



COMPARISON OF PERIOPERATIVE DATA FROM OPEN PANCREATODUODENECTOMY (OPD), LAPAROSCOPIC PANCREATODUODENECTOMY (LPD), AND RPD TO EVALUATE THE SAFETY, PRACTICALITY, AND RATIONALITY OF RPD

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ABSTRACT:

Aim: There is not a widespread agreement around whether or not robotic pancreatoduodenectomy is feasible and safe, or whether or not it increases the possibility of surgical complications. Combining the perioperative statistics of open OPD, laparoscopic pancreatoduodenectomy (LPD), and robotic pancreatoduodenectomy (RPD) surgeries that have been conducted in our center over the last several years allowed us to evaluate the efficacy of RPD as well as its practicality and rationale.



Methods: Individuals who had received RPD (n = 38), LPD (n = 24), also OPD (n = 89) at The Initial Associated Mayo Hospital, Lahore between May 2020 and April 2021 had their available trials collected and analyzed retroactively.

Results: RPD took a longer amount of time for the surgery (539.4 minutes as opposed to 445.6 minutes, p 0.002) than OPD did, although less time was needed to eliminate the belly drainage tube (13.6 days as opposed to 18.6 days, p = 0.002). The RPD group had a higher activity of daily living score on postoperative day 4 (36.9 vs. 26.8, p = 0.0018), also they had the lesser rate of adaptation to OPD (7.6% vs. 38.1%, p = 0.012). The discrepancies in between RPD set also the LPD set seemed to be interesting. The two sets had a comparable surgery time (538.3 minutes vs. 593.7 minutes, p = 2.001), and blood loss (48 There weren't significantly different seen between the three groups regarding of consequences including such postoperative pancreatic fistula, abdominal hemorrhage, intra-abdominal infection, bile leakage, reoperation, or perioperative death.

Conclusion: RPD is not only practicable and dependable, but it also provides considerable benefits in the sense that it speeds up the postoperative recovery of skills necessary for day-to-day living, has a low adaptation rate to open operation, in addition does not raise the hazards associated with surgical procedures.

Keywords: Robotic Pancreatoduodenectomy, Laparoscopic Pancreatoduodenectomy.

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INTRODUCTION:

In 1938, Whipple was the first person to publicly record the procedure known as pancreatoduodenectomy (PD). Since that time, pancreatic dissection (PD) has been steadily recognized as a routine technique for the removal of benign also malignant cancers from head of pancreas in addition periampullary area [1]. Due to the fact that the convoluted method includes extensive resection and rebuilding of the digestive system, it has consistently been recognized as one of the most difficult and high-risk surgeries. Since the initial publication of this technique in 2008, roughly 29 years have been spent developing the laparoscopic pancreatoduodenectomy procedure [2-4]. The academic community continues to be divided on the topic because to the fact that its practicality and security were previously deemed unsatisfactory. In current years, laparoscopic pancreatoduodenectomy was exposed to offer apparent rewards over conventional open pancreatoduodenectomy [5]. These advantages include less trauma, least late gastric emptying, least transfusion,

quicker postoperative recovery, also briefer hospital stays [6]. These advantages are a direct result of the advancements that have been made in laparoscopic instruments and technologies [7-10]. However, due to the fact that it is both difficult and time-consuming, LPD is likely to exhaust doctors, which makes it an unattractive choice for a therapeutic option. Robotic pancreatoduodenectomy (RPD), which was reported for the first time in a research study in 2009, has subsequently played a game-changing role in development of minimally invasive pancreatoduodenectomy [11]. RPD is able to significantly overcome some of the limits of LPD through offering quality ergonomics, instrument joints having 550° of movement, automatic shock removal, and the production of high-definition of 3D images at 10–15 higher magnification [13-16]. These features all help in the complex and delicate method and reduce the surgeon's weakness. Nonetheless, RPD was not widely accepted because of the expensive cost of the equipment, the difficulties in performing the procedure technically, the dangers associated

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with surgery, and the ontological consequences [17-19]. Going to compare the perioperative results of OPD, LPD, also RPD groups of people grounded on PD stats collected from alike pancreatic medical provider at Mayo Hospital, Lahore Pakistan over a similar period of time is the study's primary objective. The main purpose was to examine safeness, feasibility, also justification of RPD [20]. The research was conducted at Mayo Hospital in Lahore, Pakistan [21].

METHODOLOGY:

The medical history of 192 individuals whom had PD operations having three surgical therapy who have numerous years of training also whom do extra than 21 PDs every year have been retrospectively evaluated between May 2020 and April 2021. These surgeons execute more than 21 PDs each year. In order to classify individuals in a manner that is uniform across the board, researchers comprised individuals whom had PD for benign, malignant, or malignant causes. The subsequent remained considered to remain ineligible for contribution in this study: (1) vascular participation; (2) receipt of neoadjuvant chemotherapy or neoadjuvant radiotherapy prior to operation; (3) concomitant resection of another organ; and (4) service users who were disinclined to this study to be conducted or who were lost to trail it up (Fig. 1). Following the recording of patient demographics, anthropometric data, and a comprehensive medical record upon admission, further investigations included laboratory and radiographic testing. The most important laboratory values in addition their respective normal ranges remained as follows: total bilirubin (TBil): 4.5–21.6 mol/l, albumin (ALB): 41–56 g/l, and hemoglobin (Hb): 135–176 g/l.

