moderate
Lee J, 2008[123]	Yes	No (all cases)	Yes	No	Unclear	Yes	Unclear	Yes	Yes	Yes	Moderate
Lee JE, 2012[124]	Yes	Yes	Yes	Yes	Yes	Yes	Unclear	Unclear	Yes	Yes	Moderate
Lee JM, 2003[125]	Unclear	No (all cases)	Yes	Yes	Yes	Unclear	Unclear	No	Yes	Yes	Moderate
Lee JY, 2010[126]	Yes	No (all cases)	Yes	Yes	Yes	Yes	Unclear	Yes	Yes	Yes	Moderate
Lee MH, 2011[127]	Yes	No (case-control)	Yes	Yes	Yes	Yes	Unclear	Yes	Yes	Yes	Moderate
Lee MW, 2010[128]	Yes	No (all cases)	Yes	Unclear	Yes	Yes	Yes (reference studies performed prior to test)	Unclear	Yes	Yes	Moderate

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Li, 2006[129]	Yes	No (all cases)	Yes	No	Yes	Yes	Unclear	Unclear	Yes	Yes	Moderate
Li CS, 2006[130]	Yes	No (all cases)	Yes	Unclear	Yes	Yes	Unclear	Unclear	Yes	Yes	Moderate
Liangpunsakul, 2003[131]	Unlear	Yes	Yes	Unclear	Yes	Unclear	Unclear	Unclear	Unclear	Yes	High
Libbrecht, 2002[132]	Yes	Yes	Yes	Unclear	Yes	Yes (explant)	Yes	Yes	Yes	No	High
Lim JH 2006[133]	Yes	No (all cases)	Yes	Unclear	Yes	Yes	Unclear	Unclear	Yes	Yes	Moderate
Lim JH 2002[134]	Yes	No (all cases)	Unclear (excluded 115 patients with multiple HCC with unresectable distribution or main portal vein obstruction)	Unclear	Yes	Yes	Unclear	Yes	Yes	Yes	Moderate
Lim JH 2000[135]	Yes	Yes	Yes	Yes	Yes	Yes (explant)	Unclear	Yes	Yes	Yes	Moderate
Lin MT, 2011[136]	Unclear	No (all cases)	Unclear	Unclear	Unclear	Yes	Unclear	Unclear	Yes	Yes	High
Lin WY, 2005[137]	Unclear	No (all cases)	Yes	Unclear	Yes	Yes	Unclear	Unclear	No	Yes	High
Liu, 2013[138]	Yes	Yes	Yes	Unclear	No (for quantitative measures)	Yes (explant)	Unclear	Unclear	Yes	Yes	Moderate
Liu, 2012[139]	Yes	Yes	Yes	Unclear	Yes	Yes (explant)	Unclear	Unclear	Yes	Yes	Moderate
Liu, 2003[140]	Yes	No (all cases)	Yes	Unclear	Unclear	Yes (explant)	Unclear	Yes	Yes	Yes	Moderate
Lu CH, 2010[141]	Unclear	No (all cases)	Yes	Unclear	Unclear	Yes (explant)	Unclear	Yes	Yes	Yes	High

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Luca, 2010[142]	Yes	Yes	Yes	Unclear	Yes	Yes (explant)	Yes (no radiological assistance)	Yes (mean 2 months)	Yes	Yes	Low
Luo W, 2009[143]	Yes	Yes	Yes	Yes	Yes	Yes	Unclear	Unclear	No	Yes	Moderate
Luo W, 2009 (2)[144]	Yes	Yes	Yes	Yes	Unclear	Yes	Unclear	Unclear	Yes	Yes	Moderate
Luo W, 2009 (3)[145]	Unclear	Yes	Unclear (16 lesions excluded for unclear reasons)	Yes	Yes	Yes	Unclear	Unclear	No	Yes	Moderate
Lv, 2012[146]	Unclear	No (all cases)	Yes	Yes	Unclear	Yes	Unclear	Unclear	No	Yes	High
Lv, 2011[147]	Unclear	Yes	Yes	Yes	Yes	Unclear	Unclear	Unclear	No	Yes	High
Maetani, 2008[148]	Yes	No (all cases)	Yes	Unclear	Yes	Yes (explant)	Unclear	Yes (mean 21 days)	Yes	Yes	High
Marin, 2009[149]	Yes	No (all cases)	Yes	Unclear	Yes	Yes	Unclear	Unclear	No	No (excluded 9 patients with inadequate CT)	Moderate
Marin, 2009 (2)[150]	Yes	No (all cases)	Yes	Yes	Yes	Yes	Unclear	Unclear	No	No	Moderate
Marrero, 2005[151]	Yes	Yes	Yes	Yes	No	Yes	Unclear	Unclear	No	Yes	Moderate
Matsuo, 2001[152]	Yes	Yes	Yes	Yes	Yes	Yes	Unclear	Yes	No	Yes	Moderate
Mita, 2010[153]	Unclear	No (all cases)	Yes	Yes	Yes	Yes	Unclear	Unclear	Yes	Yes	Moderate
Mok, 2004[154]	Unclear	Yes	Yes	Unclear	Unclear	Yes	Unclear	Unclear	Yes	Yes	Moderate
Monzawa, 2007[155]	Unclear	No (case-control)	Yes	Unclear	Yes	Yes	Unclear	Unclear	Yes	Yes	Moderate
Mori, 2005[156]	Yes	No (all cases)	Yes	Yes	Yes	Yes	Unclear	Yes	No	Yes	Moderate
Moriyasu, 2009[157]	Unclear	Yes	Unclear	Yes	Unclear	Unclear	Unclear	Unclear	Yes	Yes	High

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Mortele, 2001[158]	Yes	Yes	Yes	Yes	Unclear	Yes (explant)	No (retrospective evaluation of pathology specimens for discordant results)	No (mean 103 days)	Yes	Yes	Moderate
Motosugi, 2010[159]	Unclear	No (case-control)	Yes	Unclear	Yes	Unclear (CT only including lesions <2 cm)	Unclear	Unclear	No	Yes	High
Murakami, 2003[160]	Yes	No (48/49 cases)	Yes	Unclear	Yes	Yes	Unclear	Unclear	No	Yes	Moderate
Murakami, 2001[161]	Yes	Yes	Yes	Yes	Yes	Yes	Unclear	Unclear	No	Yes	Moderate
Nagaoka, 2006[162]	Unclear	Yes	Yes	Yes	Yes	Unclear	Unclear	Unclear	Unclear	Yes	High
Nakamura, 2013[163]	Unclear	No (all cases)	Yes	Unclear	Yes	Yes	Unclear	Unclear	Yes	Yes	High
Nakamura, 2000[164]	Unclear	No (all cases)	Yes	Unclear	Unclear	Unclear	Unclear	Unclear	Yes	No (denominator varied for different imaging tests)	High
Nakayama, 2001[165]	Unclear	No (all cases)	Yes	Unclear	Unclear	Yes	Unclear	Unclear	Yes	Yes	High
Noguchi, 2003[166]	Yes	No (all cases)	Yes	Unclear	Yes	Yes	Unclear	Unclear	No	Yes	Moderate
Noguchi, 2002[167]	Yes	No (all cases)	Yes	Yes	Yes	Yes	Unclear	Unclear	No	Yes	Moderate
Onishi, 2012[168]	Yes	No (>90% with HCC)	Yes	Yes	Yes	Unclear	Unclear	Unclear	No	Yes	Moderate
Ooi, 2010[169]	Unclear	Yes	Yes	Unclear	Yes	Yes	Unclear	Unclear	No	Yes	Moderate
Ooka, 2013[170]	Yes	No (all cases)	Yes	Unclear	Yes	Yes	Unclear	Unclear	Yes	Yes	Moderate

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Park, 2012[171]	Unclear	Yes	Yes	Unclear	Yes	Yes (explant)	Unclear	Yes	Yes	Unclear	Moderate
Park, 2011[172]	Unclear	Yes	Yes	Yes	Yes	Yes (explant)	Yes	Yes	Yes	Yes	Moderate
Park, 2010[173]	Yes	No (all cases)	Yes	Yes	Yes	Yes	Unclear	Unclear	Yes	Yes	Moderate
Park G, 2010[174]	Yes	No (all cases)	Yes	Unclear	Yes	Unclear	Unclear	Unclear	Yes	Yes	Moderate
Park JW, 2008[175]	Unclear	No (all cases)	Yes	No	Yes	Yes	Unclear	Yes	Yes	Yes	Moderate
Paul, 2007[176]	Unclear	Yes	Yes	Unclear	Unclear	Unclear	Unclear	Unclear	Yes	Yes	High
Pauleit, 2002[177]	Yes	Yes	Yes	Unclear	Yes	Yes	Unclear	Unclear	No	Yes	Moderate
Pei, 2013[178]	Unclear	No (case-control)	Unclear (only evaluated patients with optimum scanning nodules)	Yes	Yes	Yes	Unclear	Unclear	No	Yes	Moderate
Peterson, 2000[179]	Yes	No (all cases)	Yes	Yes	Unclear	Yes (explant)	Unclear	No (mean 107 days)	Yes	Yes	High
Petruzzi, 2013[180]	Unclear	Yes	Yes	Unclear	Yes	Yes (explant)	Unclear	Unclear	Yes	Yes	Moderate
Piana, 2011[181]	Unclear	No (all cases)	Yes	Unclear	Yes	Yes (histology or AASLD criteria)	Unclear	Yes	No	Yes	High
Pitton, 2009[182]	Unclear	No (all cases)	Yes	Yes	Yes	Yes (histology, except 3 patients)	Unclear	Unclear	Yes (3 patients did not have histology)	Yes	High
Pozzi Mucelli, 2006[183]	Yes	Yes	Yes	Unclear	Yes	Unclear (lab/imaging follow-up criteria not described)	Unclear	Unclear	No	Yes	Moderate

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Pugacheva, 2011[184]	Yes	No (all cases)	Yes	Yes	Yes	Yes	Unclear	Unclear	No	Yes	Moderate
Quia, 2009[185]	Unclear	Yes	No	Yes	Yes	Yes (histopathology)	Unclear	Yes	Yes	No (excluded 74 patients)	Moderate
Rhee, 2012[186]	Yes	Yes	Unclear (excluded 49 lesions in which location on pathology did not match MRI)	Yes	No (for developing new criteria)	Yes	Unclear	Yes	No	Yes	Moderate
Rickes, 2003[187]	Unclear	Yes	Unclear (excluded 5 patients with obesity)	Yes	Yes	Unclear	Unclear	Unclear	No	No (excluded 10 patients due to loss to follow-up)	High
Rimola, 2012[188]	Unclear	Yes	Yes	Unclear	Yes	Yes (biopsy)	Unclear	Unclear	Yes	Yes	Moderate
Rizvi, 2006[189]	Unclear	Yes	Unclear	Yes	Unclear	Yes (explant)	Unclear	Unclear	Yes	No (excluded 2/21 for unclear reasons)	High
Rode, 2001[190]	Yes	Yes	Unclear	Unclear	Unclear	Yes (explant)	Yes	Yes (mean 50 days)	Yes	Yes	Moderate
Ronzoni, 2007[191]	Yes	Yes	Yes	Yes	Unclear	Yes (explant)	Unclear	Unclear	Yes	Unclear	Moderate
Sangiovanni, 2010[192]	Yes	Yes	Yes	No (for retrospective eval)	Yes	Yes (percutaneous biopsy)	Yes	Yes (<2 months)	Yes	Yes	Low
Sano, 2011[193]	Yes	No (all cases)	Yes	Yes	Yes	Yes (biopsy)	Yes	Yes	Yes	Yes	Moderate
Schima, 2006[194]	Yes	No (all cases)	Yes	Yes	Yes	Yes	Unclear	Unclear	Unclear	Yes	High
Secil, 2008[195]	Unclear	Yes	Yes	Unclear	Unclear	Yes	Unclear	Unclear	No (varied)	Yes	Moderate

Author, Year	Random or Consecutive Sample	Avoidance of Case-control Design	Avoidance of Inappropriate Exclusions	Index Test Results Interpreted Without Knowledge of Reference Standard	Use of Pre-specified Threshold or Definition for a Positive Test	Credible Reference Standard	Reference Standard Interpreted Independently from the Test Under Evaluation	Appropriate Interval Between Index Test and Reference Standard	Same Reference Standard Applied to All Patients	Were all patients included in the analysis?	Overall Risk of Bias (Low, Moderate, High)
Seitz, 2009[196]	Yes	Yes	Yes	Yes	Unclear (for CT)	Yes (biopsy, for cases included in analysis)	Unclear	Unclear	Yes (for cases included in analysis)	Yes	Moderate
Seitz, 2010[197]	Yes	Yes	Yes	Unclear (for CT)	No (for MRI)	Yes (biopsy, for cases included in analysis)	Unclear	Unclear	Yes (for cases included in analysis)	Yes	Moderate
Serste, 2012[198]	Yes	Yes	Yes	Unclear (for MRI)	Yes	Yes	Yes	Yes	Yes	Yes	Low
Shah SA, 2006[199]	Yes	No	Yes	Yes; imaging done prior to transplant; its interpretation is part of qualifier for transplant	Yes	Yes	Unclear	Unclear	Yes	Yes; all that met inclusion criteria	Moderate
Simon, 2005[200]	Unclear	Yes	Yes	Yes	Unclear	Yes	Unclear	Unclear	No	Yes	Moderate
Singh, 2007[201]	Unclear	Yes	Yes	Yes	No	Yes	Unclear	Unclear	Yes	No	High
Sofue, 2011[202]	Yes	No (all cases)	Unclear (some exclusions of patients with equivocal CT/MRI findings)	Unclear	Yes	Unclear	Unclear	Unclear	No	No	High
Sorensen, 2011[203]	Unclear	Yes	Yes	Unclear	Yes	Yes (EASL criteria)	Unclear	Unclear	Unclear	Yes	High
Strobel, 2003[204]	Yes	Yes	Yes	Yes	Unclear	Unclear (imaging criteria not described)	Unclear	Unclear	No	Yes	High

Author, Year	Random or Consecutive Sample	Avoidance of Case-control Design	Avoidance of Inappropriate Exclusions	Index Test Results Interpreted Without Knowledge of Reference Standard	Use of Pre-specified Threshold or Definition for a Positive Test	Credible Reference Standard	Reference Standard Interpreted Independently from the Test Under Evaluation	Appropriate Interval Between Index Test and Reference Standard	Same Reference Standard Applied to All Patients	Were all patients included in the analysis?	Overall Risk of Bias (Low, Moderate, High)
Sugimoto, 2012[205]	Yes	No (case control)	Yes	Yes	Not applicable (only AUROC reported)	Yes	Unclear	Unclear	Yes	Yes	Moderate
Sugiyama, 2004[206]	Unclear	No (case-control)	Yes	Unclear	Unclear	Unclear	Unclear	Unclear	No	Yes	High
Suh, 2011[207]	Unclear	Yes	Yes	Yes	No	Yes	Unclear	Unclear	No	Yes	Moderate
Sun, 2010[208]	Unclear	No (case-control)	Yes	Yes	Yes	Unclear	Unclear	Unclear	No	No	Moderate
Sun, 2009[209]	Unclear	Yes	Yes	Yes	Yes	Unclear	Unclear	Unclear	No	Yes	High
Suzuki, 2004 (2)[210]	Unclear	Yes	Yes	Unclear	Unclear	Yes	Unclear	Unclear	Yes	Yes	Moderate
Talbot, 2010[211]	Unclear	Yes	Yes	Unclear	Yes	Yes	Unclear	Unclear	No	Yes	Moderate
Talbot, 2006[212]	Unclear	No (all cases)	Yes	Unclear	Yes	Yes	Unclear	Unclear	No	No	High
Tanaka, 2005[213]	Yes	Yes	Unclear	Unclear	Unclear	Unclear	Unclear	Unclear	No (varied)	Unclear	High
Tanaka, 2001[214]	Unclear	Yes	Yes	Unclear	Yes	No (some lesions based on single imaging test)	Unclear	Unclear	No	Yes	Moderate
Tang, 1999[215]	Unclear	No (all cases)	Unclear	Yes	Yes	Yes (based on biopsy or AFP, imaging findings, and response to treatment)	Unclear	Unclear (<1 month in patients with histological diagnosis)	No (varied)	Unclear	High
Tanimoto, 2002[216]	Yes	No (all cases)	Yes	Unclear	Yes	Unclear	Unclear	Unclear	No	Yes	High
Teefey, 2003[217]	Unclear	Yes	Unclear	Unclear	Yes	Yes (explant)	Unclear	No (mean 5.3 months)	Yes	No (10/37 excluded)	Moderate

