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ORIGINAL ARTICLE

A pooled analysis of combined liver and inferior vena cava resection for hepatic malignancy

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Abstract

Background: Limited data are currently available to address the safety and efficacy of combined resection of the liver and inferior vena cava (IVC) for hepatic malignancies.

Methods: A systematic review was performed to identify relevant studies. Pooled individual data were examined for the clinical outcome of combined resection of the liver and IVC for hepatic malignancies.

Results: A total of 258 patients were described in 38 articles eligible for inclusion. Resections were performed for colorectal liver metastasis (CLM) [n = 128 (50%)], intrahepatic cholangiocarcinoma (ICC) [n = 51 (20%)], hepatocellular carcinoma (HCC) [n = 48 (19%)], and other pathologies [n = 31 (11%)]. There were 14 (5%) perioperative deaths. The median survival duration was 34 months, and the 1-, 3- and 5-year overall survival (OS) rate was 79%, 46% and 33%, respectively. The 5-year OS rate was 26% for CLM, 37% for ICC, and 30% for HCC.

Conclusion: Combined resection of the liver and IVC for hepatic malignancies is safe and applicable, and offers acceptable survival outcomes.

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Introduction

Patients with hepatic malignant tumors involving the inferior vena cava (IVC) are usually considered ineligible for surgical management because of the significant associated risks for massive bleeding or intraoperative air embolism. Advances in perioperative care and application of innovative surgical techniques such as total hepatic vascular exclusion (THVE), veno-venous bypass, and *ex vivo* hepatic resection have made it possible to perform combined liver and IVC resection in such patients.[1–14] However, the numbers of both related articles published and patients involved are limited so that it is difficult to provide sufficient evidence to draw a conclusion about the value of this procedure. The aim of this systematic review of the literature is to pool data from all individually documented patients to evaluate the safety and efficacy of combined liver and IVC resection.

Yanming Zhou and Lupeng Wu contributed equally to this work.

Methods

The present study was performed by following the recommendations of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Statement.[15] The level of evidence of each study was classified according to the Oxford Centre for Evidence-Based Medicine levels of evidence.[16]

Literature review

A systematic literature search was conducted using PubMed, Embase and the Cochrane Library, to identify articles published from January 1980 to July 2016. Search terms were: "inferior vena cava," "liver resection," and "hepatic resection." Bibliographies of the retrieved studies were checked manually for additional studies.

Inclusion criteria

(i) Papers presenting data on combined liver and IVC resection for hepatic malignancies; (ii) original data published; and (iii) long-term outcomes available.

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Exclusion criteria

(i) Non-English language studies; (ii) reviews without original data and animal studies; (iii) the absence of individual patient data; (iv) IVC leiomyosarcoma involving the vena cava by primary retroperitoneal malignancy; and (v) the absence of long-term data.

Two investigators (LW and YZ) independently reviewed all the retrieved studies that met the inclusion and exclusion criteria. Discrepancies between the two reviewers were resolved by discussion and consensus. The following data were collected for each patient: sex, age, diagnosis, operative details, histological evidence of IVC invasion, perioperative outcomes, and long-term survival. Postoperative morbidity was defined as any complication requiring medications or interventional procedures. Postoperative mortality was defined as any death occurring within 30 days of surgery or within the same hospital stay. Overall survival was defined as the interval from surgery to the date of death.

Statistical analyses

Descriptive statistics were performed by full tabulation of the results. Overall survival analysis was performed using the Kaplan–Meier method and compared by log-rank test. Given heterogeneity between included studies due to differences with respect to study populations, kind of surgical procedures, IVC resections and reconstructions, subgroup analyses was then carried out using the these variables. All statistical analyses were performed using SPSS statistical software (v.17; SPSS, Chicago, IL).

Results

Characteristics of the study population

Search of the literature yielded 423 articles (Fig. 1). After screening, a total of 258 patients were described in 38 articles eligible for inclusion.[1–14,17–40] All these studies were uncontrolled observational in nature and classified as level-4

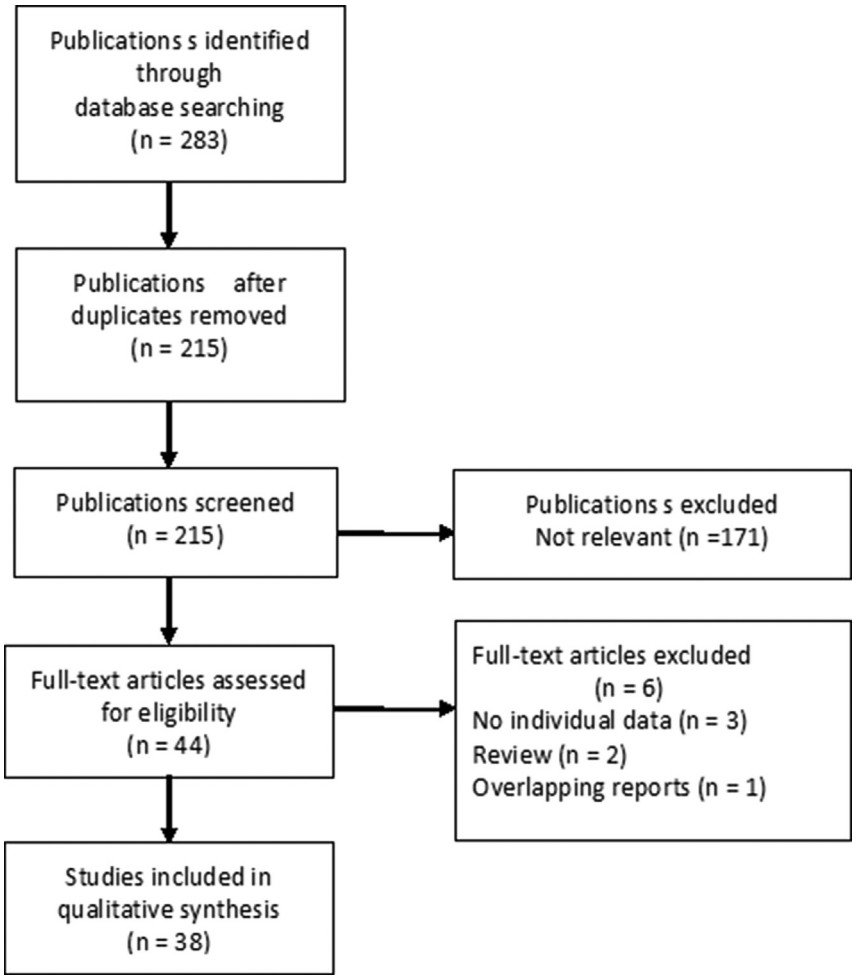

Figure 1 Study selection

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