Volume-5, Issue-1, January -2016 • ISSN No 2277 - 8160

Research Paper | Medical Science

Open Renal Approach in Pyelolithotomy: Comparative Analysis of Sub-Costal Incision Versus Trans-Costal Incision with Excision of 12Th Rib

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ABSTRACT

Introduction : Operative renal exposure must be adequate to perform the operation and to deal with any possible complications, because of its deeper location in upper retroperitoneum. Injuries to renal vascular pedicle may be difficult to control or repair through small incisions.

Objective: To compare the outcome of sub-costal incision with trans-costal incision & 12th rib resection in the surgical approach for open pyelolithotomy.

Methodology: It is a retrospective, analytical, comparative study conducted at Shardaben Hospital. A total of 51 patients were enrolled. Group A, 34 patients, underwent renal surgery via sub-costal incision. Group B, 17 patients, underwent renal surgery via trans-costal incision with excision of 12th rib. Incision time, duration of operation, postoperative pain, duration of hospital stay, & peroperative and postoperative complications were noted.

Results: Average Incision time(19.4 min in Group A & 28.9 min in group B) & average duration of operation(84.1 min in Group A and 110.5 min in group B) were longer in group B patients; pain perception(5.5 in Group A and 7.0 in Group B) was also markedly high in B group. Total period to stay in hospital was marginally higher in group B. Peroperative & postoperative complications were also slightly higher in group B patients.

Conclusion: Sub-costal renal approach provides adequate exposure, is quick, safe and less painful.

KEYWORDS : Renal approach, Subcostal incision, Transcostal incision, 12th rib excision, Pyelolithotomy.

1.INTRODUCTION

Operative renal exposure must be adequate to perform the operation and to deal with any possible complications, because of its deeper location in upper retroperitoneum. Injuries to renal vascular pedicle may be difficult to control or repair through small incisions. Poor exposure also leads to excessive retraction, with consequent increase in postoperative pain. Factors which should be considered in selecting an appropriate renal incision include operation to be performed, renal pathology, previous operations, extrarenal pathology that requires another simultaneous operation, need for bilateral renal operations, and body habitus. [1]

Open renal surgery may be carried out by four principal routes: extraperitoneal flank approach, dorsal lumbotomy, abdominal incision, or thoracoabdominal incision[2-4].The flank approach provides good access to renal parenchyma and collecting system, avoiding peritoneal contamination. The drawback is that exposure of renal pedicle is not as good as with anterior transperitoneal approaches. The most commonly used flank approach is through the bed of 11th or 12th rib.[5] The choice of rib depends on renal position and on whether the upper or lower pole is the site of disease. Sub-costal flank incision is indicated for surgery on lower renal pole or upper ureter, insertion of nephrostomy tube, or drainage of perinephric abscess. It has the disadvantage of being rather low in relation to renal position

2.AIM

The aim of this study was to compare the outcome of open renal surgery via sub-costal incision versus trans-costal incision with excision of 12th rib, in terms of incision and operative times, complications, postoperative pain, & postoperative stay.

3.METHODOLOGY

This study was conducted at Smt. SCL Hospital, Ahmedabad, from July 2013 to July 2015. It was a retroprospective, analytical, comparative study.

The patients were divided in two groups – A & B. Group A included patients who underwent Pyelolithotomy via Subcostal route and Group B included those who underwent surgery via Transcostal route. A total of 51 patients were enrolled. Group A, 34 patients, underwent renal surgery via sub-costal incision. Group B, 17 patients, underwent renal surgery via trans-costal incision with excision of 12th rib.

The INCLUSION CRITERIA were all patients with renal stone requiring surgery. The clinical presentation included on/off renal colics or fixed renal pain, renal swelling, & urinary complaints e.g. burning, dysuria, hematuria.

The EXCLUSION CRITERIA were : patients on whom nephrectomy was performed for advanced stone disease or renal tumors, age of patient less than 18 years and those who underwent ureteric stone removal alongwith renal stones.

A thorough record of patients' data was obtained, including the history & clinical examination. Investigations included complete blood count (CBC), fasting blood sugar (FBS), urea, creatinine & electrolytes, urine routine/micro (R/M), hepatitis B surface antigen (HBsAg), HIV, ultrasound abdomen, X-ray KUB & intravenous pyelogram (IVP).

3.1 OPERATIVE PROCEDURE

All the patients were operated under general anesthesia. Antibiotic prophylaxis was done, using 100cc of intravenous Levofloxacin one hour before induction of anaesthesia.

The patients were placed in the lateral position after being anesthetized, with back fairly close to the edge of the operating table & tip of 12th rib positioned over the kidney rest. The bottom leg was flexed to 45 degrees at the hip and 90 degrees at the knee, the top leg straightened, a pillow placed between the knees the patients were secured in this position with a wide adhesive tape passed over the chest and attached to the moveable portion of the table. Elevation of the kidney rest resulted in increased space between the costal margin and the iliac crest and put the flank muscles and skin on tension.

The trans-costal incision was made directly over the 12th rib, beginning at the lateral border of sacrospinalis. Incision was deepened dividing external oblique, latissimus dorsi & periosteum over the rib. Periosteum was completely mobilized round the rib with the periosteal elevator. The proximal end of the rib was transected as far back as possible, & the rib was then separated from the muscles attached anteriorly to complete its removal. Pleural reflection was safe in 12th rib excision, as it crosses the lower border of 11th rib at the junction of the anterior and middle thirds. The incision finally made through the periosteal bed of the rib to expose Gerota's fascia.

