ORIGINAL ARTICLE

Analysis of Two Different Suturing Methods in Laparoscopic Pyeloplasty

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Abstract

Background: Ureteropelvic junction (UPJ) obstruction is the most common congenital anomaly of the urinary tract (1 in 20,00 live births). Laparoscopic pyeloplasty has equivalent success rates with open pyeloplasty. We prospectively analysed techniques of transperitoneal laparoscopic dismembered pyeloplasty and compared clinical outcome between two groups using two different suturing methods (continuous and interrupted). **Material and Methods:** - After obtaining ethical clearance from Institutional Ethical Committee, the present prospective study was conducted on 33 patients over the period of two years in the Post-Graduate Department of General Surgery in a tertiary care hospital. **Results:** - In our study the commonly involved age group was 20-29 years. (57.58%) in both interrupted as well as in continuous group and mean age for continuous and interrupted suturing was 26.23±6.961 and 27.50±6.619 respectively with male predominance. The mean duration of suturing, mean duration of surgery, mean duration of drain, mean drain output, and Hospital stay in continuous group are 72.74±3.194min, 203.75±12.457min, 2.26±0.452days, 13.42±4.730ml, and 3.26±0.452days respectively and in interrupted group are 94.14±3.505min, 234.50±10.761min, 4.43±0.646days, 40.93±7.043ml and 5.43±0.646days respectively. Urine leak was the only postoperative complication occurring in (3.03%) in interrupted group. The total success rate in our study was 100% with no postoperative anastomotic re-stricture during the follow-up. **Conclusion:** - Continuous suturing may be preferred to interrupted suturing for ureteropelvic anastomosis in patients undergoing laparoscopic pyeloplasty with comparable results and good intraoperative and postoperative parameters.

Key Words

Ureteropelvic junction, Pyeloplasty, Laparoscopic, Suturing

Introduction

Ureteropelvic junction (UPJ) obstruction may be defined as a functional or anatomical obstruction to urine flow from the renal pelvis to proximal ureter that results either in symptoms and/or functional renal damage. Ureteropelvic junction obstruction (UPJO) leads to progressive dilatation of the renal collecting system and can result in progressive deterioration of renal function, pains, recurrent UTI, recurrent haematuria, stone formation, or hypertension. It is the most common congenital anomaly of the urinary tract. Approximately 1 in 20,00 live births present with UPJO. [1] Laparoscopic pyeloplasty (LP) was initially introduced by Schuessler et al. in 1993. [2] Laparoscopic pyeloplasty can be performed via a retroperitoneal or transperitoneal approach. Equivalent success rates have been quoted in the literature .[2-5] Ureteropelvic anastomosis is the most important step in pyeloplasty and has a large bearing on its success rate. Intracorporeal suturing is one of the significant factors in the outcome of laparoscopic pyeloplasty. [6] Both interrupted and continuous suturing are being practiced for ureteropelvic anastomosis. [7,8] Although continuous sutures are more watertight compared with interrupted sutures,[9] the possibility of seeing the purse-string effect and tissue damage may be a concern. [10,11]

We prospectively analysed techniques of transperitoneal laparoscopic dismembered pyeloplasty. The main aim of this study was to compare clinical outcome between two

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groups using two different suturing methods (continuous and interrupted).

Material and Methods

After obtaining ethical clearance from Institutional Ethical Committee (Approval No. 117/ETH/GMC), the present prospective study was conducted on 33 patients over the period of two years (September 2017 - September 2019) in the Post-Graduate Department of General Surgery in a tertiary care hospital. Patients with age > 14 years and Primary Ureteropelvic junction obstruction were included. Patients with Secondary Ureteropelvic junction obstruction, UPJO with secondary calculus, Acute Urinary tract infection, age < 14 years, UPJO in anomalous kidney and Suboptimal/non-functional kidneys were excluded. A detailed clinical history was taken and patients were clinically examined in detail. Following investigations were done: CBC, KFT, Blood sugar, LFT, ECG, X ray chest, USG (KUB), CT Urography, Tec.99 DTPA Scan(F-15), Urine Culture

Patients falling in the inclusion criteria were registered for the study after providing patient information sheet and obtaining informed written consent.

