附录A 证据等级(牛津循证医学中心2011版)

Appendix A Levels of Evidence (Oxford Centre for Evidence-Based Medicine, 2011 edition)

(临床)问题	步骤1 (证据等级1*)	步骤2 (证据等级2*)	步骤3 (证据等级3*)	步骤4 (证据等级4*)	步骤5 (证据等级5*)
这个疾病有多普遍?(患病率)	当地的,当前的随机样本调查(或普查)	与当地情况相匹配调查的系统综述**	当地的,非随机样本调查**	病例系列**	N/A
诊断或监测实验是否准确(诊断)	一致地应用了参考标准和盲法的横断面研究的系统综述	一致地应用了参考标准和盲法的横断面研究	非连续病例研究,或研究未能一致地应用参考标准**	病例对照研究,或应用了差的或非独立的参考标准**	基于机制的推理
若不给予这个治疗会发生什么?(预后)	起始队列研究的系统综述	起始队列研究	队列研究或随机研究的对照组*	病例系列或病例对照研究,或低质量预后队列研究**	N/A
这个治疗有用吗?(治疗效益)	随机试验或单病例随机对照试验的系统综述	随机试验或具有巨大效果的观察性研究	非随机对照队列/随访研究**	病例系列,病例对照研究,或历史对照研究**	基于机制的推理
这个治疗常见的伤害是什么(治疗伤害)	随机试验的系统综述,巢式病例对照研究的系统综述,针对你所提临床问题患者的n-of-1试验,具有巨大效果的观察性研究	单个随机试验或(特殊地)具有巨大效果的观察性研究	非随机对照队列/随访研究(上市后监测)提供,足够数量来排除常见的伤害(对长期伤害需要足够长的随访时间)**	病例系列,病例对照研究,或历史对照研究**	基于机制的推理
这个治疗少见的伤害是什么?(治疗伤害)	随机试验或n-of-1试验的系统综述	随机试验或(特殊地)具有巨大效果的观察性研究			
这个试验(早期发现)值得吗?(筛查)	随机研究的系统综述	随机试验	非随机对照队列/随访研究*	病例系列,病例对照研究,或历史对照研究**	基于机制的推理

注:*根据研究质量、精确度、间接性,各个研究间不一致,若绝对效应值小,证据等级会被调低;若效应值很大,等级会被上调;**系统综述普遍地优于单项研究。

附录B 推荐强度

Appendix B Strength of recommendation

推荐强度	定义描述
强推荐	非常确信真实值接近效应估计值。基于:高质量研究证据支持净获益(例如,利大于弊);研究结果一致性好,没有或很少有例外;对研究质量轻微或没有疑虑;和/或获得专家组成员的同意。其他基于高质量证据,确信利明显大于弊(包括指南的文献回顾和分析中讨论的内容)也可支持强推荐。
中等程度推荐	对效应估计值有中等程度信心。基于:较好研究证据支持净获益(例如,利大于弊);研究结果一致,有轻微和/或少数例外;对研究质量轻微或少量疑虑;和/或获得专家组成员的同意。其他基于中等质量证据且利大于弊(包括指南的文献回顾和分析中讨论的内容)也可形成中度推荐。
弱推荐	对效应估计值信心有限,该推荐为临床实践提供了目前最好的指导。基于:有限的研究证据支持净获益(例如,利大于弊);研究结果一致,但有重要的例外;研究质量有重要的疑虑;和/或获得专家组成员的同意。其他基于有限的证据(包括指南的文献回顾和分析中讨论的内容)也可导致弱推荐。

注:推荐强度"强推荐、中等程度推荐、弱推荐"正文中分别用"A、B、C"表示。

附录C 肝癌的液体活检

Appendix C Liquid biopsy for liver cancer

液体活检技术具有无创取样、多次检测、高度敏感等特性,常用标志物包括循环肿瘤细胞(circulating tumor cell,CTC)、循环游离DNA(cell-free DNA,cfDNA),循环肿瘤DNA(circulating tumor DNA,ctDNA)等,在肝癌的早期筛查及诊断、预后评估、疾病监测、疗效评估中展现出较高价值[432]。

CTC检测可以成为一种肝癌预后预测和疗效评价的临床新工具[81,433]。有报道,外周血上皮细胞黏附分

子阳性CTC具有干细胞样特性,是肝癌切除术后早期复发转移的独立预测指标[434];检测CTC总体负荷、CTC异质性亚型对肝癌患者经导管动脉化疗栓塞治疗后及放射治疗后肿瘤复发转移和进展具有预测作用[435-436];不同部位、不同时点检出的CTC能预测不同器官转移类型[437-438];术前CTC负荷可以指导外科手术切缘大小,降低复发转移可能[439]。此外,动态检测CTC可以用于监控肝癌肝移植术后肿瘤复发转移[440]。

cfDNA是通过细胞凋亡、坏死和分泌释放到血液中的DNA物质。在癌症患者中,总cfDNA的主要成分是由肿瘤细胞释放的特异性突变DNA片段,即ctDNA组成,能够反映肿瘤的遗传信息。据报道,ctDNA用于肝癌早期诊断的灵敏度和特异度均优于血清甲胎蛋白[83,441],还可以动态反映肝癌手术切除效果[442-443]、评估仑伐替尼、免疫检查点抑制剂治疗的疗效[444-445]。有研究[82]报道利用外周血低覆盖率全基因组cfDNA片段组学特征,可实现肝癌早期诊断和鉴别诊断,曲线下面积达0.995,有望在临床推广应用。

近期研究发现,利用特定基因表观遗传修饰特征,如甲基化[446],5-hmc[84,447]等也可以用于肝癌早期诊断。基于外周血cfDNA甲基化检测的ELSA-seq技术平台,所建立的MCDBT-1模型可以用于癌症溯源和肝癌早期筛查,显著优于其他癌种[448]。也有研究[449]报道,通过对cfDNA的体细胞突变和甲基化特征的多重同步分析,相互补充,可以更为有效地发现早期肝癌。

此外,其他新型液体活检标志物如血清自身抗体[450],血浆代谢物[451]、肿瘤相关血小板[452]、循环T淋巴细胞受体库[453]、外周血免疫细胞亚群检测[454]等在肝癌早期诊断、疗效监测中也表现出一定潜力。

附录D 推荐肝癌病理诊断报告及主要描述指标

Appendix D Recommended pathological diagnosis report and major descriptive indicators for liver cancer

请临床协助填写: 肿瘤部位及术式:肝叶切除/肝段切除/局部切除/其他 术前治疗:无/有,介入/消融/靶向/免疫检查点抑制剂/其他	肿瘤数量(*n*=);肿瘤大小:(多结节性肿瘤应尽可能逐一测量cm×cm×cm) 肿瘤取材方式:"7点"取材; 其他:
大体类型: 肝细胞癌:单结节型有包膜/单结节型无包膜、多结节型、巨块型、弥漫型、其他: 肝内胆管癌:管周浸润型、肿块型、混合型、其他: 坏死:无/有(具体比例)	组织学类型: 肝细胞癌:细梁型、粗梁型、假腺管型、团片型 特殊亚型:双表型、纤维板层型、硬化型、透明细胞型、富脂型、嫌色型、富中性粒细胞型、富淋巴细胞型和未分化型、其他: 肝内胆管癌:大胆管型、小胆管型、细胆管癌、胆管板畸形型 特殊亚型:腺鳞癌、淋巴上皮瘤样型、肉瘤样型、其他: 混合型肝细胞癌-胆管癌(分别描述两种肿瘤成分的比例)
分化分级: 肝细胞癌(Ⅰ、Ⅱ、Ⅲ、Ⅳ/高、中、低) 肝内胆管癌(高、中、低)	卫星灶:无/有 MVI:无/有 血管内松散悬浮癌细胞:无/有
大血管癌栓(巨检/手术所见):无/有 大血管癌栓位置(根据临床信息):	大胆管癌栓(巨检/手术所见):无/有 小胆管癌栓(显微镜下所见):无/有
MVI病理分级:M0:未发现MVI; M1(低危组):≤5个MVI,均发生于近癌旁肝组织(≤1 cm); M2a(高危组):>5个MVI,均发生于近癌旁肝组织(≤1 cm); M2b(高危组):MVI发生于远癌旁肝组织(>1 cm)。	
肝细胞异型增生结节:无/有,低级别/高级别 肝硬化:无/有,小结节/大结节/混合结节型	胆管上皮内瘤变:无/有,低级别/高级别 胆管内乳头状肿瘤:无/有,低级别/高级别
切缘:无癌,距肿瘤最近距离cm	肝被膜:未侵犯/侵犯
癌周围肝组织: 肝细胞异型增生:无/肝细胞大、小细胞变 脂肪变程度:无、轻度、中度、重度 肝炎:无/有,肝炎程度G,纤维化分期S	周围神经侵犯:无/有 淋巴结/远处转移:无/有,部位:
胆囊侵犯:无/有	膈肌侵犯:无/有
转化治疗/新辅助治疗后切除肝癌标本的病理学评估: pCR、MPR百分比:	免疫检查点抑制剂治疗后癌旁肝组织免疫相关肝损伤:无/有,肝细胞损伤、小叶内肝炎、胆管炎

附录E　经动脉介入治疗进展

Appendix E　Advances in transarterial interventional treatment

1. 肝动脉灌注化疗(hepatic artery infusion chemotherapy,HAIC):作为一种动脉内灌注化疗的介入治疗方式,HAIC目前尚未形成统一治疗技术标准,疗效差异较大。日本多中心、随机对照Ⅱ期临床试验研究(SCOOP-2试验)[455]对比顺铂HAIC序贯索拉非尼与标准索拉非尼单药治疗晚期肝癌患者,结果显示HAIC联合治疗组的中位生存期为10个月,对比索拉非尼单药治疗组的15.2个月,疗效不理想。HAIC联合治疗组中有23%的患者由于一般状况恶化而无法在HAIC后接受任何进一步的治疗。多中心随机Ⅲ期试验(SILIUS试验)[456]除证实了该前瞻性随机Ⅱ期试验的阴性结果外,还测试了不同的HAIC方案(低剂量顺铂-氟尿嘧啶)联合索拉非尼对比索拉非尼单药治疗日本晚期肝癌患者,同样为阴性结果。目前,日本将HAIC推荐为TACE失败/抵抗后肝功能Child-Pugh A级,且靶向药物等系统抗肿瘤进展的肝癌患者或肝功能Child-Pugh B级晚期肝癌患者的治疗方式[457](证据等级2,推荐B)。近年来我国学者采用mFOLFOX为基础的灌注方案使晚期肝癌患者HAIC疗效得以提高。目前普遍认为经导管动脉化疗栓塞(transcatheter arterial chemoembolization,TACE)疗效优于HAIC,但有一项针对不伴血管浸润或肝外转移的不可切除大肝癌患者的随机对照研究[458]显示mFOLFOX-HAIC疗效优于TACE。与TACE类似,mFOLFOX-HAIC对部分肿瘤最大径>7 cm,初始不适合外科手术切除的肝癌患者,有助于转化,但一般建议连续完成4次或以上的HAIC治疗才能达到转化治疗的机会。2023年,我国学者发表了肝癌mFOLFOX-HAIC中国专家共识[459],为HAIC治疗提供了规范化指引和推荐。

2. TACE预后的术前预测模型

(1)“Six-and-twelve”模型:即将肿瘤大小+数量之和分为≤6,>6且≤12,>12三组。该模型对接受TACE治疗的肝癌患者进行个体化预后评估和危险分层,患者的风险分层不同,其中位生存时间差异显著。因此,使用“Six-and-twelve”模型,能为肝癌患者TACE术前提供术后预期生存的参考值,辅助患者选择不同的治疗方式[306](证据等级2,推荐B)。

(2)TACE的预后列线图模型:包含门静脉侵犯、肿瘤数目、肿瘤包膜、血清甲胎蛋白(alpha-fetoprotein,AFP)、谷草转氨酶、吲哚菁绿15 min滞留率等因素。该模型经868例肝癌患者验证,其预测生存相关的C-指数达0.755[460]。因此,使用上述两种模型能为肝癌患者TACE术前提供术后预期生存的参考值,辅助患者选择不同的治疗方式。

(3)“TACE-predict”模型:是针对肝癌TACE人群,可以在术前应用并在术后再次校准的个体化预后评估和危险分层模型。研究发现,肿瘤数目与直径、AFP、白蛋白、胆红素、血管侵犯、病因是TACE术前患者的预后因素;肿瘤数目与直径、AFP、胆红素、血管侵犯及影像学应答是TACE术后患者的预后因素。据此建立了Pre-TACE-Predict模型和Post-TACE-Predict模型,该模型可分别在TACE术前和术后计算患者生存概率。Pre-TACE-Predict模型和Post-TACE-Predict模型的预测能力优于HAP和mHAP Ⅲ评分。Post-TACE-Predict模型能够在术后对患者进行进一步预后评估和危险分层,并有助于辅助TACE后续的治疗决策,对指导临床实践具有重大意义(证据等级2,推荐B)[461]。

3. TACE/HAIC联合分子靶向、免疫检查点抑制剂治疗:TACTICS Ⅱ期研究[462]表明,TACE联合索拉非尼较单一TACE明显改善不可手术切除BCLC A/B期肝癌患者的无进展生存时间(25.2个月 vs 13.5个月,*P*=0.02,风险比0.59),但总生存时间差异无统计学意义(36.2个月 vs 30.8个月,*P*=0.40)。STAH研究[463]表明,对于BCLC C期的肝癌患者,TACE联合索拉非尼较单一索拉非尼无生存获益(12.8个月 vs 10.8个月,风险比0.91)。LAUNCH研究[184]表明,TACE联合仑伐替尼较单一仑伐替尼可明显提高晚期肝癌患者的客观缓解率(54.1% vs 25%)、无进展生存时间(10.6个月 vs 6.4个月,风险比0.43)和总生存时间(17.8个月 vs 11.5个月,风险比0.45)。DEB-TACE联合仑伐替尼较单一仑伐替尼的真实世界、多中心、回顾性研究[308]显示,联合治疗能明显提高不可手术切除肝癌患者的客观缓解率(46.5% vs 13.1%)和总生存时间(15.9个月 vs 8.6个月,*P*=0.002)。在一线标准系统抗肿瘤治疗耐药后,TACE联合瑞戈非尼二线治疗的单臂、真实世界研究[464]显示可延长中晚期肝癌患者无进展生存时间至9.1个月及总生存时间至14.3个月,回顾性对照研究[465]也显示TACE联合瑞戈非尼较单一瑞戈非尼延长晚期肝癌患者的总生存时间(11.3个月 vs 8.2个月,*P*=0.034)。CHANCE001是目前国内TACE联合靶向及免疫治疗肝癌样本量最大的多中心真实世界

研究[309],证实联合治疗较单纯TACE治疗显著改善中晚期肝癌患者的无进展生存时间(9.5个月 vs 8.0个月,风险比0.70)与总生存时间(19.2个月 vs 15.7个月,风险比0.63)。CHANCE2211是TACE联合卡瑞利珠单克隆抗体和阿帕替尼治疗BCLC B/C期肝癌的全国多中心、回顾性队列研究[310],研究结果显示联合治疗组的中位总生存时间、无进展生存时间和客观缓解率显著优于单纯TACE治疗组(中位总生存时间:24.1个月 vs 15.7个月,风险比0.41;中位无进展生存时间:13.5个月 vs 7.7个月,风险比0.52;客观缓解率:59.5% vs 37.4%)。目前,多项TACE/HAIC联合系统抗肿瘤治疗的Ⅲ期临床研究正在进行中。

附录F 经动脉放射性栓塞(transarterial radioembolization,TARE)治疗进展

Appendix F Advances in TARE treatment

TARE是指采用经皮穿刺将导管插管至肿瘤供血动脉内,注射带有放射性核素的物质,通过放射性核素在肿瘤局部聚集和持续内照射毁损并杀灭肿瘤,从而达到控制肿瘤生长的治疗方法。TARE属内放射范畴,也称为选择性内放射治疗(selective internal radiation therapy,SIRT)[466]。与TACE主要通过化疗药物细胞毒作用和肿瘤动脉分支栓塞使肿瘤缺血坏死不同,TARE主要通过放射性核素释放高能量射线(β射线)持续近距离照射使肿瘤组织坏死。同时,放射性微球直径较小(20~60 μm),血管栓塞作用较TACE轻微[466]。

TARE最常用的放射性微球为钇-90(^{90}Y)微球。根据载体不同,^{90}Y微球分为玻璃微球(TheraSphere)和树脂微球(SIR-Sphere)两种[467]。TheraSphere和SIR-Sphere分别于1999年和2002年获得美国FDA批准用于肝脏恶性肿瘤的TARE治疗,其中TheraSphere的适应证为治疗不可切除的肝癌,SIR-Sphere的适应证为联合氟脲苷动脉化疗治疗不可手术切除的结直肠癌肝转移。这两种微球在临床实际应用中互有交互。在欧洲、亚洲部分国家和地区还被批准用于治疗其他不能手术切除的肝脏恶性肿瘤,如胆管细胞癌、神经内分泌肿瘤肝转移等[468]。

TARE治疗需要由介入放射科、肝脏外科、核医学科、放射肿瘤科和肿瘤内科等组成的多学科团队共同完成。根据患者一般状况、肝功能状况、肿瘤分期、治疗目的等情况以及肝-肺分流等因素制定治疗计划和计算放射性计量[467,469]。

肝癌患者TARE的临床应用主要包括[470-473]:①早期肝癌患者的根治性治疗,可使肿瘤完全坏死;②中期肝癌患者的降期治疗,为外科手术切除或肝移植创造条件;③晚期肝癌患者(伴门静脉癌栓)的姑息性治疗,延长患者生存期;④放射性肝段/肝叶切除,治疗肿瘤的同时使余肝体积增加,为外科手术切除创造机会;⑤与系统抗肿瘤治疗联合,提高肝癌患者疗效。

尽管TARE是肝癌患者有效的血管内介入治疗方法,已经在国外临床应用了20余年,但国内目前仍未获批用于原发性肝癌患者的治疗,也缺乏中国肝癌患者TARE的数据。期待^{90}Y微球的获批和临床应用,为我国肝癌患者增加新的治疗方法。

附录G 肝癌外放射治疗正常组织具体耐受剂量参考

Appendix G Specific tolerance dose to normal tissue in external radiotherapy for liver cancer

1. 立体定向放射治疗:①肝功能Child-Pugh A级,放射治疗分次数3~5 Fx,正常肝体积[肝脏体积-大体肿瘤体积,Liver-Gross tumor volume(GTV)]>700 mL或>800 mL,Liver-GTV平均剂量分别<15 Gy或<18 Gy;放射治疗分次数6 Fx,Liver-GTV体积>800 mL,平均剂量<20 Gy;每次肿瘤分割剂量4~8 Gy,Liver-GTV平均剂量<23 Gy为安全剂量(证据等级3,推荐B)[474-475]。②亚洲肝癌患者常伴有肝硬化和脾功能亢进,导致胃肠道淤血和凝血功能差,胃肠道的放射耐受剂量低于RTOG推荐的剂量[476];目前文献及专家共识认为,放射治疗分次数3~5 Fx,胃和小肠最大剂量均应<22.2~35 Gy,最佳<30 Gy。③放射治疗分次数3~5 Fx,双肾平均剂量最佳<10 Gy,脊髓最大剂量<21.9~30 Gy,最佳<18~23 Gy[477]。

2. 常规分割剂量放射治疗:①肝功能Child-Pugh A级,Liver-GTV平均剂量<28~30 Gy;肝功能Child-Pugh B级者,肝脏对射线的耐受量明显下降,最佳<6 Gy,避免肝功能Child-Pugh C级患者行肝区放射治疗[295,475]。②胃和小肠最大剂量均应<54 Gy,胃V_{45}<45%,小肠V_{50}≤5%。③双肾平均剂量≤15 Gy,如一侧肾脏平均剂量大于19 Gy,则另一侧肾脏尽量避开;脊髓最大剂量<45 Gy[474]。

参考文献：

[1] HAN BF, ZHENG RS, ZENG HM, et al. Cancer incidence and mortality in China, 2022[J]. J Natl Cancer Cent, 2024, 4(1): 47-53. DOI: 10.1016/j.jncc.2024.01.006.

[2] ZHENG RS, ZHANG SW, ZENG HM, et al. Cancer incidence and mortality in China, 2016[J]. J Natl Cancer Center, 2022, 2(1): 1-9. DOI: 10.1016/j.jncc.2022.02.002.

[3] ZHOU MG, WANG HD, ZENG XY, et al. Mortality, morbidity, and risk factors in China and its provinces, 1990-2017: A systematic analysis for the Global Burden of Disease Study 2017[J]. Lancet, 2019, 394(10204): 1145-1158. DOI: 10.1016/S0140-6736(19)30427-1.

[4] BRAY F, FERLAY J, SOERJOMATARAM I, et al. Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries[J]. CA Cancer J Clin, 2018, 68(6): 394-424. DOI: 10.3322/caac.21492.

[5] GUYATT G, OXMAN AD, AKL EA, et al. GRADE guidelines: 1. Introduction-GRADE evidence profiles and summary of findings tables[J]. J Clin Epidemiol, 2011, 64(4): 383-394. DOI: 10.1016/j.jclinepi.2010.04.026.

[6] BALSHEM H, HELFAND M, SCHÜNEMANN HJ, et al. GRADE guidelines: 3. Rating the quality of evidence[J]. J Clin Epidemiol, 2011, 64(4): 401-406. DOI: 10.1016/j.jclinepi.2010.07.015.

[7] ANDREWS JC, SCHÜNEMANN HJ, OXMAN AD, et al. GRADE guidelines: 15. Going from evidence to recommendation-determinants of a recommendation's direction and strength[J]. J Clin Epidemiol, 2013, 66(7): 726-735. DOI: 10.1016/j.jclinepi.2013.02.003.

