Open pyeloplasty in children with uretero pelvic junction obstruction (our experience at Queen Rania Al-Abdullah Hospital for children)

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ABSTRACT

Objective: The objective of our study was to examine and evaluate our experience at King Husain Medical Center with open pyeloplasty using Anderson–Hynes technique in the management of children with ureteropelvic junction obstruction (UPJO) regarding outcome, complications, failure, and success rate.

Method:A retrospective study was done at King Husain Medical Center from April 2015 to October 2018. 47 children who were diagnosed to have UPJO underwent an open Anderson–Hynes pyeloplasty. Demographic data,results,outcome and complications were analyzed to report our results regarding open Anderson–Hynes pyeloplasty.

Results:47 patients underwent an open Anderson–Hynes pyeloplasty. Nearly, 15 patients were female and 32 were males with male to female ratio are 2:1. Patient's age ranged from 2 months to10 years with mean age of 3 years.
In 28 cases (60%), pyeloplasty was done on left side versus 17 cases (36%) on right side and bilateral sides in 2 cases (4%). All patients were followed from 6 to 24 months. Success rate was 92%. Failure of surgery with recurrent PUJ obstruction occurs in 4 cases (8%), all of them underwent re-do surgery using Anderson–Hynes technique with 100% success rate. Urinary leak post-surgery was seen in one case (2%)and was managed conservatively. Urinary tract infection has been observed in 10.5% of cases.

Conclusion: Open pyeloplasty using Anderson–Hynes technique has a high success rate with minor complications and excellent results regarding improving renal function and resolving symptoms.
It is the best choice in re-do surgery with success rate reaching 100%.
Key words: Hydronephrosis; pyeloplasty; uretero pelvic junction
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Introduction

Hydronephrosis is the most common anomaly in children with incidence rate of 1 per 1,000 foetuses [1].

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Ureteropelvic junction obstruction (UPJO) is the most common cause of congenital hydronephrosis. It is an inadequate drainage of urine from renal pelvis into ureter resulting in progressive dilatation of renal pelvis and calyceal system [2, 3].
It is incidence is 1 per 5,000 births, with twothird of cases on the left side. Male to female ratio is 2:1. It is bilateral in 5%–10% [3, 4].
The etiology of UPJO is mainly due to intrinsic factors like failure of ureteric recanalization, ureteral valves,polypsand infolding of ureteral wall [5, 6].
Aberrant vessels is the main cause of extrinsic factors with incidence of 20%–30%, these vessels usually originate from renal vessels, aorta, or venacava [5, 7, 8].
The first reconstructive surgery for UPJO was done on 1886 by Trendelenburg and in 1936 YV-plasty was demonstrated by Foley [3].
The gold standard procedure for UPJO is Anderson–Hynesdismembered pyeloplasty which was demonstrated in 1946 with an excellent results and significant improvement in renal function and high success rate reaching up to 95% [9–11].
Nowadays, several surgical techniques are used for pyeloplasty such as spiral flap, antegrade endopyelotomy, retrograde endopyelotomy, balloon dilatation, laparoscopic and robotic pyeloplasty [9].

The aim of all procedures is to preserve renal function,improve drainage, and resolve the symptoms of obstruction [7, 12].
The incidence of complications post-reconstructive surgery is 2%–13%. Urinary tract infection is the most common complication but failure of surgery is the most important one [7, 13].
The purpose of our study is to report our results and outcome in the management of UPJO using open Anderson–Hynes pyeloplasty.

Methods

A retrospective study was done at King Husain Medical Center, Amman-Jordan.
A 47 children who were included in this study diagnosed to have UPJO, underwent an open Anderson–Hynes pyeloplasty in Queen Rania Al Abdullah Hospital for Children (King Husain Medical Center) from April 2015 to October 2018 by pediatric surgery team.
We included all patients presented to Pediatric Surgery Department during this period. All patients diagnosed to have UPJO by mercapto acetyl triglycine (MAG3) in correlation with clinical and renal ultrasonographic findings to document the presence of obstruction between renal pelvis and ureter.
All children were admitted to surgical floor one day prior to the surgery, and a consent form was signed by parents after the explanation of surgical procedure regarding the technique and possible complications during the operation.
Outcome, results, complications, and demographic data for all patients were analyzed to report our experience and outcome regarding open Anderson–Hynes pyeloplasty at our center.

Research ethics

This study was approved by the ethical committee in Royal Medical Services (Ref.37, date 7/2018).

Surgical technique

Surgery was performed under general anesthesia and supine position with slight elevation of the affected side. Ceftazidime was given as prophylactic antibiotics.
Foleys catheter was inserted in the urinary bladder. Anterior approach was done by a transverse incision between the tip of 12th rib and the edge of rectus about 1.5–2 cm in length. External and internal oblique muscles transected and peritoneum reflected medially, gerota fascia incised longitudinally along the lateral aspect of the kidney. Renal pelvis is identified through lateral traction of the kidney and medial traction of the peritoneum, PUJ is cleared, ureter is hanged by vessel loop and stay suture.4 Stay sutures were applied at the renal pelvis in a diamond shape involving the PUJ. The obstructed segment removed by performing one sweeping incision within borders of stay sutures in a superior- inferior manner, avoiding repeated cuts. We did not do renal pelvis reduction. Proximal ureter is spatulated till healthy segment is visualized, and funnel shape anastomosis was done between spatulated ureter and renal pelvis using polydiaxinone 5-0 over double J catheter size 4 or 5 French. Perinephric drain was inserted in all the cases.