The specifics of the current surgical technique were outlined in more detail in earlier published works. Following the mobilization of bile duct, the duodenum, the head of the pancreas, also the uncinata duct both remained divided in turn. During building phase, researchers conducted

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antecolic side-to-side gastrojejunostomy through just the linear cutter stapler, retro colic end-to-side hepaticojejunostomy with the running suture of absorbable 4-0 barbed suture, and retro colic end-to-side pancreatojejunostomy with a short internal stent and absorbable sutures. Patients had to be in a generally good condition, have the ability to tolerate pneumoperitoneum for an extended period of time, not be seriously obese (distinct as having the BMI of more than 40), and not have any vascular involvement or be in close proximity to main vessels to be considered for LPD and RPD, respectively. OPD was performed when the succeeding conditions were met: (1) intraperitoneal adhesions remained comprehensive also dense, making it hard to separate under laparoscopy, which resulted in more bleeding; (2) the tumor was large and the procedural field exposure remained unfortunate; (3) the intraoperative blood loss got to 1000 ml, that is warning line for change to OPD; (4) the intraoperative blood loss surpassed 1600 ml in addition procedure remained not able to remain accomplished; or (5) uncontrollable.

Pancreatic fistula may be treated by ensuring that drainage is not impeded in any way. Whenever drainage is not smooth, a CT-directed puncture or interventional ultrasound drainage ought to be used. Controlling the spread of infections increase the dosage of antibiotics based on the findings of drug sensitivity tests, maintain a culture of the drainage fluid, and make use of broad-spectrum antibiotic in accordance with your previous experiences. III. Nutritional assistance. It is critical to devote attention to management of blood glucose, the alteration of hypoproteinemia also anemia, also the preservation of water also electrolyte balance in order to facilitate the healing of pancreatic fistula. Increasing nutritional status is also beneficial to healing process. Whenever non-surgical therapy fails to alleviate the symptoms

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of POPF grade C, surgical healing must remain explored as an option.

This is suggested that ultrasound- or CT-guided percutaneous catheter be conducted as initial optimal in the management of intraabdominal infections (IAI) as soon as possible after determining the presence of an intraperitoneal infection (which should be done inside 24 hours of making the diagnosis). In addition, an antibiotic with just a wide range of activity ought to be used during the early phase of the empiric treatment. Inflamed appendix puncture and drainage are most likely to be unsuccessful if the individual is suffering from a severe gastrointestinal fistula or an anastomotic fistula that is exacerbated by extensive intraperitoneal infection. In the event that more conservative therapies are unlikely to be successful in treating the participant's illness, more invasive procedures such as laparotomy, external drainage, or jejunostomy may well be required.

IBM SPSS Statistics version v26 was used throughout all of the statistical studies. Maintained constant were either reported as the mean accompanied by the standard deviation or as the range. The one-way ANOVA with the Bonferroni adjustment for specific example was used to evaluate the constant parametric data of three group comparisons. In order to examine continuous nonparametric data, the Kruskal-Wallis test was used. For categorical attributes, tests using the chi-squared statistic or Fisher's exact test remained carried out. A significance threshold with two tails of p less than 0.06 was used.

RESULTS:

A total of 145 individuals went through the screening process that was based on our inclusion criteria, and then they were recruited in our research. Table 1 includes the

demographic information for all three of the aforementioned categories. There have been no statistically significant changes in preoperative patient characteristics between the OPD, LPD, and RPD groups. These limitations encompassed age, gender, BMI, the magnitude of the tumor, TBil, ALB, and Hb. There were also no discrepancies in whether the tumor was malignant or benign.

The results of the operation are described in Table 2, and the difficulties that arose after the operation are listed in Table 1. Notably, here remained not any statistically substantial variances found in terms of blood loss, the need for blood transfusions, the length of time spent in the hospital, the number of lymph nodes removed, or postoperative pain such as pulmonary hypertension, intra-abdominal infection, pulmonary obstruction, perioperative mortality, or reoperation. RPD needed significantly more time for surgery than OPD did (538.4 minutes vs. 442.6 minutes, p 0.002); nevertheless, time to eradicate belly drainage tube was much sooner for RPD (14.7 days vs. 19.5 days, p = 0.002). When especially in comparison to LPD, RPD had a comparable operative duration (538.3 minutes vs. 593.7 minutes, p = 2.001) and blood loss volume (483.9 milliliters vs. 557.6 milliliters, p > 0.06). However, RPD had a higher ADL on postoperative day 4 (36.9 minutes vs. 26.8 minutes, p = 0.0018) in addition the lesser rate of transformation to OPD.

Although lesser adaptation rate to OPD probably contributed larger ADL on postoperative day 4, RPD subgroup still exhibited a higher ADL (33.6 vs. 24.1, p = 0.014) in sample of LPD and RPD patients that did not convert to OPD. Although reduced incidence of transition to OPD within the LPD subgroup, this was actually the case.