[8] ASCO Guidelines Methodology Manual[EB/OL]. (2021-09-09)[2023-12-15]. https://www.asco.org/sites/new-www.asco.org/files/content-files/advocacy-and-policy/documents/Guidelines-Methodology-Manual_0.pdf.

[9] ZHANG BH, YANG BH, TANG ZY. Randomized controlled trial of screening for hepatocellular carcinoma[J]. J Cancer Res Clin Oncol, 2004, 130(7): 417-422. DOI: 10.1007/s00432-004-0552-0.

[10] ZENG HM, CAO MM, XIA CF, et al. Performance and effectiveness of hepatocellular carcinoma screening in individuals with HBsAg seropositivity in China: A multicenter prospective study[J]. Nat Cancer, 2023, 4(9): 1382-1394. DOI: 10.1038/s43018-023-00618-8.

[11] HOU JL, ZHAO W, LEE C, et al. Outcomes of long-term treatment of chronic HBV infection with entecavir or other agents from a randomized trial in 24 countries[J]. Clin Gastroenterol Hepatol, 2020, 18(2): 457-467. e21. DOI: 10.1016/j.cgh.2019.07.010.

[12] FAN R, PAPATHEODORIDIS G, SUN J, et al. aMAP risk score predicts hepatocellular carcinoma development in patients with chronic hepatitis[J]. J Hepatol, 2020, 73(6): 1368-1378. DOI: 10.1016/j.jhep.2020.07.025.

[13] FAN R, CHEN L, ZHAO SR, et al. Novel, high accuracy models for hepatocellular carcinoma prediction based on longitudinal data and cell-free DNA signatures[J]. J Hepatol, 2023, 79(4): 933-944. DOI: 10.1016/j.jhep.2023.05.039.

[14] HAO X, FAN R, GUO YB, et al. Establishing an integrated hospital-community pyramid for screening and achieving hepatocellular carcinoma early diagnosis and treatment[J]. Chin J Hepatol, 2021, 29(4): 289-292. DOI: 10.3760/cma.j.cn501113-20210408-00174-1.
郝新, 樊蓉, 郭亚兵, 等. 创建医院社区一体化"金字塔"肝癌筛查模式,实现肝癌早筛早诊早治[J]. 中华肝脏病杂志, 2021, 29(4): 289-292. DOI: 10.3760/cma.j.cn501113-20210408-00174-1.

[15] DONG Y, WANG WP, LEE WJ, et al. Contrast-enhanced ultrasound features of histopathologically proven hepatocellular carcinoma in the non-cirrhotic liver: A multicenter study[J]. Ultrasound Med Biol, 2022, 48(9): 1797-1805. DOI: 10.1016/j.ultrasmedbio.2022.05.005.

[16] WANG WP, DONG Y, CAO JY, et al. Detection and characterization of small superficially located focal liver lesions by contrast-enhanced ultrasound with high frequency transducers[J]. Med Ultrason, 2017, 19(4): 349-356. DOI: 10.11152/mu-1276.

[17] DONG Y, WANG WP, MAO F, et al. Imaging features of fibrolamellar hepatocellular carcinoma with contrast-enhanced ultrasound[J]. Ultraschall Med, 2021, 42(3): 306-313. DOI: 10.1055/a-1110-7124.

[18] FAN PL, XIA HS, DING H, et al. Characterization of early hepatocellular carcinoma and high-grade dysplastic nodules on contrast-enhanced ultrasound: Correlation with histopathologic findings[J]. J Ultrasound Med, 2020, 39(9): 1799-1808. DOI: 10.1002/jum.15288.

[19] SHEN YT, YUE WW, XU HX. Non-invasive imaging in the diagnosis of combined hepatocellular carcinoma and cholangiocarcinoma[J]. Abdom Radiol (NY), 2023, 48(6): 2019-2037. DOI: 10.1007/s00261-023-03879-0.

[20] HAN H, JI ZB, HUANG BJ, et al. The preliminary application of simultaneous display of contrast-enhanced ultrasound and micro-flow imaging technology in the diagnosis of hepatic tumors[J]. J Ultrasound Med, 2023, 42(3): 729-737. DOI: 10.1002/jum.16111.

[21] BARR RG, HUANG PT, LUO Y, et al. Contrast-enhanced ultrasound imaging of the liver: A review of the clinical evidence for SonoVue and Sonazoid[J]. Abdom Radiol (NY), 2020, 45(11): 3779-3788. DOI: 10.1007/s00261-020-02573-9.

[22] DIETRICH CF, NOLSØE CP, BARR RG, et al. Guidelines and good clinical practice recommendations for contrast enhanced ultrasound (CEUS) in the liver-update 2020-WFUMB in cooperation with EFSUMB, AFSUMB, AIUM, and FLAUS[J]. Ultraschall Med, 2020, 41(5): 562-585. DOI: 10.1055/a-1177-0530.

[23] LEE JY, MINAMI Y, CHOI BI, et al. The afsumb consensus statements and recommendations for the clinical practice of Contrast-Enhanced ultrasound using sonazoid[J]. J Med Ultrasound, 2020, 28(2): 59-82. DOI: 10.4103/JMU.JMU_124_19.

[24] ZHAO CK, GUAN X, PU YY, et al. Response evaluation using contrast-enhanced ultrasound for unresectable advanced hepatocellular carcinoma treated with tyrosine kinase inhibitors plus anti-PD-1 antibody therapy[J]. Ultrasound Med Biol, 2024, 50(1): 142-149. DOI: 10.1016/j.ultrasmedbio.2023.09.016.

[25] ZHOU BY, LIU H, PU YY, et al. Quantitative analysis of pre-treatment dynamic contrast-enhanced ultrasound for assessing the response of colorectal liver metastases to chemotherapy plus targeted therapy: A dual-institutional study[J]. Abdom Radiol, 2024, 49(2): 414-424. DOI: 10.1007/s00261-023-04055-0.

[26] WANG WP, JI ZB, DONG Y, et al. Application of volume navigation guided real time contrast-enhanced ultrasound for diagnosis of small malignant hepatic lesions[J/CD]. Chin J Med Ultrasound Electron Ed, 2016, 13(1): 56-60. DOI: 10.3877/cma.j.issn.1672-6448.2016.01.014.
王文平, 季正标, 董怡, 等. 实时导航超声造影在小肝癌诊断中的应用研究[J/CD]. 中华医学超声杂志(电子版), 2016, 13(1): 56-60. DOI: 10.3877/cma.j.issn.1672-6448.2016.01.014.

[27] DONG Y, WANG WP, MAO F, et al. Application of imaging fusion combining contrast-enhanced ultrasound and magnetic resonance imaging in detection of hepatic cellular carcinomas undetectable by conventional ultrasound[J]. J Gastroenterol Hepatol, 2016, 31(4): 822-828. DOI: 10.1111/jgh.13202.

[28] BO XW, XU HX, WANG D, et al. Fusion imaging of contrast-enhanced ultrasound and contrast-enhanced CT or MRI before radiofrequency ablation for liver cancers[J]. Br J Radiol, 2016, 89(1067): 20160379. DOI: 10.1259/bjr.20160379.

[29] BO XW, XU HX, GUO LH, et al. Ablative safety margin depicted by fusion imaging with post-treatment contrast-enhanced ultrasound and pre-treatment CECT/CEMRI after radiofrequency ablation for liver cancers[J]. Br J Radiol, 2017, 90(1078): 20170063. DOI: 10.1259/bjr.20170063.

[30] DONG Y, WANG WP, XU YD, et al. Point shear wave speed measurement in differentiating benign and malignant focal liver lesions[J]. Med Ultrason, 2017, 19(3): 259-264. DOI: 10.11152/mu-1142.

[31] ZHUANG Y, DING H, ZHANG Y, et al. Two-dimensional shear-wave elastography performance in the noninvasive evaluation of liver fibrosis in patients with chronic hepatitis B: Comparison with serum fibrosis indexes[J]. Radiology, 2017, 283(3): 873-882. DOI: 10.1148/radiol.2016160131.

[32] GUAN X, CHEN YC, XU HX. New horizon of ultrasound for screening and surveillance of non-alcoholic fatty liver disease spectrum[J]. Eur J Radiol, 2022, 154: 110450. DOI: 10.1016/j.ejrad.2022.110450.
[33] HUANG YL, BIAN H, ZHU YL, et al. Quantitative diagnosis of nonalcoholic fatty liver disease with ultrasound attenuation imaging in a biopsy-proven cohort[J]. Acad Radiol, 2023, 30(Suppl 1): S155-S163. DOI: 10.1016/j.acra.2023.05.033.
[34] CHEN YL, LU Q, ZHU YL, et al. Prediction of microvascular invasion in combined hepatocellular-cholangiocarcinoma based on pre-operative clinical data and contrast-enhanced ultrasound characteristics[J]. Ultrasound Med Biol, 2022, 48(7): 1190-1201. DOI: 10.1016/j.ultrasmedbio.2022.02.014.
[35] ZHANG HL, GUO LH, WANG D, et al. Multi-source transfer learning via multi-kernel support vector machine plus for B-mode ultrasound-based computer-aided diagnosis of liver cancers[J]. IEEE J Biomed Health Inform, 2021, 25(10): 3874-3885. DOI: 10.1109/JBHI.2021.3073812.
[36] DING WZ, WANG Z, LIU FY, et al. A hybrid machine learning model based on semantic information can optimize treatment decision for Naïve single 3-5-cm HCC patients[J]. Liver Cancer, 2022, 11(3): 256-267. DOI: 10.1159/000522123.
[37] LIU F, LIU D, WANG K, et al. Deep learning radiomics based on contrast-enhanced ultrasound might optimize curative treatments for very-early or early-stage hepatocellular carcinoma patients[J]. Liver Cancer, 2020, 9(4): 397-413. DOI: 10.1159/000505694.
[38] LEE YJ, LEE JM, LEE JS, et al. Hepatocellular carcinoma: Diagnostic performance of multidetector CT and MR imaging-a systematic review and meta-analysis[J]. Radiology, 2015, 275(1): 97-109. DOI: 10.1148/radiol.14140690.
[39] LIU XJ, JIANG HY, CHEN J, et al. Gadoxetic acid disodium-enhanced magnetic resonance imaging outperformed multidetector computed tomography in diagnosing small hepatocellular carcinoma: A meta-analysis[J]. Liver Transpl, 2017, 23(12): 1505-1518. DOI: 10.1002/lt.24867.
[40] MARRERO JA, KULIK LM, SIRLIN CB, et al. Diagnosis, staging, and management of hepatocellular carcinoma: 2018 practice guidance by the American association for the study of liver diseases[J]. Hepatology, 2018, 68(2): 723-750. DOI: 10.1002/hep.29913.
[41] VOGEL A, CERVANTES A, CHAU I, et al. Hepatocellular carcinoma: ESMO Clinical Practice Guidelines for diagnosis, treatment and follow-up[J]. Ann Oncol, 2018, 29(Suppl 4): iv238-iv255. DOI: 10.1093/annonc/mdy308.
[42] OMATA M, CHENG AL, KOKUDO N, et al. Asia-Pacific clinical practice guidelines on the management of hepatocellular carcinoma: A 2017 update[J]. Hepatol Int, 2017, 11(4): 317-370. DOI: 10.1007/s12072-017-9799-9.
[43] CHO ES, CHOI JY. MRI features of hepatocellular carcinoma related to biologic behavior[J]. Korean J Radiol, 2015, 16(3): 449-464. DOI: 10.3348/kjr.2015.16.3.449.
[44] HWANG J, KIM YK, JEONG WK, et al. Nonhypervascular hypointense nodules at gadoxetic acid-enhanced MR imaging in chronic liver disease: Diffusion-weighted imaging for characterization[J]. Radiology, 2015, 277(1): 309. DOI: 10.1148/radiol.2015154031.
[45] HUANG P, NI XY, ZHOU CW, et al. Subcentimeter nodules with diagnostic hallmarks of hepatocellular carcinoma: Comparison of pathological features and survival outcomes with nodules measuring 1-2 cm[J]. J Hepatocell Carcinoma, 2023, 10: 169-180. DOI: 10.2147/JHC.S401027.
[46] ZENG MS, YE HY, GUO L, et al. Gd-EOB-DTPA-enhanced magnetic resonance imaging for focal liver lesions in Chinese patients: A multicenter, open-label, phase III study[J]. Hepatobiliary Pancreat Dis Int, 2013, 12(6): 607-616. DOI: 10.1016/s1499-3872(13)60096-x.
[47] ICHIKAWA T, SAITO K, YOSHIOKA N, et al. Detection and characterization of focal liver lesions: A Japanese phase III, multicenter comparison between gadoxetic acid disodium-enhanced magnetic resonance imaging and contrast-enhanced computed tomography predominantly in patients with hepatocellular carcinoma and chronic liver disease[J]. Invest Radiol, 2010, 45(3): 133-141. DOI: 10.1097/RLI.0b013e3181caea5b.
[48] WANG W, YANG C, ZHU K, et al. Recurrence after curative resection of hepatitis B virus-related hepatocellular carcinoma: Diagnostic algorithms on gadoxetic acid-enhanced magnetic resonance imaging[J]. Liver Transpl, 2020, 26(6): 751-763. DOI: 10.1002/lt.25713.
[49] YOO SH, CHOI JY, JANG JW, et al. Gd-EOB-DTPA-enhanced MRI is better than MDCT in decision making of curative treatment for hepatocellular carcinoma[J]. Ann Surg Oncol, 2013, 20(9): 2893-2900. DOI: 10.1245/s10434-013-3001-y.
[50] RAO SX, WANG J, WANG J, et al. Chinese consensus on the clinical application of hepatobiliary magnetic resonance imaging contrast agent: Gadoxetic acid disodium[J]. J Dig Dis, 2019, 20(2): 54-61. DOI: 10.1111/1751-2980.12707.
[51] HUANG P, ZHOU CW, WU F, et al. An improved diagnostic algorithm for subcentimeter hepatocellular carcinoma on gadoxetic acid-enhanced MRI[J]. Eur Radiol, 2023, 33(4): 2735-2745. DOI: 10.1007/s00330-022-09282-5.
[52] RENZULLI M, BISELLI M, BROCCHI S, et al. New hallmark of hepatocellular carcinoma, early hepatocellular carcinoma and high-grade dysplastic nodules on Gd-EOB-DTPA MRI in patients with cirrhosis: A new diagnostic algorithm[J]. Gut, 2018, 67(9): 1674-1682. DOI: 10.1136/gutjnl-2017-315384.
[53] CHANG Y, JEONG SW, JANG JY, et al. Recent updates of transarterial chemoembolilzation in hepatocellular carcinoma[J]. Int J Mol Sci, 2020, 21(21): 8165. DOI: 10.3390/ijms21218165.
[54] KUDO M, IZUMI N, KOKUDO N, et al. Management of hepatocellular carcinoma in Japan: Consensus-Based Clinical Practice Guidelines proposed by the Japan Society of Hepatology (JSH) 2010 updated version[J]. Dig Dis, 2011, 29(3): 339-364. DOI: 10.1159/000327577.
[55] SHI J, LAI ECH, LI N, et al. Surgical treatment of hepatocellular carcinoma with portal vein tumor thrombus[J]. Ann Surg Oncol, 2010, 17(8): 2073-2080. DOI: 10.1245/s10434-010-0940-4.
[56] CHEN MY, CAO JS, HU JH, et al. Clinical-radiomic analysis for pretreatment prediction of objective response to first transarterial chemoembolization in hepatocellular carcinoma[J]. Liver Cancer, 2021, 10(1): 38-51. DOI: 10.1159/000512028.
[57] XU X, ZHANG HL, LIU QP, et al. Radiomic analysis of contrast-enhanced CT predicts microvascular invasion and outcome in hepatocellular carcinoma[J]. J Hepatol, 2019, 70(6): 1133-1144. DOI: 10.1016/j.jhep.2019.02.023.
[58] CHONG HH, YANG L, SHENG RF, et al. Multi-scale and multi-parametric radiomics of gadoxetate disodium-enhanced MRI predicts microvascular invasion and outcome in patients with solitary hepatocellular carcinoma≤5 cm[J]. Eur Radiol, 2021, 31(7): 4824-4838. DOI: 10.1007/s00330-020-07601-2.
[59] YANG L, GU DS, WEI JW, et al. A radiomics nomogram for preoperative prediction of microvascular invasion in hepatocellular carcinoma [J]. Liver Cancer, 2019, 8(5): 373-386. DOI: 10.1159/000494099.
[60] LEI ZQ, LI J, WU D, et al. Nomogram for preoperative estimation of microvascular invasion risk in hepatitis B virus-related hepatocellular carcinoma within the Milan criteria[J]. JAMA Surg, 2016, 151(4): 356-363. DOI: 10.1001/jamasurg.2015.4257.
[61] MOUSTAFA AS, ABDEL AAL AK, ERTEL N, et al. Chemoembolization of hepatocellular carcinoma with extrahepatic collateral blood supply: Anatomic and technical considerations[J]. Radiographics, 2017, 37(3): 963-977. DOI: 10.1148/rg.2017160122.
[62] PUNG L, AHMAD M, MUELLER K, et al. The role of cone-beam CT in transcatheter arterial chemoembolization for hepatocellular carcinoma: A systematic review and meta-analysis[J]. J Vasc Interv Radiol, 2017, 28(3): 334-341. DOI: 10.1016/j.jvir.2016.11.037.
[63] LIN CY, CHEN JH, LIANG J, et al. ^{18}F-FDG PET or PET/CT for detecting extrahepatic metastases or recurrent hepatocellular carcinoma: A systematic review and meta-analysis[J]. Eur J Radiol, 2012, 81(9):

