



Clinical Impact of Caudate Lobectomy in Intrahepatic Cholangiocarcinoma Involving the Hepatic Hilus

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See “Short-term and Long-term Clinical Outcomes of Combined Caudate Lobectomy for Intrahepatic Cholangiocarcinoma Involving the Hepatic Hilus: A Propensity Score Analysis” by Di Zeng, et al. on page 438, Vol. 19, No. 3, 2025

Surgical management of intrahepatic cholangiocarcinoma (ICC) with hilar involvement represents one of the most challenging issues in hepatobiliary surgery. The recent propensity score-matched study by Zeng *et al.*¹ provides compelling evidence that caudate lobectomy (CL) significantly improves both overall survival and disease-free survival without increasing perioperative complications in patients with ICC involving the hepatic hilus (hICC).

The anatomical rationale for routine CL in hilar malignancies is well-established. The caudate lobe has a unique biliary drainage pattern into the right and left hepatic ducts near the hilum, creating a potential pathway for microscopic tumor spread that is often not detected on conventional imaging. Huang and colleagues recently provided a comprehensive anatomical review that highlights these complex connections, highlighting the vulnerability of the caudate lobe even in the absence of obvious macroscopic involvement.²

While CL has long been considered standard practice for perihilar cholangiocarcinoma, its role in hICC has remained controversial due to the technical challenges and potential morbidity. The caudate lobe is difficult to resect because of its proximity to important vascular structures such as the inferior vena cava, portal vein, and hepatic vein. However, Zeng *et al.*¹ demonstrated that CL surgery can be performed safely without a significant increase in perioperative complications, despite a slightly longer operative time, by utilizing modern surgical expertise.

The oncological benefits of CL highlighted in this study

are particularly noteworthy. CL was associated with a higher R0 resection rate (86.8% vs 76.1%) and significantly lower recurrence rates at both 1 year (46.1% vs 69.6%) and 5 years (66.3% vs 83.1%). These results are consistent with those of Gilbert *et al.*,³ who demonstrated that CL improves R0 resection rate and overall survival in perihilar cholangiocarcinoma, and Wang *et al.*,⁴ who advocated complete CL over partial CL to optimize outcome.

Advances in anatomical understanding have further supported the feasibility of precise caudate resection. Maki *et al.*⁵ used three-dimensional reconstruction to clarify the anatomical boundaries between the caudate lobe and adjacent segments, thereby increasing surgical precision and reducing surgical risk.

Despite prior concerns about surgical morbidity, recent meta-analyses suggest that liver resections involving CL can be safely undertaken by experienced teams. In a meta-analysis of 19,503 patients undergoing liver resection for ICC, van Keulen *et al.*⁶ reported a pooled 90-day mortality of 6.1% and a major complication rate of 22.2%, with higher risks seen only in extended resections. Zeng *et al.*'s findings, no significant increase in morbidity despite longer operative times, suggest that CL can be performed safely with adequate expertise.

Importantly, the subgroup analyses from Zeng's study provide nuanced insights into patient selection. The greatest survival benefit from CL was observed in patients under 65 years, with Bismuth IV tumors, well-differentiated histology, and tumors smaller than 5cm. This nuanced approach allows surgeons to tailor treatment strategies based



on individual patient and tumor characteristics. As the use of clinical prediction models grows, such as the one by Fang *et al.*⁷ for distal metastasis in ICC, personalized surgical planning may be further enhanced.

International guidelines increasingly emphasize the paramount importance of achieving R0 resection in cholangiocarcinoma. A recent update from the European Society for Medical Oncology and the British Society of Gastroenterology explicitly endorses an aggressive surgical strategy when indicated, and reinforces the role of CL when anatomically indicated.^{8,9}

In conclusion, the study by Zeng *et al.* represents an important advance in establishing that CL is an essential component of curative surgery for hICC. For hepatobiliary surgeons, particularly in high-volume centers, routine consideration of CL should be regarded as a standard of care when resecting hICC.¹⁰

CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

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