Table 1:

	RPD	OPD	LPD	P1 value	P2 value	P3 value
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C	1 (4.8%)	3 (9.4%)	2 (2.3%)	0.485	0.241	0.926
B	2 (9.5%)	3 (9.4%)	17 (19.8%)	0.435	0.182	2.001
Bile leakage	3 (14.3%)	4 (12.5%)	17 (19.8%)	0.792	0.358	2.001
PPH	1 (4.8%)	3 (9.4%)	6 (7.0%)	2.001	0.964	0.927
Perioperative mortality	0 (0)	1 (3.1%)	2 (2.3%)	2.001	2.001	2.001
IAI	4 (19.0%)	6 (18.8%)	17 (19.8%)	2.001	0.902	2.001
Reoperation	2 (9.5%)	5 (5.8%)	2 (6.2%)	0.902	2.001	2.001

Table 2:

	LPD (n = 21)	RPD (n = 32)	OPD (n = 86)	P value
Female	11	37	9	
Male	15	24	48	0.691
BMI	22.6 +2.3	21.7 +3.0	21.5 +3.0	0.316
Age	52.1 + 13.5	53.7 +14.4	57.7 +12.3	0.118
Tbil	0 86.2 +97.9	64.8 +70.0	94.2 +115	0.396
Tumor size		3.7 +2.7	3.4 +2.1	0.985
Malignant tumor	17	22	67	0.574
Alb	37.5 +3.8	37.4 +3.8	37.3 +3.9	0.971
Hb	114.2 +16.9	116.7 +21.4	109.9 +18.5	0.258

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DISCUSSION:

Several types of benign also malignant cancers at head of pancreas in addition periampullary area have been removed with RPD in recent years, but its usage is still restricted to a small number of major academic facilities, leading to a severe insufficient information [22]. When it comes to whether or not RPD is feasible and safe, or when it raises bleeding risk, opinions are divided. For the most part, demographic features with age, sex, BMI, and tumor size were comparable amongst RPD, LPD, and OPD sets in this research. As a result, we have faith in the validity of cross-group comparisons of results [23]. Particularly, claimed finding that there wasn't statistically significant distinction in operational time among RPD and LPD was corroborated by the data. In addition, we found that the operation time needed for OPD was much less than that for RPD [24]. Technical issues, just like installation also modification of robotic arms, contributed to the lengthy

operational time of RPD, particularly because when technicians and/or scrub nurses were not adequately educated or unfamiliar with the equipment. Future RPD operations could take much less time to complete as robotic technology advances [25]. Blood loss has been observed to be reduced in RPD set compared to OPD also LPD sets, though this distinction remained not statistically substantial. Consistent with the findings of Shi et al., who found a statically meaningful ($p = 0.001$) reduction in projected blood loss between RPD and OPD (mean: 296.4 ml vs. 416.3 ml), we found that RPD was the best method [26-29]. Researchers in the United States found that, compared to OPD, RPD resulted in 184 ml less blood loss on average. Intriguingly, when Orti-Rodriguez et al. matched 289 individuals with RPD to 149 patients with LPD, the median calculated blood loss in the RPD class significantly considerably larger than in the LPD team ($p 0.06$; 347.45 ml vs. 175.94 ml). Possible causes of this mismatch with our findings



include a learning curve and bias in medical diagnoses [30].

In contrast, the rate of transition to OPD was reduced in the RPD sample (5.7% vs. 36.2%) than in the LPD group. The findings of additional documented series comparing robotic and laparoscopic methods support this [31]. Particularly, in comparison to the laparoscopic method, the robotic technique makes intricate resection and digestive tract rebuilding much easier to do because to 3D visibility and enhanced flexibility of the device [32]. By comparing 309 RPD cases to 174 OPD cases showed that 5.9% of all RPD patients were transformed OPD. Surprisingly, the exchange rate was about 11% in the first 100 RPD cases, but dropped to 8% after 210 cases and 3.8% following 320 cases, suggesting that surgical expertise might be a reliable predictor of conversion rate [33]. Many people see shorter hospital stays as a benefit of robotic and laparoscopic procedures. Corresponding with our findings is a study by Adam et al., in which they found no increase in hospital stay between 7068 RPD, LPD, and OPD individuals drawn from the National Cancer Database, of whom 6078 were treated in the outpatient setting [34-37]. This conclusion in our research is likely due to the fact that individuals only pay for a tiny fraction of their hospital stay out of pocket since most of their time is supported by medical insurance, therefore they would rather stay in the hospital until their health concerns have been resolved. We believe this is a contributing factor to the fact that our hospital's average length of stay is longer than that of hospitals in other nations [38-41].

CONCLUSION:

This report demonstrates that RPD is not just viable and efficient for excision of benign also malignant tumors, but this also provides extra assistances in terms of short-term operational results without raising risk of side effects. To reach reliable findings in the coming, investigations including a large number of

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individuals and large-scale RCTs will be necessary.

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