Author, Year	Random or Consecutive Sample	Avoidance of Case-control Design	Avoidance of Inappropriate Exclusions	Index Test Results Interpreted Without Knowledge of Reference Standard	Use of Pre-specified Threshold or Definition for a Positive Test	Credible Reference Standard	Reference Standard Interpreted Independently from the Test Under Evaluation	Appropriate Interval Between Index Test and Reference Standard	Same Reference Standard Applied to All Patients	Were all patients included in the analysis?	Overall Risk of Bias (Low, Moderate, High)
Trojan, 1999[218]	Yes	No (all cases)	Yes	Yes	Unclear	Yes (histopathological)	Unclear	Unclear	Yes	Yes	Moderate
Tsurusaki, 2008[219]	Yes	No (all cases)	Yes	Unclear	Yes	Yes	Unclear	Unclear	No	Yes	Moderate
Valls, 2004[220]	Unclear	Yes	Yes	Unclear	Yes	Yes (explant)	Unclear	No (mean 6.6 months)	Yes	Yes	Moderate
Van Thiel, 2004[221]	Yes	Yes	Yes	Yes	Yes	Yes (explant)	Unclear	Unclear	Yes	Unclear	Moderate
Vandecaveye, 2009[222]	Yes	Yes	Yes	Unclear	Yes	Yes (surgical pathology, percutaneous biopsy, or follow-up MRI)	Unclear	No (median months for explant)	No	Yes	Moderate
Verhoef, 2002[223]	Yes	Yes	Yes	Unclear	Yes	Yes (histopathological)	Unclear	Yes (<3 months)	Yes	Yes	Moderate
Wagnetz, 2011[224]	Yes	Yes	Yes	Unclear	Unclear	Yes (surgical biopsy)	Unclear	Yes	Yes	Yes	Moderate
Wang, 2008[225]	Yes	Yes	Yes	Unclear	Yes	Yes	Unclear	Unclear	Yes	Yes	Moderate
Wolfort, 2010[226]	Yes	No (all cases)	Yes	Yes	Yes	Yes	Unclear	Unclear	Yes	No (denominator discrepancies in subgroup analyses)	High

Author, Year	Random or Consecutive Sample	Avoidance of Case-control Design	Avoidance of Inappropriate Exclusions	Index Test Results Interpreted Without Knowledge of Reference Standard	Use of Pre-specified Threshold or Definition for a Positive Test	Credible Reference Standard	Reference Standard Interpreted Independently from the Test Under Evaluation	Appropriate Interval Between Index Test and Reference Standard	Same Reference Standard Applied to All Patients	Were all patients included in the analysis?	Overall Risk of Bias (Low, Moderate, High)
Wu, 2011[227]	Yes	No (all cases)	Yes	Unclear	Yes	Yes	Unclear	Unclear	No	Yes	Moderate
Wudel, 2003[228]	Yes	No (all cases)	Yes	Yes	Unclear	Unclear (not described for most patients)	Unclear	Unclear	No	Yes	High
Xiao, 2005[229]	Unclear	No (all cases)	Yes	Unclear	Unclear	Unclear	Unclear	Unclear	No	No	High
Xu, 2012[230]	Yes	Yes	Yes	Yes	Yes	Yes	Unclear	Unclear	No	Yes	Moderate
Xu, 2010[231]	Unclear	Yes	Yes	Yes	Yes	Yes	Unclear	Unclear	Yes	Yes	Moderate
Xu, 2009[232]	Unclear	No (all caes)	Yes	Yes	Yes	Yes	Unclear	Unclear	No	Yes	Moderate
Xu, 2008[233]	Yes	Yes	Yes	Yes	Yes	Yes	Unclear	Unclear	No	Yes	Moderate
Yamamoto, 2008[234]	Yes	No (all cases)	Yes	Yes	Unclear	Unclear	Unclear	Yes (mean 22 days)	Unclear	Yes	High
Yamamoto, 2002[235]	Unclear	No (all cases)	Yes	Yes	Yes	Unclear	Unclear	Unclear	Unclear	Yes	High
Yan, 2002[236]	Unclear	No (all cases)	Yes	Unclear	Unclear	Unclear	Unclear	Unclear	No	Yes	High
Yoo, 2009[237]	Yes	Yes	Yes	Unclear	Yes	Yes	Unclear	Yes	Yes	Yes	Moderate
Yoon, 2007[238]	Yes	Yes	Yes	Yes	Yes	Yes	Unclear	Unclear	Yes	Yes	Moderate
Yoshioka, 2002[239]	Yes	Yes	Yes	Unclear	Unclear	Yes	Unclear	Unclear	No	Yes	Moderate
Yu, 2013[240]	Unclear	Yes	Yes	Yes	Yes	Yes	Unclear	Unclear	Yes	Yes	Moderate
Yu, 2011[241]	Unclear	Yes	Yes	Yes	Unclear	Yes	Unclear (also not blinded to other imaging)	Unclear	Yes	Yes (<10% excluded)	Moderate
Yu, 2009[242]	Yes	No (all cases)	Yes	Unclear	Yes	Yes	Unclear	Unclear	No	No (excluded 24 without reference standard diagnosis)	High
Yu, 2008[243]	Unclear	No (all cases)	Yes	Unclear	Yes	Yes	Unclear	Unclear	No	Yes	High

Author, Year	Random or Consecutive Sample	Avoidance of Case-control Design	Avoidance of Inappropriate Exclusions	Index Test Results Interpreted Without Knowledge of Reference Standard	Use of Pre-specified Threshold or Definition for a Positive Test	Credible Reference Standard	Reference Standard Interpreted Independently from the Test Under Evaluation	Appropriate Interval Between Index Test and Reference Standard	Same Reference Standard Applied to All Patients	Were all patients included in the analysis?	Overall Risk of Bias (Low, Moderate, High)
Yu, 2002[244]	Unclear	No (case-control)	Unclear (excluded patients with transvasal arterioportal shunt or gross portal vein thrombosis)	Unclear	Yes	Unclear	Unclear	Unclear	No	Yes	High
Yukisawa, 2007[245]	Yes	No (all cases)	Yes	Unclear	Yes	Yes	Unclear	Unclear	No	Yes	Moderate
Zacherl, 2002[246]	Yes	No (all cases)	Yes	Yes	Unclear	Yes (explant)	Unclear	Yes	Yes	Unclear	High
Zhao, 2007[247]	Unclear	No (all cases)	Unclear	Yes	Yes	Yes	Unclear	Unclear	No	Yes	High
Zhao, 2004[248]	Unclear	No (all cases)	Unclear	Yes	Yes	Yes	Unclear	Unclear	No	Yes	High
Zhao, 2003[249]	Unclear	No (all cases)	Yes	Unclear	Unclear	Unclear	Unclear	Unclear	No	Yes	High
Zheng, 2005[250]	Unclear	No (all cases)	Yes	Unclear	Unclear	Unclear	Unclear	Unclear	No	Yes	High
Zhou, 2002[251]	Unclear	No (all cases)	Yes	Unclear	Unclear	Unclear	Unclear	Unclear	Yes	Yes	High

Appendix C. Risk of Bias

Table C2. Randomized Controlled Trials Risk of Bias

Author, Year	Randomization adequate?	Allocation concealment adequate?	Groups similar at baseline?	Eligibility criteria specified?	Outcome assessors masked?	Care provider masked?	Patient masked?	Reporting of Attrition, Crossovers, Adherence, and Contamination
Trinchet JC, 2011[252]	Yes	Yes	Yes	Yes	Unclear	Unclear	Unclear	Attrition: yes Crossover: no Adherence: yes Contamination: no
Wang JH, 2013[253]	Yes; computer-assisted randomization	Unclear	Yes; only age and bilirubin levels differ	Yes	Unclear	Unclear	Unclear	Attrition: no Crossover: no Adherence: yes Contamination: yes; 5 patients in 12-month surveillance group dx outside time schedule
Zhang BH, 2004[254]	Unclear	Unclear	Yes	Yes	Unclear	No	No	Attrition: no Crossover: no Adherence: yes Contamination: no

Author, Year	Loss to Followup: Differential/ High	Analyze people in the groups in which they were randomized?	Post-randomization exclusions	Outcomes Pre-specified	Funding source	External validity	Overall Risk of Bias (Low, Moderate, High)
Trinchet JC, 2011[252]	No/No	Yes	No (4% had lesion at inclusion and were excluded)	Yes	French Ministry of Health; French Ligue de Recherche contre le Cancer	Moderate; French study, all patients had cirrhosis	Moderate
Wang JH, 2013[253]	Not reported	Yes	No	Yes	National Scientific Council of Taiwan	Limited; study done in Taiwan; patients had low platelets and viral hepatitis	Moderate
Zhang BH, 2004[254]	Not reported	Yes	No (4% of screening group refused to participate)	Yes	Not reported	Limited; study done in China	High

Appendix C. Risk of Bias

Table C3. Cohort Study Risk of Bias

Author, Year	Did the study attempt to enroll all (or a random sample of) patients meeting inclusion criteria, or a random sample (inception cohort)?	Were the groups comparable at baseline on key prognostic factors (e.g., by restriction or matching)?	Did the study use accurate methods for ascertaining exposures and potential confounders?	Were outcome assessors and/or data analysts blinded to the exposure being studied?	Did the article report attrition?	Did the study perform appropriate statistical analyses on potential confounders?	Is there important differential loss to follow-up or overall high loss to follow-up?	Were outcomes pre-specified and defined, and ascertained using accurate methods?	Overall Risk of Bias (Low, Moderate, High)
Chen MH, 2007[255]	Unclear	Yes	Yes	Unclear	No	None performed	Unclear	Yes	High

Appendix D. Summary Evidence Table: Diagnostic Accuracy Studies of Ultrasound Imaging

Author, Year	Reason for Ultrasound Imaging[a]	Contrast	Imaging Start Date	Reference Standard[b]	Country	Sample Size	Population Characteristics[c]			
Alaboudy, 2011[4]	2	Perflurobutane	2008	2	Japan	32	Age: 68	Male: 72%	HBV: 22%	Cirrhosis: NR
Bennett, 2002[10]	2	No contrast	1991	1	United States	200	Age: 50	Male: 67%	BV: 4.5%	Cirrhosis: 100%
Catala, 2007[13]	3	Sulfur hexafluoride	2002	2	Spain	77	NR			
Chalasani, 1999[15]	1	No contrast	1994	4	United States	285	Age: 49	Male: 56%	HBV: NR	Cirrhosis: 100%
Dai, 2008[25]	3	Sulfur hexafluoride	2004	2	China	72	Age: 59	Male: 82%	HBV: NR	Cirrhosis: 100%
Di Martino, 2010[30]	2	No contrast	2007	4	Italy	140	Age: 59	Male: 74%	HBV: NR	Cirrhosis: 100%
D'Onofrio, 2005[31]	3	Sulfur hexafluoride	2002	4	Italy	NR	NR			
Forner, 2008[34]	3	Sulfur hexafluoride	2003	2	United States	89	Age: 65	Male: 60%	HBV: 6.7%	Cirrhosis: 100%
Freeman, 2006[35]	2, 5	NR	2003	1	United States	789	Age: 56	Male: 77%	HBV: NR	Cirrhosis: NR
Furuse, 2000[37]	1	No contrast	1996	2	Japan	37	Age: 64	Male: 86%	HBV: 3%	Cirrhosis: 89%
Gaiani, 2004[38]	3	Sulfur hexafluoride	2001	4	Italy	79	Age: 66	Male: 68%	HBV: 6%	Cirrhosis: NR
Gambarin-Gelwan, 2000[39]	2	No contrast	NR	1	United States	106	Age: 50	Male: 65%	HBV: 5.7%	Cirrhosis: 100%
Giorgio, 2004[41]	3	Sulfur hexafluoride	2002	2	Italy	74	Age: 67	Male: 81%	HBV: 7%	Cirrhosis: 100%
Giorgio, 2007[40]	3	Sulfur hexafluoride	2003	4	Italy	73	Age: 63	Male: 67%	HBV: 4.1%	Cirrhosis: 100%
Goto, 2012[44]	2	No contrast or perflurobutane	2007	3	Japan	100	Age: 68	Male: 60%	HBV: 9%	Cirrhosis: NR
Hatanaka, 2008 (2)[50]	3	Perfluorobutane	2007	4	Japan	214	Age: 68	Male: 63%	HBV: NR	Cirrhosis: NR
Iavarone, 2010[62]	2	Sulfur hexafluoride	2006	2	Italy	59	Age: 66	Male: 69%	HBV: 12%	Cirrhosis: 100%
Imamura, 1998[65]	2	No contrast	1995	2	Japan	114	Age: NR	Male: NR	HBV: 7.9%	Cirrhosis: 57%
Inoue, 2008[68]	2	Perflurobutane	NR	4	Japan	77	Age: 62	Male: 71%	HBV: 10%	Cirrhosis: 71%
Inoue, 2009[67]	3	No contrast	2002	2	Japan	50	Age: median 67	Male: 76%	HBV: 12%	Cirrhosis: 100%
Kawada, 2010[79]	2	Perflurobutane	2008	2	Japan	13	Age: median 67	Male: 77%	HBV: 7.7%	Cirrhosis: NR
Khalili, 2011[82]	3	Perflutren lipid microsphere	2006	4	Canada	84	Age: 58	Male: 63%	HBV: 50%	Cirrhosis: 100%
Kim CK, 2001[85]	2	No contrast	1996	1	South Korea	52	Age: 45	Male: 77%	HBV: 94%	Cirrhosis: 100%
Kim PN, 2012[89]	2	No contrast	2008	3	South Korea	898	Age: 59	Male: 76%	HBV: 73%	Cirrhosis: 89%
Korenaga, 2009[111]	2	Perflurobutane	2007	2	Japan	43	Age: 67	Male: 70%	HBV: 9.3%	Cirrhosis: 81%
Kunishi, 2012[116]	2	No contrast or perflurobutane	2009	4	Japan	50	Age: 71	Male: 70%	HBV: 10%	Cirrhosis: 100%
Lee MW, 2010[128]	3	No contrast	2005	3	South Korea	93	Age: 59	Male: 70%	HBV: NR	Cirrhosis: NR
Libbrecht, 2002[132]	2, 5	No contrast	2000	1	Belgium	49	Age: 53	Male: 65%	HBV: 19%	Cirrhosis: 100%
Lim JH, 2006 (2)[133]	2	No contrast	1999	2	South Korea	103	Age: 53	Male: 83%	HBV: NR	Cirrhosis: 59%
Liu, 2003[140]	2	No contrast	1996	1	South Korea	118	Age: 47	Male: 73%	HBV: 81%	Cirrhosis: 100%
Luo W 2009 (3)[145]	3	Perfluorobutane	2007	4	Japan	84	Age: 70	Male: 66%	HBV: NR	Cirrhosis: 100%
Luo W, 2009[143]	3	Perfluorobutane	2007	4	Japan	152	Age: 71	Male: 55%	HBV: NR	Cirrhosis: NR
Luo W, 2009 (2)[144]	3	Perflurobutane	2007	2	Japan	139	Age: 62	Male: 65%	HBV: NR	Cirrhosis: 53%
Mita, 2010[153]	3	Perfluorobutane	2008	2	Japan	29	Age: 70	Male: 45%	HBV: 3.4%	Cirrhosis: 100%