2417-2422. DOI: 10.1016/j.ejrad.2011.08.004.
[64] PARK JW, KIM JH, KIM SK, et al. A prospective evaluation of ^{18}F-FDG and ^{11}C-acetate PET/CT for detection of primary and metastatic hepatocellular carcinoma[J]. J Nucl Med, 2008, 49(12): 1912-1921. DOI: 10.2967/jnumed.108.055087.
[65] BOELLAARD R, O'DOHERTY MJ, WEBER WA, et al. FDG PET and PET/CT: EANM procedure guidelines for tumour PET imaging: Version 1.0[J]. Eur J Nucl Med Mol Imaging, 2010, 37(1): 181-200. DOI: 10.1007/s00259-009-1297-4.
[66] CHALIAN H, TÖRE HG, HOROWITZ JM, et al. Radiologic assessment of response to therapy: Comparison of RECIST Versions 1.1 and 1.0[J]. Radiographics, 2011, 31(7): 2093-2105. DOI: 10.1148/rg.317115050.
[67] WAHL RL, JACENE H, KASAMON Y, et al. From RECIST to PERCIST: Evolving considerations for PET response criteria in solid tumors[J]. J Nucl Med, 2009, 50(Suppl 1): 122S-150S. DOI: 10.2967/jnumed.108.057307.
[68] FERDA J, FERDOVÁ E, BAXA J, et al. The role of ^{18}F-FDG accumulation and arterial enhancement as biomarkers in the assessment of typing, grading and staging of hepatocellular carcinoma using ^{18}F-FDG-PET/CT with integrated dual-phase CT angiography[J]. Anticancer Res, 2015, 35(4): 2241-2246.
[69] HYUN SH, EO JS, LEE JW, et al. Prognostic value of (18)F-fluorodeoxyglucose positron emission tomography/computed tomography in patients with Barcelona Clinic Liver Cancer stages 0 and A hepatocellular carcinomas: A multicenter retrospective cohort study[J]. Eur J Nucl Med Mol Imaging, 2016, 43(9): 1638-1645. DOI: 10.1007/s00259-016-3348-y.
[70] NA SJ, OH JK, HYUN SH, et al. ^{18}F-FDG PET/CT can predict survival of advanced hepatocellular carcinoma patients: A multicenter retrospective cohort study[J]. J Nucl Med, 2017, 58(5): 730-736. DOI: 10.2967/jnumed.116.182022.
[71] BERTAGNA F, BERTOLI M, BOSIO G, et al. Diagnostic role of radiolabelled choline PET or PET/CT in hepatocellular carcinoma: A systematic review and meta-analysis[J]. Hepatol Int, 2014, 8(4): 493-500. DOI: 10.1007/s12072-014-9566-0.
[72] CHEUNG TT, HO CL, LO CM, et al. ^{11}C-acetate and ^{18}F-FDG PET/CT for clinical staging and selection of patients with hepatocellular carcinoma for liver transplantation on the basis of Milan criteria: Surgeon's perspective[J]. J Nucl Med, 2013, 54(2): 192-200. DOI: 10.2967/jnumed.112.107516.
[73] SIRIPONGSATIAN D, PROMTEANGTRONG C, KUNAWUDHI A, et al. Comparisons of quantitative parameters of Ga-68-labelled fibroblast activating protein inhibitor (FAPI) PET/CT and[^{18}F]F-FDG PET/CT in patients with liver malignancies[J]. Mol Imaging Biol, 2022, 24(5): 818-829. DOI: 10.1007/s11307-022-01732-2.
[74] LAN LJ, ZHANG SM, XU TT, et al. Prospective comparison of ^{68}Ga-FAPI versus ^{18}F-FDG PET/CT for tumor staging in biliary tract cancers[J]. Radiology, 2022, 304(3): 648-657. DOI: 10.1148/radiol.213118.
[75] ZHANG YQ, SHI HC, CHENG DF, et al. Added value of SPECT/spiral CT versus SPECT in diagnosing solitary spinal lesions in patients with extraskeletal malignancies[J]. Nucl Med Commun, 2013, 34(5): 451-458. DOI: 10.1097/MNM.0b013e32835fa552.
[76] HECTORS SJ, WAGNER M, BESA C, et al. Multiparametric FDG-PET/MRI of hepatocellular carcinoma: Initial experience[J]. Contrast Media Mol Imaging, 2018, 2018: 5638283. DOI: 10.1155/2018/5638283.
[77] ZHOU J, YU L, GAO X, et al. Plasma microRNA panel to diagnose hepatitis B virus-related hepatocellular carcinoma[J]. J Clin Oncol, 2011, 29(36): 4781-4788. DOI: 10.1200/JCO.2011.38.2697.
[78] BEST J, BECHMANN LP, SOWA JP, et al. GALAD score detects early hepatocellular carcinoma in an international cohort of patients with nonalcoholic steatohepatitis[J]. Clin Gastroenterol Hepatol, 2020, 18(3): 728-735. DOI: 10.1016/j.cgh.2019.11.012.
[79] PIRATVISUTH T, HOU JL, TANWANDEE T, et al. Development and clinical validation of a novel algorithmic score (GAAD) for detecting HCC in prospective cohort studies[J]. Hepatol Commun, 2023, 7(11): e0317. DOI: 10.1097/HC9.0000000000000317.
[80] YANG T, XING H, WANG GQ, et al. A novel online calculator based on serum biomarkers to detect hepatocellular carcinoma among patients with hepatitis B[J]. Clin Chem, 2019, 65(12): 1543-1553. DOI: 10.1373/clinchem.2019.308965.
[81] GUO W, SUN YF, SHEN MN, et al. Circulating tumor cells with stem-like phenotypes for diagnosis, prognosis, and therapeutic response evaluation in hepatocellular carcinoma[J]. Clin Cancer Res, 2018, 24(9): 2203-2213. DOI: 10.1158/1078-0432.CCR-17-1753.
[82] ZHANG XY, WANG Z, TANG W, et al. Ultrasensitive and affordable assay for early detection of primary liver cancer using plasma cell-free DNA fragmentomics[J]. Hepatology, 2022, 76(2): 317-329. DOI: 10.1002/hep.32308.
[83] QU CF, WANG YT, WANG P, et al. Detection of early-stage hepatocellular carcinoma in asymptomatic HBsAg-seropositive individuals by liquid biopsy[J]. Proc Natl Acad Sci U S A, 2019, 116(13): 6308-6312. DOI: 10.1073/pnas.1819799116.
[84] CAI JB, CHEN L, ZHANG Z, et al. Genome-wide mapping of 5-hydroxymethylcytosines in circulating cell-free DNA as a non-invasive approach for early detection of hepatocellular carcinoma[J]. Gut, 2019, 68(12): 2195-2205. DOI: 10.1136/gutjnl-2019-318882.
[85] FORNER A, VILANA R, AYUSO C, et al. Diagnosis of hepatic nodules 20 mm or smaller in cirrhosis: Prospective validation of the noninvasive diagnostic criteria for hepatocellular carcinoma[J]. Hepatology, 2008, 47(1): 97-104. DOI: 10.1002/hep.21966.
[86] ROBERTS LR, SIRLIN CB, ZAIEM F, et al. Imaging for the diagnosis of hepatocellular carcinoma: A systematic review and meta-analysis[J]. Hepatology, 2018, 67(1): 401-421. DOI: 10.1002/hep.29487.
[87] European Association for the Study of the Liver. EASL clinical practice guidelines: Management of hepatocellular carcinoma[J]. J Hepatol, 2018, 69(1): 182-236. DOI: 10.1016/j.jhep.2018.03.019.
[88] CONG WM, BU H, CHEN J, et al. Practice guidelines for the pathological diagnosis of primary liver cancer: 2015 update[J]. World J Gastroenterol, 2016, 22(42): 9279-9287. DOI: 10.3748/wjg.v22.i42.9279.
[89] WHO Classification of Tumours Editorial Board. WHO classification of tumours. Digestive system tumours[M]. 5th ed. Lyon: IARC Press, 2019: 254-259.
[90] Expert Committee of Expert Consensus on Pathological Diagnosis of Intrahepatic Cholangiocarcinoma (2022 version). Expert consensus on pathological diagnosis of intrahepatic cholangiocarcinoma (2022 version)[J]. Chin J Pathol, 2022, 51(9): 819-827. DOI: 10.3760/cma.j.cn112151-20220517-00423.
《肝内胆管癌病理诊断专家共识(2022版)》编写专家委员会. 肝内胆管癌病理诊断专家共识(2022版)[J]. 中华病理学杂志, 2022, 51(9): 819-827. DOI: 10.3760/cma.j.cn112151-20220517-00423.
[91] HUANG YH, ZHANG CZY, HUANG QS, et al. Clinicopathologic features, tumor immune microenvironment and genomic landscape of Epstein-Barr virus-associated intrahepatic cholangiocarcinoma[J]. J Hepatol, 2021, 74(4): 838-849. DOI: 10.1016/j.jhep.2020.10.037.
[92] YU WL, YU GZ, DONG H, et al. Proteomics analysis identified TPI1 as a novel biomarker for predicting recurrence of intrahepatic cholangiocarcinoma[J]. J Gastroenterol, 2020, 55(12): 1171-1182. DOI: 10.1007/s00535-020-01729-0.
[93] CONG WM. Surgical pathology of hepatobiliary tumors[M]. Singapore: Springer, 2017: 145-216.
[94] CHEN LL, CHEN SL, ZHOU Q, et al. Microvascular invasion status and its survival impact in hepatocellular carcinoma depend on tissue sampling protocol[J]. Ann Surg Oncol, 2021, 28(11): 6747-6757. DOI: 10.1245/s10434-021-09673-w.
[95] NARA S, SHIMADA K, SAKAMOTO Y, et al. Prognostic impact of marginal resection for patients with solitary hepatocellular carcinoma: Evidence from 570 hepatectomies[J]. Surgery, 2012, 151(4): 526-536. DOI: 10.1016/j.surg.2011.12.002.

[96] CONG WM. Surgical pathology of hepatobiliary tumors[M]. Beijing: People's Medical Publishing House, 2015: 276-339.
丛文铭. 肝胆肿瘤外科病理学[M]. 北京: 人民卫生出版社, 2015: 276-339.
[97] LU XY, XI T, LAU WY, et al. Hepatocellular carcinoma expressing cholangiocyte phenotype is a novel subtype with highly aggressive behavior[J]. Ann Surg Oncol, 2011, 18(8): 2210-2217. DOI: 10.1245/s10434-011-1585-7.
[98] ZHUO JY, LU D, LIN ZY, et al. The distinct responsiveness of cytokeratin 19-positive hepatocellular carcinoma to regorafenib[J]. Cell Death Dis, 2021, 12(12): 1084. DOI: 10.1038/s41419-021-04320-4.
[99] SCHEUER PJ. Classification of chronic viral hepatitis: A need for reassessment[J]. J Hepatol, 1991, 13(3): 372-374. DOI: 10.1016/0168-8278(91)90084-o.
[100] Chinese Society of Infectious Diseases and Parasitology and Chinese Society of Hepatology of Chinese Medical Association. The programme of prevention and cure for viral hepatitis[J]. Chin J Infect Dis, 2001, 19(1): 56-62. DOI: 10.3760/j.issn:1000-6680.2001.01.027.
中华医学会传染病与寄生虫病学分会、肝病学分会. 病毒性肝炎防治方案[J]. 中华传染病杂志, 2001, 19(1): 56-62. DOI: 10.3760/j.issn:1000-6680.2001.01.027.
[101] World Health Organization. World Health Organization (2015) guidelines for the prevention, care and treatment of persons with chronic hepatitis B infection[EB/OL]. http://www. who. int/hiv/pub/hepatitis/hepatitis-b-guidelines/en/.
[102] RODRÍGUEZ-PERÁLVAREZ M, LUONG TV, ANDREANA L, et al. A systematic review of microvascular invasion in hepatocellular carcinoma: Diagnostic and prognostic variability[J]. Ann Surg Oncol, 2013, 20(1): 325-339. DOI: 10.1245/s10434-012-2513-1.
[103] WANG H, CHEN JJ, YIN SY, et al. A grading system of microvascular invasion for patients with hepatocellular carcinoma undergoing liver resection with curative intent: A multicenter study[J]. J Hepatocell Carcinoma, 2024, 11: 191-206. DOI: 10.2147/JHC.S447731.
[104] ZHENG ZH, GUAN RG, WANG JX, et al. Microvascular invasion in hepatocellular carcinoma: A review of its definition, clinical significance, and comprehensive management[J]. J Oncol, 2022, 2022: 9567041. DOI: 10.1155/2022/9567041.
[105] SHENG X, JI Y, REN GP, et al. A standardized pathological proposal for evaluating microvascular invasion of hepatocellular carcinoma: A multicenter study by LCPGC[J]. Hepatol Int, 2020, 14(6): 1034-1047. DOI: 10.1007/s12072-020-10111-4.
[106] ISIK B, GONULTAS F, SAHIN T, et al. Microvascular venous invasion in hepatocellular carcinoma: Why do recurrences occur?[J]. J Gastrointest Cancer, 2020, 51(4): 1133-1136. DOI: 10.1007/s12029-020-00487-9.
[107] KENDALL T, VERHEIJ J, GAUDIO E, et al. Anatomical, histomorphological and molecular classification of cholangiocarcinoma[J]. Liver Int, 2019, 39(Suppl 1): 7-18. DOI: 10.1111/liv.14093.
[108] ZOU YN, ZHU K, PANG YR, et al. Molecular detection of FGFR2 rearrangements in resected intrahepatic cholangiocarcinomas: FISH could be an ideal method in patients with histological small duct subtype[J]. J Clin Transl Hepatol, 2023, 11(6): 1355-1367. DOI: 10.14218/JCTH.2022.00060S.
[109] DONG LQ, LU DY, CHEN R, et al. Proteogenomic characterization identifies clinically relevant subgroups of intrahepatic cholangiocarcinoma[J]. Cancer Cell, 2022, 40(1): 70-87. e15. DOI: 10.1016/j.ccell.2021.12.006.
[110] TRAVIS WD, DACIC S, WISTUBA I, et al. IASLC multidisciplinary recommendations for pathologic assessment of lung cancer resection specimens after neoadjuvant therapy[J]. J Thorac Oncol, 2020, 15(5): 709-740. DOI: 10.1016/j.jtho.2020.01.005.
[111] ALLARD MA, SEBAGH M, RUIZ A, et al. Does pathological response after transarterial chemoembolization for hepatocellular carcinoma in cirrhotic patients with cirrhosis predict outcome after liver resection or transplantation?[J]. J Hepatol, 2015, 63(1): 83-92. DOI: 10.1016/j.jhep.2015.01.023.
[112] STEIN JE, LIPSON EJ, COTTRELL TR, et al. Pan-tumor pathologic scoring of response to PD-(L)1 blockade[J]. Clin Cancer Res, 2020, 26(3): 545-551. DOI: 10.1158/1078-0432.CCR-19-2379.
[113] IMAMURA H, SEYAMA Y, KOKUDO N, et al. One thousand fifty-six hepatectomies without mortality in 8 years[J]. Arch Surg, 2003, 138(11): 1198-1206; discussion1206. DOI: 10.1001/archsurg.138.11.1198.
[114] KUBOTA K, MAKUUCHI M, KUSAKA K, et al. Measurement of liver volume and hepatic functional reserve as a guide to decision-making in resectional surgery for hepatic tumors[J]. Hepatology, 1997, 26(5): 1176-1181. DOI: 10.1053/jhep.1997.v26.pm0009362359.
[115] BRUIX J, CASTELLS A, BOSCH J, et al. Surgical resection of hepatocellular carcinoma in cirrhotic patients: Prognostic value of preoperative portal pressure[J]. Gastroenterology, 1996, 111(4): 1018-1022. DOI: 10.1016/s0016-5085(96)70070-7.
[116] CESCON M, COLECCHIA A, CUCCHETTI A, et al. Value of transient elastography measured with FibroScan in predicting the outcome of hepatic resection for hepatocellular carcinoma[J]. Ann Surg, 2012, 256(5): 706-712; discussion 712-713. DOI: 10.1097/SLA.0b013e3182724ce8.
[117] SHEN YH, ZHOU CH, ZHU GD, et al. Liver stiffness assessed by shear wave elastography predicts postoperative liver failure in patients with hepatocellular carcinoma[J]. J Gastrointest Surg, 2017, 21(9): 1471-1479. DOI: 10.1007/s11605-017-3443-9.
[118] RAJAKANNU M, CHERQUI D, CIACIO O, et al. Liver stiffness measurement by transient elastography predicts late posthepatectomy outcomes in patients undergoing resection for hepatocellular carcinoma[J]. Surgery, 2017, 162(4): 766-774. DOI: 10.1016/j.surg.2017.06.006.
[119] ZHONG JH, KE Y, GONG WF, et al. Hepatic resection associated with good survival for selected patients with intermediate and advanced-stage hepatocellular carcinoma[J]. Ann Surg, 2014, 260(2): 329-340. DOI: 10.1097/SLA.0000000000000236.
[120] XIAO H, ZHANG BH, MEI B, et al. Hepatic resection for hepatocellular carcinoma in patients with portal hypertension: A long-term benefit compared with transarterial chemoembolization and thermal ablation[J]. Medicine (Baltimore), 2015, 94(7): e495. DOI: 10.1097/MD.0000000000000495.
[121] BOSCH J, ABRALDES JG, BERZIGOTTI A, et al. The clinical use of HVPG measurements in chronic liver disease[J]. Nat Rev Gastroenterol Hepatol, 2009, 6(10): 573-582. DOI: 10.1038/nrgastro.2009.149.
[122] CHEN X, ZHAI J, CAI X, et al. Severity of portal hypertension and prediction of postoperative liver failure after liver resection in patients with Child-Pugh grade A cirrhosis[J]. Br J Surg, 2012, 99(12): 1701-1710. DOI: 10.1002/bjs.8951.
[123] CHIN KM, PRIETO M, CHEONG CK, et al. Outcomes after curative therapy for hepatocellular carcinoma in patients with non-alcoholic fatty liver disease: A meta-analysis and review of current literature[J]. HPB (Oxford), 2021, 23(8): 1164-1174. DOI: 10.1016/j.hpb.2021.01.009.
[124] MIRDAD RS, MADISON HYER J, DIAZ A, et al. Postoperative imaging surveillance for hepatocellular carcinoma: How much is enough?[J]. J Surg Oncol, 2021, 123(7): 1568-1577. DOI: 10.1002/jso.26433.
[125] CHEN MS, LI JQ, ZHENG Y, et al. A prospective randomized trial comparing percutaneous local ablative therapy and partial hepatectomy for small hepatocellular carcinoma[J]. Ann Surg, 2006, 243(3): 321-328. DOI: 10.1097/01.sla.0000201480.65519.b8.
[126] KUDO M, HASEGAWA K, KAWAGUCHI Y, et al. A multicenter randomized controlled trial to evaluate the efficacy of surgery versus radiofrequency ablation for small hepatocellular carcinoma (SURF trial): Analysis of overall survival[J]. J Clin Oncol, 2021, 39(15_suppl): 4093. DOI: 10.1200/jco.2021.39.15_suppl.4093.
[127] YAMASHITA T, KAWAGUCHI Y, KANEKO S, et al. A multicenter, non-randomized, controlled trial to evaluate the efficacy of surgery versus radiofrequency ablation for small hepatocellular carcinoma (SURF-Cohort Trial): Analysis of overall survival[J]. J Clin Oncol,

2022, 40(16_suppl): 4095. DOI: 10.1200/jco.2022.40.16_suppl.4095.
[128] MOHKAM K, DUMONT PN, MANICHON AF, et al. No-touch multibipolar radiofrequency ablation *vs.* surgical resection for solitary hepatocellular carcinoma ranging from 2 to 5 cm[J]. J Hepatol, 2018, 68(6): 1172-1180. DOI: 10.1016/j.jhep.2018.01.014.
[129] XU XL, LIU XD, LIANG M, et al. Radiofrequency ablation versus hepatic resection for small hepatocellular carcinoma: Systematic review of randomized controlled trials with meta-analysis and trial sequential analysis[J]. Radiology, 2018, 287(2): 461-472. DOI: 10.1148/radiol.2017162756.
[130] LIU PH, HSU CY, HSIA CY, et al. Surgical resection versus radiofrequency ablation for single hepatocellular carcinoma≤2 cm in a propensity score model[J]. Ann Surg, 2016, 263(3): 538-545. DOI: 10.1097/SLA.0000000000001178.
[131] FENG K, YAN J, LI XW, et al. A randomized controlled trial of radiofrequency ablation and surgical resection in the treatment of small hepatocellular carcinoma[J]. J Hepatol, 2012, 57(4): 794-802. DOI: 10.1016/j.jhep.2012.05.007.
[132] XU QH, KOBAYASHI S, YE X, et al. Comparison of hepatic resection and radiofrequency ablation for small hepatocellular carcinoma: A meta-analysis of 16, 103 patients[J]. Sci Rep, 2014, 4: 7252. DOI: 10.1038/srep07252.
[133] XIA Y, LI J, LIU GH, et al. Long-term effects of repeat hepatectomy vs percutaneous radiofrequency ablation among patients with recurrent hepatocellular carcinoma: A randomized clinical trial[J]. JAMA Oncol, 2020, 6(2): 255-263. DOI: 10.1001/jamaoncol.2019.4477.
[134] YIN L, LI H, LI AJ, et al. Partial hepatectomy vs. transcatheter arterial chemoembolization for resectable multiple hepatocellular carcinoma beyond Milan Criteria: A RCT[J]. J Hepatol, 2014, 61(1): 82-88. DOI: 10.1016/j.jhep.2014.03.012.
[135] TORZILLI G, BELGHITI J, KOKUDO N, et al. A snapshot of the effective indications and results of surgery for hepatocellular carcinoma in tertiary referral centers: Is it adherent to the EASL/AASLD recommendations?: An observational study of the HCC East-West study group[J]. Ann Surg, 2013, 257(5): 929-937. DOI: 10.1097/SLA.0b013e31828329b8.
[136] HYUN MH, LEE YS, KIM JH, et al. Hepatic resection compared to chemoembolization in intermediate- to advanced-stage hepatocellular carcinoma: A meta-analysis of high-quality studies[J]. Hepatology, 2018, 68(3): 977-993. DOI: 10.1002/hep.29883.
[137] TSILIMIGRAS DI, MEHTA R, PAREDES AZ, et al. Overall tumor burden dictates outcomes for patients undergoing resection of multinodular hepatocellular carcinoma beyond the Milan criteria[J]. Ann Surg, 2020, 272(4): 574-581. DOI: 10.1097/SLA.0000000000004346.
[138] FAMULARO S, DONADON M, CIPRIANI F, et al. Hepatectomy versus sorafenib in advanced nonmetastatic hepatocellular carcinoma: A real-life multicentric weighted comparison[J]. Ann Surg, 2022, 275(4): 743-752. DOI: 10.1097/SLA.0000000000005373.
[139] KOKUDO T, HASEGAWA K, MATSUYAMA Y, et al. Survival benefit of liver resection for hepatocellular carcinoma associated with portal vein invasion[J]. J Hepatol, 2016, 65(5): 938-943. DOI: 10.1016/j.jhep.2016.05.044.
[140] ZHANG XP, GAO YZ, CHEN ZH, et al. An eastern hepatobiliary surgery hospital/portal vein tumor Thrombus scoring system as an aid to decision making on hepatectomy for hepatocellular carcinoma patients with portal vein tumor Thrombus: A multicenter study[J]. Hepatology, 2019, 69(5): 2076-2090. DOI: 10.1002/hep.30490.
[141] GOVALAN R, LAUZON M, LUU M, et al. Comparison of surgical resection and systemic treatment for hepatocellular carcinoma with vascular invasion: National cancer database analysis[J]. Liver Cancer, 2021, 10(5): 407-418. DOI: 10.1159/000515554.
[142] PAWLIK TM, POON RT, ABDALLA EK, et al. Hepatectomy for hepatocellular carcinoma with major portal or hepatic vein invasion: Results of a multicenter study[J]. Surgery, 2005, 137(4): 403-410. DOI: 10.1016/j.surg.2004.12.012.
[143] LU J, ZHANG XP, ZHONG BY, et al. Management of patients with hepatocellular carcinoma and portal vein tumour thrombosis: Comparing east and west[J]. Lancet Gastroenterol Hepatol, 2019, 4(9): 721-730. DOI: 10.1016/S2468-1253(19)30178-5.
[144] FAN J, ZHOU J, WU ZQ, et al. Efficacy of different treatment strategies for hepatocellular carcinoma with portal vein tumor thrombosis[J]. World J Gastroenterol, 2005, 11(8): 1215-1219. DOI: 10.3748/wjg.v11.i8.1215.
[145] WEI XB, JIANG YB, ZHANG XP, et al. Neoadjuvant three-dimensional conformal radiotherapy for resectable hepatocellular carcinoma with portal vein tumor Thrombus: A randomized, open-label, multicenter controlled study[J]. J Clin Oncol, 2019, 37(24): 2141-2151. DOI: 10.1200/JCO.18.02184.
[146] WANG K, GUO WX, CHEN MS, et al. Multimodality treatment for hepatocellular carcinoma with portal vein tumor Thrombus: A large-scale, multicenter, propensity mathching score analysis[J]. Medicine (Baltimore), 2016, 95(11): e3015. DOI: 10.1097/MD.0000000000003015.
[147] LI XL, ZHU XD, CAI H, et al. Postoperative α-fetoprotein response predicts tumor recurrence and survival after hepatectomy for hepatocellular carcinoma: A propensity score matching analysis[J]. Surgery, 2019, 165(6): 1161-1167. DOI: 10.1016/j.surg.2019.01.009.
[148] YANG J, TAO HS, CAI W, et al. Accuracy of actual resected liver volume in anatomical liver resections guided by 3-dimensional parenchymal staining using fusion indocyanine green fluorescence imaging[J]. J Surg Oncol, 2018, 118(7): 1081-1087. DOI: 10.1002/jso.25258.
[149] MISE Y, HASEGAWA K, SATOU S, et al. How has virtual hepatectomy changed the practice of liver surgery?: Experience of 1 194 virtual hepatectomy before liver resection and living donor liver transplantation[J]. Ann Surg, 2018, 268(1): 127-133. DOI: 10.1097/SLA.0000000000002213.
[150] FANG CH, WANG XY, LIU YY. Computer-aided combined with indocyanine green molecular fluorescence imaging technology in the diagnosis and surgical navigation of liver tumors (2019 edition)[J]. Chin J Pract Surg, 2019, 39(7): 641-650, 654. DOI: 10.19538/j.cjps.issn1005-2208.2019.07.01.
方驰华, 王晓颍, 刘允怡. 计算机辅助联合吲哚菁绿分子荧光影像技术在肝脏肿瘤诊断和手术导航中应用指南(2019版)[J]. 中国实用外科杂志, 2019, 39(7): 641-650, 654. DOI: 10.19538/j.cjps.issn1005-2208.2019.07.01.
[151] JIANG HT, CAO JY. Impact of laparoscopic versus open hepatectomy on perioperative clinical outcomes of patients with primary hepatic carcinoma[J]. Chin Med Sci J, 2015, 30(2): 80-83. DOI: 10.1016/s1001-9294(15)30016-x.
[152] Hepatobiliary Pancreatic Surgery Professional Committee, China Research Hospital Association. Chinese expert consensus on laparoscopic hepatectomy for hepatocellular carcinoma (2020 edtion)[J]. Chin J Dig Surg, 2020, 19(11): 1119-1134. DOI: 10.3760/cma.j.cn115610-20201029-00682.
中国研究型医院学会肝胆胰外科专业委员会. 腹腔镜肝切除术治疗肝细胞癌中国专家共识(2020版)[J]. 中华消化外科杂志, 2020, 19(11): 1119-1134. DOI: 10.3760/cma.j.cn115610-20201029-00682.
[153] ZHU P, LIAO W, ZHANG WG, et al. A prospective study using propensity score matching to compare long-term survival outcomes after robotic-assisted, laparoscopic, or open liver resection for patients with BCLC stage 0-a hepatocellular carcinoma[J]. Ann Surg, 2023, 277(1): e103-e111. DOI: 10.1097/SLA.0000000000005380.
[154] WANG S, YE GX, WANG J, et al. Laparoscopic versus open liver resection for hepatocellular carcinoma in elderly patients: A systematic review and meta-analysis of propensity score-matched studies[J]. Front Oncol, 2022, 12: 939877. DOI: 10.3389/fonc.2022.939877.
[155] WANG XY, TEH CSC, ISHIZAWA T, et al. Consensus guidelines for the use of fluorescence imaging in hepatobiliary surgery[J]. Ann Surg, 2021, 274(1): 97-106. DOI: 10.1097/SLA.0000000000004718.
[156] DI BENEDETTO F, MAGISTRI P, DI SANDRO S, et al. Safety and effi-

