

Laparoscopic versus Open Hepatectomy for Intrahepatic Cholangiocarcinoma

A Propensity Score Matched Analysis Focusing on Oncological Adequacy and lymph node yield

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Introduction

Lymph node dissection during liver resection for intrahepatic cholangiocarcinoma (iCCA) is recommended due to the risk of lymph node metastasis, which occurs in approximately 25–50% of cases¹, in contrast to hepatocellular carcinoma (HCC). Laparoscopic liver resection (LLR) for hepatocellular carcinoma (HCC) is currently accepted as a standard treatment; however, for intrahepatic cholangiocarcinoma (iCCA), which also requires laparoscopic lymph node dissection, the benefits remain uncertain, as the procedure is technically demanding and carries a risk of injury to hepatoduodenal ligament structures, including the hepatic artery, portal vein, and bile duct (Figure 1). This study aimed to compare the adequacy of lymph node dissection between LLR and open liver resection (OLR).

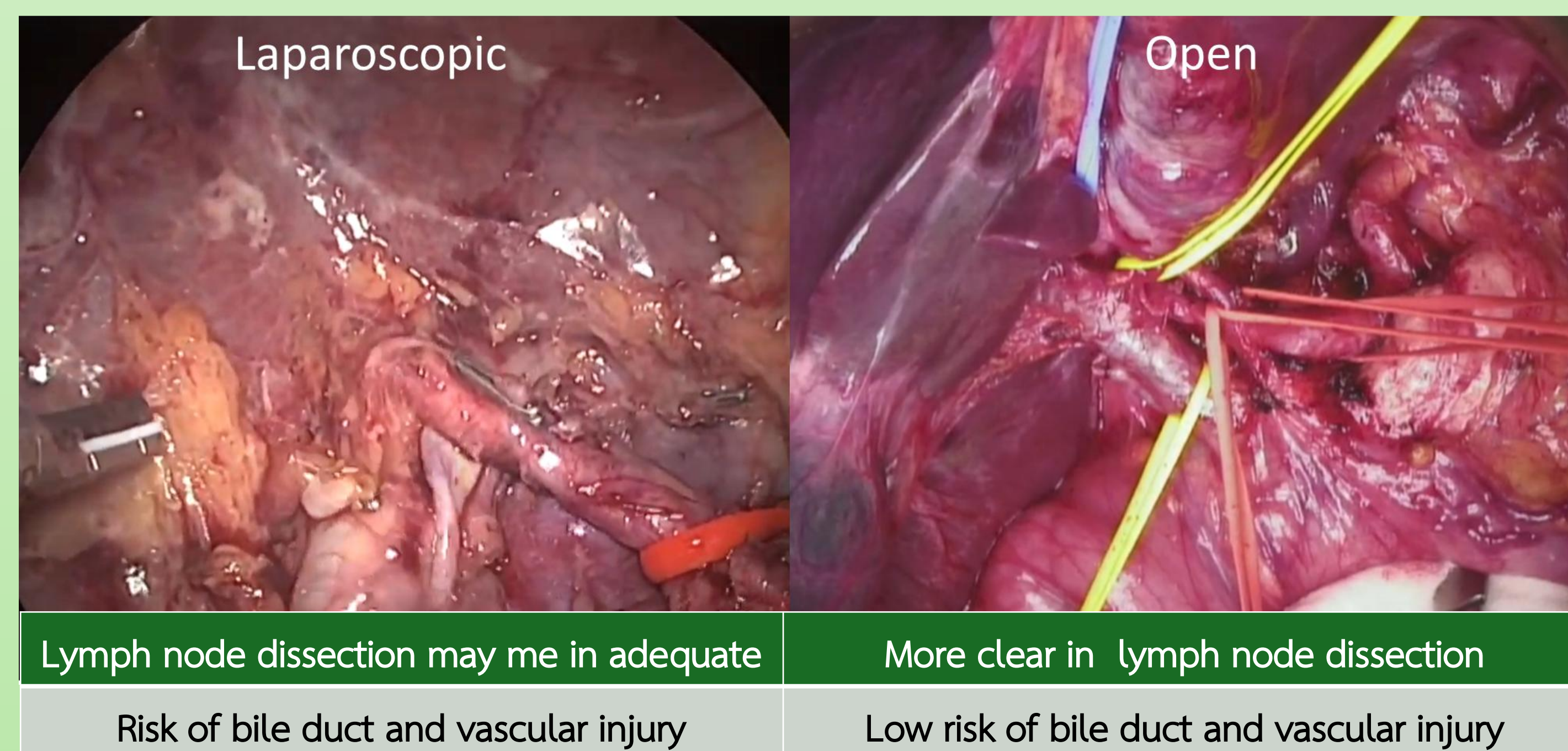


Figure 1: Comparison of Laparoscopic and Open Hepatoduodenal Ligament Dissection for Lymph Node Retrieval.

Method

Between 2014 and 2024, medical records of iCCA who underwent curative-intent resection were retrospectively reviewed and categorized into two groups: open liver resection (OLR) and laparoscopic liver resection (LLR). The number of lymph nodes resected, 90-day mortality, postoperative complications, length of hospital stay, and survival outcomes were compared. Propensity score matching was performed to balance baseline characteristics between the two groups (Figure 2).