Operative Technique : While under general anaesthesia, the patients were catheterised and Ryle's tube was inserted. In the transperitoneal approach patient was placed in lateral decubitus position. Three ports were used on left side (10-mm port 3 cm above and lateral to the umbilicus for the camera; another 10 mm port in the midclavicular line in the subcostal region and 5 mm port in iliac fossa but on right side another port was used in the subcostal region for retraction of liver. The colon was reflected medially and the renal pelvis was mobilized. The proximal ureter was mobilized, with care taken to preserve the vascularity and crossing vessels if present. The UPJ was dismembered (*Fig 1*) and the ureter spatulated (*Fig 2*) laterally using scissors without using diathermy. All ureteropelvic anastomoses were performed by intracorporeal suturing. The size of the suture 4-0 polyglactin [vicryl]/4-0 sutures was used for interrupted and continuous sutures. The posterior layer suturing was done initially followed by antegrade stent insertion. The anterior layer suturing was completed subsequently (*Fig 3*). The pelvis was closed by continuous suturing. In both the continuous suture group and the interrupted suture group, tube drains were placed. Then complete haemostasis was achieved, abdomen was deflated and port sites were closed back and antiseptic dressing was applied. In postoperative period morning X-ray KUB was done in both the groups. Catheter was usually removed on 2nd post-operative day if urine was clear and drain was removed when drain output was <10ml per 24 hours. Removal of DJ stents was done at 6 weeks. In follow up following investigations were done: USG (3-month, 6-month, 12 month), Tech99 DTPA Scan (6 month and 12 month).

The procedure was defined as successful if there was an improvement or stabilization of the renal function and improved drainage (based on the measurement of glomerular filtration rate [GFR] and T12 on isotope renogram postoperatively), along with relief of symptoms. The data obtained was saved in Microsoft Excel and analysed using statistical package for social sciences (SPSS Ver. 22).

Results

In our study the youngest patient was 19 years, oldest 47 years and commonly involved age group was 20-29 years in both interrupted as well as in continuous group and mean age for continuous and interrupted suturing was 26.23±6.961 and 27.50±6.619 respectively as shown in *table 1*. The study showed that males were predominant as compared to females. Out of 33 cases males were 17(51.51%) whereas females were 16(48.49%) in number. In our study we did continuous suturing in 19 (57.58%) patients and interrupted in 14 (42.42%) patients, the mean duration of suturing in continuous group and in interrupted was 72.74±3.194 minutes and 94.14±3.505 minutes respectively which was statistically significant with p value<0.001. The mean duration of surgery in continuous and in interrupted group was 203.75±12.457 minutes and 234.50±10.761 minutes respectively which was statistically significant with a p value of 0.027. The mean duration of drain in continuous and in interrupted group was 2.26±0.452 days and 4.43±0.646 days which was statistically significant with a p value < 0.001. In our study mean drain output in continuous and in interrupted group was 13.42±4.730 ml and 40.93±7.043 ml respectively which was statistically significant p value< 0.001. Hospital stays in continuous and in interrupted group was 3.26±0.452 days and 5.43±0.646 days respectively which was statistically significant with a p value < 0.001. Descriptive data is shown in *table 2*. All procedures were completed without open conversion. The pathogenesis of UPJO was determined intraoperatively. The overall complication rate was 3.03%. Urine leak was the only

Table 1. Age Distribution of Study Participants According to Type of Suturing

Age Group	No. of Patients		Total	Percentage (%)
	Continuous	Interrupted		
<20	2	2	4	12.12
20-29	12	7	19	57.58
30-39	4	5	9	27.27
40-49	1	0	1	3.03
=50	0	0	0	0
	Mean±SD Continuous/Interrupted =26.23±6.961/27.50±6.619			

