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Evaluation of the functional outcome of surgically corrected uretero-pelvic junction obstruction

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Abstract

Introductions: Ureteropelvic junction obstruction (UPJO) is a common renal disease where flow of urine is obstructed from renal pelvis to ureter leading to renal function deterioration. This study analysed the functional outcome of patients after Anderson-Hynes (A-H) pyeloplasty for UPJO.

Methods: Retrospective analysis was done for renal function outcome on patients who underwent either open or laparoscopic dismembered A-H pyeloplasty during 20 months period from May 2017 to November 2018 in the Department of Urology in Bir Hospital, National Academy of Medical Sciences (NAMS), Kathmandu, Nepal. Renal functional outcome was based on pre and post-operative glomerular filtration rate and split renal function. Ethical approval was obtained from institutional review board (IRB-NAMS). Descriptive analysis of data was performed.

Results: Total 22 patients, 15 male and 7 female underwent dismembered pyeloplasty. The age ranged from 18 months to 65 years. Improvement of split renal functions was noted in 18 out of 22 (81.3%).

Conclusions: A-H pyeloplasty is effective surgical option for functional renal improvement in patients with obstructive UPJO .

Keywords: Anderson-Hynes pyeloplasty, split renal function, ureteropelvic junction obstruction

Introductions

The ureteropelvic junction obstruction (UPJO) causes renal function deterioration due to back pressure within the renal pelvicalyceal system caused by obstruction in flow of urine from renal pelvis to ureter due to intrinsic factors (narrow segment of ureter, neural depletion and fibrotic changes) or extrinsic factors (aberrant lower pole vessel, kinking, vesicoureteral reflux, stricture and scar of previous renal surgeries).¹ The incidence of UPJO ranges from 1 per 1000 to 2000 births, more common in male with a male to female ratio of 3-4:1, more common on left side, and are bilateral in 10-40% cases.²

Pressure and volume dependent concept of urinary flow from renal pelvis to ureter states that the lower the volume of urine in pelvic system less the obstruction, but if urine volume is high there is obstructive urinary flow causing progressive dilation of the pelvicalyceal system.³ The open dismembered Anderson-Hynes (A-H) pyeloplasty introduced in 1949 for obstructed retrocaval ureter is considered the gold standard for surgical correction of UPJO.⁴

The national data on incidence, management and outcome of treatment of UPJO is scarce. The aim of this study was to evaluate the renal function outcome of patients after A-H pyeloplasty for UPJO.

Methods

A retrospective data analysis was conducted on patients who underwent either open or laparoscopic A-H pyeloplasty during 20 months from May 2017 to November 2018 (Baisakh 2074 to Mangsir 2075) in the Department of Urology, Bir Hospital, National Academy of Medical Sciences (NAMS), Kathmansu, Nepal. Data were collected from audit forms available in record unit of Bir

hospital. Ethical approval was obtained from IRB-NAMS.

Functional outcome after A-H pyeloplasty was assessed by comparing pre and post-operative glomerular filtration rate (GFR) and split renal function (SRF) at followup after 3 months with Diethylenetriamine Pentaacetic Acid (DTPA) renograms. Compared with pre-operative DTPA, the postoperative DTPA more than 5% of Differential Renal Function or stable function indicates improvement in renal function, and reduced renal function of >5% indicates deterioration in renal function.⁷

Patients with associated renal stone disease or previous renal surgery were excluded.

Data were descriptively analyzed using Microsoft Excel.

Results

Data on 22 A-H pyeloplasty as per inclusion criteria (out of 48 cases) were included in final analysis. Of 26 exclusion, six had associated renal stone disease and 20 were lost to follow up at three months with DTPA renogram. During the study period total 1064 major surgeries were performed in the Department of Urology out of which pyeloplasty were 48 (4.6%).

One patient was below age of 10 year, and majority in second and third decades of life. Fifteen patients were male and seven female. Ten UPJO were operated on right side and twelve on the left side. Open pyeloplasty was performed in 12 and laparoscopic in 10.

Postoperative SRF improved in 18 (81.8%). The number of patients with SRF of 21-30 decrease and 30-40 and >40 increased after surgery. The GFR improved after surgery, the number of patients with low GFR of 11-20 decreased and those with GFR 21-30 increased, Table 1.

Table 1. Pre- and post-operative glomerular filtration rate (GFR) and split renal function (SRF) after Anderson-Hynes (A-H) pyeloplasty (n=22)

GFR pre-operative (ml/min)	No. of cases	GFR post-operative (ml/min)	No of cases
<10	1	<10	2
11-20	6	11-20	4
21-30	2	21-30	5
31-40	6	31-40	5
>40	7	>40	6
SRF pre-operative in %	No of cases	SRF post-operative in %	No. of cases
<10	0	<10	0
11-20	1	11-20	1
21-30	6	21-30	4
31-40	7	31-40	8
>40	8	>40	9

Discussions

Our findings shows the postoperative SRF improved in 18 (81.8%) out of 22 patients after A-H pyeloplasty. On postoperative DTPA renogram, the number of patients with low GFR of 11-20 decreased and those with GFR 21-30 increased, showing overall improvements in renal function after surgery. Similarly, the number of patients with SRF of 21-30 decrease and 30-40 and >40 increased after surgery.

Kidney function is categorized as good if SRF is more than 40% and poor if less than 40% requiring surgical correction.⁵ The treatment of UPJO is controversial regarding the poorly functioning kidney with SRF <10%.^{6,7} This was also seen in our study showing no improvements in those with preoperative GFR <10 or >40.

The efficacy and long term outcome of pyeloplasty in poorly functioning kidneys using DTPA renogram preoperative and postoperative in 35 patients showed good intermediate results in poorly functioning kidney, with average increase of 14.2% of SRF.⁸ Our finding is consistent with this with average 12% improvement in SRF. More improvement in postoperative SRF is seen in patients with mild impairment in pre renal function and less improvement with more impaired preoperative renal function.⁶ Significant improvement can be expected in

most kidneys with initial SRF is between 30-40%.⁹

In 35 patients after A-H pyeloplasty, 91.67% had improvement on DTPA renogram after 3 months.¹⁰ Long term success with stable improvement in SRF or symptom free has been reported in seven years (2004-2011) retrospective study of 83 patients.¹¹

In present study, we had followup of DTPA at 3 months as longer followup has not shown beneficial. In the study on 145 patients who underwent pyeloplasty between 2000 to 2008 with followup at 3 months, 6 months, 1 year and yearly up to 5 years, they concluded that after an unobstructed postoperative diuretic renogram at 3 months, recurrent UPJO is unlikely and long term followup is not justifiable.¹² Other studies have reported similar results of renography after 3 months of surgery.¹³⁻¹⁵

The review of laparoscopic pyeloplasty has shown comparable efficacy to open pyeloplasty and advantage of minimally invasive surgery with less discomfort, shorter hospital stay and cosmesis.¹⁶ Due to retrospective nature of data, we could not do minute analysis of discomfort or cosmesis.

Conflict of interests

None

Fundings

None

Conclusions

Anderson-Hynes dismembered pyeloplasty (A-H pyeloplasty) is effective in improvement of split renal function (SRF) in Ureteropelvic junction obstruction (UPJO) with preserved renal function.

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