Author, Year	Reason for Ultrasound Imaging[a]	Contrast	Imaging Start Date	Reference Standard[b]	Country	Sample Size	Population Characteristics[c]			
Mok, 2004[154]	1	No contrast	1997	2	China	103	Age: median 48	Male: 78%	HBV: 100%	Cirrhosis: NR
Moriyasu, 2009[157]	3	No contrast or perflurobutane	NR	4	Japan	190	Age: 63	Male: 67%	HBV: NR	Cirrhosis: NR
Ooi, 2010[169]	3	Sulfur hexafluoride	2006	4	Singapore	73	Age: 64	Male: 75%	HBV: NR	Cirrhosis: NR
Paul, 2007[176]	1	No contrast	2001	4	India	301 (291 under-went US)	Age: NR	Male: NR	HBV: NR	Cirrhosis: 100%
Pei, 2012[178]	4	Sulfur hexafluoride	2005	2	China	100	Age: 51 Note: HCC group only	Male: 86%	HBV: NR	Cirrhosis: NR
Quaia, 2009[185]	3	Sulfur hexafluoride	2009	2	Italy	106	Age: 70	Male: 64%	HBV: 80%	Cirrhosis: 100%
Rickes, 2003[187]	3	No contrast or galactose	1998	4	Germany	87	Age: 60	Male: 71%	HBV: 14%	Cirrhosis: 100%
Rode, 2001[190]	2	No contrast	1996	1	France	43	Age: 51	Male: 70%	HBV: 9.3%	Cirrhosis: 100%
Sangiovanni, 2010[192]	3	Sulfur hexafluoride	2006	2	Italy	64	Age: NR	Male: NR	HBV: NR	Cirrhosis: 100%
Seitz, 2009[196]	3	Sulfur hexafluoride	2004	4	Germany	267	Age: 60	Male: 45%	HBV: NR	Cirrhosis: NR
Seitz, 2010[197]	3	Sulfur hexafluoride	2004	4	Germany	269	Age: 53	Male: 41%	HBV: NR	Cirrhosis: NR
Shah SA, 2006 (2)[199]	5	NR	NR	1	Canada	118	Age: NR	Male: 80%	HBV: 19%	Cirrhosis: NR
Singh, 2007[201]	1	No contrast	2005	2	United States	17	Age: 56	Male: NR	HBV: NR	Cirrhosis: 100%
Strobel, 2003[204]	3	Octafluoropropane	1998	4	Germany	90	NR			
Sugimoto, 2012[205]	4	Perflurobutane	2008	2	Japan	66	Age: 69	Male: 70%	HBV: 12%	Cirrhosis: NR
Suzuki, 2004 (2)[210]	3	Galactose	2000	2	Japan	46	Age: 66	Male: 67%	HBV: NR	Cirrhosis: NR
Tanaka, 2001[214]	3	Galactose	1999	2	Japan	107	Age: 62	Male: 75%	HBV: NR	Cirrhosis: NR
Teefey, 2003[217]	2	No contrast	1996	2	United States	25	Age: 47	Male: 65%	HBV: NR	Cirrhosis: 100%
Trojan, 1999[218]	2	No contrast	1996	2	Germany	14	Age: median 60	Male: 71%	HBV: 21%	Cirrhosis: NR
Van Thiel, 2004[221]	1	No contrast	1998	1	United States	100	Age: 52	Male: 68%	HBV: 2%	Cirrhosis: NR
Wang, 2008[225]	3	Sulfur hexafluoride	2005	4	China	52	Age: 45	Male: 65%	HBV: NR	Cirrhosis: 0%
Xu, 2008[233]	3	No contrast or sulfur hexafluoride (for HCC <2 cm)	2005	4	China	104	Age: 48	Male: 78%	HBV: NR	Cirrhosis: NR
Xu, 2012[230]	3	No contrast or sulfur hexafluoride	2004	4	China	133	Age: 52	Male: 83%	HBV: 95%	Cirrhosis: 100%
Yamamoto, 2002[235]	3	Galactose	NR	4	Japan	41	Age: 65	Male: 54%	HBV: 2.4%	Cirrhosis: 95%
Yu, 2011[241]	2	No contrast	1999	1	United States	638	Age: 53	Male: 64%	HBV: 10%	Cirrhosis: NR
Zhou, 2002[251]	2	No contrast	1995	2	China	49	Age: NR	Male: 90%	HBV: NR	Cirrhosis: NR

HBV = hepatitis B virus; NR = not reported

a Reason for imaging key: 1=surveillance, 2=detection rate in patients undergoing surgery or with known HCC; 3=evaluation/characterization of liver mass; 4=differentiation between HCC and another type of lesion mass; 5=staging

b Reference standard key: 1=explanted livers only, 2=histological specimen (may include some explanted livers), 3=imaging and clinical criteria, 4=mixed histological and imaging/clinical criteria

c Age reported as mean (years), unless otherwise indicated

Appendix E. Summary Evidence Table: Diagnostic Accuracy Studies of Computed Tomography Imaging

Author, Year	Reason for CT Imaging[a]	Scanner Type	Con-trast Rate (ml/s)	Delayed Phase?	Delayed Phase Timing >120 s[b]	Section Thickness (mm)	Did study meet all imaging criteria?[c]	Imaging Start Date	Reference Standard[d]	Country	Number of Patients	Population Characteristics[e]
Addley, 2011[1]	2	16- or 64-row multidetector CT	4	No	NA	1-2	No	2002	1	United Kingdom	39	Age: 56 Male: 72% HBV: 5.1% Cirrhosis: NR
Akai, 2011[3]	2	64-row multidetector CT	3	Yes	No	5	No	2008	1	Japan	34	Age: 65 Male: 79% HBV: NR Cirrhosis: NR
Alaboudy, 2011[4]	2	64-row multidetector CT	NR	No	NA	5	No	2008	2	Japan	32	Age: 68 Male: 72% HBV: 22% Cirrhosis: NR
Baccarini U, 2006[7]	5	NR	NR	NR	NR	NR	No	NR	1	Italy	50	Age: median 57 Male: 86% HBV: NR Cirrhosis: NR
Baek, 2012[8]	2	4-(n=6), 16-(n=9), or 64-row (n=36) multidetector CT	3-4	Yes	Yes	3-5	No	2008	4	South Korea	51	Age: NR, range 32-80 Male: 84% HBV: 80% Cirrhosis: 100%
Bartolozzi, 2000[9]	2	Non-multidetector spiral CT	3	No	NA	7 (collimation)	No	1997	4	Italy	50	Age: 65 Male: 64% HBV: NR Cirrhosis: 100%
Bhattacharjya, 2004[11]	2	Non-multidetector spiral CT	4	No	NA	7-10 (collimation)	No	1995	1	UK	30	Age: NR Male: NR HBV: 23% Cirrhosis: 100%
Burrel, 2003[12]	2, 5	Non-multidetector spiral CT	4	Yes	Yes	5 (collimation)	No	2000	1	Spain	26	Age: 56 Male: 66% HBV: NR Cirrhosis: 100%
Catala, 2007[13]	3	Non-multidetector spiral CT	4	Yes	Yes	5 (collimation)	No	2002	2	Spain	77	NR
Chalasani, 1999[15]	1	Non-multidetector spiral CT	4	No	NA	5 (collimation)	No	1994	4	United States	285	Age: 49 Male: 56% HBV: None Cirrhosis: 100%
Cheung, 2013[17]	2, 5	16-row multidetector CT	NR	Yes	NR	5	No	2004	2	China	43	Age: 60 Male: 79% HBV: 7.0% Cirrhosis: NR
Colagrande, 2000[24]	3	Non-multidetector spiral CT	3-4	No	NA	8	No	1996	2	Italy	24	Age: 67 Male: 92% HBV: NR Cirrhosis: 100%
Dai, 2008[25]	3	Non-multidetector spiral CT	3.5	Yes	120-240	5	No	2004	2	China	72	Age: 59 Male: 82% HBV: NR Cirrhosis: 100%
de Ledinghen, 2002[26]	2	Non-multidetector spiral CT	3	No	NA	5 (collimation)	No	1997	1	France	34	Age: 54 Male: 71% HBV: 8.8% Cirrhosis: 100%

Author, Year	Reason for CT Imaging[a]	Scanner Type	Con-trast Rate (ml/s)	Delayed Phase?	Delayed Phase Timing ≥120 s[b]	Section Thickness (mm)	Did study meet all imaging criteria?[c]	Imaging Start Date	Reference Standard[d]	Country	Number of Patients	Population Characteristics[e]
Denecke, 2009[28]	2	4-(n=9) or 16-row (n=23) multidetector CT	4	Yes	No	5 (4-row) or 1.25-5 (16-row)	No	2001	1	Germany	32	Age: 57 Male: 88% HBV: 16% Cirrhosis: NR
Di Martino, 2010[30]	2	64-row multidetector CT	4	Yes	Yes	3	Yes	2007	4	Italy	140	Age: 59 Male: 74% HBV: NR Cirrhosis: 100%
Di Martino, 2013[29]	2	64-row multidetector CT	4-5	Yes	Yes	3	Yes	2007	4	Italy	58	Age: 63 Male: 67% HBV: 14% Cirrhosis: 100%
Doyle, 2007[32]	2	8-row (n=8), 4-row (n=27), or non-multidetector CT (n=1)	5	No	NA	5 (collimation)	No	2001	2	Canada	36	Age: 55 Male: 67% HBV: 50% Cirrhosis: 100%
Freeman, 2006[35]	2, 5	NR	NR	NR	NR	NR	No	2003	1	United States	789	Age: 56 Male: 77% HBV: NR Cirrhosis: NR
Freeny, 2003[36]	2	Non-multidetector spiral CT	5	Yes	Yes	3 (collimation)	No	1992	1	Switzerland	51	Age: 49 Male: 58% HBV: None Cirrhosis: 100% Note: only includes patients with hyperattenuating nodules on CT
Furuse, 2000[37]	1	Non-multidetector spiral CT	3	No	NA	NR	No	1996	2	Japan	37	Age: 64 Male: 86 HBV: 3% Cirrhosis: 89%
Giorgio, 2004[41]	3	Non-multidetector spiral CT	3	Yes	Yes	NR	No	2002	2	Italy	74	Age: 67 Male: 81% HBV: 7% Cirrhosis: 100%
Golfieri, 2009[42]	3	6-row multidetector CT	4	Yes	Yes	5	No	2003	2	Italy	63	Age: 64 Male: 84% HBV: 35% Cirrhosis: 100%
Haradome, 2011[46]	2	16-row multidetector CT	4	Yes	Yes	3	Yes	2008	2	Japan	75	Age: 55 Male: 80% HBV: 19% Cirrhosis: 72%
Hidaka, 2013[52]	2	64-row multidetector CT	4-5	Yes	NR	3	No	2008	1	Japan	11	Age: NR Male: NR HBV: 27% Cirrhosis: NR
Higashihara, 2012[53]	2	4- (n=5) or 64-row (n=25) multidetector CT	3-4	No	NA	5	No	2007	3	Japan	30	Age: 73 Male: 57% HBV: NR Cirrhosis: NR
Hirakawa, 2011[54]	2	4-row multidetector CT	2.5	Yes	Yes	5	No	1999	1	Japan	25	Age: 55 Male: 52% HBV: NR Cirrhosis: 100%
Hori, 1998[58]	2	Non-multidetector spiral CT	2	Yes	Yes	7-10	No	1995	3	Japan	50	Age: 65 Male: 76% HBV: 10% Cirrhosis: NR
Hori, 2002[57]	2	Non-multidetector spital CT	3-5	Yes	Yes	5,7	No	1995	4	Japan	41	Age: 64 Male: 83% HBV: 17% Cirrhosis:56%

Author, Year	Reason for CT Imaging[a]	Scanner Type	Con-trast Rate (ml/s)	Delayed Phase?	Delayed Phase Timing ≥120 s[b]	Section Thickness (mm)	Did study meet all imaging criteria?[c]	Imaging Start Date	Reference Standard[d]	Country	Number of Patients	Population Characteristics[e]
Hwang, 2012[59]	2	64-row multidetector CT	3-4	Yes	Yes	5	Yes	2008	4	South Korea	54	Age: NR, range 33 to 81 years Male: 81% HBV: 70% Cirrhosis: NR
Iannaccone, 2005[61]	3	Multidetector CT, rows NR	5	Yes	Yes	3	No	2001	4	Italy	195	Age: 61 Male: 66% HBV: 19% Cirrhosis: 100%
Iavarone, 2010[62]	2	64-row multidetector CT	4	Yes	Yes	2.5	Yes	2006	2	Italy	59	Age: median 66 Male: 69% HBV: 12% Cirrhosis: 100%
Ichikawa, 2002[64]	2	16-row multidetector CT	3	No	NA	5	No	2001	2	Japan	59	Age: 58 Male: 59% HBV: NR Cirrhosis: 100%
Ichikawa, 2010[63]	2	Non-multidetector or multidetector CT, rows NR	2-4	Yes	Yes	NR	No	2001	4	Japan	151	Age: 66 Male: 72% HBV: NR Cirrhosis: 66%
Inoue, 2012[66]	2	64-row multidetector CT	NR	No	NA	5	No	2008	2	Japan	66	Age: 66 Male: 64% HBV: 30% Cirrhosis: 62%
Iwazawa, 2010[70]	2	16-row multidetector CT	3	No	NA	5	No	2007	4	Japan	69	Age: 68 Male: 58% HBV: NR Cirrhosis: NR
Jang, 2000[71]	2	Non-multidetector spiral CT	3	Yes	Yes	7 (collimation)	No	1996	2	South Korea	52	Age: 55 Male: 67% HBV: NR Cirrhosis: NR
Jeng, 2002[73]	2	Non-multidetector spiral CT	2	No	NA	10	No	1998	4	Taiwan	125	Age: 62 Male: 54% HBV: NR Cirrhosis: NR
Kang, 2003[78]	2	Non-multidetector spiral CT	3	Yes	Yes	7	No	1999	2	South Korea	70	Age: 52 Male: 84% HBV: NR Cirrhosis: 64%
Kawada, 2010[79]	2	64-row multidetector CT	3	No	NA	5	No	2008	2	Japan	13	Age: median 67 Male: 77% HBV: 7.7% Cirrhosis: NR
Kawaoka, 2009[80]	5	16-row multidetector CT	3.5	Yes	Yes	NR	No	2005	4	Japan	34	Age: 59 Male: 82% HBV: 32% Cirrhosis: NR
Kawata, 2002[81]	2	8-row multidetector CT	5	No	NA	5	No	1999	4	Japan	62 patients (analysis restricted to 43 patients with HCC)	Age: 64 Male: 69% HBV: NR Cirrhosis: NR
Khalili, 2011[82]	3	64-row multidetector CT	5	Yes	Yes	5	Yes	2006	4	Canada	84	Age: 58 Male: 63% HBV: 50% Cirrhosis: 100%

Author, Year	Reason for CT Imaging[a]	Scanner Type	Con-trast Rate (ml/s)	Delayed Phase?	Delayed Phase Timing ≥120 s[b]	Section Thickness (mm)	Did study meet all imaging criteria?[c]	Imaging Start Date	Reference Standard[d]	Country	Number of Patients	Population Characteristics[e]
Khan, 2000[83]	2	Non-multidetector spiral CT	NR	No	NA	5-7 (collimation)	No	1995	2	United States	20	Age: 60 Male: 75% HBV: 18% Cirrhosis: 75%
Kim KW, 2009[87]	2	16-row multidetector CT	NR	Yes	Yes	2-3	No	2005	4	South Korea	82	Age: 56 Male: 84% HBV: 92% Cirrhosis: 100%
Kim SE, 2011[90]	4	Non-multidetector spiral CT	3.5	Yes	Yes	5	No	2006	2	South Korea	206	Age: 55 Male: 77% HBV: 67% Cirrhosis: 52%
Kim SH, 2005[92]	2	4- (n=27) or 8-row (n=46) multidetector CT	4	Yes	Yes	5	No	2002	2	South Korea	73	Age: 53 Male: 84% HBV: NR Cirrhosis: 48%
Kim SH, 2009[91]	2	16- (n=31), 40- (n=14), or 64-row (n=17) multidetector CT	3-4	Yes	Yes	5	Yes	2007	2	South Korea	62	Age: 55 Male: 87% HBV: 85% Cirrhosis: 48%
Kim SJ, 2008[93]	2	4- (n=13), 8- (n=13), 16- (n=20), or 40-row (n=40) multidetector CT	4	Yes	Yes	5	No	2004	2	South Korea	86	Age: 52 Male: 81% HBV or HCV: 91% Cirrhosis: 48%
Kim SK, 2002 (2)[94]	2	4-row multidetector CT	3	Yes	Yes	5	No	2000	4	South Korea	25	Age: 54 Male: 84% HBV: 84% Cirrhosis: 64%
Kim T, 2002[95]	2	Non-multidetector spiral CT	3-5	Yes	Yes	5 (collimation)	No	1999	4	South Korea	106	NR
Kim YK, 2006[106]	2	16-row multidetector CT	3	Yes	Yes	3	Yes	2003	4	South Korea	31	Age: 57 Male: 90% HBV: 97% Cirrhosis: 100%
Kim YK, 2006 (2)[107]	2	16-row multidetector CT	3	Yes	Yes	3	Yes	2003	4	South Korea	44	Age: 56 Male: 82% HBV: 100% Cirrhosis: 100%
Kim YK, 2009 (2)[102]	2	16-row multidetector CT	3	Yes	Yes	3	Yes	2007	4	South Korea	62	Age: NR, range 40 to 74 Male: 81% HBV: 90% Cirrhosis: NR
Kitamura, 2008[109]	2	4-row multidetector CT	3	NR	NR	5	No	2000	4	Turkey	91	Age: 57 Male: 62% HBV: NR Cirrhosis: NR
Kumano, 2009[115]	2	8-row multidetector CT	4	No	NA	3	No	2002	4	Japan	28	Age: NR Male: 79% HBV: NR Cirrhosis: NR
Laghi, 2003[119]	2	Multidetector, rows NR	5	No	NA	3	No	2000	4	Italy	48	Age: 61 Male: 73% HBV: 36% Cirrhosis: NR
Lee CH, 2012[121]	2	16-row multidetector CT	3-4	Yes	Yes	5	Yes	2008	4	South Korea	46	Age: 57 Male: 83% HBV: 90% Cirrhosis: NR

