Robotic Vs. 'Open' Major Hepatectomy: A Propensity Score Matching Study

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Introduction: The data on major robotic hepatectomy are lacking. This study was undertaken to compare robotic vs. the 'open' major hepatectomy utilizing patient propensity score matching (PSM).

Methods: With IRB approval, we prospectively followed 183 patients who had undergone robotic or 'open' major hepatectomy, defined as the removal of three or more segments. 42 patients who underwent the 'open' approach were matched with 42 who underwent the robotic approach. The criteria for PSM was resection type, tumor size, cell type, and BMI. Survival was stratified for hepatocellular carcinoma (HCC), intrahepatic cholangiocarcinoma (IHCC), and colorectal liver metastases (CLM). The data are presented as median(mean±SD).

Results: Operative duration for the robotic approach was 293(302±131.5) vs. 280(300±115.6) minutes for the 'open' approach (p=NS) (Table); estimated blood loss (EBL) was 200(239±183.6) vs. 300(491±577.1) mL (p=0.01). There were zero postoperative complications with a Clavien-Dindo classification ≥III for the robotic approach and three for the 'open' approach (p=NS). ICU length of stay (LOS) was 1(1±0) vs. 2(3±2.0) days (p=0.0001) and overall LOS was 4(4±3.3) vs. 6(6±2.7) days (p=0.003). When utilizing the robotic approach, patients with malignant tumor pathology (i.e., HCC, IHCC, and CLM) lived significantly longer (p=0.05). Patients with the robotic approach for HCC pathology lived significantly longer, as well (p=0.05).

Conclusion: Utilizing propensity matched patients, the robotic approach led to lower EBL, shorter ICU LOS, and shorter overall LOS while maintaining similar operative duration and promoting survival. We believe that the robotic approach is safe and efficacious and should be the preferred approach for major hepatectomy.

Robotic vs 'Open' After Propensity Score Matching for Major Hepatectomy			
	'Open'	Robotic	Total/p-value
Demographic data	n=42	n=42	n=84
Age(years)	64(64±12.1)	61(61±12.5)	p=NS
Sex(M/W)	19M/23W	24M/18W	p=NS
BMI(kg/m^2)	27(27±4.6)	28(28±5.9)	p=NS
Perioperative variables			
Operative duration(min)	280(300±115.6)	293(302±131.5)	p=NS
Size of lesion(cm)	7(7±4.0)	6(6±3.8)	p=NS
Pathology(HCC/IHCC/CLM/Other)	13/12/6/11	13/12/6/11	p=NS
Distance to margin(cm)	1(1±0.9)	1(1±1.3)	p=NS
Margin status(R0/R1/R2)	31/4/0	29/6/0	p=NS
Estimated blood loss(mL)	300(491±577.1)	200(239±183.6)	**p=0.01***
Postoperative complications(n)	UTI(2), Anastomotic leak(1), Sepsis(1), Respiratory failure(2), Systemic inflammatory response syndrome(1)	Ileus(2)	p=NS
Clavien-Dindo classification ≥III(n)	IVa(1), V(3)	None	p=NS
Length of ICU stay(days)	2(3±2.0)	1(1±0)	**p=0.0001***
Length of stay(days)	6(6±2.7)	4(4±3.3)	**p=0.003***
30-day readmission(n)	11	13	p=NS
In-hospital mortality(n)	3	1	p=NS

NS (not significant)

* significance is defined as p-value≤0.05