Table 2. Descriptive table

Type of suturing		Age(yr.)	Time duration of suturing (Min)	Time duration of surgery (min)	Drain output (ml)	Duration of drain (days)	Hospital stay (days)
Continuous	Mean	26.32	72.74	203.79	13.42	2.26	3.26
	N	19	19	19	19	19	19
	SD	6.961	3.194	12.457	4.730	.452	.452
	Med.	24.00	72.00	200.00	10.00	2.00	3.00
	Min.	19	70	190	10	2	3
	Max.	47	80	225	25	3	4
	Range	28	10	35	15	1	1
Interrupted	Mean	27.50	94.14	234.50	40.93	4.43	5.43
	N	14	14	14	14	14	14
	SD	6.619	3.505	10.761	7.043	.646	.646
	Med.	27.50	95.00	239.00	40.00	4.50	5.50
	Min.	19	90	210	30	3	4
	Max.	38	100	245	60	5	6
	Range	19	10	35	30	2	2
Total	Mean	26.82	81.82	216.82	25.09	3.18	4.18
	N	33	33	33	33	33	33
	SD	6.738	11.232	19.285	14.944	1.211	1.211
	Med.	25.00	75.00	220.00	20.00	3.00	4.00
	Min.	19	70	190	10	2	3
	Max.	47	100	245	60	5	6
	Range	28	30	55	50	3	3
P value			**<0.001**	**0.027**	**<0.001**	**<0.001**	**<0.001**

N=Number; SD=Standard deviation; Med=Median; Min=Minimum; Max=Maximum

postoperative complication occurring in interrupted group (*Table 3*), while none occurred in continuous group. Follow-up studies showed that clinical progression was absent in all cases and significant alleviation/disappearance of hydronephrosis occurred in all 33 cases as shown in *Table 4*. The total success rate in our study was 100% with no postoperative anastomotic re-stricture during the follow-up.

Discussion

Laparoscopic pyeloplasty is at the cutting edge of becoming the gold standard for UPJ obstruction. Intracorporeal suturing is one of the significant factors in the outcome of laparoscopic pyeloplasty [6]. Both interrupted and continuous suturing are being practiced for ureteropelvic anastomosis [7,8]. Postoperative re-strictures are usually caused by high anastomotic tension, excessive suturing of the ureter and a depleted blood supply. In our study total number of patients were 33 in which continuous suturing was done in 19 patients and interrupted in 14 patients. The mean age group in our study was 26.23 years and 27.80 years in continuous and interrupted groups, respectively and the majority of our patients i.e., 19 belonged to age group of 20-29 years both in continuous and interrupted group with male predominance (57.58%). Comparable age groups were studied by Ramalingam M *et al* [12] with mean age of patients being 26.8 years in continuous group and 28.3 years in interrupted group with male predominance in ratio of 1.5:1. Another study by Shao P *et al* [13] the mean age of patients were 19 years in continuous group with

Table 3. Postoperative Complications

Complications	Interrupted Suturing Group	Continuous Suturing Group
UTI	0	0
Extravasation (prolonged drainage)	1 (7.14%)	0
Stent malposition	0	0
Prolonged ileus (>2 d)	0	0
Drain site/port site hernia	0	0
Total	**1 (3.03%)**	

Table 4. Outcome

Operative	Interrupted	Continuous	P Value
Postop mean GFR (mL/min)	34.7	36.1	NS
Improvement in GFR (mL/min)	4.76	4.65	NS
Failure rate	0	0	