Author, Year	Reason for CT Imaging[a]	Scanner Type	Con-trast Rate (ml/s)	Delayed Phase?	Delayed Phase Timing ≥120 s[b]	Section Thickness (mm)	Did study meet all imaging criteria?[c]	Imaging Start Date	Reference Standard[d]	Country	Number of Patients	Population Characteristics[e]	
Lee DH, 2009[122]	2	4-row (n=4), 8-row (n=23), 16-row (n=35), or 64-row (n=17) multidetector CT	2-5	No	NA	2.5-3	No	2005	1	South Korea	78	Age: 53 HBV: 89%	Male: 74% Cirrhosis: 100%
Lee J, 2008[123]	2	Non-multidetector spiral CT (n=7), or 4- (n=3), 8- (n=2), or 16-row (n=4) multidetector CT	3	Yes	Yes	5-7	No	1997	2	South Korea	16	Age: 55 HBV: 81%	Male: 81% Cirrhosis: 75%
Lee JE, 2012[124]	5	NR	NR	NR	NR	NR	No	2006	4	South Korea	138	Age: 69 HBV: 64%	Male: 83% Cirrhosis: NR
Lee JM, 2003[125]	2	Non-multidetector spiral CT	3	No	NA	5	No	1998	4	South Korea	43	Age: NR HBV: NR	Male: NR Cirrhosis: 100%
Li CS, 2006[130]	2	Non-multidetector spiral CT	2.5-3.5	Yes	No	7	No	2000	2	Taiwan	37	Age: 60 HBV: 60%	Male: 68% Cirrhosis: 5%
Libbrecht, 2002[132]	2, 5	Non-multidetector spiral CT	2.5-4	No	NA	5	No	2000	1	Belgium	49	Age: 53 HBV: 19%	Male: 65% Cirrhosis: 100%
Lim JH, 2000[135]	2	Non-multidetector spiral CT	3	Yes	Yes	7 (collimation)	No	1996	1	South Korea	41	Age: 49 HBV: 100%	Male: 80% Cirrhosis: 100%
Lim JH, 2002[134]	2	Non-multidetector spiral CT	3	Yes	Yes	7	No	1996	2	South Korea	113	Age: 53 HBV: 68%	Male: 82% Cirrhosis: 87%
Lin MT, 2011[136]	2	Non-multidetector spiral CT	NR	NR	NR	5	No	2006	2	Taiwan	343	Age: 56 HBV: 57%	Male: 78% Cirrhosis: 47%
Liu, 2012[139]	2	8- or 16-row multidetector CT	4-5	Yes	Yes	3	Yes	2004	1	United States	24	Age: 53 HBV: 25%	Male: 83% Cirrhosis: 96%
Liu, 2013[138]	2	8-, 16-, or 64-row multidetector CT	4-5	Yes	Yes	3	Yes	2004	1	United States	24	Age: 53 HBV: 25%	Male: 83% Cirrhosis: NR
Lu CH, 2010[141]	2, 5	64-row multidetector CT	2.5-3	Yes	NR	NR	No	2006	1	Taiwan	57	Age: 51 HBV: NR	Male: 89% Cirrhosis: NR
Luca, 2010[142]	2, 5	16 or 64 row multidetector CT	5	Yes	Yes	2.5	Yes	2004	1	Italy	125	Age: 55 HBV: 20%	Male: 72% Cirrhosis: 100%
Luo W, 2009 (2)[144]	3	16-row multidetector CT	3	Yes	Yes	5	Yes	2007	2	Japan	152	Age: 71 HBV: NR	Male: 55% Cirrhosis: NR

Author, Year	Reason for CT Imaging[a]	Scanner Type	Con-trast Rate (ml/s)	Delayed Phase?	Delayed Phase Timing ≥120 s[b]	Section Thickness (mm)	Did study meet all imaging criteria?[c]	Imaging Start Date	Reference Standard[d]	Country	Number of Patients	Population Characteristics[e]
Lv, 2011[147]	4	Spectral CT	3-4	No	NA	0.625 (collimation)	No	2010	4	China	49	Age: 53 Male: 80% HBV: NR Cirrhosis: 18%
Lv, 2012[146]	2	Non-multidetector spiral CT with spectral mode	3-4	No	NA	1.25	No	2011	4	China	27	Age: 56 Male: 81% HBV: NR Cirrhosis: 19%
Maetani, 2008[148]	2	8-row multidetector CT	2-3	Yes	No	2 (collimation)	No	2003	1	Japan	41	Age: 55 Male: 68% HBV: 32% Cirrhosis: 100%
Marin, 2009[149]	2	64-row multidetector CT	5	Yes	Yes	3	Yes	2006	4	Italy	71	Age: 65 Male: 85% HBV: 25% Cirrhosis: 100%
Marin, 2009 (2)[150]	2	64-row multidetector CT	5	Yes	Yes	3	Yes	2005	4	Italy	36	Age: 66 Male: 75% HBV: 29% Cirrhosis: NR
Mita, 2010[153]	3	Non-multidetector spiral CT	3	Yes	No	5 (collimation)	No	2008	2	Japan	29	Age: 70 Male: 45% HBV: 3.4 Cirrhosis: 100%
Monzawa, 2007[155]	2	Non-multidetector spiral CT	4	Yes	Yes	5	No	1996	2	Japan	98	Age: 66 for cases, 61 for controls Male: 67% for cases, 59% for controls HBV: NR Cirrhosis: 100%
Moriyasu, 2009[157]	3	Non-multidetector or multidetector CT, rows NR	NR	NR	NR	mean 6.9 (range 2-10 mm across centers)	No	2006	4	Japan	190	Age: 63 Male: 67% HBV: NR Cirrhosis: NR
Mortele, 2001[158]	2	Non-multidetector spiral CT	2-4	No	NA	5 (collimation)	No	1991	1	Belgium	53	Age: 56 Male: 53% HBV: 11% Cirrhosis: 100%
Murakami, 2001[161]	2	8-row multidetector CT	5	No	NA	5	No	1998	4	Japan	51	NR
Murakami, 2003[160]	2	16-row multidetector CT	4	No	NA	5	No	2000	4	Japan	49	Age: 66 Male: 63% HBV: NR Cirrhosis: NR
Nagaoka, 2006[162]	5	NR	NR	NR	NR	NR	No	2004	3	Japan	21	Age (median): 64 Male: 76% HBV: 19% Cirrhosis: NR
Nakamura, 2000[164]	2	Non-multidetector spiral CT	3	Yes	Yes	10	No	1997	3	Japan	30	Age: 63 Male: 97% HBV: NR Cirrhosis: 83%
Nakamura, 2013[163]	2	16- or 64-row multidetector C T	NR	Yes	Yes	5	No	2008	1	Japan	11	Age: 69 Male: 73% HBV: 9% Cirrhosis: 100%
Nakayama, 2001[165]	2	Non-multidetector spiral CT	3	No	NA	7-10 (collimation)	No	1993	4	Japan	69	Age: 64 Male: 74% HBV: NR Cirrhosis: NR Note: describes entire sample, not limited to those who underwent CT

Author, Year	Reason for CT Imaging[a]	Scanner Type	Con-trast Rate (ml/s)	Delayed Phase?	Delayed Phase Timing ≥120 s[b]	Section Thickness (mm)	Did study meet all imaging criteria?[c]	Imaging Start Date	Reference Standard[d]	Country	Number of Patients	Population Characteristics[e]
Noguchi, 2002[167]	2	4-row multidetector spiral CT	5	Yes	Yes	5	No	1999	4	Japan	29	Age: 64 Male: 90% HBV: NR Cirrhosis: NR
Noguchi, 2003[166]	2	Non-multidetector spiral CT	5	Yes	Yes	5	No	2000	4	Japan	53	Age: 63 Male: 68% HBV: NR Cirrhosis: 100%
Onishi, 2012[168]	2	8- or 64-row multidetector CT	3-5	Yes	Yes	5	Yes	2008	4	Japan	31	Age: 70 Male: 90% HBV: 13% Cirrhosis: NR
Park, 2011[172]	2	Dual source 64-row multidetector CT	NR	No	NA	1.2 (collimation)	No	2008	1	South Korea	42	Age: 50 Male: 42% HBV: 64% Cirrhosis: NR
Peterson, 2000[179]	2	Non-multidetector spiral CT	2.5-5	No	NA	7 (collimation)	No	1993	1	United States	59	Age: 57 Male: 69% HBV: 6.8% Cirrhosis: 100%
Pitton, 2009	2	64-row multidetector CT	5	No	NA	5	No	2006	4	Germany	28	Age: 67 years Male: 89% HBV: NR Cirrhosis: NR
Pozzi Mucelli, 2006[183]	2	4-row multidetector CT	5	No	NA	5	No	2003	4	Italy	50	Age: 68 Male: 64% HBV: 24% Cirrhosis: NR
Pugacheva, 2011[184]	2	64-row multidetector CT	3	Yes	Yes	2.5	Yes	2006	4	Japan	38 patients (only 30 underwe nt CT or MRI)	Age: 69 Male: 75% HBV: 7.9% Cirrhosis: NR
Quaia, 2009[185]	3	64-row multidetector CT	5	Yes	Yes	0.3	Yes	2009	2	Italy	106	Age: 70 Male: 64% HBV: 80% Cirrhosis: 100%
Rizvi, 2006[189]	2	NR	NR	NR	NR	NR	No	1995	1	United States	21	Age: 50 Male: 62% HBV: 4.8% Cirrhosis: NR
Rode, 2001[190]	2	Non-mutlidetector spiral CT	4	No	NA	5	No	1996	1	France	43	Age: 51 Male: 70% HBV: 9.3% Cirrhosis: 100%
Ronzoni, 2007[191]	2, 5	Multidetector, rows NR	3.4-4	Yes	Yes	3	No	2003	1	Italy	88	Age: 51 Male: 80% HBV: NR Cirrhosis: NR
Sangiovanni, 2010[192]	3	64-row multidetector CT	4	Yes	Yes	2.5	Yes	2006	2	Italy	64	Age: NR Male: NR HBV: NR Cirrhosis:100%
Sano, 2011[193]	2	16-row multidetector CT	2.6-5	Yes	Yes	5	No	2008	2	Japan	64	Age: 66 Male: 73% HBV: NR Cirrhosis: NR
Schima, 2006[194]	2	4-, 8-, or 16-row multidetector CT	3	Yes	Yes	2.5-3	No	2003	4	6 European countries	97	Age: 64 Male: 81% HBV: 10% Cirrhosis: 71%

Author, Year	Reason for CT Imaging[a]	Scanner Type	Con-trast Rate (ml/s)	Delayed Phase?	Delayed Phase Timing ≥120 s[b]	Section Thickness (mm)	Did study meet all imaging criteria?[c]	Imaging Start Date	Reference Standard[d]	Country	Number of Patients	Population Characteristics[e]
Seitz, 2009[196]	3	Non-multidetector spiral CT (n=54) or ≥4-row multidetector CT (n=213)	≥3	No	NA	≤5	No	2004	4	Germany	267	Age: 60 Male: 45 HBV: NR Cirrhosis: NR
Serste, 2012[198]	3	Multidetector CT, rows NR	NR	Yes	NR	NR	No	2005	2	France	74	Age: 60 Male: 78% HBV: 27% Cirrhosis: 82%
Shah SA, 2006 (2)[199]	5	NR	NR	NR	NR	NR	No	NR	1	Canada	118	Age: NR Male: 80% HBV: 19% Cirrhosis: NR
Singh, 2007[201]	1	Non-multidetector spiral CT	3	NR	NR	10 (collimation)	No	2005	2	United States	17	Age: 56 Male: NR HBV: NR Cirrhosis: 100%
Sofue, 2011[202]	2	4-row multidetector CT	NR	Yes	Yes	10	No	2005	4	Japan	26	Age: 70 Male: 81% HBV: NR Cirrhosis: 100%
Sun, 2010[208]	4	8-, 16-, or 64-row multidetector CT	3-5	Yes	Yes	2.5-3	Yes	2008	4	South Korea	69	Age: 56 Male: 82% HBV: 81% Cirrhosis: 100%
Teefey, 2003[217]	2	Non-multidetector spiral CT	5	Yes	Yes	5	No	1996	2	United States	25	Age: 47 Male: 65% HBV: NR Cirrhosis: 100%
Trojan, 1999[218]	2	Non-multidetector spiral CT	NR	No	NA	NR	No	1996	2	Germany	14	Age: median 60 Male: 71% HBV: 21% Cirrhosis: NR
Valls, 2004[220]	2, 5	Non-multidetector spiral CT	5	Yes	Yes	5 (collimation)	No	1995	1	Spain	85	Age: 55 Male: 65% HBV: 7.1% Cirrhosis: 100%
Van Thiel, 2004[221]	1	Non-multidetector spiral CT	NR	NR	NR	NR	No	1998	1	United States	100	Age: 52 Male: 68% HBV: 2% Cirrhosis: NR
Wagnetz, 2011[224]	2	64-row multidetector CT	5	No	NA	3	No	2005	2	Canada	292	Age: 60 Male: 38% HBV: NR Cirrhosis: NR
Xiao, 2005[229]	2	16-row multidetector CT	3	Yes	Yes	1.25	Yes	NR	4	China	56	Age: 56 Male: 66% HBV: NR Cirrhosis: NR
Yamamoto, 2002[235]	3	Non-multidetector spiral CT	3	No	NA	NR	No	NR	4	Japan	41	Age: 65 Male: 54% HBV: 2.4% Cirrhosis: 95%
Yan, 2002[236]	2	Non-multidetector spiral CT	3	Yes	Yes	NR	No	1996	4	China	53	Age: 61 Male: 79% HBV: NR Cirrhosis: NR