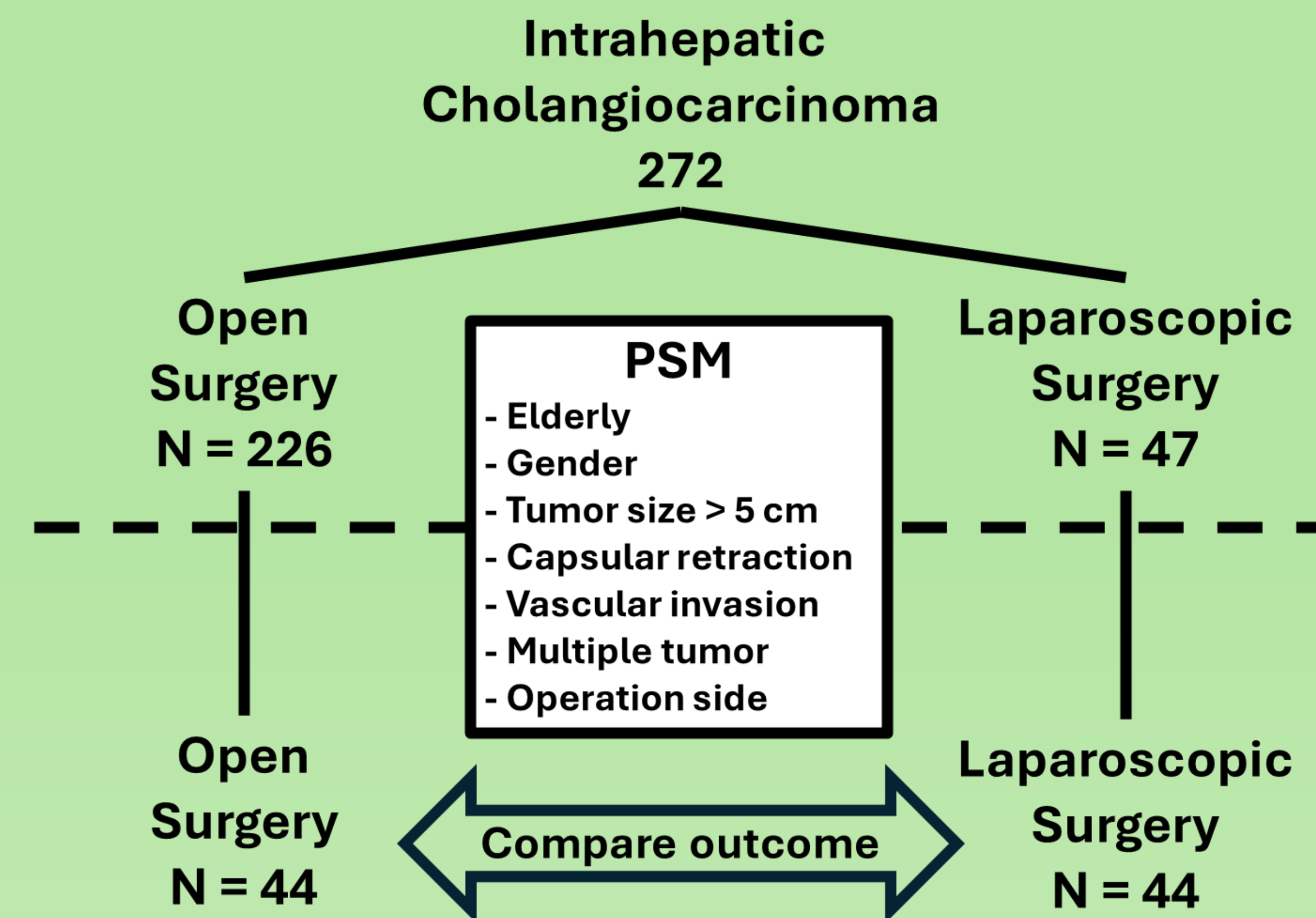


Figure 2 : Variables included in the propensity score matching analysis.

Result

Among 273 patients, 226 (82.7%) underwent OLR and 47 (17.2%) underwent LLR. In the OLR group, after propensity score matching, 44 patients were included in each group. Characteristics of patients after propensity score matching are shown in Table 1. Among these, 35 (79.6%) in the OLR group and 20 (45.5%) in the LLR group underwent LND ($P = 0.001$). The mean number of lymph nodes harvested was 5 in the OLR group and 5.7 in the LLR group ($P = 0.87$). The 5-year survival rate was 58.6% in the OLR group and 68.1% in the LLR group (HR 0.67, 95% CI 0.30–1.50, $P = 0.329$) (Figure 4).