In cases with aberrant vessels usually we mobilized these vessels to be away from the area of anastomosis between ureter and renal pelvis by putting these vessels posterior to renal pelvis.
Foleys catheter was removed secondday post-surgery and drain was removed on third day except in one case with urinary leak where drain was removed on 7^{th} day post-surgery.
Double J catheter was removed after 4 weeks by cystoscopy, and we kept the patients on Cephalexin as prophylactic antibiotics till we remove the double J catheter.
All patients were followed as outpatient in clinic by clinical exam and renal ultrasound 2 weeks after double J catheter removal, mercapto acetyl triglycine (MAG3) 4 weeks after double J catheter removal.
Ultrasound was repeated at 3 months and 1year later.

Results

A47 children who were diagnosed to have UPJO underwent an open Anderson–Hynes pyeloplasty. Nearly, 15 (32%) patients were female and 32 (68%) were males with male to female ratio is 2:1. Patient's age ranged from 2 months to10 years with the mean age of 3 years.
In 28 cases (60%), pyeloplasty was done on left side versus 17 cases (36%) on right side and on bilateral sides in 2 cases (4%).
The mean operative time was 65 minutes (range 50 – 120 minutes).
Mean hospital stay was 5 days (range 4 – 8 days).
All patients were followed from 6 to 24 months. Mean follow up was 16 months.
Success rate was 92%, as MAG3 showed improvement in excretion with no hold up of contrast.
Complications was mainly failure of surgery in four cases (8%), 3 were males and 1 was female. All 4 patients were infants and redo surgery was done for all of them with Anderson–Hynes dismembered procedure. In one case (2%), urinary leak post-surgery was seen and was managed

conservatively. Five cases of urinary tract infection was reported mainly during the presence of double J catheter, which was treated by therapeutic antibiotics empirically according to our hospital guidelines till results of urinary cultures and then according to sensitivity without the need to remove the catheter before 4 weeks.

Discussion

A dilemma regarding the diagnosis of UPJO as a cause of hydronephrosis in children still present despite the advancement of diagnostic radiological modalities [13].

Most of pediatric surgery centers like our center depend on the correlation between clinical, ultrasonographic findings, and MAG3 which confirm the presence of urinary excretion obstruction leading to the diagnosis of UPJO [14].

Open dismembered Anderson–Hynes pyeloplasty still the preferred choice for the most of pediatric surgeons with success rate more than 90% despite the advancement of laparoscopic pyeloplasty which started to be popular with success rate above 87% [15,16].

Persistence of hydronephrosis seen on images post-surgery, does not mean operation failure and for this reason, ultrasonographic findings alone are not enough to confirm success versus failure of the reconstructive surgery. So, we need to correlate these findings with symptoms resolution and the improvement of drainage and renal function stabilization by MAG3 [16].

Song[17]reported in his series a 95% success rate post open Anderson–Hynes pyeloplasty and also we reported a 92% success rate with the same procedure so our results is acceptable.

In our series, we reported a redo surgery in four cases (8%) due to the failure of primary surgery, we use the same procedure (Anderson–Hynes pyeloplasty) with a success rate of 100%. Alhazmi[18] reported a success rate of 100% in redo pyeloplasty using open Anderson–Hynes technique and these results support our policy in using open Anderson–Hynes pyeloplasty in cases which need redo surgery.

The most common complication in our series was urinary tract infections with incidence of 10.5% and this is mostly due to the presence of double J catheter. We still use double J catheter due to it is rule in decrease edema and urinary leak incidence, and also our results is less than other series as Subedi[7]reported an incidence of 12% of urinary tract infections.

RaananTal [19] mentioned in his study that urinary leak incidence post open Anderson–Hynes pyeloplasty is 7.8%, but we reported an incidence of 2% urinary leak in our center and this low incidence is mostly due to the usage of double J catheter.

Laparoscopic pyeloplasty started to become more popular between pediatric surgeons with success rate more than 87% as Mohan [20] reported in his series which is relatively near success rate after open Anderson–Hynes pyeloplasty.

Laparoscopic pyeloplasty needs long operative time as Mohan [20]reported a mean operative time of 250 minutes; we reported a shorter operative time post open Anderson–Hynes pyeloplasty with mean time of 65 minutes so open technique still has the advantage over laparoscopic one regarding operative time.

Regarding hospital stay length we reported an average length of 5 days and Song[17]reported a mean hospital stay of 3.5 days post-laparoscopic pyeloplasty which is slightly less than our results, sowe start to encourage pediatric surgeons in our center to be more familiar with laparoscopic pyeloplasty which need more training and experience.

Conclusion

Open Anderson–Hynes pyeloplasty is an excellent procedure for the children with UPJO with high success rate and low morbidity;in our center it is the first choice.
It is the best choice in the management of failure cases which need redo surgery with success rate reaching 100%.

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