Author, Year	Reason for CT Imaging[a]	Scanner Type	Con-trast Rate (ml/s)	Delayed Phase?	Delayed Phase Timing ≥120 s[b]	Section Thickness (mm)	Did study meet all imaging criteria?[c]	Imaging Start Date	Reference Standard[d]	Country	Number of Patients	Population Characteristics[e]
Yu, 2011[241]	2	Non-multidetector spiral CT or 4-, 16-, or 64-row multidetector CT	2-3	No	NA	7-7 (single, 4-row), 5 (16-, 64-row)	No	1999	1	United States	638	Age: 53 Male: 64% HBV: 10% Cirrhosis: NR
Yu, 2013[240]	4	64-row multidetector CT with spectral imaging mode	3-4	No	NA	0.625 (collimation)	No	2010	2	China	58	Age (median): 45 Male: 64% HBV: NR Cirrhosis: 24%
Yukisawa, 2007[245]	2	16-row multidetector CT	3	Yes	Yes	5	Yes	2004	4	Japan	25	Age: mean NR, range 53 to 76 Male: 76% HBV: NR Cirrhosis: 100%
Zacherl, 2002[246]	2, 5	Non-multidetector spiral CT	5	No	NA	5 (collimation)	No	1998	1	Austria	23	Age: 57 Male: 87% HBV: 17% Cirrhosis: 91%
Zhao, 2003[249]	2	4-row multidetector CT	3	No	NA	6.5	No	2001	4	China	75	Age: 49 Male: 89% HBV: NR Cirrhosis: NR
Zhao, 2004[248]	2	Multidetector CT, rows NR	3	No	NA	6.5	No	2001	4	China	40	Age: 49 Male: 85% HBV: NR Cirrhosis: NR
Zhao, 2007[247]	2	Multidetector CT, rows NR	3	No	NA	2.5	No	2002	4	China	24	Age: 56 Male: 78% HBV: NR Cirrhosis: 100% Note: describes entire sample, not limited to those in analysis
Zheng, 2005[250]	2	16-row multidetector CT	3	No	NA	NR	No	2003	4	China	28	Age: 49 Male: 86% HBV: NR Cirrhosis: NR
Zhou, 2002[251]	2	Non-multidetector spiral CT	3-4	No	NA	5-10 (collimation)	No	1995	2	China	49	Age: mean NR, range 21 to 75 Male: 90% HBV: NR Cirrhosis: NR

CT = computed tomography; HBV = hepatitis B virus; NA = not applicable; NR = not reported; s = second

a Reason for CT imaging key: 1=surveillance; 2=detection rate in patients undergoing surgery or with known HCC; 3=evaluation/characterization of liver mass; 4=differentiation between HCC and another type of lesion; 5=staging

b Delayed phase reported as time after contrast injection

c Imaging criteria = multidetector CT >8 rows; contrast rate >3 ml/s; delayed phase; timing of delayed phase >120 s after contrast injection; slice thickness <5 mm

d Reference standard key: 1=explanted livers only, 2=histological specimen (may include some explanted livers), 3=imaging and clinical criteria, 4=mixed histological and imaging/clinical criteria

e Age reported as mean (years), unless otherwise noted

Appendix F. Sumary Evidence Table: Diagnostic Accuracy Studies of Magnetic Resonance Imaging

Author, Year	Reason for MRI Imaging[a]	Scanner Type	Contrast, Rate	Delayed phase?	Delayed Phase Timing >120 s[b]	Section Thickness (mm)	Did study meet all imaging criteria?[c]	Imaging Start Date	Reference Standard[d]	Country	Number of Patients	Population Characteristics[e]
Ahn, 2010[2]	2	1.5 T or 3 T	Gadoxetate disodium, rapid bolus	Yes	Yes	2	Yes	2007	4	South Korea	59	Age: 57 Male: 85% HBV: 76% Cirrhosis: 93%
Akai, 2011[3]	2	1.5 T	Gadoxetic acid disodium, rapid bolus	Yes	Yes	5	Yes	2008	1	Japan	34	Age: 65 Male: 79% HBV: NR Cirrhosis: NR
Alaboudy, 2011[4]	2	1.5 T or 3T	Gadoxetic acid disodium, 2 ml/s	Yes	Yes	NR	No	2008	2	Japan	32	Age: 68 years Male: 72% HBV: 22% Cirrhosis: NR
An, 2012[6]	2	3.0 T	Gadoxetic acid disodium, 2 ml/s	Yes	Yes	2.5	Yes	2009	2	South Korea	175	Age: 57 Male: 79% HBV: 77% Cirrhois: NR
An, 2013[5]	2	3.0 T	Gadoxetic acid disodium, 1-2 ml/s	No	NA	2.5	No	2008	2	South Korea	86	Age: 57 Male: 80% HBV: 87% Cirrhosis: 76%
Baek, 2012[8]	2	3 T	Gadoxetic acid disodium, 2 ml/s	Yes	Yes	2	Yes	2008	4	South Korea	51	Age: NR, range 32-80 Male: 84% HBV: 80% Cirrhosis: 100%
Burrel, 2003[12]	2, 5	1.5 T	Gadodiamide, 2 ml/s	Yes	NR	4-5	No	2000	1	Spain	29	Age: 56 Male: 66% HBV: NR Cirrhosis: 100%
Cereser, 2010[14]	2	1.5 T	Gadobenate dimeglumine, 2 ml/s	Yes	Yes	4	Yes	2005	2	Italy	33	Age: 64 Male: 82% HBV: 6% Cirrhosis: 100%
Choi, 2001 (2)[20]	2	1.5 T	Gadopentetate disodium, rate NR	Yes	Yes	6-8	No	1998	2	South Korea	33	Age: 54 Male: 73% HBV: 70% Cirrhosis: 67%
Choi, 2008[19]	2	1.5 T	Gadobenate dimeglumine, rate NR	Yes	Yes	2.5	Yes	2003	1	South Korea	47	Age: 49 Male: 60% HBV: 79% Cirrhosis: 100%
Chou, 2011[21]	3	1.5 T	Gadopentetate dimeglumine, rapid bolus	Yes	Yes	8	No	2004	2	Taiwan	21	Age: 62 Male: 62% HBV: 43% Cirrhosis: 100%
Chung, 2010[23]	3	3.0 T	Gadoxetic acid, 1 or 2 ml/s	Yes	NR	2 or 3	No	2008	4	South Korea	62	Age: 59 Male: 68% HBV: 50% Cirrhosis: 48%
Chung, 2011[22]	3	1.5 T	Gadopentetate dimeglumine, 2 ml/s	Yes	Yes	6	No	2007	4	South Korea	46	Age: 60 Male: 78% HBV: 76% Cirrhosis: 100%
de Ledinghen, 2002[26]	2	1.5 T	Gadopentetate dimeglumine, rate NR	No	NA	8-10	No	1997	1	France	34	Age: 54 Male: 71% HBV: 8.8% Cirrhosis: 100%

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Di Martino, 2010[30]	2	1.5 T	Gadobenate dimeglumine, 2 ml/s	Yes	Yes	3	Yes	2007	4	Italy	140	Age: 59 Male: 74% HBV: NR Cirrhosis: 100%
Di Martino, 2013[29]	2	1.5 T	Gadoxetic acid disodium, 2 ml/s	Yes	Yes	3	Yes	2007	4	Italy	58	Age: 63 Male: 67% HBV: 14% Cirrhosis: 100%
Forner, 2008[34]	3	1.5 T	Gadodiamide, 2 ml/s	Yes	Yes	3	Yes	2003	2	United States	89	Age: median 65 Male: 60% HBV: 6.7% Cirrhosis: 100%
Freeman, 2006[35]	2, 5	NR	NR	NR	NR	NR	No	2003	1	United States	789	Age: 56 Male: 77% HBV: NR Cirrhosis: NR
Giorgio, 2007[40]	3	1.5 T	Gadobenate dimeglumine, 3 ml/s	Yes	No	4	No	2003	4	Italy	73	Age: 63 Male: 67% HBV: 4.1% Cirrhosis: 100%
Golfieri, 2009[42]	3	1.5 T	Ferucarbotran and gadopentetate dimeglumine, 2 ml/s	Yes	Yes	4-5	Yes	2003	2	Italy	63	Age: 64 Male: 84% HBV: 35% Cirrhosis: 100%
Goshima S, 2004[43]	3	1.5 T	Gadopentetate dimeglumine, rapid bolus	Yes	Yes	8	No	1998	4	Japan	8	Age: 71 years Male: 63% HBV: NR Cirrhosis: NR
Guo, 2012[45]	2	3 T	Gadodiamide, 3 ml/s	Yes	No	4.8-5	No	2009	4	China	46	Age: 56 Male: 82% HBV: 89% Cirrhosis: 100%
Haradome, 2011[46]	2	1.5 T	Gadoxetic acid disodium, 1 ml/s	Yes	Yes	4	Yes	2008	2	Japan	75	Age: 55 Male: 80% HBV: 19% Cirrhosis: 72%
Hardie, 2011[47]	2	1.5 T	No contrast	No	NA	8	No	2008	1	United States	37	Age: 57 Male: 68% HBV: NR Cirrhosis: 100%
Hardie, 2011 (2)[48]	2	1.5 T	Gadopentetate dimeglumine	Yes	Yes	NR	No	2008	1	United States	37	Age: 57 Male: 73% HBV: NR Cirrhosis: NR
Hardie, 2011 (3)[49]	2	1.5 T	No contrast	No	NA	6, 10	No	2008	1	United States	25	NR
Hecht, 2006[51]	2	1.5 T	Gadopentetate dimeglumine, 2 ml/s	Yes	Yes	2-3	Yes	1999	1	United States	38	Age: 54 Male: 74% HBV: 10% Cirrhosis: 100%
Hidaka, 2013[52]	2	1.5 T	Gadoxetic acid disodium, 1.5 ml/s	Yes	Yes	NR	No	2008	1	Japan	11	Age: NR Male: NR HBV: 27% Cirrhosis: NR
Hirakawa, 2011[54]	2	1.5 T	Gadopentetate dimeglumine, rate NR	Yes	Yes	NR	No	1999	1	Japan	25	Age: 55 Male: 52% HBV: NR Cirrhosis: 100%

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Hori, 1998[58]	2	1.5 T	Gadopentetate dimeglumine, 1 ml/s	Yes	Yes	7-8	No	1995	3	Japan	50	Age: 65 Male: 76% HBV: 10% Cirrhosis: NR
Hwang, 2012[59]	2	3.0 T	Gadoxetic acid disodium, rate NR	Yes	Yes	2	Yes	2008	4	South Korea	54	Age: NR, range 33 to 81 Male: 81% HBV: 70% Cirrhosis: NR
Iavarone, 2010[62]	2	1.5 T	Gadobenate dimeglumine, 2 ml/s	Yes	Yes	3	Yes	2006	2	Italy	59	Age: median 66 Male: 69% HBV: 12% Cirrhosis: 100%
Ichikawa, 2010[63]	2	1.5 T	Gadoxetic acid disodium, rate NR	Yes	Yes	5-10	No	2001	4	Japan	151	Age: 66 years Male: 72% HBV: NR Cirrhosis: 66%
Inoue, 2012[66]	2	1.5 T or 3 T	Gadoxetic acid disodium, 2 ml/s	Yes	Yes	3-5	Yes	2008	2	Japan	66	Age: 66 Male: 64% HBV: 30% Cirrhosis: 62%
Ito, 2004[69]	4	1.5 T	Gadopentetate dimeglumine, 3 ml/s	No	NA	10	No	2002	4	Japan	40	Age: 62 Male: 58% HBV: NR Cirrhosis: NR
Jeong, 1999[75]	4	1.5 T	Gadopentetate dimeglumine, rapid bolus	Yes	Yes	8-10	No	1996	4	South Korea	51	Age: 54 Male: 67% HBV: NR Cirrhosis: NR
Jeong, 2011[74]	2	1.5 T	Gadobenate dimeglumine, 2 ml/s	Yes	Yes	3	Yes	2006	4	South Korea	19	Age: 54 Male: NR HBV: NR Cirrhosis: 100%
Jin, 2013[76]	5	NR	Gadoxetic acid disodium, 2 ml/s	Yes	NR	5-8	No	2009	4	South Korea	104	Age: 55 Male: 84% HBV: 73% Cirrhosis: NR
Kamura T, 2002[77]	4	1.5 T	Gadopentetate dimeglumine or gadodiamide, rate NR	Yes	Yes	4-5	Yes	1996	4	Japan	NR	NR
Kawada, 2010[79]	2	3.0 T	Gadoxetic acid disodium, 2 ml/s	Yes	Yes	5	Yes	2008	2	Japan	13	Age: median 67 Male: 77% HBV: 7.7% Cirrhosis: NR
Khalili, 2011[82]	3	1.5 T	Gadobenate dimeglumine, 2 ml/s	Yes	Yes	NR	No	2006	4	Canada	84	Age: 58 Male: 63% HBV: 50% Cirrhosis: 100%
Kim AY, 2012[84]	2	3.0 T	Gadoxetic acid disodium, 1 ml/s	Yes	Yes	2	Yes	2009	4	South Korea	189	Age: 63 Male: 77% HBV: 90% Cirrhosis: 100%
Kim DJ, 2012[86]	3	1.5 T	Gadopentetate dimeglumine, 3 ml/s	Yes	Yes	5	Yes	2008	4	South Korea	65	Age: NR, range 37-82 Male: 80% HBV: 69% Cirrhosis: 100%

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Kim MJ, 2012[88]	2	3.0 T	Gadoxetic acid disodium, 2 ml/s	Yes	Yes	2	Yes	2008	2	South Korea	50	Age: 54 Male: 80% HBV: 84% Cirrhosis: 84%
Kim SH, 2009[91]	2	3.0 T	Gadoxetic acid disodium, 2 ml/s	Yes	Yes	2	Yes	2007	2	South Korea	62	Age: 55 Male: 87% HBV: 85% Cirrhosis: 48%
Kim TK, 2011[96]	3	1.5 T	Gadobenate dimeglumine, 2 ml/s	Yes	Yes	5	Yes	2006	4	South Korea	96	Age: 58 Male: 60% HBV: 53% Cirrosis: NR
Kim YK, 2004[108]	2	1.5 T	Gadopentetate dimeglumine and ferucarbotran	Yes	Yes	3.5-4	Yes	2002	4	South Korea	27	Age: 54 Male: 63% HBV: NR Cirrhosis: NR
Kim YK, 2006[106]	2	1.5 T	Gadopentetate dimeglumine, rate NR	Yes	Yes	3.5-4	Yes	2003	4	South Korea	31	Age: 57 Male: 90% HBV: 97% Cirrhosis: 100%
Kim YK, 2007[105]	2	1.5 T	Gadobenate dimeglumine, rate NR and ferucarbotran	Yes	Yes	3.5-4	Yes	2004	4	South Korea	29	Age: 56 Male: 72% HBV: 100% Cirrhosis: !00%
Kim YK, 2008[103]	2	1.5 T	Gadobenate dimeglumine, 2 mL/s	Yes	Yes	3.5-4	Yes	2004	4	South Korea	115	Age: NR, range 40 to 74 Male: 77% HBV: 96% Cirrhosis: 100%
Kim YK, 2008 (2)[104]	2	1.5 T	Gadobutrol, 2 ml/s	Yes	Yes	3.5-4	Yes	2005	4	South Korea	23	Age: NR, range 40 to 74 Male: 83% HBV: 100% Cirrhosis: 100%
Kim YK, 2009 (2)[102]	2	1.5 T	Gadoxetic acid disodium solution, 2 ml/s	Yes	Yes	2.5-3	Yes	2007	4	South Korea	62	Age: NR Male: 81% HBV: 90% Cirrhosis: NR
Kim YK, 2010[99]	2	1.5 T	Gadoxetic acid disodium, 1 ml/s or gadopentetate dimeglumine, 2 ml/s, and ferucarbotran	Yes	Yes	2.5-3	Yes	2009	4	South Korea	41 patients 41 (100%) with HCC 56 HCC lesions	Age (mean): not reported, range 40 to 74 years Male: 76% Cirrhosis: NR
Kim YK, 2010 (2)[100]	2	1.5 T	Gadoxetic acid disodium, 2 ml/s	Yes	Yes	2.5-3	Yes	2007	4	South Korea	89	Age: NR, range 40 to 74 Male: 70% HBV: 93% Cirrhosis: NR
Kim YK, 2011[97]	2	1.5 T or 3.0 T	Gadoxetic acid, 1 ml/s	Yes	Yes	3	Yes	2009	4	South Korea	40	Age: 63 Male: 70% HBV: 95% Cirrhosis: 95%
Kim YK, 2011 (2)[98]	2	1.5 T	Gadoxetic acid, 1 ml/s	Yes	Yes	2.5-3	Yes	2009	4	South Korea	14	Age: NR Male: 71% HBV: 100% Cirrhosis: 100%