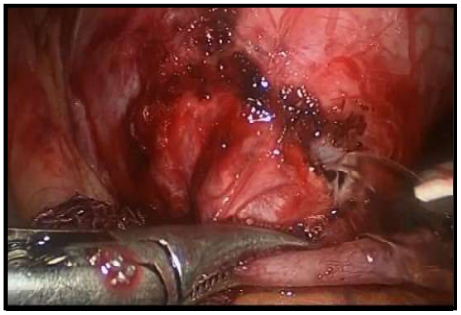

Fig 1. Dismembering of Ureteropelvic Junction

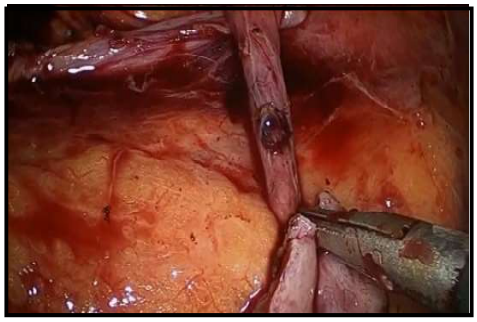

Fig 2. Ureteric Spatulation

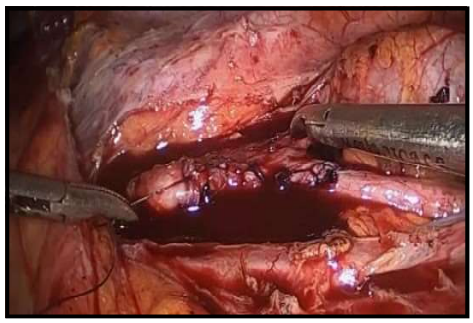

Figure 3. Ureteropelvic Anastomosis

male predominance (male/female 40:22) and in interrupted group the mean age was 20 years with male predominance (male/female 29:14).

In our study the mean operative time was 203.75 minutes including mean anastomotic time of 72.74 minutes in continuous group and 234.50 minutes including anastomotic time of 94.14 minutes in interrupted group. Our study is comparable with the findings of Ramalingam M *et al* [12] where the mean operative time was 219 minutes including anastomotic time of 64 minutes in interrupted group and in continuous group the mean operative time was186 minutes including anastomotic time of 55 minutes. In another study by InagakiT *et al* [14] the mean operative duration, including cystoscopy, retrograde pyelography, anastomotic time and ureteric stent placement, was 246 (100-480) min. Similar results were also observed by Han HH *et al* [15]in their study, the mean operative time was 242 minutes (164-349) in continuous group and 308 minutes in interrupted group. Another study by Shao P *et al* [13] observed mean operative time in interrupted group was 116 minutes including anastomotic time of 47 minutes and in continuous group was 81 minutes including anastomotic time of 28 minutes in interrupted groups, respectively.

In our study the overall complication rate was 3.03%. Urinary leak was the only complication occurring in 7.14% in interrupted group while none occurred in continuous group. The drain was kept for a mean of 2.26 days in continuous group and 4.43 days in interrupted group. Significantly less duration of hospital stay was observed in continuous group as compared to interrupted groups viz. 3.26 days vs 5.43 days. Similar results were observed in a study by Shao P *et al* [13] wherein the overall complication rate was 7.6%. Urine leak was the most common postoperative complication occurring in 9.3% in group A (interrupted), while none occurred in group B (continuous) (total 3.8%). The drain was kept for a mean

of 11 days postoperatively for those with urine leakage. The average hospitalization stay was 7 days. Ramalingam M *et al* [12] also confirmed our observation in their study, the mean drain output (108 mL vs 175 mL), drain tube retention (2.8 days vs 4.2 days), and duration of hospitalization (2.7 days vs 4.6 days) were significantly less in the continuous suturing group compared with the interrupted suture group respectively. The complication rate was 15.38% in the interrupted suturing group and 7.14% in the continuous suturing group.

In our study overall success rate was 100%, high success rate was obtained in our study, which can be attributed to precise design, careful dissection and meticulous suturing. The experience of various centres that have reported their results from laparoscopic pyeloplasty underlines the efficacy of the laparoscopic approach being equivalent to standard open surgery. In reviewing other studies with more than 100 cases like the study by Moon *et al* [16] the overall success rate was 96.2%, another study by Rassweiler *et al* [17] the overall success was 94.4%. The study by Srivastava *et al* [18] the overall success rate was 94.3%.

The main limitation of our study was a smaller number of patients as time limit for our study was only two years. This could be the one reason for 100 % success rate in our study. Though robotics is gaining momentum in the field of surgery but laparoscopy is the choice in low-income states. The purpose of these studies is to validate results from different developing institutions.