cacy of robotic vs open liver resection for hepatocellular carcinoma [J]. JAMA Surg, 2023, 158(1): 46-54. DOI: 10.1001/jamasurg.2022.5697.

[157] XIA YX, ZHANG F, LI XC, et al. Surgical treatment of primary liver cancer: A report of 10 966 cases[J]. Chin J Surg, 2021, 59(1): 6-17. DOI: 10.3760/cma.j.cn112139-20201110-00791.
夏永祥, 张峰, 李相成, 等. 原发性肝癌10 966例外科治疗分析[J]. 中华外科杂志, 2021, 59(1): 6-17. DOI: 10.3760/cma.j.cn112139-20201110-00791.

[158] HIDAKA M, EGUCHI S, OKUDA K, et al. Impact of anatomical resection for hepatocellular carcinoma with microportal invasion (vp1): A multi-institutional study by the Kyushu study group of liver surgery[J]. Ann Surg, 2020, 271(2): 339-346. DOI: 10.1097/SLA.0000000000002981.

[159] ZHONG FP, ZHANG YJ, LIU Y, et al. Prognostic impact of surgical margin in patients with hepatocellular carcinoma: A meta-analysis [J]. Medicine (Baltimore), 2017, 96(37): e8043. DOI: 10.1097/MD.0000000000008043.

[160] SHI M, GUO RP, LIN XJ, et al. Partial hepatectomy with wide versus narrow resection margin for solitary hepatocellular carcinoma: A prospective randomized trial[J]. Ann Surg, 2007, 245(1): 36-43. DOI: 10.1097/01.sla.0000231758.07868.71.

[161] YANG PH, SI AF, YANG J, et al. A wide-margin liver resection improves long-term outcomes for patients with HBV-related hepatocellular carcinoma with microvascular invasion[J]. Surgery, 2019, 165(4): 721-730. DOI: 10.1016/j.surg.2018.09.016.

[162] LIAO KX, YANG KJ, CAO L, et al. Laparoscopic anatomical versus non-anatomical hepatectomy in the treatment of hepatocellular carcinoma: A randomised controlled trial[J]. Int J Surg, 2022, 102: 106652. DOI: 10.1016/j.ijsu.2022.106652.

[163] LIU CL, FAN ST, LO CM, et al. Anterior approach for major right hepatic resection for large hepatocellular carcinoma[J]. Ann Surg, 2000, 232(1): 25-31. DOI: 10.1097/00000658-200007000-00004.

[164] ZHOU C, PENG YF, ZHOU KQ, et al. Surgical resection plus radiofrequency ablation for the treatment of multifocal hepatocellular carcinoma[J]. Hepatobiliary Surg Nutr, 2019, 8(1): 19-28. DOI: 10.21037/hbsn.2018.11.19.

[165] ZHANG ZM, LAI ECH, ZHANG C, et al. The strategies for treating primary hepatocellular carcinoma with portal vein tumor thrombus [J]. Int J Surg, 2015, 20: 8-16. DOI: 10.1016/j.ijsu.2015.05.009.

[166] FU SY, LAU WY, LI AJ, et al. Liver resection under total vascular exclusion with or without preceding Pringle manoeuvre[J]. Br J Surg, 2010, 97(1): 50-55. DOI: 10.1002/bjs.6841.

[167] SATOH S, IKAI I, HONDA G, et al. Clinicopathologic evaluation of hepatocellular carcinoma with bile duct thrombi[J]. Surgery, 2000, 128(5): 779-783. DOI: 10.1067/msy.2000.108659.

[168] KIM DS, KIM BW, HATANO E, et al. Surgical outcomes of hepatocellular carcinoma with bile duct tumor Thrombus: A korea-japan multicenter study[J]. Ann Surg, 2020, 271(5): 913-921. DOI: 10.1097/SLA.0000000000003014.

[169] ZHU XD, HUANG C, SHEN YH, et al. Downstaging and resection of initially unresectable hepatocellular carcinoma with tyrosine kinase inhibitor and anti-PD-1 antibody combinations[J]. Liver Cancer, 2021, 10(4): 320-329. DOI: 10.1159/000514313.

[170] Hepatobiliary Pancreatic Surgery Professional Committee, China Research Hospital Association. Expert consensus on presicion liver resection[J]. Chin J Dig Surg, 2017, 16(9): 883-893. DOI: 10.3760/cma.j.issn.1673-9752.2017.09.001.
中国研究型医院学会肝胆胰外科专业委员会. 精准肝切除术专家共识[J]. 中华消化外科杂志, 2017, 16(9): 883-893. DOI: 10.3760/cma.j.issn.1673-9752.2017.09.001.

[171] ALOIA TA. Associating liver partition and portal vein ligation for staged hepatectomy: Portal vein embolization should remain the gold standard[J]. JAMA Surg, 2015, 150(10): 927-928. DOI: 10.1001/jamasurg.2015.1646.

[172] PIRON L, DESHAYES E, ESCAL L, et al. Portal vein embolization: Present and future[J]. Bull Cancer, 2017, 104(5): 407-416. DOI: 10.1016/j.bulcan.2017.03.009.

[173] OGATA S, BELGHITI J, FARGES O, et al. Sequential arterial and portal vein embolizations before right hepatectomy in patients with cirrhosis and hepatocellular carcinoma[J]. Br J Surg, 2006, 93(9): 1091-1098. DOI: 10.1002/bjs.5341.

[174] HWANG S, HA TY, KO GY, et al. Preoperative sequential portal and hepatic vein embolization in patients with hepatobiliary malignancy [J]. World J Surg, 2015, 39(12): 2990-2998. DOI: 10.1007/s00268-015-3194-2.

[175] DUPRÉ A, HITIER M, PEYRAT P, et al. Associating portal embolization and artery ligation to induce rapid liver regeneration in staged hepatectomy[J]. Br J Surg, 2015, 102(12): 1541-1550. DOI: 10.1002/bjs.9900.

[176] GLANTZOUNIS GK, TOKIDIS E, BASOURAKOS SP, et al. The role of portal vein embolization in the surgical management of primary hepatobiliary cancers. A systematic review[J]. Eur J Surg Oncol, 2017, 43(1): 32-41. DOI: 10.1016/j.ejso.2016.05.026.

[177] SCHNITZBAUER AA, LANG SA, GOESSMANN H, et al. Right portal vein ligation combined with in situ splitting induces rapid left lateral liver lobe hypertrophy enabling 2-staged extended right hepatic resection in small-for-size settings[J]. Ann Surg, 2012, 255(3): 405-414. DOI: 10.1097/SLA.0b013e31824856f5.

[178] WANG Z, PENG YF, HU JW, et al. Associating liver partition and portal vein ligation for staged hepatectomy for unresectable hepatitis B virus-related hepatocellular carcinoma: A single center study of 45 patients[J]. Ann Surg, 2020, 271(3): 534-541. DOI: 10.1097/SLA.0000000000002942.

[179] PENG YF, WANG Z, QU XD, et al. Transcatheter arterial embolization-salvaged ALPPS, a novel ALPPS procedure especially for patients with hepatocellular carcinoma and severe fibrosis/cirrhosis[J]. Hepatobiliary Surg Nutr, 2022, 11(4): 504-514. DOI: 10.21037/hbsn-21-466.

[180] LI PP, HUANG G, JIA NY, et al. Associating liver partition and portal vein ligation for staged hepatectomy versus sequential transarterial chemoembolization and portal vein embolization in staged hepatectomy for HBV-related hepatocellular carcinoma: A randomized comparative study[J]. Hepatobiliary Surg Nutr, 2022, 11(1): 38-51. DOI: 10.21037/hbsn-20-264.

[181] ZHANG YQ, HUANG GH, WANG Y, et al. Is salvage liver resection necessary for initially unresectable hepatocellular carcinoma patients downstaged by transarterial chemoembolization? ten years of experience[J]. Oncologist, 2016, 21(12): 1442-1449. DOI: 10.1634/theoncologist.2016-0094.

[182] LYU N, KONG YN, MU LW, et al. Hepatic arterial infusion of oxaliplatin plus fluorouracil/leucovorin *vs.* sorafenib for advanced hepatocellular carcinoma[J]. J Hepatol, 2018, 69(1): 60-69. DOI: 10.1016/j.jhep.2018.02.008.

[183] HE MK, LI QJ, ZOU RH, et al. Sorafenib plus hepatic arterial infusion of oxaliplatin, fluorouracil, and leucovorin vs sorafenib alone for hepatocellular carcinoma with portal vein invasion: A randomized clinical trial[J]. JAMA Oncol, 2019, 5(7): 953-960. DOI: 10.1001/jamaoncol.2019.0250.

[184] PENG ZW, FAN WZ, ZHU BW, et al. Lenvatinib combined with transarterial chemoembolization as first-line treatment for advanced hepatocellular carcinoma: A phase III, randomized clinical trial (LAUNCH)[J]. J Clin Oncol, 2023, 41(1): 117-127. DOI: 10.1200/JCO.22.00392.

[185] LI BK, QIU JL, ZHENG Y, et al. Conversion to resectability using transarterial chemoembolization combined with hepatic arterial infusion chemotherapy for initially unresectable hepatocellular carcinoma[J]. Ann Surg Open, 2021, 2(2): e057. DOI: 10.1097/AS9.0000000000000057.

[186] BYUN HK, KIM HJ, IM YR, et al. Dose escalation by intensity modulated radiotherapy in liver-directed concurrent chemoradiotherapy for locally advanced BCLC stage C hepatocellular carcinoma[J].

Radiother Oncol, 2019, 133: 1-8. DOI: 10.1016/j.radonc.2018.12.025.
[187] PINNA AD, TIAN Y, MAZZAFERRO V, et al. Liver transplantation and hepatic resection can achieve cure for hepatocellular carcinoma[J]. Ann Surg, 2018, 268(5): 868-875. DOI: 10.1097/SLA.0000000000002889.
[188] TABRIZIAN P, JIBARA G, SHRAGER B, et al. Recurrence of hepatocellular cancer after resection: Patterns, treatments, and prognosis[J]. Ann Surg, 2015, 261(5): 947-955. DOI: 10.1097/SLA.0000000000000710.
[189] CHAN AWH, ZHONG JH, BERHANE S, et al. Development of pre and post-operative models to predict early recurrence of hepatocellular carcinoma after surgical resection[J]. J Hepatol, 2018, 69(6): 1284-1293. DOI: 10.1016/j.jhep.2018.08.027.
[190] WU JC, HUANG YH, CHAU GY, et al. Risk factors for early and late recurrence in hepatitis B-related hepatocellular carcinoma[J]. J Hepatol, 2009, 51(5): 890-897. DOI: 10.1016/j.jhep.2009.07.009.
[191] IMAMURA H, MATSUYAMA Y, TANAKA E, et al. Risk factors contributing to early and late phase intrahepatic recurrence of hepatocellular carcinoma after hepatectomy[J]. J Hepatol, 2003, 38(2): 200-207. DOI: 10.1016/s0168-8278(02)00360-4.
[192] WANG Z, REN ZG, CHEN Y, et al. Adjuvant transarterial chemoembolization for HBV-related hepatocellular carcinoma after resection: A randomized controlled study[J]. Clin Cancer Res, 2018, 24(9): 2074-2081. DOI: 10.1158/1078-0432.CCR-17-2899.
[193] WEI W, JIAN PE, LI SH, et al. Adjuvant transcatheter arterial chemoembolization after curative resection for hepatocellular carcinoma patients with solitary tumor and microvascular invasion: A randomized clinical trial of efficacy and safety[J]. Cancer Commun (Lond), 2018, 38(1): 61. DOI: 10.1186/s40880-018-0331-y.
[194] LI SH, MEI J, CHENG Y, et al. Postoperative adjuvant hepatic arterial infusion chemotherapy with FOLFOX in hepatocellular carcinoma with microvascular invasion: A multicenter, phase III, randomized study[J]. J Clin Oncol, 2023, 41(10): 1898-1908. DOI: 10.1200/JCO.22.01142.
[195] LEE JH, LEE JH, LIM YS, et al. Adjuvant immunotherapy with autologous cytokine-induced killer cells for hepatocellular carcinoma[J]. Gastroenterology, 2015, 148(7): 1383-1391. e6. DOI: 10.1053/j.gastro.2015.02.055.
[196] HE C, PENG W, LI C, et al. Thymalfasin, a promising adjuvant therapy in small hepatocellular carcinoma after liver resection[J]. Medicine (Baltimore), 2017, 96(16): e6606. DOI: 10.1097/MD.0000000000006606.
[197] CHEN Q, SHU C, LAURENCE AD, et al. Effect of Huaier Granule on recurrence after curative resection of HCC: A multicentre, randomised clinical trial[J]. Gut, 2018, 67(11): 2006-2016. DOI: 10.1136/gutjnl-2018-315983.
[198] HUANG G, LI PP, LAU WY, et al. Antiviral therapy reduces hepatocellular carcinoma recurrence in patients with low HBV-DNA levels: A randomized controlled trial[J]. Ann Surg, 2018, 268(6): 943-954. DOI: 10.1097/SLA.0000000000002727.
[199] WU JS, YIN ZW, CAO LX, et al. Adjuvant pegylated interferon therapy improves the survival outcomes in patients with hepatitis-related hepatocellular carcinoma after curative treatment: A meta-analysis[J]. Medicine (Baltimore), 2018, 97(28): e11295. DOI: 10.1097/MD.0000000000011295.
[200] SINGAL AG, LIM JK, KANWAL F. AGA clinical practice update on interaction between oral direct-acting antivirals for chronic hepatitis C infection and hepatocellular carcinoma: Expert review[J]. Gastroenterology, 2019, 156(8): 2149-2157. DOI: 10.1053/j.gastro.2019.02.046.
[201] CABIBBO G, CELSA C, CALVARUSO V, et al. Direct-acting antivirals after successful treatment of early hepatocellular carcinoma improve survival in HCV-cirrhotic patients[J]. J Hepatol, 2019, 71(2): 265-273. DOI: 10.1016/j.jhep.2019.03.027.
[202] QIN SK, CHEN MS, CHENG AL, et al. Atezolizumab plus bevacizumab versus active surveillance in patients with resected or ablated high-risk hepatocellular carcinoma (IMbrave050): A randomised, open-label, multicentre, phase 3 trial[J]. Lancet, 2023, 402(10415): 1835-1847. DOI: 10.1016/S0140-6736(23)01796-8.
[203] SAPISOCHIN G, BRUIX J. Liver transplantation for hepatocellular carcinoma: Outcomes and novel surgical approaches[J]. Nat Rev Gastroenterol Hepatol, 2017, 14(4): 203-217. DOI: 10.1038/nrgastro.2016.193.
[204] FAN J, YANG GS, FU ZR, et al. Liver transplantation outcomes in 1, 078 hepatocellular carcinoma patients: A multi-center experience in Shanghai, China[J]. J Cancer Res Clin Oncol, 2009, 135(10): 1403-1412. DOI: 10.1007/s00432-009-0584-6.
[205] ZHENG SS, XU X, WU J, et al. Liver transplantation for hepatocellular carcinoma: Hangzhou experiences[J]. Transplantation, 2008, 85(12): 1726-1732. DOI: 10.1097/TP.0b013e31816b67e4.
[206] LI J, YAN LN, YANG J, et al. Indicators of prognosis after liver transplantation in Chinese hepatocellular carcinoma patients[J]. World J Gastroenterol, 2009, 15(33): 4170-4176. DOI: 10.3748/wjg.15.4170.
[207] SHAO Z, YANG GS, YANG N, et al. Application of Sanya Criteria in the treatment of liver transplantation for hepatocellular carcinoma[J]. Chin J Pract Surg, 2008, 28(6): 466-469. DOI: 10.3321/j.issn:1005-2208.2008.06.018.
邵卓, 杨广顺, 杨宁, 等. 三亚共识在原发性肝癌肝移植治疗中的运用[J]. 中国实用外科杂志, 2008, 28(6): 466-469. DOI: 10.3321/j.issn:1005-2208.2008.06.018.
[208] KULIK L, HEIMBACH JK, ZAIEM F, et al. Therapies for patients with hepatocellular carcinoma awaiting liver transplantation: A systematic review and meta-analysis[J]. Hepatology, 2018, 67(1): 381-400. DOI: 10.1002/hep.29485.
[209] LEE S, KIM KW, SONG GW, et al. The real impact of bridging or downstaging on survival outcomes after liver transplantation for hepatocellular carcinoma[J]. Liver Cancer, 2020, 9(6): 721-733. DOI: 10.1159/000507887.
[210] NORDNESS MF, HAMEL S, GODFREY CM, et al. Fatal hepatic necrosis after nivolumab as a bridge to liver transplant for HCC: Are checkpoint inhibitors safe for the pretransplant patient?[J]. Am J Transplant, 2020, 20(3): 879-883. DOI: 10.1111/ajt.15617.
[211] MAZZAFERRO V, CITTERIO D, BHOORI S, et al. Liver transplantation in hepatocellular carcinoma after tumour downstaging (XXL): A randomised, controlled, phase 2b/3 trial[J]. Lancet Oncol, 2020, 21(7): 947-956. DOI: 10.1016/S1470-2045(20)30224-2.
[212] MEHTA N, GUY J, FRENETTE CT, et al. Excellent outcomes of liver transplantation following down-staging of hepatocellular carcinoma to within Milan criteria: A multicenter study[J]. Clin Gastroenterol Hepatol, 2018, 16(6): 955-964. DOI: 10.1016/j.cgh.2017.11.037.
[213] TABRIZIAN P, HOLZNER ML, MEHTA N, et al. Ten-year outcomes of liver transplant and downstaging for hepatocellular carcinoma[J]. JAMA Surg, 2022, 157(9): 779-788. DOI: 10.1001/jamasurg.2022.2800.
[214] LLOVET JM, PAVEL M, RIMOLA J, et al. Pilot study of living donor liver transplantation for patients with hepatocellular carcinoma exceeding Milan Criteria (Barcelona Clinic Liver Cancer extended criteria)[J]. Liver Transpl, 2018, 24(3): 369-379. DOI: 10.1002/lt.24977.
[215] PINHEIRO RS, WAISBERG DR, NACIF LS, et al. Living donor liver transplantation for hepatocellular cancer: An (almost) exclusive Eastern procedure?[J]. Transl Gastroenterol Hepatol, 2017, 2: 68. DOI: 10.21037/tgh.2017.08.02.
[216] KULIK LM, FISHER RA, RODRIGO DR, et al. Outcomes of living and deceased donor liver transplant recipients with hepatocellular carcinoma: Results of the A2ALL cohort[J]. Am J Transplant, 2012, 12(11): 2997-3007. DOI: 10.1111/j.1600-6143.2012.04272.x.
[217] WONG TCL, NG KKC, FUNG JYY, et al. Long-term survival outcome between living donor and deceased donor liver transplant for hepatocellular carcinoma: Intention-to-treat and propensity score matching analyses[J]. Ann Surg Oncol, 2019, 26(5): 1454-1462. DOI: 10.1245/s10434-019-07206-0.
[218] GOLDARACENA N, GORGEN A, DOYLE A, et al. Live donor liver transplantation for patients with hepatocellular carcinoma offers increased survival vs. deceased donation[J]. J Hepatol, 2019, 70(4):