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Kondo, 2005[110]	2	1.5 T	Gadopentetate dimeglumine, 3 ml/s	Yes	Yes	8	No	1998	2	Japan	49	Age: 62 Male: 69% HBV: NR Cirrhosis: 100% Note: describes entire sample, including those not included in analysis
Koushima, 2002[112]	2	1.5 T	No contrast	No	NA	NA	No	1998	4	Japan	29	Age: 63 for cases, NR for controls Male: 76% of cases, 50% of controls HBV: 14% Cirrhosis: 100%
Krinsky, 2001[114]	2	1.5 T	Gadopentetate dimeglumine, 2 ml/s	Yes	No	5-8	No	1995	1	United States	71	Age: 50 Male: 59% HBV: 13% Cirrhosis: 100%
Krinsky, 2002[113]	2	1.5 T	Gadopentetate dimeglumine, 2 ml/s	Yes	NR	NR	No	1995	1	United States	24	Age: 52 Male: NR HBV: NR Cirrhosis: 100%
Kumano, 2009[115]	2	1.5 T	Gadopentetate dimeglumine, 2 ml/s	No	NA	7	No	2002	4	Japan	28	Age: NR Male: 79% HBV: NR Cirrhosis: NR
Kwak, 2004[118]	2	1.5 T	Gadopentetate dimeglumine, rapid bolus and ferumoxides	Yes	Yes	6	No	2000	4	South Korea	24	Age: 52 Male: 75% HBV: 100% Cirrhosis: NR
Kwak, 2005[117]	2	1.5 T	Gadopentetate dimeglumine, 3 ml/s and ferumoxides	Yes	Yes	2.3	Yes	2002	4	South Korea	49	Age: 57 Male: 80% HBV: 100% Cirrhosis: 100%
Lauenstein, 2007[120]	2	1.5 T	Gadopentetate dimeglumine, 2 ml/s	Yes	Yes	2-3	Yes	2004	1	United States	115	Age: 54 Male: 67% HBV: 9% Cirrhosis: NR
Lee CH, 2012[121]	2	3.0 T	Gadoxetic acid disodium, 1 ml/s	Yes	Yes	5	Yes	2008	4	South Korea	46	Age: 57 Male: 83% HBV: 80% Cirrhosis: NR
Lee JY, 2010[126]	2	3.0 T	Gadoxetic acid disodium, 2 ml/s and ferucarbotran	Yes	Yes	2	Yes	2007	2	South Korea	27	Age: 54 Male: 78% HBV: 93% Cirrhosis: 52%
Lee MH, 2011[127]	4	3.0 T	Gadoxetic acid disodium, 2 ml/s	Yes	Yes	2	Yes	2008	2	South Korea	66	Age: 59 Male: 77% HBV: 68% Cirrhosis: 100%
Libbrecht, 2002[132]	2, 5	1.5 T	Gadopentetate dimeglumine or gadoterate meglumine, 1.5 to 2 ml/s	No	NA	8	No	2000	1	Belgium	49	Age; 53 Male: 65% HBV: 19% Cirrhosis: 100%

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Lin MT, 2011[136]	2	NR	NR	NR	NR	NR	No	2006	2	Taiwan	343	Age: 56 Male: 78% HBV: 57% Cirrhosis: 47%
Lu CH, 2010[141]	2, 5	1.5 T	Gadopentetate dimeglumine, 1.6-1.8 ml/s	Yes	No	5	No	2006	1	Taiwan	57	Age: 51 Male: 89% HBV: NR Cirrhosis: NR
Marin, 2009 (2)[150]	2	1.5 T	Gadobenate dimeglumine, 2 ml/s	Yes	Yes	5	Yes	2005	4	Italy	36	Age: 66 Male: 75% HBV: 29% Cirrhosis: NR Note: described entire sample, including those excluded from analysis
Marrero, 2005[151]	3	1.5 T	Gadopentetate dimeglumine, rate NR	Yes	Yes	NR	No	2002	2	United States	94	Age: 56 years Male: 69% HBV: 11% Cirrhosis: NR
Matsuo, 2001[152]	2	1.5 T	Gadopentetate dimeglumine, rate NR	Yes	Yes	8-10	No	1998	4	Japan	53	Age: 64 Male: 75% HBV: NR Cirrhosis: 90%
Mori, 2005[156]	2	1.5 T	Gadodiamide, 2.5 ml/s	Yes	Yes	8-9	No	2002	4	Japan	31	Age: 68 Male: 84% HBV: NR Cirrhosis: NR
Motosugi, 2010[159]	4	1.5 T	Gadoxetic acid disodium, 1 ml/s	Yes	Yes	NR	No	2008	4	Japan	80	Age: 69 Male: 69% HBV: 19% Cirrhosis: NR
Nakamura, 2000[164]	2	1.5 T	NR	NR	NR	8	No	1997	3	Japan	30	Age: 63 Male: 97% HBV: NR Cirrhosis: 83%
Nakamura, 2013[163]	2	1.5 T	Gadoxetic acid disodium, 2 ml/s	Yes	Yes	5	Yes	2008	1	Japan	11	Age: 69 Male: 73% HBV: 9% Cirrhosis: 100%
Noguchi, 2003[166]	2	1.5 T	Gadopentetate dimeglumine, 2 ml/s	Yes	Yes	NR	No	NR	4	Japan	53	Age: 63 Male: 68% HBV: NR Cirrhosis: 100%
Onishi, 2012[168]	2	1.5 T or 3.0 T	Gadoxetic acid disodium, 1 ml/s	Yes	Yes	4	Yes	2008	4	Japan	31	Age: 70 Male: 90% HBV: 13% Cirrhosis: NR
Ooka, 2013[170]	2	1.5 T	Gadoxetic acid disodium, 2 ml/s	Yes	Yes	6	No	2008	2	Japan	54	Age: 69 Male: 74% HBV: 20% Cirrhosis: NR
Park G, 2010[174]	2	1.5 T	Gadopentetate dimeglumine, 3 ml/s or Gadoxetic acid disodium, 3 ml/s	Yes	Yes	2.5-3	Yes	2008	4	South Korea	43	Age: NR, range 44 to 70 Male: 65% HBV: 98% Cirrhosis: NR

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Park, 2010[173]	2	3.0 T	Gadoxetic acid disodium and gadobenate dimeglumine, 2 ml/s	Yes	Yes	2	Yes	2007	2	South Korea	18	Age: 53 HBV: 89%	Male: 94% Cirrhosis: 67%
Park, 2012[171]	2	1.5 T	No contrast or gadopentetate dimeglumine, rate NR	Yes	NR	2-3	No	2005	1	United States	52	Age: 57 HBV: NR	Male: NR Cirrhosis: 100%
Pauleit, 2002[177]	2	1.5 T	Gadopentetate dimeglumine, 5 ml/s and ferumoxides	Yes	Yes	8-9	No	NR	4	Germany	43	Age: 60 HBV: 23%	Male: 79% Cirrhosis: 63%
Petruzzi, 2013[180]	2	1.5 T or 3.0 T	NR	Yes	NR	NR	No	2009	1	United States	45	NR	
Piana, 2011[181]	2	1.5 T	No contrast or gadoterate meglumine, 2 ml/s	Yes	Yes	NR	No	2004	4	France	91	Age: 63 HBV: 20%	Male: 74% Cirrhosis: NR
Pitton, 2009[182]	2	1.5 T	Gadopentetate dimeglumine, 2 ml/s	Yes	Yes	4	Yes	2006	4	Germany	28	Age: 67 HBV: NR	Male: 89% Cirrhosis: NR
Pugacheva, 2011[184]	2	1.5 T	Gadopentetate dimeglumine, rate NR	Yes	Yes	NR	No	2006	4	Japan	38 (30 underwent CT or MRI)	Age: 69 HBV: 7.9%	Male: 75% Cirrhosis: NR
Rhee, 2012[186]	4	3.0 T	Gadoxetic acid disodium, 2 ml/s	Yes	Yes	2	Yes	2008	2	South Korea	34	Age: 57 HBV: 82%	Male: 88% Cirrhosis: 97%
Rimola, 2012[188]	3	1.5 T	Gadodiamide, 2 ml/s	Yes	NR	2.5	No	2003	2	Spain	159	Age: 63 HBV: 14%	Male: 58% Cirrhosis: 100%
Rode, 2001[190]	2	1.5 T	Gadopentetate dimeglumine, rapid bolus	Yes	NR	6-8	No	1996	1	France	43	Age: 51 HBV: 9.3%	Male: 70% Cirrhosis: 100%
Sangiovanni, 2010[192]	3	1.5 T	Gadobenate dimelumine, 2 ml/s	Yes	Yes	3	Yes	2006	2	Italy	64	Age: NR HBV: NR	Male: NR Cirrhosis:100%
Sano, 2011[193]	2	1.5 T	Gadoxetic acid, 1 ml/s	Yes	Yes	5	Yes	2008	2	Japan	64	Age: 66 HBV: NR	Male: 73% Cirrhosis: NR

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Secil, 2008[195]	2	1.5 T with and without dynamic subtract-tion	Gadopentetate dimeglumine, rapid bolus	Yes	NR	NR	No	NR	4	Turkey	32	Age: NR HBV: NR	Male: NR Cirrhosis: 100%
Seitz, 2010[197]	3	1.5 T	Gadopentetate dimeglumine, rate NR	No	NA	5-8	No	2004	4	Germany	269	Age: 53 HBV: NR	Male: 41 Cirrhosis: NR
Serste, 2012[198]	3	1.5 T	NR	Yes	NR	NR	No	2005	2	France	74	Age: 60 HBV: 27%	Male: 78% Cirrhosis: 82%
Simon, 2005[200]	2	1.5 T	Gadopentetate dimeglumine, rate NR	Yes	No	4.4	No	1999	4	Germany	25	Age: 60 HBV: NR	Male: 84% Cirrhosis: 84%
Singh, 2007[201]	1	1.5 T	Gadopentetate dimeglumine, 3 ml/s	NR	NR	NR	No	2005	2	United States	17	Age: 56 HBV: NR	Male: NR Cirrhosis: 100%
Sugimoto, 2012[205]	4	1.5 T	Gadoxetic acid disodium, rate NR	Yes	Yes	3	Yes	2008	2	Japan	66	Age: 69 HBV: 12%	Male: 70% Cirrhosis: NR
Suh, 2011[207]	3	3.0 T	Gadoxetic acid disodium, rapid bolus	Yes	Yes	2	Yes	2007	4	South Korea	48	Age: 56 HBV: NR	Male: 62% Cirrhosis: NR
Sun, 2010[208]	4	3.0 T	Gadoxetic acid disodium, 1.5 ml/s	Yes	Yes	4.8	Yes	2008	4	South Korea	69	Age: 56 HBV: 81%	Male: 82% Cirrhosis: 100%
Tanaka, 2005[213]	2	1.5 T	Gadopentetate dimeglumine, rate NR	Yes	Yes	6-9	No	NR	4	Japan	31	Age: 67 HBV: NR	Male: 65% Cirrhosis: NR
Tang, 1999[215]	2	1.5 T	Gadopentetate dimeglumine, rapid bolus	Yes	Yes	8	No	1997	4	Japan	53	Age: 63 HBV: NR	Male: 60% Cirrhosis: NR
Tanimoto, 2002[216]	2	1.5 T	Gadopentetate dimeglumine, 1 ml/s	Yes	Yes	NR	No	1998	4	Japan	50	Age: 63 HBV: NR	Male: NR Cirrhosis: 60%
Teefey, 2003[217]	2	1.5 T	Gadodiamide, 2 ml/s	Yes	Yes	8	No	1996	2	United States	25	Age; 47 HBV: NR	Male: 65% Cirrhosis: 100%

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Tsurusaki, 2008[219]	2	1.5 T with and without SENSE, high vs. low spatial resolution	Gadopentetate dimeglumine at 2 ml/s	No	NA	4	No	NR	4	Japan	35	Age: 65 Male: 69% HBV: NR Cirrhosis: NR
Vandecaveye, 2009[222]	4	1.5 T	Gadobenate dimeglumine, rate NR	Yes	NR	4	No	NR	4	Belgium	55	Age: NR Male: NR HBV: 13% Cirrhosis: 100%
Wagnetz, 2011[224]	2	1.5 T	Gadodiamide or gadobutrol, rate NR	Yes	No	5	No	2005	2	Canada	292	Age: 60 Male: 38% HBV: NR Cirrhosis: NR
Xu, 2009[232]	2	1.5 T	Gadopentetate dimeglumine, 2 ml/s	Yes	Yes	7	No	2005	4	China	37	Age: 46 Male: 95% HBV: NR Cirrhosis: NR
Xu, 2010[231]	4	1.5 T	Gadopentetate dimeglumine, 2 ml/s	Yes	Yes	7	No	2007	2	China	54	Age: 48 Male: 85% HBV: 100% Cirrhosis: NR
Yan, 2002[236]	2	1.5 T	Gadopentetate dimeglumine, rate NR	Yes	Yes	NR	No	1996	4	China	53	Age: 61 Male: 79% HBV: NR Cirrhosis: NR
Yoshioka, 2002[239]	2	1.5 T with and without SENSE	Gadodiamide, 2.5 ml/s	Yes	Yes	8-10	No	2000	4	Japan	40	Age: 62 Male: 80% HBV: NR Cirrhosis: NR
Yu, 2002[244]	4	1.5 T	Gadopentetate dimeglumine, 3 ml/s	Yes	Yes	NR	No	NR	4	South Korea	120	Age: NR Male: NR HBV: 77% Cirrhosis: NR
Yu, 2008[243]	2	1.5 T	Gadopentetate dimeglumine, 3 ml/s	Yes	Yes	8-10	No	2000	1	United States	53	Age: 57 Male: 74% HBV: 85% Cirrhosis: NR
Yu, 2009[242]	2	1.5 T	Gadopentetate dimeglumine, 3 ml/s and ferucarbotran	Yes	Yes	8-10	No	2003	1	United States	42	Age: NR, range 44 to 73 Male: 70% HBV: 69% Cirrhosis: 86%
Yu, 2011[241]	2	1.5 T	Gadodiamide, rate NR	Yes	NR	NR	No	1999	1	United States	638	Age: 53 Male: 64% HBV: 10% Cirrhosis: NR

Author, Year	Reason for MRI Imaging[a]	Scanner Type	Contrast, Rate	Delayed phase?	Delayed Phase Timing ≥120 s[b]	Section Thickness (mm)	Did study meet all imaging criteria?[c]	Imaging Start Date	Reference Standard[d]	Country	Number of Patients	Population Characteristics[e]
Zhao, 2007[247]	2	1.5 T	Gadopentetate dimeglumine, rapid bolus	Yes	Yes	7	No	2002	4	China	24	Age: 56 Male: 78% HBV: NR Cirrhosis: 100% Note: describes entire sample, including those excluded from analysis

HBV = hepatitis B virus; MRI = magnetic resonance imaging; NA = not applicable; NR = not reported; s = second; T = tesla

a Reason for MRI imaging key: 1=surveillance; 2=detection rate in patients undergoing surgery or with known HCC; 3=evaluation/characterization of liver mass; 4=differentiation between HCC and another type of lesion; 5=staging

b Delayed phase reported as time after gadolinium contrast injection

c Imaging criteria = 3.0 T MRI; delayed phase (or hepatobiliary for gadobenate or gadoxetic acid contrast); timing of delayed phase >120 s after contrast injection; slice thickness <5 mm

d Reference standard key: 1=explanted livers only; 2=histological specimen (may include some explanted livers); 3=imaging and clinical criteria; 4=mixed histological and imaging/clinical criteria

e Age reported as mean (years), unless otherwise noted

Appendix G. Summary Evidence Table: Diagnostic Studies of Positron Emission Tomography Imaging