The subcostal incision begun at the renal angle, & carried forward about a finger breadth below the lower border of last rib onto anterior abdominal wall. Anteriorly it was curved slightly downward over the midaxillary line to avoid the subcostal nerve, and extended towards the lateral border of rectus abdominis. Latissimus dorsi & serratus inferior posterior were divided posteriorly, while external oblique, internal oblique & transversus was divided anteriorly.

In both groups, the incision was completed by incising the lumbar fascia and inserting two fingers into the perinephric space to push the underlying peritoneum forward.The perinephric space was entered by incising Gerota's fascia posteriorly to avoid injury to the peritoneum. After extracting the calculi, checking patency of distal urinary tract and placing a drain in the renal fossa, the musculo-fascial incision was carefully approximated in two layers with continuous vicryl No. 1; skin was closed with Ethilon 2-0 vertical mattress.

All patients received pain killers postoperatively in the form of Injection Diclofenac intravenously after consideration of their RFT. The dressing was removed on 3rd postoperative day, followed by dressing on 6th day and then 9th day using Povidone Iodine(5%) and Spirit. The drains were removed after discharge dropped to less than 10 ml per day. Patients were discharged on 5th-7th postoperative day, & then called for follow-ups for 6 months (weekly in 1st month, & then monthly); thereafter asked to report in case of any problem/complication related to urinary tract & operation. Alternate Skin sutures were removed on 8th or 9th post-operative day. All skin sutures were then removed the next day.

variables noted & analyzed were: demographic data, presenting complaint, associated medical disease, abdominal tenderness, WBC count, Urea, creatinine, electrolyte, urine R/M, abdominal ultrasound, IVP, type of incision, type of operation, operative findings, incision time, operation time, complications (peroperative and postoperative), postoperative pain, postoperative hospital stay & follow-ups. Patient's follow-up period was six months.

Incision time was defined as the time from start of skin incision to the incision of Gerotas fascia. Operative time was defined as the time between the placements of incision to the last skin suture applied. Severity of pain was defined using visual analogue scale (VAS).

5. OBSERVATION & RESULTS :

VARIABLE	SUBCOSTAL (MEAN)	TRANSCOSTAL (MEAN)
DURATION OF OPERATION (in minutes)	84.1 min	110.5 min
INCISION TIME (in minutes)	19.4 min	28.9 min
PAIN (ACCORDING TO VAS SCORE)	5.5	7.0
HOSPITAL STAY (in days)	5.8	7.2

Comparative analysis of duration of operation, incision time, pain VAS score & hospital stay.

COMPARATIVE ANALYSIS OF COMPLICATIONS

VARIABLES	COMPLICATIONS	SUBCOSTAL INCISION (OUT OF 34 CASES)	TRANSCOSTAL INCISION (OUT OF 17 CASES)
PEROPERATIVE	PLEURAL BREECH	0	3(17.6%)
	PERITONEAL BREECH	1(2.9%)	2(11.7%)
	INTRAOPERATIVE BLEEDING	Nil	Nil
POSTOPERATIVE	WOUND INFECTION	5(14.7%)	3(17.6%)
	SEROMA	3(8.8%)	5(29.4%)
	HEMATURIA	2(5.8%)	2(11.7%)
	INCISIONAL HERNIA	Nil	Nil

6. DISCUSSION

Urinary lithiasis is a very common disease[6].Urolithiasis or nephrolithiasis occur in 5% of the population[7].Urinary infection is a risk factor for lithiasis[8].Bilateral stones, late metabolic diagnosis and infection are factors that can induce an alteration of the renal function. Staghorn stone is a grave disease for the renal function.

Non-availability of resources, the lack of PCNL & ESWL facilities, the cost & need for multiple sessions &/or ancillary procedures in these minimally invasive techniques & the vigorous follow-up required still make open surgery a viable & an applicable option in our institute. All patients were operated upon after explaining all available options and after complete counselling and written informed consent.

There was no mortality in our series. ICD insertion was not required in any out of 3 patients in whom pleural breech had occurred. In cases of peritoneal breech, the peritoneum was sutured primarily using vicryl 2-0.

Mean hospital stay in this series was 5.8 days (group A) & 7.2 days (group B), respectively. This is comparable to that found by Diblasio[9] five days and Paik[10] 6.4 days respectively.

We encountered 23.6% morbidity in cases with subcostal incision and 33.3% morbidity in cases with transcostal incision; consisting of wound infection(17.6%), seroma(29.4%) & hematuria(11.4%). Lechevallier[11] had reported postoperative complications of stenosis, fistula and infections. In our study, there was no incidence of stenosis or fistula in either of the groups included in the study.

Bayazit[12] in a series of 100 surgeries (via incisions made subcostally or by an 11th or 12th rib resection) had reported peritoneal breech in 2%, & pleural breech in 24% patients; all lacerations were repaired without placement of a chest drain. In our study, we encountered pleural breech in 17.6% and peritoneal breech in 14.6% and all lacerations were repaired without the placement of a chest drain. Dzeranov et al[13] had reported peroperative complications from opening of the pleural and peritoneal cavities in 8.5%. In our series, we encountered increased incidences of pleural(17.6%) and peritoneal breech(11.7%) in patients operated via transcostal incision.

Similarly, incision time was significantly higher in patients with trans-costal incisions(28.9 min) as compared to those patients with subcostal incision(19.4 min).

7.CONCLUSION

Sub-costal renal approach provides adequate exposure, & is quick, safe & less painful.

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