666-673. DOI: 10.1016/j.jhep.2018.12.029.
[219] SPOSITO C, CUCCHETTI A, MAZZAFERRO V. Assessing competing risks for death following liver transplantation for hepatocellular carcinoma[J]. Dig Dis Sci, 2019, 64(4): 1001-1007. DOI: 10.1007/s10620-019-05538-1.
[220] SEGEV DL, SOZIO SM, SHIN EJ, et al. Steroid avoidance in liver transplantation: Meta-analysis and meta-regression of randomized trials[J]. Liver Transpl, 2008, 14(4): 512-525. DOI: 10.1002/lt.21396.
[221] RODRÍGUEZ-PERÁLVAREZ M, TSOCHATZIS E, NAVEAS MC, et al. Reduced exposure to calcineurin inhibitors early after liver transplantation prevents recurrence of hepatocellular carcinoma[J]. J Hepatol, 2013, 59(6): 1193-1199. DOI: 10.1016/j.jhep.2013.07.012.
[222] LIANG WH, WANG DP, LING XT, et al. Sirolimus-based immunosuppression in liver transplantation for hepatocellular carcinoma: A meta-analysis[J]. Liver Transpl, 2012, 18(1): 62-69. DOI: 10.1002/lt.22441.
[223] ZHOU J, WANG Z, WU ZQ, et al. Sirolimus-based immunosuppression therapy in liver transplantation for patients with hepatocellular carcinoma exceeding the Milan criteria[J]. Transplant Proc, 2008, 40(10): 3548-3553. DOI: 10.1016/j.transproceed.2008.03.165.
[224] GEISSLER EK, SCHNITZBAUER AA, ZÜLKE C, et al. Sirolimus use in liver transplant recipients with hepatocellular carcinoma: A randomized, multicenter, open-label phase 3 trial[J]. Transplantation, 2016, 100(1): 116-125. DOI: 10.1097/TP.0000000000000965.
[225] THORAT A, JENG LB, YANG HR, et al. Assessing the role of everolimus in reducing hepatocellular carcinoma recurrence after living donor liver transplantation for patients within the UCSF criteria: re-inventing the role of mammalian target of rapamycin inhibitors[J]. Ann Hepatobiliary Pancreat Surg, 2017, 21(4): 205-211. DOI: 10.14701/ahbps.2017.21.4.205.
[226] SCHNITZBAUER AA, FILMANN N, ADAM R, et al. mTOR inhibition is most beneficial after liver transplantation for hepatocellular carcinoma in patients with active tumors[J]. Ann Surg, 2020, 272(5): 855-862. DOI: 10.1097/SLA.0000000000004280.
[227] FILGUEIRA NA. Hepatocellular carcinoma recurrence after liver transplantation: Risk factors, screening and clinical presentation [J]. World J Hepatol, 2019, 11(3): 261-272. DOI: 10.4254/wjh.v11.i3.261.
[228] BODZIN AS, LUNSFORD KE, MARKOVIC D, et al. Predicting mortality in patients developing recurrent hepatocellular carcinoma after liver transplantation: Impact of treatment modality and recurrence characteristics[J]. Ann Surg, 2017, 266(1): 118-125. DOI: 10.1097/SLA.0000000000001894.
[229] AU KP, CHOK KSH. Multidisciplinary approach for post-liver transplant recurrence of hepatocellular carcinoma: A proposed management algorithm[J]. World J Gastroenterol, 2018, 24(45): 5081-5094. DOI: 10.3748/wjg.v24.i45.5081.
[230] IAVARONE M, INVERNIZZI F, CZAUDERNA C, et al. Preliminary experience on safety of regorafenib after sorafenib failure in recurrent hepatocellular carcinoma after liver transplantation[J]. Am J Transplant, 2019, 19(11): 3176-3184. DOI: 10.1111/ajt.15551.
[231] SHI GM, WANG JP, HUANG XW, et al. Graft programmed death ligand 1 expression as a marker for transplant rejection following anti-programmed death 1 immunotherapy for recurrent liver tumors[J]. Liver Transpl, 2021, 27(3): 444-449. DOI: 10.1002/lt.25887.
[232] SAPISOCHIN G, LEE WC, JOO DJ, et al. Long-term effects of everolimus-facilitated tacrolimus reduction in living-donor liver transplant recipients with hepatocellular carcinoma[J]. Ann Transplant, 2022, 27: e937988. DOI: 10.12659/AOT.937988.
[233] LEE DD, SAPISOCHIN G, MEHTA N, et al. Surveillance for HCC after liver transplantation: Increased monitoring may yield aggressive treatment options and improved postrecurrence survival[J]. Transplantation, 2020, 104(10): 2105-2112. DOI: 10.1097/TP.0000000000003117.
[234] ZHONG JH, XING BC, ZHANG WG, et al. Repeat hepatic resection versus radiofrequency ablation for recurrent hepatocellular carcinoma: Retrospective multicentre study[J]. Br J Surg, 2021, 109(1): 71-78. DOI: 10.1093/bjs/znab340.
[235] WANG Z, LIU M, ZHANG DZ, et al. Microwave ablation versus laparoscopic resection as first-line therapy for solitary 3-5-cm HCC[J]. Hepatology, 2022, 76(1): 66-77. DOI: 10.1002/hep.32323.
[236] LI L, ZHANG JL, LIU XH, et al. Clinical outcomes of radiofrequency ablation and surgical resection for small hepatocellular carcinoma: A meta-analysis[J]. J Gastroenterol Hepatol, 2012, 27(1): 51-58. DOI: 10.1111/j.1440-1746.2011.06947.x.
[237] HUANG JW, YAN LN, CHENG ZY, et al. A randomized trial comparing radiofrequency ablation and surgical resection for HCC conforming to the Milan criteria[J]. Ann Surg, 2010, 252(6): 903-912. DOI: 10.1097/SLA.0b013e3181efc656.
[238] FENG Q, CHI YG, LIU YQ, et al. Efficacy and safety of percutaneous radiofrequency ablation versus surgical resection for small hepatocellular carcinoma: A meta-analysis of 23 studies[J]. J Cancer Res Clin Oncol, 2015, 141(1): 1-9. DOI: 10.1007/s00432-014-1708-1.
[239] CHEN QW, YING HF, GAO S, et al. Radiofrequency ablation plus chemoembolization versus radiofrequency ablation alone for hepatocellular carcinoma: A systematic review and meta-analysis[J]. Clin Res Hepatol Gastroenterol, 2016, 40(3): 309-314. DOI: 10.1016/j.clinre.2015.07.008.
[240] ZHANG YJ, CHEN MS, CHEN Y, et al. Long-term outcomes of transcatheter arterial chemoembolization combined with radiofrequency ablation as an initial treatment for early-stage hepatocellular carcinoma[J]. JAMA Netw Open, 2021, 4(9): e2126992. DOI: 10.1001/jamanetworkopen.2021.26992.
[241] PENG ZW, ZHANG YJ, CHEN MS, et al. Radiofrequency ablation with or without transcatheter arterial chemoembolization in the treatment of hepatocellular carcinoma: A prospective randomized trial [J]. J Clin Oncol, 2013, 31(4): 426-432. DOI: 10.1200/JCO.2012.42.9936.
[242] WANG L, KE Q, LIN NP, et al. The efficacy of transarterial chemoembolization combined with microwave ablation for unresectable hepatocellular carcinoma: A systematic review and meta-analysis[J]. Int J Hyperthermia, 2019, 36(1): 1288-1296. DOI: 10.1080/02656736.2019.1692148.
[243] ZHOU C, ZHANG XY, PENG YF, et al. Surgical resection plus radiofrequency ablation versus radical surgery for hepatocellular carcinoma: A propensity score matching analysis[J]. J Cancer, 2019, 10(17): 3933-3940. DOI: 10.7150/jca.29501.
[244] ZHUANG BW, LI W, WANG W, et al. Treatment effect of radiofrequency ablation versus liver transplantation and surgical resection for hepatocellular carcinoma within Milan criteria: A population-based study[J]. Eur Radiol, 2021, 31(7): 5379-5389. DOI: 10.1007/s00330-020-07551-9.
[245] LIVRAGHI T, MELONI F, di STASI M, et al. Sustained complete response and complications rates after radiofrequency ablation of very early hepatocellular carcinoma in cirrhosis: Is resection still the treatment of choice? [J]. Hepatology, 2008, 47(1): 82-89. DOI: 10.1002/hep.21933.
[246] PENG ZW, LIN XJ, ZHANG YJ, et al. Radiofrequency ablation versus hepatic resection for the treatment of hepatocellular carcinomas 2 cm or smaller: A retrospective comparative study[J]. Radiology, 2012, 262(3): 1022-1033. DOI: 10.1148/radiol.11110817.
[247] VIETTI VIOLI N, DURAN R, GUIU B, et al. Efficacy of microwave ablation versus radiofrequency ablation for the treatment of hepatocellular carcinoma in patients with chronic liver disease: A randomised controlled phase 2 trial[J]. Lancet Gastroenterol Hepatol, 2018, 3(5): 317-325. DOI: 10.1016/S2468-1253(18)30029-3.
[248] AN C, LI WZ, HUANG ZM, et al. Small single perivascular hepatocellular carcinoma: Comparisons of radiofrequency ablation and microwave ablation by using propensity score analysis[J]. Eur Radiol, 2021, 31(7): 4764-4773. DOI: 10.1007/s00330-020-07571-5.
[249] YU J, YU XL, HAN ZY, et al. Percutaneous cooled-probe microwave

versus radiofrequency ablation in early-stage hepatocellular carcinoma: A phase III randomised controlled trial[J]. Gut, 2017, 66(6): 1172-1173. DOI: 10.1136/gutjnl-2016-312629.
[250] TAN WC, DENG QW, LIN SY, et al. Comparison of microwave ablation and radiofrequency ablation for hepatocellular carcinoma: A systematic review and meta-analysis[J]. Int J Hyperthermia, 2019, 36(1): 264-272. DOI: 10.1080/02656736.2018.1562571.
[251] YU J, CHENG ZG, HAN ZY, et al. Period-dependent survival benefit of percutaneous microwave ablation for hepatocellular carcinoma: A 12-year real-world, multicentric experience[J]. Liver Cancer, 2022, 11(4): 341-353. DOI: 10.1159/000522134.
[252] LIN SM, LIN CJ, LIN CC, et al. Randomised controlled trial comparing percutaneous radiofrequency thermal ablation, percutaneous ethanol injection, and percutaneous acetic acid injection to treat hepatocellular carcinoma of 3 cm or less[J]. Gut, 2005, 54(8): 1151-1156. DOI: 10.1136/gut.2004.045203.
[253] LIU M, LIU C, LI CL, et al. Expert consensus on image-guided cryoablation of liver cancer(2020 edition)[J]. Chin J Med, 2020, 55(5): 489-492. DOI: 10.3969/j.issn.1008-1070.2020.05.008.
柳明, 刘超, 李成利, 等. 影像引导肝癌的冷冻消融治疗专家共识(2020版)[J]. 中国医刊, 2020, 55(5): 489-492. DOI: 10.3969/j.issn.1008-1070.2020.05.008.
[254] HASEGAWA K, AOKI T, ISHIZAWA T, et al. Comparison of the therapeutic outcomes between surgical resection and percutaneous ablation for small hepatocellular carcinoma[J]. Ann Surg Oncol, 2014, 21(Suppl 3): S348-S355. DOI: 10.1245/s10434-014-3585-x.
[255] AHMED M, TECHNOLOGY ASSESSMENT COMMITTEE OF THE SOCIETY OF INTERVENTIONAL RADIOLOGY. Image-guided tumor ablation: Standardization of terminology and reporting criteria: A 10-year update: Supplement to the consensus document[J]. J Vasc Interv Radiol, 2014, 25(11): 1706-1708. DOI: 10.1016/j.jvir.2014.09.005.
[256] LI L, WANG W, PAN H, et al. Microwave ablation combined with OK-432 induces Th1-type response and specific antitumor immunity in a murine model of breast cancer[J]. J Transl Med, 2017, 15(1): 23. DOI: 10.1186/s12967-017-1124-9.
[257] MIZUKOSHI E, YAMASHITA T, ARAI K, et al. Enhancement of tumor-associated antigen-specific T cell responses by radiofrequency ablation of hepatocellular carcinoma[J]. Hepatology, 2013, 57(4): 1448-1457. DOI: 10.1002/hep.26153.
[258] SLOVAK R, LUDWIG JM, GETTINGER SN, et al. Immuno-thermal ablations-boosting the anticancer immune response[J]. J Immunother Cancer, 2017, 5(1): 78. DOI: 10.1186/s40425-017-0284-8.
[259] DUAN XH, WANG MZ, HAN XW, et al. Combined use of microwave ablation and cell immunotherapy induces nonspecific immunity of hepatocellular carcinoma model mice[J]. Cell Cycle, 2020, 19(24): 3595-3607. DOI: 10.1080/15384101.2020.1853942.
[260] ROZEMAN EA, PREVOO W, MEIER MAJ, et al. Phase Ib/II trial testing combined radiofrequency ablation and ipilimumab in uveal melanoma (SECIRA-UM)[J]. Melanoma Res, 2020, 30(3): 252-260. DOI: 10.1097/CMR.0000000000000653.
[261] WANG GF. Chinese tumor intervention expert consensus on the application principles of transcatheter arterial infusion chemotherapy[J]. J Interv Radiol, 2017, 26(11): 963-970.
王革芳. 经导管动脉灌注化疗药物应用原则: 中国肿瘤介入专家共识[J]. 介入放射学杂志, 2017, 26(11): 963-970.
[262] LENCIONI R, de BAERE T, SOULEN MC, et al. Lipiodol transarterial chemoembolization for hepatocellular carcinoma: A systematic review of efficacy and safety data[J]. Hepatology, 2016, 64(1): 106-116. DOI: 10.1002/hep.28453.
[263] PELLETIER G, DUCREUX M, GAY F, et al. Treatment of unresectable hepatocellular carcinoma with lipiodol chemoembolization: A multicenter randomized trial. groupe CHC[J]. J Hepatol, 1998, 29(1): 129-134. DOI: 10.1016/s0168-8278(98)80187-6.
[264] LO CM, NGAN H, TSO WK, et al. Randomized controlled trial of transarterial lipiodol chemoembolization for unresectable hepatocellular carcinoma[J]. Hepatology, 2002, 35(5): 1164-1171. DOI: 10.1053/jhep.2002.33156.
[265] LLOVET JM, REAL MI, MONTAÑA X, et al. Arterial embolisation or chemoembolisation versus symptomatic treatment in patients with unresectable hepatocellular carcinoma: A randomised controlled trial[J]. Lancet, 2002, 359(9319): 1734-1739. DOI: 10.1016/S0140-6736(02)08649-X.
[266] CAMMÀ C, SCHEPIS F, ORLANDO A, et al. Transarterial chemoembolization for unresectable hepatocellular carcinoma: Meta-analysis of randomized controlled trials[J]. Radiology, 2002, 224(1): 47-54. DOI: 10.1148/radiol.2241011262.
[267] LLOVET JM, BRUIX J. Systematic review of randomized trials for unresectable hepatocellular carcinoma: Chemoembolization improves survival[J]. Hepatology, 2003, 37(2): 429-442. DOI: 10.1053/jhep.2003.50047.
[268] Writing Group of Chinese Society of Interventional Radiology. Technical standards of transcatheter arterial chemoembolization for hepatocellular carcinoma: Experts common opinion[J]. Chin J Radiol, 2011, 45(10): 908-912. DOI: 10.3760/cma.j.issn.1005-1201.2011.10.003.
中华医学会放射学分会介入学组协作组. 原发性肝细胞癌经导管肝动脉化疗性栓塞治疗技术操作规范专家共识[J]. 中华放射学杂志, 2011, 45(10): 908-912. DOI: 10.3760/cma.j.issn.1005-1201.2011.10.003.
[269] Clinical Guidelines Committee of Chinese College of Interventionalists. Chinese clinical practice guidelines for transarterial chemoembolization of hepatocellular carcinoma[J]. Chin J Intern Med, 2021, 60(7): 599-614. DOI: 10.3760/cma.j.cn112137-20210425-00991.
中国医师协会介入医师分会临床诊疗指南专委会. 中国肝细胞癌经动脉化疗栓塞(TACE)治疗临床实践指南(2021年版)[J]. 中华内科杂志, 2021, 60(7): 599-614. DOI: 10.3760/cma.j.cn112137-20210425-00991.
[270] GUO Z, TENG GJ, ZOU YH, et al. Transarterial treatment of primary and secondary liver cancer with drug? eluting beads transarterial chemoembolization: Technical recommendations[J]. Chin J Radiol, 2019, 53(5): 336-340. DOI: 10.3760/cma.j.issn.1005-1201.2019.05.002.
郭志, 滕皋军, 邹英华, 等. 载药微球治疗原发性和转移性肝癌的技术操作推荐[J]. 中华放射学杂志, 2019, 53(5): 336-340. DOI: 10.3760/cma.j.issn.1005-1201.2019.05.002.
[271] SHAO GL, ZOU YH, LUCATELLI P, et al. Chinese expert consensus on technical recommendations for the standard operation of drug-eluting beads for transvascular embolization[J]. Ann Transl Med, 2021, 9(8): 714. DOI: 10.21037/atm-21-1678.
[272] LIANG B, MAKAMURE J, SHU SL, et al. Treatment response, survival, and safety of transarterial chemoembolization with CalliSpheres® microspheres versus conventional transarterial chemoembolization in hepatocellular carcinoma: A meta-analysis[J]. Front Oncol, 2021, 11: 576232. DOI: 10.3389/fonc.2021.576232.
[273] MIYAYAMA S, MATSUI O. Superselective conventional transarterial chemoembolization for hepatocellular carcinoma: Rationale, technique, and outcome[J]. J Vasc Interv Radiol, 2016, 27(9): 1269-1278. DOI: 10.1016/j.jvir.2016.04.014.
[274] IWAZAWA J, OHUE S, HASHIMOTO N, et al. Survival after C-arm CT-assisted chemoembolization of unresectable hepatocellular carcinoma[J]. Eur J Radiol, 2012, 81(12): 3985-3992. DOI: 10.1016/j.ejrad.2012.08.012.
[275] TAKAYASU K, ARII S, IKAI I, et al. Overall survival after transarterial lipiodol infusion chemotherapy with or without embolization for unresectable hepatocellular carcinoma: Propensity score analysis[J]. AJR Am J Roentgenol, 2010, 194(3): 830-837. DOI: 10.2214/AJR.09.3308.
[276] MIYAYAMA S, MATSUI O, YAMASHIRO M, et al. Ultraselective transcatheter arterial chemoembolization with a 2-f tip microcatheter for small hepatocellular carcinomas: Relationship between local tumor recurrence and visualization of the portal vein with iodized oil[J]. J Vasc Interv Radiol, 2007, 18(3): 365-376. DOI: 10.1016/j.jvir.2006.12.004.
[277] de BAERE T, RONOT M, CHUNG JW, et al. Initiative on superselec-