Author, Year	Reason for PET Imaging[a]	Scan Tracer	Imaging Start Date	Reference Standard[b]	Country	Sample Size	Population Characteristics[c]			
Chen, 2005[16]	1	FDG	2000	4	Taiwan	26	Age: 61	Male: 81%	HBV: NR	Cirrhosis: NR
Cheung, 2011[18]	2	FDG or ^{11}C-acetate	2004	2	China	58	Age: NR	Male: 84%	HBV: 81%	Cirrhosis: NR
Cheung, 2013[17]	2, 4	FDG and ^{11}C-acetate or FDG or ^{11}C-acetate	2004	2	China	43	Age: 60	Male: 79%	HBV: 7%	Cirrhosis: NR
Delbeke, 1998[27]	3	FDG	NR	2	United States	110	Age: 59	Male: 55%	HBV: NR	Cirrhosis: NR
Eckel, 2009[33]	2	^{18}F-fluorothymidine	NR	4	Germany	18	Age: 67	Male: 94%	HBV: NR	Cirrhosis: NR
Ho, 2003[55]	2	FDG and or ^{11}C-acetate or FDG	NR	4	China	57	Age: 60	Male: 65%	HBV: 70%	Cirrhosis: NR
Ho, 2007[56]	4	FDG or ^{11}C-acetate or FDG and ^{11}C-acetate	2002	4	China	121	Age: 59	Male: 79%	HBV: NR	Cirrhosis: NR
Hwang, 2009[60]	2	FDG or ^{11}C-acetate	2006	4	South Korea	13	Age: 51	Male: 85%	HBV: 67%	Cirrhosis: NR
Jeng, 2003[72]	3	FDG	NR	2	Taiwan	48	Age: NR, range 40 to 65	Male: 58%	HBV: 100%	Cirrhosis: NR
Kawaoka, 2009[80]	4	FDG	2005	4	Japan	34	Age: 59	Male: 82%	HBV: 32%	Cirrhosis: NR
Khan, 2000[83]	2	FDG	1995	2	United States	20	Age: 60	Male: 75%	HBV: 18%	Cirrhosis: 75%
Kim YK, 2010 (3)[101]	1	FDG	2005	4	South Korea	10	Age: median 48	Male: 100%	HBV: 100%	Cirrhosis: NR
Lee JE, 2012[124]	4	FDG	2006	4	South Korea	138	Age: 69	Male: 83%	HBV: 64%	Cirrhosis: NR
Li, 2006[129]	2	^{11}C-acetate	NR	2	Austria	21	Age: 64	Male: 90%	HBV: NR	Cirrhosis: NR
Liangpunsakul, 2003[131]	2	FDG	2000	4	United States	8	Age: 53	Male: 50%	HBV: NR	Cirrhosis: 100%
Lin WY, 2005[137]	2	FDG	NR	4	Taiwan	12	Age: 64	Male: 83%	HBV: NR	Cirrhosis: NR
Nagaoka, 2006[162]	4	FDG	2004	3	Japan	21	Age: median 64	Male: 76%	HBV: 19%	Cirrhosis: NR
Park JW, 2008[175]	2, 4	FDG or ^{11}C-acetate	2006	2	South Korea	99	Age: 58	Male: 79%	HBV: 80%	Cirrhosis: NR
Sorensen, 2011[203]	2, 4	FDG	NR	4	Denmark	39	Age: 61	Male: 59%	HBV: 2.6%	Cirrhosis: 79%
Sugiyama, 2004[206]	4	FDG	2000	4	Japan	19	Age: 69	Male: 79%	HBV: NR	Cirrhosis: NR
Sun, 2009[209]	1	FDG	2007	4	Cjoma	25	Age: 52	Male: 84%	HBV: NR	Cirrhosis: NR
Talbot, 2006[212]	2	FDG or ^{18}F-fluorocholine	2005	4	France	12	Age: NR	Male: 75%	HBV: 8.3%	Cirrhosis: 75%
Talbot, 2010[211]	2	FDG or ^{18}F-fluorocholine	2005	4	France	59	NR			
Teefey, 2003[217]	2	FDG	1996	2	United States	25	Age: 47	Male: 65%	HBV: NR	Cirrhosis: 100%
Trojan, 1999[218]	2	FDG	1996	2	Germany	14	Age: median 60	Male: 71%	HBV: 21%	Cirrhosis: NR

Author, Year	Reason for PET Imaging[a]	Scan Tracer	Imaging Start Date	Reference Standard[b]	Country	Sample Size	Population Characteristics[c]			
Verhoef, 2002[223]	2	FDG	2002	2	The Netherlands	13	Age: 54	Male: 85%	HBV: 46%	Cirrhosis: 92%
Wolfort, 2010[226]	4	FDG	2000	2	United States	20	NR			
Wu, 2011[227]	2, 4	FDG or FDG and ^{11}C-choline	2007	4	China	76	Age: 56	Male: 84%	HBV: NR	Cirrhosis: 60%
Wudel, 2003[228]	1, 2	FDG	1993	4	United States	91	Age: 60	Male: 79%	HBV: NR	Cirrhosis: NR
Yamamoto, 2008[234]	2	FDG or ^{11}C-choline	2007	2	Japan	12	Age: 71	Male: 42%	HBV: 17%	Cirrhosis: NR
Yoon, 2007[238]	4	FDG	2002	3	South Korea	87	Age: median 54	Male: 78%	HBV: 79%	Cirrhosis: NR

FDG = ^{18}F-fluorodeoxyglucose; HBV = hepatitis B virus; NA = not applicable; NR = not reported; PET = positron emission tomography

[a] Reason for PET imaging key: 1=recurrence; 2=detection rate in patients undergoing surgery or with known HCC; 3=evaluation/characterization of liver mass; 4=staging/detection of metastatic disease

[b] Reference standard key: 1=explanted livers only; 2=histological specimen (may include some explanted livers); 3=imaging and clinical criteria; 4=mixed histological and imaging/clinical criteria

[c] Age reported as mean (years), unless otherwise noted

Appendix H. Evidence Table: Patient Outcomes for Staging (Randomized Controlled Trials)

Author, Year	Imaging Tests Used for Screening	Details of Imaging Tests	Definition of a Positive Test on Imaging and Followup	Population Characteristics	Eligibility Criteria	Country, Setting	Number Approached, Eligible, Enrolled, Analyzed
Trinchet JC, 2011[252]	Ultrasound Note: AFP was assesed but after analyses, high rates of AFP observed in 2 groups precluded interpretation based on AFP randomization and analysis was restricted to ultrasound randomization	Technical details of ultrasound not reported	In cases of focal liver lesions, diagnostic procedure using contrast-enhanced imaging, serum AFP, and/or guided biopsy was performed according to EASL guidelines; HCC diagnosis based on histology, if lesion >2 cm in diameter then early arterial hypervascularization on 2 contrast-enhanced methods, or when there was an association between serum AFP >400 ng/mL plus early arterial hypervascularization on one contrast-enhanced method; in case of increased AFP with no focal liver lesion on ultrasound, CT scan was performed	Age (mean): 55 years Male: 69% Race: NR Alcoholic cirrhosis: 39% HCV-related cirrhosis: 44% HBV-related cirrhosis: 13% Hemochromatosis-related cirrhosis: 1.6% Cirrhosis due to other etiology: 2.5% Note: other etiology = nonalcoholic steatohepatitis, primary biliary cirrhosis, autoimmune hepatitis, cryptogenic cirrhosis	Patients >18 years with histologically proven cirrhosis due to either excessive alcohol consumption, chronic HCV or HBV, or hereditary hemochromatosis, with no complications from cirrhosis, patients with Child-Pugh class A or B and no focal liver lesion. Excluded patients with Child-Pugh class C, severe uncontrolled extrahepatic disease resulting in estimated life expectancy <1 year, co-infection with HIV	France and Belgium; Selected from clinical centers in a cooperative group that included specialized liver disease centers	Overall (3-month surveillance vs. 6-month surveillance) Number approached: NR Number eligible: 1340 Number enrolled: 1340 (668 vs. 672) Number analyzed: 1278 (640 vs. 638)
Wang JH, 2013[253]	Ultrasound	Technical details of ultrasound not reported	Newly detected hepatic nodule on ultrasound >1cm in diameter suspicious for HCC; referrred to medical centers for further diagnositic procedures; followup by public health nurses; final diagnosis based on histology, EASL imaging criteria, or AASLD imaging criteria	Age (mean): 65.2 years Male: 50% Race: NR HBV: 28% HCV: 65%	Patients >40 years with either positive HBsAg or anti-HCV and a platelet count <150 (x109)/l. Excluded those with history of hepatic malignancy.	Taiwan; Selected from health data for 10 townships	Overall (4-month surveillance vs. 12-month surveillance) Number approached: 28,722 Number eligible: 1581 (785 vs. 796) Number enrolled: 744

Author, Year	Imaging Tests Used for Screening	Details of Imaging Tests	Definition of a Positive Test on Imaging and Followup	Population Characteristics	Eligibility Criteria	Country, Setting	Number Approached, Eligible, Enrolled, Analyzed
				HBV and HCV: 7% Liver cirrhosis: 32%			(387 vs. 357) Number analyzed: 744 (387 vs. 357)
Zhang BH, 2004[254]	Ultrasound (in conjunction with AFP)	Technical details of ultrasound not reported	Solid liver lesion on ultrasound or AFP >20 mcg/l; individuals with an initial positive test underwent retesting; individuals with a positive retest underwent additional diagnostic evaluation (history, physical exam, serum AFP, ultrasound by senior doctor, CT or MRI as required); final diagnosis based on histology or long-term followup	Age (mean): 41.5[a] years Male: 63% Race: NR HBsAg positive: 64% Hepatitis: 27% HBsAg positive and hepatitis: 9%	People aged 35 to 59 years with serum evidence of HBV infection or a history of chronic hepatitis without HBV infection (abnormal biochemistry ≥6 months). Excluded those with history of HCC, or other malignant diseases, or serious illness.	China; Selected from medical records of primary care centers	Overall (screening vs. control) Number approached: NR Number eligible: 19,200 (9757 vs. 9373) Number enrolled:18,816 (9373 vs. 9443) Number analyzed:18,816 (9373 vs. 9443)

Author, Year	Duration of Followup	Attrition	Interventions	Outcomes	Adverse Events/Harms	Sponsor	Risk of Bias
Trinchet JC, 2011[252]	Mean followup 47.1 months in 3-month surveillance group vs. 46.8 months in 6-month surveillance group	0.9% (12/1340) patients lost to followup; 11.9% (143/1278) of patients not compliant with protocol, 14.6% (86/638) in 6-month surveillance group, 9.4% (57/640) in 3-month surveillance group Note: the raw numbers do not exactly equal the	A: Ultrasound every 3 months B: Ultrasound every 6 months	A vs. B <u>Cases of HCC/ new focal liver lesion</u> 53/183 (30%) vs. 70/155 (45%) <u>2 and 5-year cumulative incidence of HCC</u> 4.0%, 10.0% vs. 2.7%, 12.3% <u>Prevalence and cumulative incidence of</u>	NR	French Ministry of Health; French Ligue de Recherche contre le Cancer	Moderate

Author, Year	Duration of Followup	Attrition	Interventions	Outcomes	Adverse Events/Harms	Sponsor	Risk of Bias
		reported proportions for compliance		HCC <30 mm 79%, 7.8% vs. 70%, 9.1% Survival rates for all patients At 2 years: 95.8% vs. 93.5% At 5 years: 84.9% vs. 85.8% Cases of HCC-related mortality 17/72 (23.6%) vs. 12/82 (14.6%) Note: all associations were NS			
Wang JH, 2013[253]	4 years; individuals in 4-month surveillance scanned mean 7.13+/-2.0 times and individuals in 12-month surveillance scanned mean 2.53+/-0.5 times	NR: 27.4% of 4-month surveillance group and 45.7% of 12-month surveillance group attended all exams (67.6% in 4-month surveillance group attended >6 exams, 73.1% in 12-month surveillance group attended >2 exams)	A: Ultrasound every 4 months B: Ultrasound every 12 months	A vs. B Cases of HCC/ new hepatic nodule 24/46 (52%) vs.15/28 (54%), including 5 patients diagnosed outside of surveillance schedule in B 3-year cumulative incidence of HCC 11.7% vs. 9.7% 1-,2-, and 4- year cumulative survival rates for patients with HCC 95.8%, 78.8%, 57.4% vs. 80%, 64%, 56%	NR	National Scientific Council of Taiwan	Moderate
Zhang BH, 2004[254]	5 years; all individuals offered screening 5 to 10 times	NR; Screened group completed 58% of offered screening (median: 5 screens)	A: Serum AFP test and ultrasound every 6 months B: No screening,	A vs. B Cases (incidence per 100,000) of HCC 86 (223.7) vs. 67 (163.1); rate ratio, 1.37	NR	NR	High

Author, Year	Duration of Followup	Attrition	Interventions	Outcomes	Adverse Events/Harms	Sponsor	Risk of Bias
			usual care	(95% CI 0.41 to 0.98); Cases (incidence per 100,000) of HCC-associated death 32 (83.2) vs. 54 (131.5); rate ratio, 0.63 (95% CI 0.41 to 0.98)			

AASLD = American Association for the Study of Liver Disease; AFP = alphafetoprotein; CT = computed tomography; EASL = European Association for the Study of the Liver; HBV = hepatitis B virus; HBsAg = hepatitis B surface antigen; HBsAb = antibody to hepatitis B surface antigen; HBcAb = antibody to hepatitis B core antigen; HBeAg = hepatitis B e antigen; HBeAb = antibody to hepatitis B e antigen; HCC = hepatocellular cancer; NR = not reported; NS = not significant

[a] Calculated

Appendix I. Evidence Table: Patient Outcomes for Staging (Cohort Study)

Author, Year	Imaging Tests Evaluated	Details of Imaging Tests	Definition of a Positive Test on Imaging and Followup	Population Characteristics	Eligibility Criteria	Country, Setting	Number Approached, Eligible, Enrolled, Analyzed
Chen MH, 2007[255]	A: CEUS B: Conventional US in control group plus contrast-enhanced CT or MRI within one week of RFA	Contrast-enhanced US Operator: Performed by 3 experienced sonographers Contrast: sulfur hexaflouride (Sonovue) administered as 2.4 ml bolus over 2 to 3 s Transducer frequency: 2.5 to 5.0 MHz (3 systems used) Contrast-enhanced CT 64-slice spiral CT scanner used, other details NR; Images read by 3 experienced radiologists MRI 1.5 T MRI scanner, other details NR; Images read by 3 experienced radiologists	On CEUS, quick enhancement in arterial phase with fast washout in portal or parenchymal phase; repeat CEUS was done if first CEUS suspicious for new tumor; patients selected for RFA on basis of tumor size, number, position, and anatomic relationship with surrounding structures	Age (mean): 67.2[a] years Male: 62% Race: NR	Patients with HCC diagnosed on imaging or histology	China; enrolled patients, source not reported	18 to 50 months

Author, Year	Comparison Groups	Adjusted Variables for Statistical Analysis	Outcomes	Adverse Events	Funding Source	Risk of Bias
Chen MH, 2007[255]	Screening: CEUS plus contrast-enhanced CT (n=81) or MRI	No adjustments	Screening vs. control Local tumor progression rate, % (n) 7.2 (6/83) vs. 18.3 (15/82); p=0.033; RR[a], 0.40 (95%	Not reported for screening	NR	High

	(n=11) Control: conventional ultrasound plus contrast-enhanced CT (n=74) or MRI (n=13)		CI 0.16 to 0.87) New HCC rate, % (n) 15.7 (13/83) vs. 35.4 (29/82); p=0.004; RR[a], 0.44 (95% CI 0.25 to 0.79) Mean local progression-free survival (months) 40.5 (SD 1.9) vs. 33.3 (2.2); p=0.015 New tumor-free survival (months) 38.1 (SD 2.0) vs. 26.4 (SD 2.0); p<0.001			

CT = computed tomography; HCC = hepatocellular cancer; MRI = magnetic resonance imaging; NR = not reported; RFA = radiofrequency ablation; US = ultrasound
[a] Calculated