Conclusion

Ureteropelvic anastomosis using the continuous suturing technique has a comparable success rate with that using interrupted suturing. But Continuous suturing had an edge over interrupted suturing in various parameters like time taken for suturing, postoperative drain output and duration of drainage, which decreased the hospital stay. This in turn reduced the overall cost of the procedure. Continuous suturing may be preferred to interrupted suturing for ureteropelvic anastomosis in patients undergoing laparoscopic pyeloplasty.

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Conflicts of Interest

There are no conflicts of interest.

References

1. Tripp BM, Homsy YL. Neonatal hydronephrosis-the controversy and the management. PediatrNephrol 1995;9:503-09.
2. Schuessler WW, Grune MT, Tecuanhuey LV, Preminger GM. Laparoscopic dismembered pyeloplasty. J Urol 1993;150:1795-99.
3. Eden CG, Cahill D, Allen JD. Laparoscopic dismembered pyeloplasty: 50 consecutive cases. BJU Int 2001;88(6):526-31.
4. Soulie M, Salomon L, Patard JJ, Mouly P, Manuta A, Antiphen P, et al. Extraperitoneal laparoscopic pyeloplasty: A multicentre study of 55 procedures. J Urol 2001;166(1):48-50.
5. Hemal AK, Goel R, Goel A. Cost effective laparoscopic pyeloplasty: Single centre experience. Int J Urol 2003; 10(11): 563-8.
6. Arvind NK, Singh O, Gupta SS. Laparoscopic pyeloplasty: an analysis of first 100 cases and important lessons learned. Int Urol Nephrol 2011;43:85-90.
7. Shao P, Qin C, Ju X. Comparison of two different suture methods in laparoscopic dismembered pyeloplasty. Urol Int 2011; 87:304-08.
8. Papalia R, Simone G, Leonardo C. Retrograde placement of ureteral stent and ureteropelvic anastomosis with two running sutures in transperitoneal laparoscopic pyeloplasty: tips of success in our learning curve. J Endourol 2009;23(5):847-52.
9. Rassweiler JJ, Teber D, Frede T. Complications of laparoscopic pyeloplasty. World J Urol 2008;26(6):539-47.
10. Mehl ML, Kyles AE, Pollard R, et al. Comparison of 3 techniques for ureteroneocystostomy in cats. Vet Surg 2005;34(2): 114-19.
11. Kass EJ, Feber K. Pyeloplasty. In: Graham SD, Keane TE, editors. Glenn's Urologic Surgery. 7th ed. St. Louis, MO: Wolters Kluwer Health; 2010: 648.
12. Ramalingam M, Murugesan A, Senthil K, Pai MG. A comparison of continuous and interrupted suturing in laparoscopic pyeloplasty. JSLS 2014; 18: 294-300.
13. Shao P, Qin C, Ju X, Meng X, Li J, Le Q. Comparison of two different suture methods in laparoscopic dismembered pyeloplasty. UrolInt 2011;87:304-308.
14. Ben-Slama MR, Salomon L, Hoznek A, Cicco A, Saint F, Alame W, Antiphon P, Chopin DK, and Abbou CC. Initial Experience In 15 Cases. Urology 2000;56:45-48.
15. Han HH, Ham WS, Kim JH, Hong CH, Choi YD, Han SW, Chung BH.Transmesocolic approach for left side laparoscopic pyeloplasty: comparison with laterocolic approach in the initial learning period. Yonsei Med J 2013; 54(1): 197-203.
16. Moon DA, El-Shazly MA, Chang CM, et al. Laparoscopic pyeloplasty: evolution of a new gold standard. Urology 2006;67(9): 32-36.
17. Rassweiler JJ, Subotic S, Feist-Schwenk M, et al. Minimally invasive treatment of ureteropelvic junction obstruction: long-term experience with an algorithm for laser endopyelotomy and laparoscopic retroperitoneal pyeloplasty. J Urol 2007; 173(3):1000-5
18. Srivastava A, Singh P, Maheshwari R. Laparoscopic pyeloplasty: a versatile alternative to open pyeloplasty. UrolInt 2009; 83: 420-24.