tive conventional transarterial chemoembolization results (INSPIRE) [J]. Cardiovasc Intervent Radiol, 2022, 45(10): 1430-1440. DOI: 10.1007/s00270-022-03233-9.
[278] PRAJAPATI HJ, SPIVEY JR, HANISH SI, et al. mRECIST and EASL responses at early time point by contrast-enhanced dynamic MRI predict survival in patients with unresectable hepatocellular carcinoma (HCC) treated by doxorubicin drug-eluting beads transarterial chemoembolization (DEB TACE)[J]. Ann Oncol, 2013, 24(4): 965-973. DOI: 10.1093/annonc/mds605.
[279] XIA DD, WANG QH, BAI W, et al. Optimal time point of response assessment for predicting survival is associated with tumor burden in hepatocellular carcinoma receiving repeated transarterial chemoembolization[J]. Eur Radiol, 2022, 32(9): 5799-5810. DOI: 10.1007/s00330-022-08716-4.
[280] KIM BK, KIM KA, PARK JY, et al. Prospective comparison of prognostic values of modified response evaluation criteria in solid tumours with European Association for the Study of the Liver criteria in hepatocellular carcinoma following chemoembolisation[J]. Eur J Cancer, 2013, 49(4): 826-834. DOI: 10.1016/j.ejca.2012.08.022.
[281] MEMON K, KULIK L, LEWANDOWSKI RJ, et al. Radiographic response to locoregional therapy in hepatocellular carcinoma predicts patient survival times[J]. Gastroenterology, 2011, 141(2): 526-535, 535. e1-535. e2. DOI: 10.1053/j.gastro.2011.04.054.
[282] LU J, ZHAO M, ARAI Y, et al. Clinical practice of transarterial chemoembolization for hepatocellular carcinoma: Consensus statement from an international expert panel of International Society of Multidisciplinary Interventional Oncology (ISMIO)[J]. Hepatobiliary Surg Nutr, 2021, 10(5): 661-671. DOI: 10.21037/hbsn-21-260.
[283] TERZI E, GOLFIERI R, PISCAGLIA F, et al. Response rate and clinical outcome of HCC after first and repeated cTACE performed "on demand"[J]. J Hepatol, 2012, 57(6): 1258-1267. DOI: 10.1016/j.jhep.2012.07.025.
[284] LU J, GUO JH, JI JS, et al. Irradiation stent with ^{125}I plus TACE versus sorafenib plus TACE for hepatocellular carcinoma with major portal vein tumor thrombosis: A multicenter randomized trial[J]. Int J Surg, 2023, 109(5): 1188-1198. DOI: 10.1097/JS9.0000000000000295.
[285] LUO JJ, ZHANG ZH, LIU QX, et al. Endovascular brachytherapy combined with stent placement and TACE for treatment of HCC with main portal vein tumor thrombus[J]. Hepatol Int, 2016, 10(1): 185-195. DOI: 10.1007/s12072-015-9663-8.
[286] LU J, GUO JH, ZHU HD, et al. Safety and efficacy of irradiation stent placement for malignant portal vein Thrombus combined with transarterial chemoembolization for hepatocellular carcinoma: A single-center experience[J]. J Vasc Interv Radiol, 2017, 28(6): 786-794. e3. DOI: 10.1016/j.jvir.2017.02.014.
[287] HU HT, LI HL, GUO CY, et al. Transcatheter arterial chemoembolization combined ^{125}iodine seed implantation for primary hepatic carcinoma with portal vein tumor thrombus thrombosis[J]. Chin J Radiol, 2012, 46(6): 552-556. DOI: 10.3760/cma.j.issn.1005-1201.2012.06.016.
胡鸿涛, 黎海亮, 郭晨阳, 等. ^{125}I粒子植入联合动脉化学栓塞治疗原发性肝癌合并门静脉癌栓[J]. 中华放射学杂志, 2012, 46(6): 552-556. DOI: 10.3760/cma.j.issn.1005-1201.2012.06.016.
[288] ZHANG ZH, ZHANG W, GU JY, et al. Treatment of hepatocellular carcinoma with tumor Thrombus with the use of iodine-125 seed strand implantation and transarterial chemoembolization: A propensity-score analysis[J]. J Vasc Interv Radiol, 2018, 29(8): 1085-1093. DOI: 10.1016/j.jvir.2018.02.013.
[289] YANG SB, ZHANG JH, FU YF, et al. TACE with portal vein radioactive seeds for HCC with portal vein tumor thrombus: A meta-analysis [J]. Minim Invasive Ther Allied Technol, 2022, 31(6): 856-864. DOI: 10.1080/13645706.2022.2045326.
[290] SI ZM, WANG GZ, QIAN S, et al. Combination therapies in the management of large (≥5 cm) hepatocellular carcinoma: Microwave ablation immediately followed by transarterial chemoembolization[J]. J Vasc Interv Radiol, 2016, 27(10): 1577-1583. DOI: 10.1016/j.jvir.2016.02.014.
[291] LEWIS AR, PADULA CA, MCKINNEY JM, et al. Ablation plus transarterial embolic therapy for hepatocellular carcinoma larger than 3 cm: Science, evidence, and future directions[J]. Semin Intervent Radiol, 2019, 36(4): 303-309. DOI: 10.1055/s-0039-1697641.
[292] MORIMOTO M, NUMATA K, KONDOU M, et al. Midterm outcomes in patients with intermediate-sized hepatocellular carcinoma: A randomized controlled trial for determining the efficacy of radiofrequency ablation combined with transcatheter arterial chemoembolization[J]. Cancer, 2010, 116(23): 5452-5460. DOI: 10.1002/cncr.25314.
[293] YUAN P, WANG F, ZHU GY, et al. The clinical efficiency of TACE combined with simultaneous computed tomography-guided radiofrequency ablation for advanced hepatocellular carcinoma[J]. Invest New Drugs, 2021, 39(5): 1383-1388. DOI: 10.1007/s10637-021-01101-w.
[294] HUO YR, ESLICK GD. Transcatheter arterial chemoembolization plus radiotherapy compared with chemoembolization alone for hepatocellular carcinoma: A systematic review and meta-analysis[J]. JAMA Oncol, 2015, 1(6): 756-765. DOI: 10.1001/jamaoncol.2015.2189.
[295] Radiation Oncology Branch of the Chinese Medical Association; Expert Committee on Liver Cancer and Digestive System of China Institute of Biomedical Engineering; Liver Cancer Research Group of Radiation Oncology Branch of China Research Hospital. Consensus on radiation therapy for primary liver cancer in 2016[J]. Chin J Radiat Oncol, 2016, 25(11): 1141-1150. DOI: 10.3760/cma.j.issn.1004-4221.2016.11.001.
中华医学会放射肿瘤学分会, 中国生物医学工程学会精确放疗分会肝癌学组与消化系统肿瘤专家委员会, 中国研究型医院学会放射肿瘤学分会肝癌学组. 2016年原发性肝癌放疗共识[J]. 中华放射肿瘤学杂志, 2016, 25(11): 1141-1150. DOI: 10.3760/cma.j.issn.1004-4221.2016.11.001.
[296] KIM Y, STAHL CC, MAKRAMALLA A, et al. Downstaging therapy followed by liver transplantation for hepatocellular carcinoma beyond Milan criteria[J]. Surgery, 2017, 162(6): 1250-1258. DOI: 10.1016/j.surg.2017.08.007.
[297] MEHTA N, FRENETTE C, TABRIZIAN P, et al. Downstaging outcomes for hepatocellular carcinoma: Results from the multicenter evaluation of reduction in tumor size before liver transplantation (MERITS-LT) consortium[J]. Gastroenterology, 2021, 161(5): 1502-1512. DOI: 10.1053/j.gastro.2021.07.033.
[298] SHI F, WU M, LIAN SS, et al. Radiofrequency ablation following downstaging of hepatocellular carcinoma by using transarterial chemoembolization: Long-term outcomes[J]. Radiology, 2019, 293(3): 707-715. DOI: 10.1148/radiol.2019181991.
[299] WU JY, YIN ZY, BAI YN, et al. Lenvatinib combined with anti-PD-1 antibodies plus transcatheter arterial chemoembolization for unresectable hepatocellular carcinoma: A multicenter retrospective study [J]. J Hepatocell Carcinoma, 2021, 8: 1233-1240. DOI: 10.2147/JHC.S332420.
[300] CHIANG CL, CHIU KWH, CHAN KSK, et al. Sequential transarterial chemoembolisation and stereotactic body radiotherapy followed by immunotherapy as conversion therapy for patients with locally advanced, unresectable hepatocellular carcinoma (START-FIT): A single-arm, phase 2 trial[J]. Lancet Gastroenterol Hepatol, 2023, 8(2): 169-178. DOI: 10.1016/S2468-1253(22)00339-9.
[301] LI L, LI B, ZHANG M. Postoperative adjuvant transarterial chemoembolization improves the prognosis of hepatocellular carcinoma patients with microvascular invasion: A systematic review and meta-analysis[J]. Acta Radiol, 2020, 61(6): 723-731. DOI: 10.1177/0284185119878357.
[302] ESAGIAN SM, KAKOS CD, GIORGAKIS E, et al. Adjuvant transarterial chemoembolization following curative-intent hepatectomy versus hepatectomy alone for hepatocellular carcinoma: A systematic review and meta-analysis of randomized controlled trials[J]. Cancers (Basel), 2021, 13(12): 2984. DOI: 10.3390/cancers13122984.
[303] CHEN W, MA T, ZHANG J, et al. A systematic review and meta-

analysis of adjuvant transarterial chemoembolization after curative resection for patients with hepatocellular carcinoma[J]. HPB (Oxford), 2020, 22(6): 795-808. DOI: 10.1016/j.hpb.2019.12.013.
[304] LIU BJ, GAO S, ZHU X, et al. Combination therapy of chemoembolization and hepatic arterial infusion chemotherapy in hepatocellular carcinoma with portal vein tumor thrombosis compared with chemoembolization alone: A propensity score-matched analysis[J]. Biomed Res Int, 2021, 2021: 6670367. DOI: 10.1155/2021/6670367.
[305] HUANG JJ, HUANG WS, ZHAN MX, et al. Drug-eluting bead transarterial chemoembolization combined with FOLFOX-based hepatic arterial infusion chemotherapy for large or huge hepatocellular carcinoma[J]. J Hepatocell Carcinoma, 2021, 8: 1445-1458. DOI: 10.2147/JHC.S339379.
[306] WANG QH, XIA DD, BAI W, et al. Development of a prognostic score for recommended TACE candidates with hepatocellular carcinoma: A multicentre observational study[J]. J Hepatol, 2019, 70(5): 893-903. DOI: 10.1016/j.jhep.2019.01.013.
[307] WANG ZX, WANG EX, BAI W, et al. Exploratory analysis to identify candidates benefitting from combination therapy of transarterial chemoembolization and sorafenib for first-line treatment of unresectable hepatocellular carcinoma: A multicenter retrospective observational study[J]. Liver Cancer, 2020, 9(3): 308-325. DOI: 10.1159/000505692.
[308] XIA DD, BAI W, WANG EX, et al. Lenvatinib with or without concurrent drug-eluting beads transarterial chemoembolization in patients with unresectable, advanced hepatocellular carcinoma: A real-world, multicenter, retrospective study[J]. Liver Cancer, 2022, 11(4): 368-382. DOI: 10.1159/000523849.
[309] ZHU HD, LI HL, HUANG MS, et al. Transarterial chemoembolization with PD-$(L)_1$ inhibitors plus molecular targeted therapies for hepatocellular carcinoma (CHANCE001)[J]. Signal Transduct Target Ther, 2023, 8(1): 58. DOI: 10.1038/s41392-022-01235-0.
[310] JIN ZC, ZHONG BY, CHEN JJ, et al. Real-world efficacy and safety of TACE plus camrelizumab and apatinib in patients with HCC (CHANCE2211): A propensity score matching study[J]. Eur Radiol, 2023, 33(12): 8669-8681. DOI: 10.1007/s00330-023-09754-2.
[311] LI SQ, WU JY, WU JY, et al. Prediction of early treatment response to the combination therapy of TACE plus lenvatinib and anti-PD-1 antibody immunotherapy for unresectable hepatocellular carcinoma: Multicenter retrospective study[J]. Front Immunol, 2023, 14: 1109771. DOI: 10.3389/fimmu.2023.1109771.
[312] JANG JW, CHOI JY, BAE SH, et al. Transarterial chemo-lipiodolization can reactivate hepatitis B virus replication in patients with hepatocellular carcinoma[J]. J Hepatol, 2004, 41(3): 427-435. DOI: 10.1016/j.jhep.2004.05.014.
[313] Chinese Society of Infectious Diseases, Chinese Medical Association; Chinese Society of Hepatology, Chinese Medical Association. Guidelines for the prevention and treatment of chronic hepatitis B (version 2019)[J]. J Clin Hepatol, 2019, 35(12): 2648-2669. DOI: 10.3969/j.issn.1001-5256.2019.12.007.
中华医学会感染病学分会, 中华医学会肝病学分会. 慢性乙型肝炎防治指南(2019年版)[J]. 临床肝胆病杂志, 2019, 35(12): 2648-2669. DOI: 10.3969/j.issn.1001-5256.2019.12.007.
[314] LYU N, WANG X, LI JB, et al. Arterial chemotherapy of oxaliplatin plus fluorouracil versus sorafenib in advanced hepatocellular carcinoma: A biomolecular exploratory, randomized, phase III trial (FOHAIC-1)[J]. J Clin Oncol, 2022, 40(5): 468-480. DOI: 10.1200/JCO.21.01963.
[315] LYU N, LIN YE, KONG YN, et al. FOXAI: A phase II trial evaluating the efficacy and safety of hepatic arterial infusion of oxaliplatin plus fluorouracil/leucovorin for advanced hepatocellular carcinoma[J]. Gut, 2018, 67(2): 395-396. DOI: 10.1136/gutjnl-2017-314138.
[316] LONG YY, LIANG Y, LI SJ, et al. Therapeutic outcome and related predictors of stereotactic body radiotherapy for small liver-confined HCC: A systematic review and meta-analysis of observational studies[J]. Radiat Oncol, 2021, 16(1): 68. DOI: 10.1186/s13014-021-01761-1.
[317] CHEN YX, ZHUANG Y, YANG P, et al. Helical IMRT-based stereotactic body radiation therapy using an abdominal compression technique and modified fractionation regimen for small hepatocellular carcinoma[J]. Technol Cancer Res Treat, 2020, 19: 1533033820937002. DOI: 10.1177/1533033820937002.
[318] CHINO F, STEPHENS SJ, CHOI SS, et al. The role of external beam radiotherapy in the treatment of hepatocellular cancer[J]. Cancer, 2018, 124(17): 3476-3489. DOI: 10.1002/cncr.31334.
[319] HARA K, TAKEDA A, TSURUGAI Y, et al. Radiotherapy for hepatocellular carcinoma results in comparable survival to radiofrequency ablation: A propensity score analysis[J]. Hepatology, 2019, 69(6): 2533-2545. DOI: 10.1002/hep.30591.
[320] JANG WI, BAE SH, KIM MS, et al. A phase 2 multicenter study of stereotactic body radiotherapy for hepatocellular carcinoma: Safety and efficacy[J]. Cancer, 2020, 126(2): 363-372. DOI: 10.1002/cncr.32502.
[321] KIM N, CHENG J, JUNG I, et al. Stereotactic body radiation therapy *vs.* radiofrequency ablation in Asian patients with hepatocellular carcinoma[J]. J Hepatol, 2020, 73(1): 121-129. DOI: 10.1016/j.jhep.2020.03.005.
[322] SU TS, LIANG P, LIANG J, et al. Long-term survival analysis of stereotactic ablative radiotherapy versus liver resection for small hepatocellular carcinoma[J]. Int J Radiat Oncol Biol Phys, 2017, 98(3): 639-646. DOI: 10.1016/j.ijrobp.2017.02.095.
[323] WAHL DR, STENMARK MH, TAO YB, et al. Outcomes after stereotactic body radiotherapy or radiofrequency ablation for hepatocellular carcinoma[J]. J Clin Oncol, 2016, 34(5): 452-459. DOI: 10.1200/JCO.2015.61.4925.
[324] COMITO T, LOI M, FRANZESE C, et al. Stereotactic radiotherapy after incomplete transarterial (chemo-) embolization (TAE/TACE) versus exclusive TAE or TACE for treatment of inoperable HCC: A phase III trial (NCT02323360)[J]. Curr Oncol, 2022, 29(11): 8802-8813. DOI: 10.3390/curroncol29110692.
[325] YOON SM, KIM SY, LIM YS, et al. Stereotactic body radiation therapy for small (≤5 cm) hepatocellular carcinoma not amenable to curative treatment: Results of a single-arm, phase II clinical trial[J]. Clin Mol Hepatol, 2020, 26(4): 506-515. DOI: 10.3350/cmh.2020.0038.
[326] MENG MB, CUI YL, LU Y, et al. Transcatheter arterial chemoembolization in combination with radiotherapy for unresectable hepatocellular carcinoma: A systematic review and meta-analysis[J]. Radiother Oncol, 2009, 92(2): 184-194. DOI: 10.1016/j.radonc.2008.11.002.
[327] OHRI N, DAWSON LA, KRISHNAN S, et al. Radiotherapy for hepatocellular carcinoma: New indications and directions for future study[J]. J Natl Cancer Inst, 2016, 108(9): djw133. DOI: 10.1093/jnci/djw133.
[328] YOON SM, RYOO BY, LEE SJ, et al. Efficacy and safety of transarterial chemoembolization plus external beam radiotherapy vs sorafenib in hepatocellular carcinoma with macroscopic vascular invasion: A randomized clinical trial[J]. JAMA Oncol, 2018, 4(5): 661-669. DOI: 10.1001/jamaoncol.2017.5847.
[329] ZENG ZC, FAN J, TANG ZY, et al. A comparison of treatment combinations with and without radiotherapy for hepatocellular carcinoma with portal vein and/or inferior vena cava tumor thrombus[J]. Int J Radiat Oncol Biol Phys, 2005, 61(2): 432-443. DOI: 10.1016/j.ijrobp.2004.05.025.
[330] SHEN LJ, XI M, ZHAO L, et al. Combination therapy after TACE for hepatocellular carcinoma with macroscopic vascular invasion: Stereotactic body radiotherapy versus sorafenib[J]. Cancers (Basel), 2018, 10(12): 516. DOI: 10.3390/cancers10120516.
[331] WEI ZW, ZHAO JJ, BI XY, et al. Neoadjuvant radiotherapy for resectable hepatocellular carcinoma with portal vein tumor thrombus: A systematic review[J]. Hepatobiliary Surg Nutr, 2022, 11(5): 709-717. DOI: 10.21037/hbsn-20-854.
[332] SUN J, YANG L, SHI J, et al. Postoperative adjuvant IMRT for pa-

tients with HCC and portal vein tumor thrombus: An open-label randomized controlled trial[J]. Radiother Oncoll, 2019, 140: 20-25. DOI: 10.1016/j.radonc.2019.05.006.
[333] SU K, GU T, XU K, et al. Gamma knife radiosurgery versus transcatheter arterial chemoembolization for hepatocellular carcinoma with portal vein tumor thrombus: A propensity score matching study [J]. Hepatol Int, 2022, 16(4): 858-867. DOI: 10.1007/s12072-022-10339-2.
[334] GUO L, WEI XB, FENG S, et al. Radiotherapy prior to or after transcatheter arterial chemoembolization for the treatment of hepatocellular carcinoma with portal vein tumor thrombus: A randomized controlled trial[J]. Hepatol Int, 2022, 16(6): 1368-1378. DOI: 10.1007/s12072-022-10423-7.
[335] RIM CH, PARK S, YOON WS, et al. Radiotherapy for bone metastases of hepatocellular carcinoma: A hybrid systematic review with meta-analyses[J]. Int J Radiat Biol, 2023, 99(3): 419-430. DOI: 10.1080/09553002.2022.2094020.
[336] CHA J, SEONG J. Application of radiotherapeutic strategies in the BCLC-defined stages of hepatocellular carcinoma[J]. Liver Cancer, 2012, 1(3-4): 216-225. DOI: 10.1159/000343836.
[337] SOLIMAN H, RINGASH J, JIANG HY, et al. Phase II trial of palliative radiotherapy for hepatocellular carcinoma and liver metastases[J]. J Clin Oncol, 2013, 31(31): 3980-3986. DOI: 10.1200/JCO.2013.49.9202.
[338] WONG TCL, LEE VHF, LAW ALY, et al. Prospective study of stereotactic body radiation therapy for hepatocellular carcinoma on waitlist for liver transplant[J]. Hepatology, 2021, 74(5): 2580-2594. DOI: 10.1002/hep.31992.
[339] SAPISOCHIN G, BARRY A, DOHERTY M, et al. Stereotactic body radiotherapy *vs.* TACE or RFA as a bridge to transplant in patients with hepatocellular carcinoma. An intention-to-treat analysis[J]. J Hepatol, 2017, 67(1): 92-99. DOI: 10.1016/j.jhep.2017.02.022.
[340] WU F, CHEN B, DONG DZ, et al. Phase 2 evaluation of neoadjuvant intensity-modulated radiotherapy in centrally located hepatocellular carcinoma: A nonrandomized controlled trial[J]. JAMA Surg, 2022, 157(12): 1089-1096. DOI: 10.1001/jamasurg.2022.4702.
[341] CHEN B, WU JX, CHENG SH, et al. Phase 2 study of adjuvant radiotherapy following narrow-margin hepatectomy in patients with HCC [J]. Hepatology, 2021, 74(5): 2595-2604. DOI: 10.1002/hep.31993.
[342] SHI CY, LI Y, GENG L, et al. Adjuvant stereotactic body radiotherapy after marginal resection for hepatocellular carcinoma with microvascular invasion: A randomised controlled trial[J]. Eur J Cancer, 2022, 166: 176-184. DOI: 10.1016/j.ejca.2022.02.012.
[343] WANG WH, WANG Z, WU JX, et al. Survival benefit with IMRT following narrow-margin hepatectomy in patients with hepatocellular carcinoma close to major vessels[J]. Liver Int, 2015, 35(12): 2603-2610. DOI: 10.1111/liv.12857.
[344] WANG LM, WANG WH, RONG WQ, et al. Postoperative adjuvant treatment strategy for hepatocellular carcinoma with microvascular invasion: A non-randomized interventional clinical study[J]. BMC Cancer, 2020, 20(1): 614. DOI: 10.1186/s12885-020-07087-7.
[345] CHEN JL, HE K, HAN YW, et al. Clinical efficacy and safety of external radiotherapy combined with sorafenib in the treatment of hepatocellular carcinoma: A systematic review and meta-analysis[J]. Ann Hepatol, 2022, 27(4): 100710. DOI: 10.1016/j.aohep.2022.100710.
[346] MUNOZ-SCHUFFENEGGER P, BARRY A, ATENAFU EG, et al. Stereotactic body radiation therapy for hepatocellular carcinoma with Macrovascular invasion[J]. Radiother Oncol, 2021, 156: 120-126. DOI: 10.1016/j.radonc.2020.11.033.
[347] CHANG WI, KIM BH, KIM YJ, et al. Role of radiotherapy in Barcelona Clinic Liver Cancer stage C hepatocellular carcinoma treated with sorafenib[J]. J Gastroenterol Hepatol, 2022, 37(2): 387-394. DOI: 10.1111/jgh.15722.
[348] LI H, WU ZY, CHEN JL, et al. External radiotherapy combined with sorafenib has better efficacy in unresectable hepatocellular carcinoma: A systematic review and meta-analysis[J]. Clin Exp Med, 2023, 23(5): 1537-1549. DOI: 10.1007/s10238-022-00972-4.
[349] BRADE AM, NG S, BRIERLEY J, et al. Phase 1 trial of sorafenib and stereotactic body radiation therapy for hepatocellular carcinoma [J]. Int J Radiat Oncol Biol Phys, 2016, 94(3): 580-587. DOI: 10.1016/j.ijrobp.2015.11.048.
[350] WANG HZ, ZHU XG, ZHAO YT, et al. Phase 1 trial of apatinib combined with intensity-modulated radiotherapy in unresectable hepatocellular carcinoma[J]. BMC Cancer, 2022, 22(1): 771. DOI: 10.1186/s12885-022-09819-3.
[351] HUANG Y, ZHANG ZY, LIAO WJ, et al. Combination of sorafenib, camrelizumab, transcatheter arterial chemoembolization, and stereotactic body radiation therapy as a novel downstaging strategy in advanced hepatocellular carcinoma with portal vein tumor Thrombus: A case series study[J]. Front Oncol, 2021, 11: 650394. DOI: 10.3389/fonc.2021.650394.
[352] LI JR, XUAN SH, DONG P, et al. Immunotherapy of hepatocellular carcinoma: Recent progress and new strategy[J]. Front Immunol, 2023, 14: 1192506. DOI: 10.3389/fimmu.2023.1192506.
[353] KIMURA T, FUJIWARA T, KAMEOKA T, et al. The current role of stereotactic body radiation therapy (SBRT) in hepatocellular carcinoma (HCC)[J]. Cancers (Basel), 2022, 14(18): 4383. DOI: 10.3390/cancers14184383.
[354] ZHONG LT, WU DH, PENG WW, et al. Safety of PD-1/PD-L1 inhibitors combined with palliative radiotherapy and anti-angiogenic therapy in advanced hepatocellular carcinoma[J]. Front Oncol, 2021, 11: 686621. DOI: 10.3389/fonc.2021.686621.
[355] CHEN YX, YANG P, DU SS, et al. Stereotactic body radiotherapy combined with sintilimab in patients with recurrent or oligometastatic hepatocellular carcinoma: A phase II clinical trial[J]. World J Gastroenterol, 2023, 29(24): 3871-3882. DOI: 10.3748/wjg.v29.i24.3871.
[356] BUJOLD A, MASSEY CA, KIM JJ, et al. Sequential phase I and II trials of stereotactic body radiotherapy for locally advanced hepatocellular carcinoma[J]. J Clin Oncol, 2013, 31(13): 1631-1639. DOI: 10.1200/JCO.2012.44.1659.
[357] ZENG ZC. Stereotactic radiotherapy for hepatocellular carcinoma [J]. Chin J Oncol, 2015, 37(9): 650-652, 653. DOI: 10.3760/cma.j.issn.0253-3766.2015.09.004.
曾昭冲. 肝细胞癌的立体定向放射治疗[J]. 中华肿瘤杂志, 2015, 37(9): 650-652, 653. DOI: 10.3760/cma.j.issn.0253-3766.2015.09.004.
[358] HE J, SHI SM, YE LX, et al. A randomized trial of conventional fraction versus hypofraction radiotherapy for bone metastases from hepatocellular carcinoma[J]. J Cancer, 2019, 10(17): 4031-4037. DOI: 10.7150/jca.28674.
[359] HOU JZ, ZENG ZC, WANG BL, et al. High dose radiotherapy with image-guided hypo-IMRT for hepatocellular carcinoma with portal vein and/or inferior vena cava tumor thrombi is more feasible and efficacious than conventional 3D-CRT[J]. Jpn J Clin Oncol, 2016, 46(4): 357-362. DOI: 10.1093/jjco/hyv205.
[360] ZHANG HG, CHEN YX, HU Y, et al. Image-guided intensity-modulated radiotherapy improves short-term survival for abdominal lymph node metastases from hepatocellular carcinoma[J]. Ann Palliat Med, 2019, 8(5): 717-727. DOI: 10.21037/apm.2019.11.17.
[361] BYUN HK, KIM HJ, IM YR, et al. Dose escalation in radiotherapy for incomplete transarterial chemoembolization of hepatocellular carcinoma[J]. Strahlenther Onkol, 2020, 196(2): 132-141. DOI: 10.1007/s00066-019-01488-9.
[362] D'AVOLA D, GRANITO A, TORRE-ALÁEZ M, et al. The importance of liver functional reserve in the non-surgical treatment of hepatocellular carcinoma[J]. J Hepatol, 2022, 76(5): 1185-1198. DOI: 10.1016/j.jhep.2021.11.013.
[363] HU Y, ZHOU YK, CHEN YX, et al. 4D-CT scans reveal reduced magnitude of respiratory liver motion achieved by different abdominal compression plate positions in patients with intrahepatic tumors under-

