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ORIGINAL ARTICLE

A Meta-analysis comparing the effect of anatomical resection vs. non-anatomical resection on the long-term outcomes for patients undergoing hepatic resection for hepatocellular carcinoma

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Abstract

Background: This study aimed to compare the outcomes of patients undergoing anatomical resection (AR) versus non-anatomical resection (NAR) for hepatocellular carcinoma (HCC) from the published comparative studies within the literatures.

Methods: A meta-analysis of studies published from 2001 to 2010 were conducted using RevMan 5.0. Measured outcomes were morbidity, mortality, recurrence and 5 year overall (OS) and disease free (DFS) survival.

Results: Seventeen observational studies involving 3129 patients were analyzed: 1626 (52%) in AR group and 1503 (48%) in NAR group. The 5-year OS (RR, 1.18; 95% CI, 1.03–1.36; P = 0.018) and DFS (RR, 1.56; 95% CI, 1.23–1.97; P < 0.001) were significantly greater in the AR group than the NAR group, while the overall recurrence was significantly lower (RR, 0.84; 95% CI, 0.75–0.94; P < 0.001). There were no significant differences in mortality (RR, 1.00; 95% CI, 0.80–1.25; P = 0.980) or morbidity (OR, 0.97; 95% CI, 0.48–1.99; P = 0.943) between the AR and NAR groups.

Conclusion: AR for HCC is superior to NAR considering its higher 5-year OS and DFS rates and lower overall recurrence rate. Heterogeneity detection within the analysis suggests these results should be interpreted with caution and further well designed studies are required to address this issue.

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Introduction

Hepatocellular carcinoma (HCC) is the fifth-most-common cancer in the world. Each year it has been estimated there are 748,300 new diagnoses of HCC and 695,900 HCC cancer deaths worldwide.[1] The incidence of HCC continues to increase due to the dissemination of hepatitis B and C virus infection.[2] Liver resection is considered the most effective therapy for patients with HCC who are not candidates for liver transplantation. With considerable improvements in the refinement of surgical techniques, perioperative mortality has decreased. However, the high incidence of recurrence remains a major challenge in HCC management.[3,4] It is proposed that subclinical metastases, originating from the primary tumor through microscopic vascular invasion and peripheral spread are responsible for early hepatic recurrence. Early recurrence has been shown to be the most significant adverse prognostic factors.[5,6] An anatomical resection (AR) was first proposed by Makuuchi *et al.* with the aim of achieving complete excision of the tumor-bearing portal tributaries supplied by a major branch of the portal vein and hepatic artery.[7] The rational was to excise the high-risk area for micro-portal invasion and occult intrahepatic metastases from the primary tumor.[8,9] Recent studies have suggested AR improved long-term outcomes compared to non-AR (NAR).[8,10–16] However, other researchers have recommended NAR especially in presence of diseased liver in an effort to preserve the residual hepatic function.[17–21]

Thus the true benefit of AR compared to NAR remains controversial. The aim of this study was to evaluate the available evidence comparing the prognosis of AR and NAR for the treatment of HCC using a meta-analysis in the absence of available randomized studies.

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Methods

Literature search

This meta-analysis followed PRISMA guidelines. The PubMed, Science Citation index, and Medline database were used to search the literature for studies comparing AR versus NAR for the treatment of HCC published from 2001 to 2010 written in English. "Anatomical resection," "non-anatomic resection," "limited resection", "systematic resection", "wedge resection", "hepatocellular carcinoma", and "prognosis" were used as the following Mesh search headings. The reference lists of the identified articles were also searched for additional studies.

AR was considered as the resection of the neoplasm together with the portal vein relevant to the neoplasm and the corresponding hepatic territory. Thus segmentectomy, subsegmentectomy, sectoriectomy, hemihepatectomy, and trisectoriectomy were classified as AR., based on Couinaud's classification. NAR was defined as a resection without consideration of the segmental anatomy (limited resection), including extended monosegmentectomy or sectionectomy, considered as additional partial resections contiguous to a segment or a section resected anatomically.[11,19,22]

Data extraction and quality assessment

Data extraction was performed by one investigator, and was then checked independently for the accuracy by another investigator. The variables extracted from each study was as follows: the year of publication, the first author, the male/female ratio, the number of subjects operated on by the use of each resection technique, hepatitis virus infection, hepatic function (Child-Pugh A percentage), cirrhosis. The outcomes recorded were morbidity, mortality, recurrence and overall (OS) and disease free (DFS) 5 year survival. Any discrepancies were settled through a discussion until reaching a consensus.

The Jadad scoring criteria was used to evaluate the quality of the randomized studies included.[23] This scale reflects

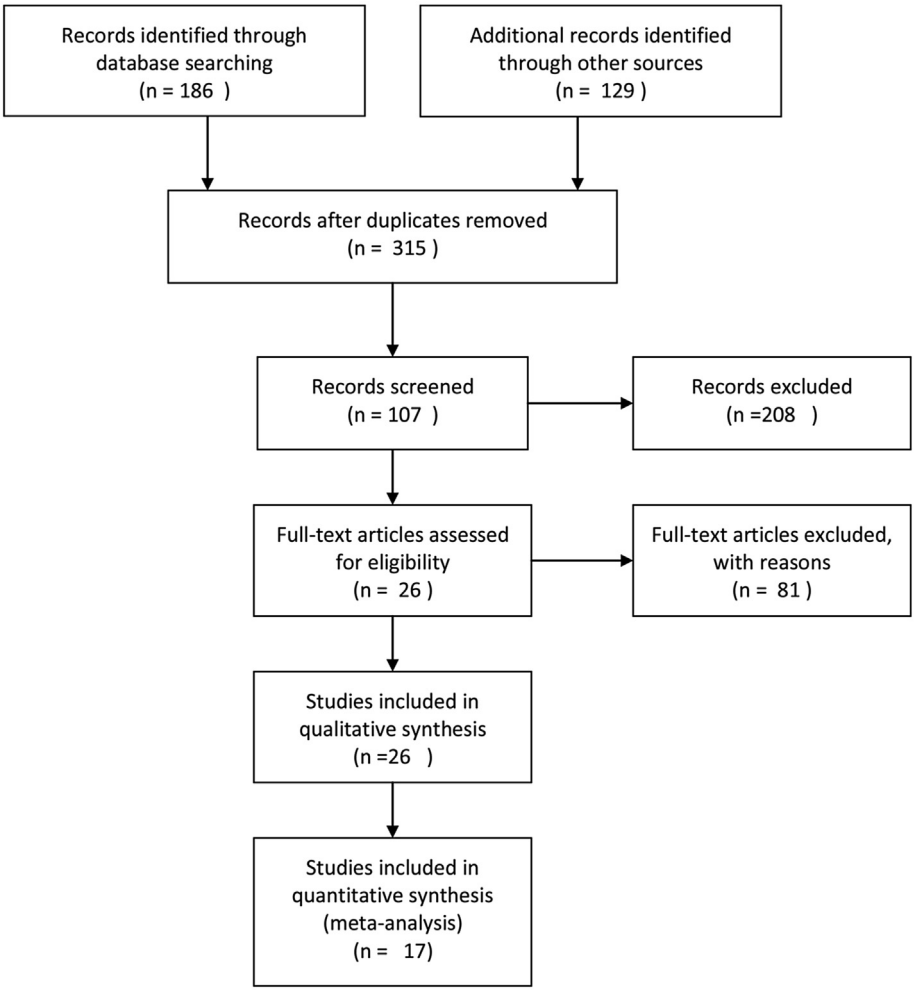

Figure 1 Flow chart of selection process in this meta-analysis

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