



ONCOLOGIC OUTCOMES OF ROBOTIC COMPARED TO OPEN PANCREATIC SURGERY: A NATIONAL CANCER DATABASE PARTICIPANT USER FILE STUDY

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PROBLEM

Is a robotic surgical approach inferior to an open approach in terms of oncologic outcomes for patients undergoing pancreatic resection?

BACKGROUND

Minimally invasive surgery (MIS) has faced significant criticism as an approach to cancer of the pancreas. While MIS, including robotic surgery, is used and accepted in colorectal, urologic and gynecologic oncologic resections, the majority of pancreaticoduodenectomies (PD) and distal pancreatectomy splenectomies (DPS) are done open. Concern for oncologic outcomes is a reason some cite for open surgery in these anatomically challenging operations. We sought to review oncologic outcomes of robotic vs open PD and DPS. We hypothesized that a robotic approach is non-inferior to an open approach in terms of oncologic outcomes for pancreatic resections.

OBJECTIVE

To compare lymph node harvest and pathologic margin status between robotic PD and DPS to open PD and DPS, respectively.

METHODS

Using the National Cancer Database Participant Use File (NCDB PUF), we identified patients with surgically resected pancreatic cancer. We stratified these patients into groups that underwent open and robotic PD and DPS. Pathologic margin, lymph node harvest, and 30 and 90 day mortality were evaluated. We excluded patients with incomplete data or who experienced crossover in surgical approaches.

Table 1- Distal Pancreatectomy Open vs Robotic

	Open	Robotic	p value
Mean Age (mean ± SD)	62.9 ± 13.0	62.2 ± 13.9	p=0.2092
Charlson Deyo Score (%)			
0	3280 (64%)	419 (66.2%)	p=0.6773
1	1383 (27%)	163 (25.8%)	
2	314 (6.1%)	33 (5.2%)	
>=3	146 (2.9%)	18 (2.8%)	
Sex (%)			
Male	2475 (48.3%)	305 (48.2%)	p=0.9514
Female	2648 (51.7%)	328 (51.8%)	
Margins (%)			
Negative	4342 (84.8%)	566 (89.4%)	p=0.0020
Positive	781 (15.2%)	67 (10.6%)	
Lymph Nodes Harvested (%)			
0-11 Nodes	2955 (57.7%)	388 (61.3%)	p=0.0833
12-30 Nodes	2168 (42.3%)	245 (38.7%)	
Mortality 30 Days (%)			
Alive	4155 (98.2%)	411 (99.3%)	p=0.5529
Dead	78 (1.8%)	3 (0.7%)	
Mortality 90 Days (%)			
Alive	4039 (95.9%)	406 (98.8%)	p=0.0037
Dead	171 (4.1%)	5 (1.2%)	

Table 2- Pancreaticoduodenectomy Open vs Robotic

	Open	Robotic	p value
Mean Age	65.5 ± 11.1	66.6 ± 11.1	p= 0.1078
Charlson Deyo Score (%)			
0	7965 (64.7%)	173 (64.8%)	p=0.6351
1	3346 (27.2%)	76 (28.5%)	
2	722 (5.8%)	15 (5.6%)	
>=3	279 (2.3%)	3 (1.1%)	
Sex (%)			
Male	6489 (52.7%)	140 (52.4%)	p=0.9303
Female	5823 (47.3%)	127 (47.6%)	
Margins (%)			
Negative	9526 (77.4%)	214 (80.1%)	p=0.2787
Positive	2786 (22.6%)	53 (19.9%)	
Lymph Nodes Harvested (%)			
0-11 Nodes	4178 (33.9%)	73 (27.3%)	p=0.0241
12-30 Nodes	8134 (66.1%)	194 (72.7%)	
Mortality 30 Days (%)			
Alive	9727 (96.2%)	155 (97.5%)	p=0.3938
Dead	386 (3.8%)	4 (2.5%)	
Mortality 90 Days (%)			
Alive	9295 (92.4%)	150 (94.9%)	p=0.1814
Dead	769 (7.6%)	8 (5.1%)	

RESULTS

We found 5,756 patients who underwent DPS(Open:5,123; Robotic:633). There was a higher percentage of 12-30 lymph nodes harvested for robotic DPS vs open DPS, though not statistically significant(61.3% vs 57.7%, p=0.0833). Robotic DPS had a significantly lower rate of positive margins than open DPS (11.6% vs 15.2%, p=0.0020). There was a lower 90 day mortality associated with robotic DPS vs open(4.1% vs 1.2%,p=0.0037). We found 12,579 patients who underwent PD (Open:12,312; Robotic:267). There were significantly more robotic PD cases with 12-30 lymph nodes harvested than open (72.7% vs 66.1%,p=0.0241). There was no significant difference in positive margin status for robotic vs open PD (19.8% vs 22.6%,p=0.2787). There was no difference in 30 and 90 day mortality.

CONCLUSIONS

To our knowledge, this is the largest group of patients that underwent PD and DPS comparing purely open vs robotic without any crossover. This study demonstrates the oncologic safety of robotic surgery for both PD and DPS in terms of lymph node harvest and rate of margin negative resections. 30 and 90 day mortality were similar with the exception of improved 90 day mortality in the robotic DPS group. Robotic PD and DPS serves as a safe and non-inferior oncologic surgical approach to pancreatic cancer when performed by those well trained in the technique.

REFERENCES

1. American College of Surgeons. National Cancer Database. <https://www.facs.org/quality-programs/cancer/ncdb>. Accessed August 24, 2018

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