going helical tomotherapy[J]. Med Phys, 2016, 43(7): 4335. DOI: 10.1118/1.4953190.

[364] SONG SH, JEONG WK, CHOI D, et al. Evaluation of early treatment response to radiotherapy for HCC using pre- and post-treatment MRI[J]. Acta Radiol, 2019, 60(7): 826-835. DOI: 10.1177/0284185118805253.

[365] GATTI M, MAINO C, DARVIZEH F, et al. Role of gadoxetic acid-enhanced liver magnetic resonance imaging in the evaluation of hepatocellular carcinoma after locoregional treatment[J]. World J Gastroenterol, 2022, 28(26): 3116-3131. DOI: 10.3748/wjg.v28.i26.3116.

[366] SANUKI-FUJIMOTO N, TAKEDA A, OHASHI T, et al. CT evaluations of focal liver reactions following stereotactic body radiotherapy for small hepatocellular carcinoma with cirrhosis: Relationship between imaging appearance and baseline liver function[J]. Br J Radiol, 2010, 83(996): 1063-1071. DOI: 10.1259/bjr/74105551.

[367] HAO GY, PANG J, CHEN Y, et al. CT appearances of primary hepatic carcinoma after stereotactic ablative radiotherapy[J]. Clin J Med Off, 2014, 42(4): 393-395, 398. DOI: 10.3969/j.issn.1671-3826.2014.04.21.
郝光远, 庞军, 陈燕, 等. 原发性肝癌立体定向消融放疗后CT影像学随访观察[J]. 临床军医杂志, 2014, 42(4): 393-395, 398. DOI: 10.3969/j.issn.1671-3826.2014.04.21.

[368] GUHA CD, KAVANAGH BD. Hepatic radiation toxicity: Avoidance and amelioration[J]. Semin Radiat Oncol, 2011, 21(4): 256-263. DOI: 10.1016/j.semradonc.2011.05.003.

[369] ZENG ZC, SEONG J, YOON SM, et al. Consensus on stereotactic body radiation therapy for small-sized hepatocellular carcinoma at the 7th asia-pacific primary liver cancer expert meeting[J]. Liver Cancer, 2017, 6(4): 264-274. DOI: 10.1159/000475768.

[370] KIM TH, KOH YH, KIM BH, et al. Proton beam radiotherapy vs. radiofrequency ablation for recurrent hepatocellular carcinoma: A randomized phase III trial[J]. J Hepatol, 2021, 74(3): 603-612. DOI: 10.1016/j.jhep.2020.09.026.

[371] BIAN HJ, ZHENG JS, NAN G, et al. Randomized trial of[131I]metuximab in treatment of hepatocellular carcinoma after percutaneous radiofrequency ablation[J]. J Natl Cancer Inst, 2014, 106(9): dju239. DOI: 10.1093/jnci/dju239.

[372] The Chinese Society of Nuclear Medicine Working Committee for Treatment of Bone Metastasis. Expert consensus on strontium-89 chloride treatment of bone metastases (2017)[J]. Chin J Nucl Med Mol Imaging, 2018, 38(6): 412-415. DOI: 10.3760/cma.j.issn.2095-2848.2018.06.008.
中华医学会核医学分会转移性骨肿瘤治疗工作委员会. 氯化锶[^{89}Sr]治疗转移性骨肿瘤专家共识(2017年版)[J]. 中华核医学与分子影像杂志, 2018, 38(6): 412-415. DOI: 10.3760/cma.j.issn.2095-2848.2018.06.008.

[373] FINN RS, QIN SK, IKEDA M, et al. Atezolizumab plus bevacizumab in unresectable hepatocellular carcinoma[J]. N Engl J Med, 2020, 382(20): 1894-1905. DOI: 10.1056/NEJMoa1915745.

[374] CHENG AL, QIN SK, IKEDA M, et al. Updated efficacy and safety data from IMbrave150: Atezolizumab plus bevacizumab vs. sorafenib for unresectable hepatocellular carcinoma[J]. J Hepatol, 2022, 76(4): 862-873. DOI: 10.1016/j.jhep.2021.11.030.

[375] REN ZG, XU JM, BAI YX, et al. Sintilimab plus a bevacizumab biosimilar (IBI$_3$05) versus sorafenib in unresectable hepatocellular carcinoma (ORIENT-32): A randomised, open-label, phase 2-3 study[J]. Lancet Oncol, 2021, 22(7): 977-990. DOI: 10.1016/S1470-2045(21)00252-7.

[376] QIN SK, CHAN SL, GU SZ, et al. Camrelizumab plus rivoceranib versus sorafenib as first-line therapy for unresectable hepatocellular carcinoma (CARES-310): A randomised, open-label, international phase 3 study[J]. Lancet, 2023, 402(10408): 1133-1146. DOI: 10.1016/S0140-6736(23)00961-3.

[377] QIN SK, BI F, GU SZ, et al. Donafenib versus sorafenib in first-line treatment of unresectable or metastatic hepatocellular carcinoma: A randomized, open-label, parallel-controlled phase II-III trial[J]. J Clin Oncol, 2021, 39(27): 3002-3011. DOI: 10.1200/JCO.21.00163.

[378] KUDO M, FINN RS, QIN SK, et al. Lenvatinib versus sorafenib in first-line treatment of patients with unresectable hepatocellular carcinoma: A randomised phase 3 non-inferiority trial[J]. Lancet, 2018, 391(10126): 1163-1173. DOI: 10.1016/S0140-6736(18)30207-1.

[379] QIN SK, KUDO M, MEYER T, et al. Tislelizumab vs sorafenib as first-line treatment for unresectable hepatocellular carcinoma: A phase 3 randomized clinical trial[J]. JAMA Oncol, 2023, 9(12): 1651-1659. DOI: 10.1001/jamaoncol.2023.4003.

[380] LLOVET JM, RICCI S, MAZZAFERRO V, et al. Sorafenib in advanced hepatocellular carcinoma[J]. N Engl J Med, 2008, 359(4): 378-390. DOI: 10.1056/NEJMoa0708857.

[381] CHENG AL, KANG YK, CHEN ZD, et al. Efficacy and safety of sorafenib in patients in the Asia-Pacific Region with advanced hepatocellular carcinoma: A phase III randomised, double-blind, placebo-controlled trial[J]. Lancet Oncol, 2009, 10(1): 25-34. DOI: 10.1016/S1470-2045(08)70285-7.

[382] PRESSIANI T, BONI C, RIMASSA L, et al. Sorafenib in patients with Child-Pugh class A and B advanced hepatocellular carcinoma: A prospective feasibility analysis[J]. Ann Oncol, 2013, 24(2): 406-411. DOI: 10.1093/annonc/mds343.

[383] QIN SK, BAI YX, LIM HY, et al. Randomized, multicenter, open-label study of oxaliplatin plus fluorouracil/leucovorin versus doxorubicin as palliative chemotherapy in patients with advanced hepatocellular carcinoma from Asia[J]. J Clin Oncol, 2013, 31(28): 3501-3508. DOI: 10.1200/JCO.2012.44.5643.

[384] QIN SK, CHENG Y, LIANG J, et al. Efficacy and safety of the FOLFOX4 regimen versus doxorubicin in Chinese patients with advanced hepatocellular carcinoma: A subgroup analysis of the EACH study[J]. Oncologist, 2014, 19(11): 1169-1178. DOI: 10.1634/theoncologist.2014-0190.

[385] QU FL, HAO XZ, QIN SK, et al. Multicenter phase II clinical trial of arsenic trioxide injection in the treatment of primary hepatocarcinoma[J]. Chin J Oncol, 2011, 33(9): 697-701. DOI: 10.3760/cma.j.issn.0253-3766.2011.09.013.
屈凤莲, 郝学志, 秦叔逵, 等. 亚砷酸注射液治疗原发性肝癌的Ⅱ期多中心临床研究[J]. 中华肿瘤杂志, 2011, 33(9): 697-701. DOI: 10.3760/cma.j.issn.0253-3766.2011.09.013.

[386] ABOU-ALFA GK, LAU G, KUDO M, et al. Plain language summary of the HIMALAYA study: Tremelimumab and durvalumab for unresectable hepatocellular carcinoma (liver cancer)[J]. Future Oncol, 2023, 19(38): 2505-2516. DOI: 10.2217/fon-2023-0486.

[387] QIAO Q, HAN C, YE SS, et al. The efficacy and safety of cadonilimab combined with lenvatinib for first-line treatment of advanced hepatocellular carcinoma (COMPASSION-08): A phase Ib/II single-arm clinical trial[J]. Front Immunol, 2023, 14: 1238667. DOI: 10.3389/fimmu.2023.1238667.

[388] BRUIX J, QIN S, MERLE P, et al. Regorafenib for patients with hepatocellular carcinoma who progressed on sorafenib treatment (RESORCE): a randomised, double-blind, placebo-controlled, phase 3 trialI[J]. Lancet, 2017, 389(10064): 56-66. DOI: 10.1016/S0140-6736(16)32453-9.

[389] QIN SK, LI Q, GU SZ, et al. Apatinib as second-line or later therapy in patients with advanced hepatocellular carcinoma (AHELP): A multicentre, double-blind, randomised, placebo-controlled, phase 3 trial[J]. Lancet Gastroenterol Hepatol, 2021, 6(7): 559-568. DOI: 10.1016/S2468-1253(21)00109-6.

[390] ZHU AX, KANG YK, YEN CJ, et al. Ramucirumab after sorafenib in patients with advanced hepatocellular carcinoma and increased α-fetoprotein concentrations (REACH-2): A randomised, double-blind, placebo-controlled, phase 3 trial[J]. Lancet Oncol, 2019, 20(2): 282-296. DOI: 10.1016/S1470-2045(18)30937-9.

[391] SHAO GL, BAI YX, YUAN XL, et al. Ramucirumab as second-line treatment in Chinese patients with advanced hepatocellular carci-

noma and elevated alpha-fetoprotein after sorafenib (REACH-2 China): A randomised, multicentre, double-blind study[J]. EClinicalMedicine, 2022, 54: 101679. DOI: 10.1016/j.eclinm.2022.101679.

[392] QIN SK, CHEN ZD, FANG WJ, et al. Pembrolizumab versus placebo as second-line therapy in patients from Asia with advanced hepatocellular carcinoma: A randomized, double-blind, phase III trial[J]. J Clin Oncol, 2023, 41(7): 1434-1443. DOI: 10.1200/JCO.22.00620.

[393] QIN SK, REN ZG, MENG ZQ, et al. Camrelizumab in patients with previously treated advanced hepatocellular carcinoma: A multicentre, open-label, parallel-group, randomised, phase 2 trial[J]. Lancet Oncol, 2020, 21(4): 571-580. DOI: 10.1016/S1470-2045(20)30011-5.

[394] XU JM, SHEN J, GU SZ, et al. Camrelizumab in combination with apatinib in patients with advanced hepatocellular carcinoma (RESCUE): A nonrandomized, open-label, phase II trial[J]. Clin Cancer Res, 2021, 27(4): 1003-1011. DOI: 10.1158/1078-0432.CCR-20-2571.

[395] XU JM, ZHANG Y, JIA R, et al. Anti-PD-1 antibody SHR-1210 combined with apatinib for advanced hepatocellular carcinoma, gastric, or esophagogastric junction cancer: An open-label, dose escalation and expansion study[J]. Clin Cancer Res, 2019, 25(2): 515-523. DOI: 10.1158/1078-0432.CCR-18-2484.

[396] REN Z, DUCREUX M, ABOU-ALFA GK, et al. Tislelizumab in patients with previously treated advanced hepatocellular carcinoma (RATIONALE-208): A multicenter, non-randomized, open-label, phase 2 trial[J]. Liver Cancer, 2023, 12(1): 72-84. DOI: 10.1159/000527175.

[397] YAU T, KANG YK, KIM TY, et al. Efficacy and safety of nivolumab plus ipilimumab in patients with advanced hepatocellular carcinoma previously treated with sorafenib: The CheckMate 040 randomized clinical trial[J]. JAMA Oncol, 2020, 6(11): e204564. DOI: 10.1001/jamaoncol.2020.4564.

[398] ABOU-ALFA GK, MEYER T, CHENG AL, et al. Cabozantinib in patients with advanced and progressing hepatocellular carcinoma[J]. N Engl J Med, 2018, 379(1): 54-63. DOI: 10.1056/NEJMoa1717002.

[399] National Comprehensive Cancer Network. NCCN clinical practice guidelines in oncology NCCN guidelines. hepatocellular carcinoma (version 1. 2023)[EB/OL]. (2023-03-10) www.nccn.org/patients.

[400] HASEGAWA K, TAKEMURA N, YAMASHITA T, et al. Clinical practice guidelines for hepatocellular carcinoma: The Japan society of hepatology 2021 version (5th JSH-HCC guidelines)[J]. Hepatol Res, 2023, 53(5): 383-390. DOI: 10.1111/hepr.13892.

[401] SINGAL AG, LLOVET JM, YARCHOAN M, et al. AASLD practice guidance on prevention, diagnosis, and treatment of hepatocellular carcinoma[J]. Hepatology, 2023, 78(6): 1922-1965. DOI: 10.1097/HEP.0000000000000466.

[402] SEYMOUR L, BOGAERTS J, PERRONE A, et al. iRECIST: Guidelines for response criteria for use in trials testing immunotherapeutics[J]. Lancet Oncol, 2017, 18(3): e143-e152. DOI: 10.1016/S1470-2045(17)30074-8.

[403] CAI DF. Establish a clinical medical system of integrated Chinese and western medicine by disease and syndrome differentiation[J]. Chin J Integr Tradit West Med, 2019, 39(9): 1034-1035. DOI: 10.7661/j.cjim.20190815.241.
蔡定芳. 病证辨治创建中国中西结合临床医学体系[J]. 中国中西医结合杂志, 2019, 39(9): 1034-1035. DOI: 10.7661/j.cjim.20190815.241.

[404] CAI DF. On diagnosis and treatment pattern based on combination of disease identification and syndrome typing[J]. Chin J Integr Tradit West Med, 2019, 39(2): 133-135. DOI: 10.7661/j.cjim.20190114.040.
蔡定芳. 论病证结合临床诊疗模式[J]. 中国中西医结合杂志, 2019, 39(2): 133-135. DOI: 10.7661/j.cjim.20190114.040.

[405] SUN Y, QIN SK, LI W, et al. A randomized, double-blinded, phase III study of icaritin versus huachashu as the first-line therapy in biomarker-enriched HBV-related advanced hepatocellular carcinoma with poor conditions: Interim analysis result[J]. J Clin Oncol, 2021, 39 (15 suppl): abstract 4077. DOI: 10.1200/JCO.2021.39.15_suppl.4077.

[406] QIN SK, LI Q, XU JM, et al. Icaritin-induced immunomodulatory efficacy in advanced hepatitis B virus-related hepatocellular carcinoma: Immunodynamic biomarkers and overall survival[J]. Cancer Sci, 2020, 111(11): 4218-4231. DOI: 10.1111/cas.14641.

[407] YU Z, GUO JF, HU MY, et al. Icaritin exacerbates mitophagy and synergizes with doxorubicin to induce immunogenic cell death in hepatocellular carcinoma[J]. ACS Nano, 2020, 14(4): 4816-4828. DOI: 10.1021/acsnano.0c00708.

[408] CAI WH, YIN CL, FAN QQ. Clinical effect of Aidi injection combined with transarterial chemoembolization in treatment of advanced primary liver cancer[J]. J Chin Physician, 2018, 20(11): 1723-1725. DOI: 10.3760/cma.j.issn.1008-1372.2018.11.032.
蔡文辉, 尹春丽, 范庆秋. 艾迪联合肝动脉化疗栓塞术治疗中晚期原发性肝癌的临床观察[J]. 中国医师杂志, 2018, 20(11): 1723-1725. DOI: 10.3760/cma.j.issn.1008-1372.2018.11.032.

[409] CHENG Y, HUA HQ. Research progress on anti-hepatoma mechanisms and clinical application of β-elemene[J]. Chin Clin Oncol, 2017, 22(10): 950-953. DOI: 10.3969/j.issn.1009-0460.2017.10.018.
成远, 华海清. 榄香烯治疗原发性肝癌的研究进展[J]. 临床肿瘤学杂志, 2017, 22(10): 950-953. DOI: 10.3969/j.issn.1009-0460.2017.10.018.

[410] FAN S, LI QY, ZHOU ZT, et al. Effect of TACE combined with Jinlong capsule on primary liver cancer[J]. China Pract Med, 2019, 14(21): 42-44. DOI: 10.14163/j.cnki.11-5547/r.2019.21.022.
范隼, 李庆源, 周志涛, 等. TACE联合金龙胶囊治疗原发性肝癌的效果研究[J]. 中国实用医药, 2019, 14(21): 42-44. DOI: 10.14163/j.cnki.11-5547/r.2019.21.022.

[411] GAO JL. Prospective randomized controlled study on advanced primary hepatic cancer treated by Ganfule prescription[J]. China J Chin Mater Med, 2014, 39(12): 2367-2369. DOI: 10.4268/cjcmm20141243.
高继良. 肝复乐方剂治疗晚期原发性肝癌的前瞻性、随机对照临床研究[J]. 中国中药杂志, 2014, 39(12): 2367-2369. DOI: 10.4268/cjcmm20141243.