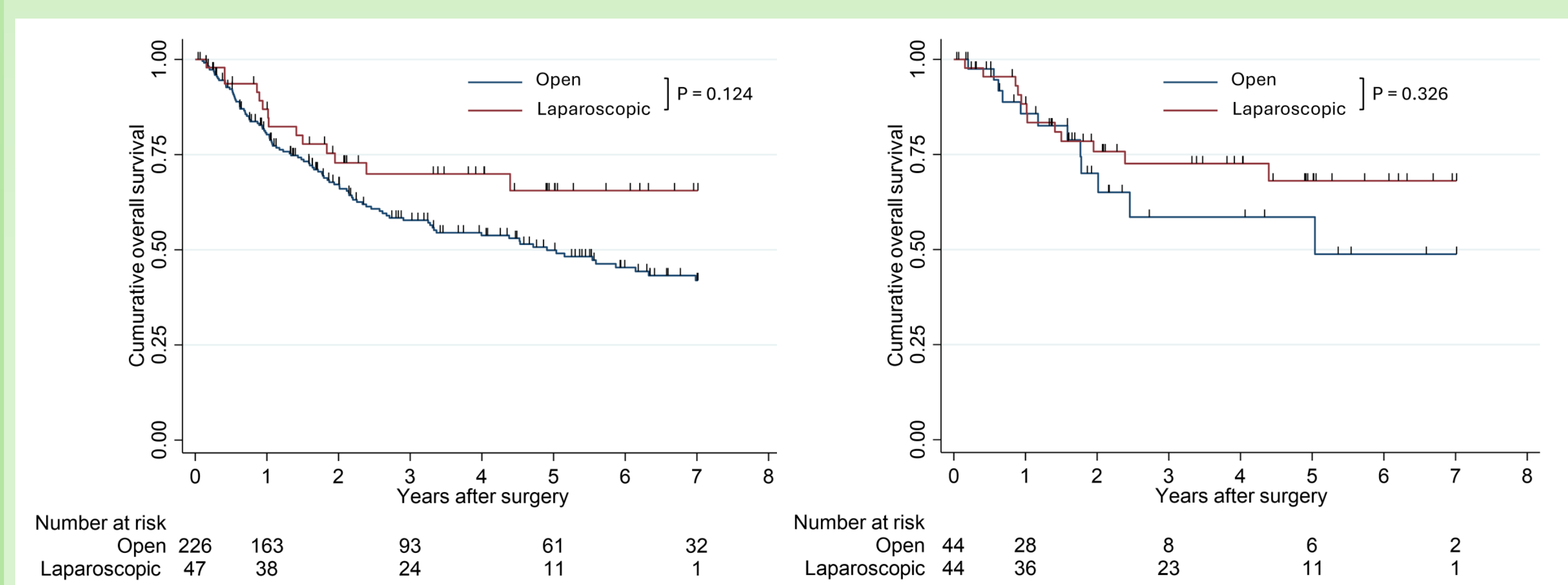


Figure 3 : Survival outcome comparing OLR vs LLR before and after propensity score matching.

Characteristic	Open (N = 44)	Laparoscopic (N = 44)	P value
Age, years, (median; range)	61 (41 - 87)	65 (44 - 81)	0.435
Gender			
Male	28 (63.6)	20 (45.5)	0.087
Female	16 (36.4)	24 (54.6)	
Radiologic finding			
Tumor size more than 5 cm	18 (40.9)	14 (31.8)	0.375
Capsular retraction	16 (36.4)	14 (31.8)	0.653
Macroscopic vascular invasion	11 (25.0)	5 (11.4)	0.097
Lymphadenopathy	6 (33.3)	8 (50.0)	0.324
Multiplicity of tumor	5 (11.4)	4 (9.1)	0.725
Operation			
Right side hepatectomy	26 (59.1)	32 (72.7)	0.177
Right hepatectomy	23 (52.3)	30 (68.2)	
Extended right hepatectomy	1 (2.3)	2 (4.5)	
Minor hepatectomy on right side	2 (4.5)	0 (0)	
Left side hepatectomy	18 (40.9)	12 (27.3)	0.177
Left hepatectomy	17 (38.6)	11 (25.0)	
Extended left hepatectomy	0 (0)	0 (0)	
Minor hepatectomy on left side	1 (2.3)	1 (2.3)	
Central bisectionectomy	0 (0)	0 (0)	
Lymph node dissection perform	35 (79.6)	20 (45.5)	0.001
Lymph nodes harvested (mean, SD)	5 (3.95)	5.7 (5.2)	0.870
Adequate lymph node harvested (≥ 6)	12 (33.3)	9 (45.0)	0.388
Lymph nodes metastasis	9 (20.9)	5 (12.8)	0.330
Morphology			
Intraductal growth	32 (72.7)	23 (56.1)	0.109
Periductal infiltrating	12 (27.3)	7 (17.1)	0.259
Mass forming	27 (61.4)	25 (61.0)	0.971
90-day mortality	1 (2.3)	1 (2.3)	1.000
Margin positive	14 (31.8)	7 (15.9)	0.080

Table 1: Patients characteristics comparing OLR vs LLR after propensity score matched.

Discussion

In contrast to previous study, which showed that LLR was inferior to OLR and did not substantially improve the quality of patient care², our study demonstrated comparable oncologic outcomes and survival benefits. However, postoperative complications were not evaluated in this study. In conclusion, the effectiveness of LLR was comparable to that of OLR. Therefore, LLR may be considered a suitable option for iCCA, offering oncologic outcomes comparable to those of OLR.

References

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