Appendix J. Strength of Evidence

Key Question 1. Surveillance

Key Question 1a. Test performance

	Imaging modality or comparison	Number of studies	Risk of bias (Low, moderate, high)	Consistency (High, moderate, low)	Directness (Direct or indirect)	Precision (High, moderate, low)	Number of subjects	Strength of evidence (high, moderate, low, insufficient)
Surveillance settings *Unit of analysis: patients with HCC*	US without contrast	Sens: 3 Spec: 2	Moderate	Moderate	Indirect	Moderate	388	Sens: Low Spec: Low
	CT	Sens: 2 Spec: 2	Moderate	High	Indirect	Moderate	385	Sens: Low Spec: Low
	MRI or PET	No evidence	--	--	--	--	--	No evidence
Surveillance settings *Unit of analysis: HCC lesions*	US without contrast	Sens: 2 Spec: 1	Moderate	Moderate	Indirect	Low	137	Sens: Low Spec: Low
	CT	Sens: 1 Spec: 0	Moderate	Single study	Indirect	Low	37	Sens: Low Spec: Insufficient
	MRI or PET	No evidence	--	--	--	--	--	No evidence
Nonsurveillance settings *Unit of analysis: patients with HCC*	US without contrast	Sens: 8 Spec: 6	Moderate	Low	Indirect	Moderate	1187	Sens: Low Spec: Low
	CT	Sens: 16 Spec: 11	Moderate	Low	Indirect	High	1277	Sens: Moderate Spec: Moderate
	MRI	Sens: 11 Spec: 9	Moderate	Low	Indirect	High	1111	Sens: Moderate Spec: Moderate
	PET	Sens: 15 Spec: 5	Moderate	Low	Indirect	Moderate	559	Sens: Low Spec: :Low
Nonsurveillance settings *Unit of analysis: HCC lesions*	US without contrast	Sens: 11 Spec: 2	Moderate	Low	Indirect	Moderate	2370	Sens: Low Spec: Low
	US with contrast	Sens: 6 Spec: 0	Moderate	Low	Indirect	Moderate	280	Sens: Low Spec: Insufficient
	CT	Sens: 75 Spec: 20	Moderate	Low	Indirect	High	5499	Sens: Moderate Spec: Moderate
	MRI	Sens: 69 Spec: 13	Moderate	Low	Indirect	High	4267	Sens: Moderate Spec: Moderate
	PET	Sens: 4 Spec: 1	Moderate	Low	Indirect	Moderate	175	Sens: Low Spec: Low
Direct (within-study) comparisons of	US without contrast vs. CT	Sens: 6 Spec: 5	Moderate	Moderate	Direct	High	777	Sens: Moderate Spec: Moderate

	Imaging modality or comparison	Number of studies	Risk of bias (Low, moderate, high)	Consistency (High, moderate, low)	Directness (Direct or indirect)	Precision (High, moderate, low)	Number of subjects	Strength of evidence (high, moderate, low, insufficient)
imaging modalities *Unit of analysis: patients with HCC*	US without contrast vs. MRI	Sens: 3 Spec: 3	Moderate	High	Direct	High	712	Sens: Moderate Spec: Moderate
	MRI vs. CT	Sens: 4 Spec: 4	Moderate	Moderate	Direct	High	3577	Sens: Moderate Spec: Moderate
Direct (within-study) comparisons of imaging modalities *Unit of analysis: HCC lesions*	US without contrast vs. CT	Sens: 3 Spec: 2	Moderate	Moderate	Direct	High	821	Sens: Moderate Spec: Moderate
	US without contrast vs. MRI	Sens: 3 Spec: 2	Moderate	High	Direct	High	821	Sens: Moderate Spec: Moderate
	US with contrast vs. CT	Sens: 3 Spec: 0	Moderate	Moderate	Direct	High	140	Sens: Moderate Spec: Insufficient
	US with contrast vs. MRI	Sens: 2 Spec: 0	Moderate	High	Direct	Moderate	91	Sens: Moderate Spec: Insufficient
	MRI vs. CT	Sens: 28 Spec: 6	Moderate	Low	Direct	High	2599	Sens: Moderate Spec: Low
Multiple imaging modalities	Various combinations	Sens: 2	Moderate	Low	Indirect	Moderate	91	Sens: Low

Key Question 1a.i. Effects of reference standard on test performance (based on HCC lesions as the unit of analysis)

Imaging modality or comparison	Number of studies	Risk of bias (Low, moderate, high)	Consistency (High, moderate, low)	Directness (Direct or indirect)	Precision (High, moderate, low)	Number of subjects	Strength of evidence (high, moderate, low, insufficient)
US*	Sens: 16 Spec: 0	Moderate	Low	Indirect	Moderate	1871	Sens: Moderate Spec: Insufficient
CT*	Sens: 74 Spec: 11	Moderate	Low	Indirect	High	5112	Sens: Moderate Spec: Low
MRI*	Sens: 69 Spec: 13	Moderate	Low	Indirect	High	4319	Sens: Moderate Spec: Low
PET*	Sens: 3 Spec: 0	**Moderate**	**Low**	**Indirect**	**Low**	**169**	**Sens: Low Spec: Insufficient**

Key Question 1a.ii. Effects of patient, tumor, technical, and other factors on test performance

	Imaging modality or comparison	Number of studies	Risk of bias (Low, moderate, high)	Consistency (High, moderate, low)	Directness (Direct or indirect)	Precision (High, moderate, low)	Number of subjects	Strength of evidence (high, moderate, low, insufficient)
Lesion Size	US	Sens: 14 Spec: 3	Moderate	Low	Direct	Moderate	1781	Sens: Moderate Spec: Low
	CT	Sens: 33 Spec: 2	Moderate	Low	Direct	Moderate	2710	Sens: Moderate Spec: Low
	MRI	Sens: 25 Spec: 5	Moderate	Low	Direct	Moderate	1990	Sens: Moderate Spec: Low
	PET	Sens: 5	Moderate	Low	Direct	Low	268	Sens: Low
Degree of tumor differentiation	US with contrast	Sens: 3 Spec: 0	Moderate	Low	Direct	Moderate	165	Sens: Low Spec: Insufficient
	CT	Sens: 5 Spec: 0	Moderate	Low	Direct	High	320	Sens: Moderate Spec: Insufficient
	MRI	Sens: 2 Spec: 0	Moderate	Low	Direct	Low	242	Sens: Low Spec: Insufficient
	PET	Sens: 5 Spec: 0	Moderate	Low	Direct	Moderate	268	Sens: Low Spec: Insufficient
Other factors	US	1 to 3, depending on factor	Moderate	Low	Direct	Low	1119	Low
	CT	4-8, depending on factor	Moderate	Low	Direct	Low-Moderate	240	Low-Moderate
	MRI	2-8, depending on factor	Moderate	Low	Direct	Low-moderate	518	Low-moderate
	PET	1-8, depending on factor	Moderate	Low	Direct	Low-moderate	372	Low-moderate

Key Question 1b. Diagnostic thinking

Imaging modality or comparison	Number of studies	Risk of bias (Low, moderate, high)	Consistency (High, moderate, low)	Directness (Direct or indirect)	Precision (High, moderate, low)	Number of subjects	Strength of evidence (high, moderate, low, insufficient)
All	No evidence	--	--	--	--	--	No evidence

Key Question 1c. Clinical and patient-centered outcomes

Imaging modality or comparison	Number of studies	Risk of bias (Low, moderate, high)	Consistency (High, moderate, low)	Directness (Direct or indirect)	Precision (High, moderate, low)	Number of subjects	Strength of evidence (high, moderate, low, insufficient)
US plus serum AFP	3 RCT's	High	1 study of surveillance vs. no surveillance	Direct	High	18816	Low

Key Question 1d. Harms

Imaging modality or comparison	Number of studies	Risk of bias (Low, moderate, high)	Consistency (High, moderate, low)	Directness (Direct or indirect)	Precision (High, moderate, low)	Number of subjects	Strength of evidence (high, moderate, low, insufficient)
MRI, CT, US	2	Moderate	Moderate	Direct	Low	248	Insufficient

Key Question 2. Diagnosis
Key Question 2a. Test performance

	Imaging modality or comparison	Number of studies	Risk of bias (Low, moderate, high)	Consistency (High, moderate, low)	Directness (Direct or indirect)	Precision (High, moderate, low)	Number of subjects	Strength of evidence (high, moderate, low, insufficient)
Evaluation of a previously identified lesion *Unit of analysis: patients with HCC*	US with contrast	Sens: 9 Spec: 5	Moderate	Low	Indirect	High	1207	Sens: Moderate Spec: Low
	US without contrast	Sens: 2 Spec: 0	Moderate	High	Indirect	Moderate		Sens: Low Spec: Insufficient
	CT	Sens: 5 Spec: 3	Moderate	Moderate	Indirect	Moderate	760	Sens: Moderate Spec: Low
	MRI	Sens: 3 Spec: 3	Moderate	High	Indirect	Low	432	Sens: Low Spec: Low
Evaluation of a previously identified lesion *Unit of analysis: HCC lesions*	US with contrast	Sens: 22 Spec: 13	Moderate	Low	Indirect	Moderate	1757	Sens: Moderate Spec: Moderate
	CT	Sens: 12 Spec: 16	Moderate	Low	Indirect	Moderate	829	Sens: Moderate Spec: Moderate
	MRI	Sens: 13 Spec: 12	Moderate	Low	Indirect	Moderate	854	Sens: Moderate Spec: Moderate
	PET	Sens: 2 Spec: 2	Moderate	High	Indirect	Low	158	Sens: Moderate Spec: Moderate
For distinguishing HCC lesions from non-HCC hepatic lesions	US with contrast	1	Moderate	1 study	Indirect	Low	100	Low
	CT	4	Moderate	Moderate	Indirect	Low	382	Low
	MRI	9	Moderate	Moderate	Indirect	Moderate	535	Moderate
Direct (within-study) comparisons of imaging modalities *Unit of analysis: Patients with HCC*	US without contrast vs. CT	Sens: 1 Spec: 0	Moderate	1 study	Direct	Moderate		Sens: Low Spec: Insufficient
	US with contrast vs. CT	Sens: 4 Spec: 2	Moderate	High	Direct	Moderate	686	Sens: Moderate Spec: Insufficient
	MRI vs. CT	Sens: 1 Spec: 1	Moderate	1 study	Direct	Moderate	74	Sens: Low Spec: Low
Direct (within-study) comparisons of imaging modalities *Unit of analysis: HCC lesion*	US with contrast vs. CT	Sens: 3 Spec: 0	Moderate	Low	Direct	Moderate	191	Sens: Moderate Spec: Low
	US with contrast vs. MRI	Sens: 1 Spec: 1	Moderate	1 study	Direct	Low		Sens: Low Spec: Low
	MRI vs. CT	Sens: 1 Spec: 1	Moderate	1 study	Direct	Low	63	Sens: Low Spec: Low

	Imaging modality or comparison	Number of studies	Risk of bias (Low, moderate, high)	Consistency (High, moderate, low)	Directness (Direct or indirect)	Precision (High, moderate, low)	Number of subjects	Strength of evidence (high, moderate, low, insufficient)
Multiple imaging modalities	Various combinations	7	Moderate	Moderate	Direct	Moderate	552	Moderate

Key Question 2a.i. Effects of reference standard on test performance (based on HCC lesions as the unit of analysis)

Imaging modality or comparison	Number of studies	Risk of bias (Low, moderate, high)	Consistency (High, moderate, low)	Directness (Direct or indirect)	Precision (High, moderate, low)	Number of subjects	Strength of evidence (high, moderate, low, insufficient)
All	US: 24 CT: 12 MRI: 12	Moderate	Moderate	Indirect	Moderate		Sens: Moderate Spec: Moderate

Key Question 2a.ii. Effects of patient, tumor, technical, and other factors on test performance

	Imaging modality or comparison	Number of studies	Risk of bias (Low, moderate, high)	Consistency (High, moderate, low)	Directness (Direct or indirect)	Precision (High, moderate, low)	Number of subjects	Strength of evidence (high, moderate, low, insufficient)
Lesion Size	US	Sens: 14 Spec: 3	Moderate	Low	Direct	Moderate		Sens: Moderate Spec: Low
	CT and MRI							See KQ 1a.ii.
Degree of tumor differentiation	US	Sens: 3 Spec: 0	Moderate	Moderate	Direct	Low	202	Sens: Low Spec: Insufficient
	CT and MRI							See KQ1a.ii.
Other factors	US	1-2, depending on factor	Moderate	Moderate	Direct	Low		Insufficient-low
	CT	1-3. depending on factor	Moderate	Moderate	Direct	Low		Insufficient-low
	MRI	5-8, depending on factor	Moderate	Moderate	Direct	Low-moderate		Low-moderate

Key Question 2b. Diagnostic thinking

Imaging modality or comparison	Number of studies	Risk of bias (Low, moderate, high)	Consistency (High, moderate, low)	Directness (Direct or indirect)	Precision (High, moderate, low)	Number of subjects	Strength of evidence (high, moderate, low, insufficient)
All	No evidence	--	--	--	--	--	No evidence

Key Question 2c. Clinical and patient-centered outcomes

Imaging modality or comparison	Number of studies	Risk of bias (Low, moderate, high)	Consistency (High, moderate, low)	Directness (Direct or indirect)	Precision (High, moderate, low)	Number of subjects	Strength of evidence (high, moderate, low, insufficient)
All	No evidence	--	--	--	--	--	No evidence

Key Question 2d. Harms

Imaging modality or comparison	Number of studies	Risk of bias (Low, moderate, high)	Consistency (High, moderate, low)	Directness (Direct or indirect)	Precision (High, moderate, low)	Number of subjects	Strength of evidence (high, moderate, low, insufficient)
US and CT	1	High	1 study	Direct	Low	190	Insufficient

Key Question 3. Staging

Key Question 3a. Test performance

	Imaging modality or comparison	Number of studies	Risk of bias (Low, moderate, high)	Consistency (High, moderate, low)	Directness (Direct or indirect)	Precision (High, moderate, low)	Number of subjects	Strength of evidence (high, moderate, low, insufficient)
Staging accuracy, using TNM criteria	CT	6	Moderate	Moderate	Indirect	Moderate		Moderate
	MRI	2	Moderate	Moderate	Indirect	Moderate		Low
	PET	1	Moderate	1 study	Indirect	Moderate		Low
	MRI vs. CT	2	Moderate	Moderate	Direct	Moderate		Low
Identification of metastatic disease *Unit of analysis: Patients with metastatic HCC*	PET	Sens: 6 Spec: 5	Moderate	Moderate	Indirect	Moderate		Sens: Moderate Spec: Moderate
Identification of metastatic disease *Unit of analysis: Metastatic HCC lesions*	PET	Sens: 5 Spec: 0	Moderate	High	Indirect	Moderate		Sens: Moderate Spec: Insufficient

Key Question 3.a.i. Effects of reference standard on test performance

Imaging modality or comparison	Number of studies	Risk of bias (Low, moderate, high)	Consistency (High, moderate, low)	Directness (Direct or indirect)	Precision (High, moderate, low)	Number of subjects	Strength of evidence (high, moderate, low, insufficient)
CT, MRI, PET	6	Moderate	High	Indirect	Low		Sens: Low Spec: Low

Key Question 3.a.ii. Effects of patient, tumor, and technical factors on test performance

Imaging modality or comparison	Number of studies	Risk of bias (Low, moderate, high)	Consistency (High, moderate, low)	Directness (Direct or indirect)	Precision (High, moderate, low)	Number of subjects	Strength of evidence (high, moderate, low, insufficient)
CT, MRI, PET	No evidence	--	--	--	--	--	No evidence
PET	1-8, depending on factor	Moderate	Moderate	Indirect	Low-moderate		Low-moderate

Key Question 3b. Diagnostic thinking

	Imaging modality or comparison	Number of studies	Risk of bias (Low, moderate, high)	Consistency (High, moderate, low)	Directness (Direct or indirect)	Precision (High, moderate, low)	Number of subjects	Strength of evidence (high, moderate, low, insufficient)
Transplant eligibility, using Milan criteria	CT	7	Moderate	High	Indirect	Low		Moderate
	CT vs. MRI	1	Moderate	1 study	Direct	Low		Low
	PET vs. CT	1	Moderate	1 study	Direct	Low		Low
Use of resection and ablative therapies	MRI vs. CT	1	High	1 study	Direct	Low		Low

Key Question 3c. Clinical and patient-centered outcomes

Imaging modality or comparison	Number of studies	Risk of bias (Low, moderate, high)	Consistency (High, moderate, low)	Directness (Direct or indirect)	Precision (High, moderate, low)	Number of subjects	Strength of evidence (high, moderate, low, insufficient)
US with contrast vs. US without contrast plus CT	1	High`	1 study	Direct	Low		Low

Key Question 3d. Harms

Imaging modality or comparison	Number of studies	Risk of bias (Low, moderate, high)	Consistency (High, moderate, low)	Directness (Direct or indirect)	Precision (High, moderate, low)	Number of subjects	Strength of evidence (high, moderate, low, insufficient)
All	No evidence	--	--	--	--	--	No evidence

AFP = alpha-fetoprotein; CT = computed axial tomography; HCC = hepatocellular carcinoma; MRI = magnetic resonance imaging; PET = positron emission tomography; RCT = randomized control trial; Sens = sensitivity; Spec = specificity; TNM = tumor, node, metastasis staging sytem; US = ultrasound; vs. = versus

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