[412] LU DP, WANG YQ, ZHAO WL, et al. Clinical effect of Kanglaite combined with transarterial chemoembolization in treatment of liver cancer[J]. The World Clin Medicine, 2017, 11(5): 70, 72.
路大鹏, 王玉强, 赵卫林, 等. 康莱特联合肝动脉化疗栓塞术治疗肝癌的临床研究[J]. 世界临床医学, 2017, 11(5): 70,72.

[413] ZHENG DH, YANG JM, WU JX, et al. Cidan capsule in combination with adjuvant transarterial chemoembolization reduces recurrence rate after curative resection of hepatocellular carcinoma: A multicenter, randomized controlled trial[J]. Chin J Integr Med, 2023, 29(1): 3-9. DOI: 10.1007/s11655-022-3537-4.

[414] ZHAI XF, LIU XL, SHEN F, et al. Traditional herbal medicine prevents postoperative recurrence of small hepatocellular carcinoma: A randomized controlled study[J]. Cancer, 2018, 124(10): 2161-2168. DOI: 10.1002/cncr.30915.

[415] The Chinese Chapter of International Hepato-Pancreato-Biliary Association, Chinese Society of Liver Cancer, Society for Hepato-pancreato-biliary Surgery of Chinese Research Hospital Association, et al. Chinese expert consensus on antiviral therapy for hepatitis B virus-related hepatocellular carcinoma (2023 edition)[J]. Chin J Dig Surg, 2023, 22(1): 29-41. DOI: 10.3760/cma.j.cn115610-20221024-00612.
国际肝胆胰协会中国分会, 中国抗癌协会肝癌专业委员会, 中国研究型医院学会肝胆胰外科专业委员会, 等. 乙肝病毒相关肝细胞癌抗病毒治疗中国专家共识(2023版)[J]. 中华消化外科杂志, 2023, 22(1): 29-41. DOI: 10.3760/cma.j.cn115610-20221024-00612.

[416] Liver Cancer Study Group, Chinese Society of Hepatology, Chinese Medical Association. Expert consensus on antiviral therapy for HBV/HCV-related hepatocellular carcinoma: A 2021 update[J]. J Clin Hepatol, 2021, 37(10): 2292-2302. DOI: 10.3969/j.issn.1001-5256.2021.10.008.
中华医学会肝病学分会肝癌学组. HBV/HCV相关肝细胞癌抗病毒治疗专家共识(2021年更新版)[J]. 临床肝胆病杂志, 2021, 37(10): 2292-2302. DOI: 10.3969/j.issn.1001-5256.2021.10.008.

[417] Chinese Society of Hepatology, Chinese Medical Association; Chinese Society of Infectious Diseases, Chinese Medical Association. Guideline for the prevention and treatment of hepatitis C (2022 version)[J]. Chin J Infect Dis, 2023, 41(1): 29-46. DOI: 10.3760/cma.j.cn311365-20230217-00045.
中华医学会肝病学分会, 中华医学会感染病学分会. 丙型肝炎防治指南(2022年版)[J]. 中华传染病杂志, 2023, 41(1): 29-46. DOI: 10.3760/cma.j.cn311365-20230217-00045.

[418] YANG HY, MAO YL, LU X, et al. The effects of urinary trypsin inhibitor on liver function and inflammatory factors in patients undergoing hepatectomy: A prospective, randomized, controlled clinical study [J]. Am J Surg, 2011, 202(2): 151-157. DOI: 10.1016/j.amjsurg.2010.07.044.

[419] Guidelines Committee of Chinese Society of Clinical Oncology. Chinese Society of Clinical Oncology(CSCO)guidelines for standardized management of tumor chemoradiotherapy-related neutropenia (Version 2021)[J]. Chin Clin Oncol, 2021, 26(7): 638-648. DOI: 10.3969/j.issn.1009-0460.2021.07.011.
中国临床肿瘤学会指南工作委员会. 中国临床肿瘤学会(CSCO)肿瘤放化疗相关中性粒细胞减少症规范化管理指南(2021)[J]. 临床肿瘤学杂志, 2021, 26(7): 638-648. DOI: 10.3969/j.issn.1009-0460.2021.07.011.

[420] Thrombosis and Hemostasis Group, Chinese Society of Hematology, Chinese Medical Association. Chinese expert consensus on the clinical application of recombinant human thrombopoiein and thrombopoiein receptor agonist(2023)[J]. Chin J Hematol, 2023, 9(7): 535-542. DOI: 10.3760/cma.j.issn.0253-2727.2023.07.002.
中华医学会血液学分会血栓与止血学组. 促血小板生成药物临床应用管理中国专家共识(2023年版)[J]. 中华血液学杂志, 2023, 9(7): 535-542. DOI: 10.3760/cma.j.issn.0253-2727.2023.07.002.

[421] HUANG A, GUO DZ, WANG YP, et al. The treatment strategy and outcome for spontaneously ruptured hepatocellular carcinoma: A single-center experience in 239 patients[J]. J Cancer Res Clin Oncol, 2022, 148(11): 3203-3214. DOI: 10.1007/s00432-022-03916-3.

[422] MORIS D, CHAKEDIS J, SUN SH, et al. Management, outcomes, and prognostic factors of ruptured hepatocellular carcinoma: A systematic review[J]. J Surg Oncol, 2018, 117(3): 341-353. DOI: 10.1002/jso.24869.

[423] SAHU SK, CHAWLA YK, DHIMAN RK, et al. Rupture of hepatocellular carcinoma: A review of literature[J]. J Clin Exp Hepatol, 2019, 9(2): 245-256. DOI: 10.1016/j.jceh.2018.04.002.

[424] TAN NP, MAJEED A, ROBERTS SK, et al. Survival of patients with ruptured and non-ruptured hepatocellular carcinoma[J]. Med J Aust, 2020, 212(6): 277-278. DOI: 10.5694/mja2.50483.

[425] YOSHIDA H, MAMADA Y, TANIAI N, et al. Spontaneous ruptured hepatocellular carcinoma[J]. Hepatol Res, 2016, 46(1): 13-21. DOI: 10.1111/hepr.12498.

[426] ZHONG F, CHENG XS, HE K, et al. Treatment outcomes of spontaneous rupture of hepatocellular carcinoma with hemorrhagic shock: A multicenter study[J]. Springerplus, 2016, 5(1): 1101. DOI: 10.1186/s40064-016-2762-8.

[427] AOKI T, KOKUDO N, MATSUYAMA Y, et al. Prognostic impact of spontaneous tumor rupture in patients with hepatocellular carcinoma: An analysis of 1 160 cases from a nationwide survey[J]. Ann Surg, 2014, 259(3): 532-542. DOI: 10.1097/SLA.0b013e31828846de.

[428] LAI ECH, LAU WY. Spontaneous rupture of hepatocellular carcinoma: A systematic review[J]. Arch Surg, 2006, 141(2): 191-198. DOI: 10.1001/archsurg.141.2.191.

[429] SHIN BS, PARK MH, JEON GS. Outcome and prognostic factors of spontaneous ruptured hepatocellular carcinoma treated with transarterial embolization[J]. Acta Radiol, 2011, 52(3): 331-335. DOI: 10.1258/ar.2010.100369.

[430] PARK J, JEONG YS, SUH YS, et al. Clinical course and role of embolization in patients with spontaneous rupture of hepatocellular carcinoma[J]. Front Oncol, 2022, 12: 999557. DOI: 10.3389/fonc.2022.999557.

[431] ROUSSEL E, BUBENHEIM M, LE TREUT YP, et al. Peritoneal carcinomatosis risk and long-term survival following hepatectomy for spontaneous hepatocellular carcinoma rupture: Results of a multicenter French study (FRENCH-AFC)[J]. Ann Surg Oncol, 2020, 27(9): 3383-3392. DOI: 10.1245/s10434-020-08442-5.

[432] ZHOU J, HUANG A, YANG XR. Liquid biopsy and its potential for management of hepatocellular carcinoma[J]. J Gastrointest Cancer, 2016, 47(2): 157-167. DOI: 10.1007/s12029-016-9801-0.

[433] ZHOU Y, WANG BL, WU J, et al. Association of preoperative EpCAM Circulating Tumor Cells and peripheral Treg cell levels with early recurrence of hepatocellular carcinoma following radical hepatic resection[J]. BMC Cancer, 2016, 16: 506. DOI: 10.1186/s12885-016-2526-4.

[434] SUN YF, XU Y, YANG XR, et al. Circulating stem cell-like epithelial cell adhesion molecule-positive tumor cells indicate poor prognosis of hepatocellular carcinoma after curative resection[J]. Hepatology, 2013, 57(4): 1458-1468. DOI: 10.1002/hep.26151.

[435] GUO W, YANG XR, SUN YF, et al. Clinical significance of EpCAM mRNA-positive circulating tumor cells in hepatocellular carcinoma by an optimized negative enrichment and qRT-PCR-based platform [J]. Clin Cancer Res, 2014, 20(18): 4794-4805. DOI: 10.1158/1078-0432.CCR-14-0251.

[436] ZHENG WJ, WANG PX, SUN YF, et al. Uncovering the heterogeneity and clinical relevance of circulating tumor-initiating cells in hepatocellular carcinoma using an integrated immunomagnetic-microfluidic platform[J]. ACS Appl Mater Interfaces, 2022, 14(32): 36425-36437. DOI: 10.1021/acsami.2c09085.

[437] SUN YF, GUO W, XU Y, et al. Circulating tumor cells from different vascular sites exhibit spatial heterogeneity in epithelial and mesenchymal composition and distinct clinical significance in hepatocellular carcinoma[J]. Clin Cancer Res, 2018, 24(3): 547-559. DOI: 10.1158/1078-0432.CCR-17-1063.

[438] SUN YF, WANG PX, CHENG JW, et al. Postoperative circulating tumor cells: An early predictor of extrahepatic metastases in patients with hepatocellular carcinoma undergoing curative surgical resection[J]. Cancer Cytopathol, 2020, 128(10): 733-745. DOI: 10.1002/cncy.22304.

[439] ZHOU KQ, SUN YF, CHENG JW, et al. Effect of surgical margin on recurrence based on preoperative circulating tumor cell status in hepatocellular carcinoma[J]. EBioMedicine, 2020, 62: 103107. DOI: 10.1016/j.ebiom.2020.103107.

[440] WANG PX, XU Y, SUN YF, et al. Detection of circulating tumour cells enables early recurrence prediction in hepatocellular carcinoma patients undergoing liver transplantation[J]. Liver Int, 2021, 41(3): 562-573. DOI: 10.1111/liv.14734.

[441] HUANG A, ZHANG X, ZHOU SL, et al. Plasma circulating cell-free DNA integrity as a promising biomarker for diagnosis and surveillance in patients with hepatocellular carcinoma[J]. J Cancer, 2016, 7(13): 1798-1803. DOI: 10.7150/jca.15618.

[442] HUANG A, ZHAO X, YANG XR, et al. Circumventing intratumoral heterogeneity to identify potential therapeutic targets in hepatocellular carcinoma[J]. J Hepatol, 2017, 67(2): 293-301. DOI: 10.1016/j.jhep.2017.03.005.

[443] HUANG A, ZHANG X, ZHOU SL, et al. Detecting circulating tumor DNA in hepatocellular carcinoma patients using droplet digital PCR is feasible and reflects intratumoral heterogeneity[J]. J Cancer, 2016, 7(13): 1907-1914. DOI: 10.7150/jca.15823.

[444] FUJII Y, ONO A, HAYES CN, et al. Identification and monitoring of mutations in circulating cell-free tumor DNA in hepatocellular carcinoma treated with lenvatinib[J]. J Exp Clin Cancer Res, 2021, 40(1): 215. DOI: 10.1186/s13046-021-02016-3.

[445] XIA YX, TANG WW, QIAN XF, et al. Efficacy and safety of camrelizumab plus apatinib during the perioperative period in resectable hepatocellular carcinoma: A single-arm, open label, phase II clinical trial[J]. J Immunother Cancer, 2022, 10(4): e004656. DOI: 10.1136/jitc-2022-004656.

[446] GAO Q, ZENG Q, WANG ZJ, et al. Circulating cell-free DNA for cancer early detection[J]. Innovation (Camb), 2022, 3(4): 100259. DOI: 10.1016/j.xinn.2022.100259.
[447] LI WS, ZHANG X, LU XY, et al. 5-Hydroxymethylcytosine signatures in circulating cell-free DNA as diagnostic biomarkers for human cancers [J]. Cell Res, 2017, 27(10): 1243-1257. DOI: 10.1038/cr.2017.121.
[448] GAO Q, LIN YP, LI BS, et al. Unintrusive multi-cancer detection by circulating cell-free DNA methylation sequencing (THUNDER): Development and independent validation studies[J]. Ann Oncol, 2023, 34(5): 486-495. DOI: 10.1016/j.annonc.2023.02.010.
[449] WANG P, SONG QQ, REN J, et al. Simultaneous analysis of mutations and methylations in circulating cell-free DNA for hepatocellular carcinoma detection[J]. Sci Transl Med, 2022, 14(672): eabp8704. DOI: 10.1126/scitranslmed.abp8704.
[450] ZHANG S, LIU YM, CHEN J, et al. Autoantibody signature in hepatocellular carcinoma using seromics[J]. J Hematol Oncol, 2020, 13(1): 85. DOI: 10.1186/s13045-020-00918-x.
[451] HANG D, YANG XL, LU JY, et al. Untargeted plasma metabolomics for risk prediction of hepatocellular carcinoma: A prospective study in two Chinese cohorts[J]. Int J Cancer, 2022, 151(12): 2144-2154. DOI: 10.1002/ijc.34229.
[452] WAQAR W, ASGHAR S, MANZOOR S. Platelets' RNA as biomarker trove for differentiation of early-stage hepatocellular carcinoma from underlying cirrhotic nodules[J]. PLoS One, 2021, 16(9): e0256739. DOI: 10.1371/journal.pone.0256739.
[453] WANG ZF, ZHONG Y, ZHANG ZF, et al. Characteristics and clinical significance of T-cell receptor repertoire in hepatocellular carcinoma[J]. Front Immunol, 2022, 13: 847263. DOI: 10.3389/fimmu.2022.847263.
[454] ZHANG Q, YE M, LIN C, et al. Mass cytometry-based peripheral blood analysis as a novel tool for early detection of solid tumours: A multicentre study[J]. Gut, 2023, 72(5): 996-1006. DOI: 10.1136/gutjnl-2022-327496.
[455] KONDO M, MORIMOTO M, KOBAYASHI S, et al. Randomized, phase II trial of sequential hepatic arterial infusion chemotherapy and sorafenib versus sorafenib alone as initial therapy for advanced hepatocellular carcinoma: SCOOP-2 trial[J]. BMC Cancer, 2019, 19(1): 954. DOI: 10.1186/s12885-019-6198-8.
[456] KUDO M, UESHIMA K, YOKOSUKA O, et al. Sorafenib plus low-dose cisplatin and fluorouracil hepatic arterial infusion chemotherapy versus sorafenib alone in patients with advanced hepatocellular carcinoma (SILIUS): A randomised, open label, phase 3 trial[J]. Lancet Gastroenterol Hepatol, 2018, 3(6): 424-432. DOI: 10.1016/S2468-1253(18)30078-5.
[457] KUDO M, KAWAMURA Y, HASEGAWA K, et al. Management of hepatocellular carcinoma in Japan: JSH consensus statements and recommendations 2021 update[J]. Liver Cancer, 2021, 10(3): 181-223. DOI: 10.1159/000514174.
[458] LI QJ, HE MK, CHEN HW, et al. Hepatic arterial infusion of oxaliplatin, fluorouracil, and leucovorin versus transarterial chemoembolization for large hepatocellular carcinoma: A randomized phase III trial [J]. J Clin Oncol, 2022, 40(2): 150-160. DOI: 10.1200/JCO.21.00608.
[459] ZHAO M, GUO Z, ZOU YH, et al. Arterial chemotherapy for hepatocellular carcinoma in China: consensus recommendations[J]. Hepatol Int, 2024, 18(1): 4-31. DOI: 10.1007/s12072-023-10599-6.
[460] XU L, PENG ZW, CHEN MS, et al. Prognostic nomogram for patients with unresectable hepatocellular carcinoma after transcatheter arterial chemoembolization[J]. J Hepatol, 2015, 63(1): 122-130. DOI: 10.1016/j.jhep.2015.02.034.
[461] HAN GH, BERHANE S, TOYODA H, et al. Prediction of survival among patients receiving transarterial chemoembolization for hepatocellular carcinoma: A response-based approach[J]. Hepatology, 2020, 72(1): 198-212. DOI: 10.1002/hep.31022.
[462] KUDO M, UESHIMA K, IKEDA M, et al. Final results of TACTICS: A randomized, prospective trial comparing transarterial chemoembolization plus sorafenib to transarterial chemoembolization alone in patients with unresectable hepatocellular carcinoma[J]. Liver Cancer, 2022, 11(4): 354-367. DOI: 10.1159/000522547.
[463] PARK JW, KIM YJ, KIM DY, et al. Sorafenib with or without concurrent transarterial chemoembolization in patients with advanced hepatocellular carcinoma: The phase III STAH trial[J]. J Hepatol, 2019, 70(4): 684-691. DOI: 10.1016/j.jhep.2018.11.029.
[464] HAN Y, CAO G, SUN B, et al. Regorafenib combined with transarterial chemoembolization for unresectable hepatocellular carcinoma: A real-world study[J]. BMC Gastroenterol, 2021, 21(1): 393. DOI: 10.1186/s12876-021-01967-3.
[465] XU BB, LU D, LIU KC, et al. Efficacy and prognostic factors of regorafenib in the treatment of BCLC stage C hepatocellular carcinoma after failure of the first-line therapy[J]. Drug Des Devel Ther, 2023, 17: 507-518. DOI: 10.2147/DDDT.S400533.
[466] SANGRO B, IÑARRAIRAEGUI M, BILBAO JI. Radioembolization for hepatocellular carcinoma[J]. J Hepatol, 2012, 56(2): 464-473. DOI: 10.1016/j.jhep.2011.07.012.
[467] PRESTON E, SHAIDA N. Selective internal radiation therapy in the management of primary and metastatic disease in the liver[J]. Br J Hosp Med (Lond), 2021, 82(2): 1-11. DOI: 10.12968/hmed.2020.0624.
[468] LIU DM, LEUNG TW, CHOW PK, et al. Clinical consensus statement: Selective internal radiation therapy with yttrium 90 resin microspheres for hepatocellular carcinoma in Asia[J]. Int J Surg, 2022, 102: 106094. DOI: 10.1016/j.ijsu.2021.106094.
[469] Nuclear Medicine Committee, Chinese Society of Clinical Oncology; Beijing Nuclear Medicine Quality Control and Improvement Center. Chinese expert consensus on selective internal radiation therapy with yttrium-90 for primary and metastatic hepatocellular carcinoma[J]. Chin J Hepatol, 2021, 29(7): 648-658. DOI: 10.3760/cma.j.cn501113-20210302-00103.
中国临床肿瘤学会核医学专家委员会, 北京市核医学质量控制和改进中心. 钇-90(^{90}Y)微球选择性内放射治疗原发性和转移性肝癌的中国专家共识[J]. 中华肝脏病杂志, 2021, 29(7): 648-658. DOI: 10.3760/cma.j.cn501113-20210302-00103.
[470] SALEM R, JOHNSON GE, KIM E, et al. Yttrium-90 radioembolization for the treatment of solitary, unresectable HCC: The LEGACY study [J]. Hepatology, 2021, 74(5): 2342-2352. DOI: 10.1002/hep.31819.
[471] ALISEDA D, MARTÍ-CRUCHAGA P, ZOZAYA G, et al. Liver resection and transplantation following yttrium-90 radioembolization for primary malignant liver tumors: A 15-year single-center experience[J]. Cancers (Basel), 2023, 15(3): 733. DOI: 10.3390/cancers15030733.
[472] LEWANDOWSKI RJ, GABR A, ABOUCHALEH N, et al. Radiation segmentectomy: Potential curative therapy for early hepatocellular carcinoma[J]. Radiology, 2018, 287(3): 1050-1058. DOI: 10.1148/radiol.2018171768.
[473] PONZIANI FR, SANTOPAOLO F, POSA A, et al. SIRT in 2025. Cardiovasc Intervent Radiol[J]. 2022, 45(11): 1622-1633. DOI: 10.1007/s00270-022-03228-6.
[474] MARKS LB, YORKE ED, JACKSON A, et al. Use of normal tissue complication probability models in the clinic[J]. Int J Radiat Oncol Biol Phys, 2010, 76(3 Suppl): S10-S19. DOI: 10.1016/j.ijrobp.2009.07.1754.
[475] PAN CC, KAVANAGH BD, DAWSON LA, et al. Radiation-associated liver injury[J]. Int J Radiat Oncol Biol Phys, 2010, 76(3 Suppl): S94-S100. DOI: 10.1016/j.ijrobp.2009.06.092.
[476] CHON YE, SEONG J, KIM BK, et al. Gastroduodenal complications after concurrent chemoradiation therapy in patients with hepatocellular carcinoma: Endoscopic findings and risk factors[J]. Int J Radiat Oncol Biol Phys, 2011, 81(5): 1343-1351. DOI: 10.1016/j.ijrobp.2010.07.1986.
[477] HANNA GG, MURRAY L, PATEL R, et al. UK consensus on normal tissue dose constraints for stereotactic radiotherapy[J]. Clin Oncol (R Coll Radiol), 2018, 30(1): 5-14. DOI: 10.1016/j.clon.2017.09.007.