Original Article

Laparoscopic Pyloromyotomy for Hypertrophied Pyloric Stenosis – Experience of 14 Class

1. Ali Raza Brohi 2. Ali Akbar Syal 3. Shams Raza Brohi 4. Naseem Mengal

1. Assoc. Prof. of Paed Surgery 2. Prof. of Paeds Medicine 3. Prof. of Neurosurgery 4. PGR of Peads Surgery, Peoples University of Medical & Health Sciences, Nawabshah

ABSTRACT

Aim of study: To share the first ever national experience about laparoscopic pyloromyotomy and its technical details

Study design: Descriptive study

Place and Duration of Study: Study conducted at private hospital at Nawabshah Sind from sept 2009 to Dec 2010,

Introduction: Hypertrophic pyloric stenosis is a common problem in pediatric surgery. Conventional management by the open extra mucosal pyloromyotomy has been the method of choice for many decades. Advanced, minimally invasive surgery also allows successful laparoscopic management of this entity.

Material &methods: In this study 14 cases of laparoscopic pyloromyotomy, concentrating on technical details. Patients operated at some private hospital Nawabshah.

Results: 14 patients underwent laparoscopic pyloromyotomy with standard technique. Initial operating time was more of initial learning curve . The infants tolerated the operative procedure well. There was one conversion to the open method because of immaturity of patient and technical difficulty.

Conclusion: Our experience suggests that laparoscopic pyloromyotomy can be a safe and efficient procedure, but during the learning phase, laparoscopy should be decided on a case-by-case basis and performed by an experienced laparoscopic surgeon. Careful selection of patients is helpful to increase confidence and operative comfort.

Key Words: IHPS , Pyloromyotomy, Laparoscopic

INTRODUCTION

Infantile Hypertrophic Pyloric Stenosis is a common cause of gastric outlet obstruction in infants.1 Since Alain et al.2 published the first laparoscopic pyloromyotomy, this procedure has been accepted in few pediatric surgery centers.3–14 The traditional Ramstedt pyloromyotomy via a right upper-quadrant transverse incision remains the gold standard operation for IHPS. However, primarily to improve cosmesis, several other approaches have been described, but technical modifications that have been published recently8,10,12,13 report equal safety and procedure duration 6,8,9,11,12 with less surgical stress, a shorter hospital stay,11,12,14 and better cosmetic results. These reports offer strong arguments in favor of the laparoscopic approach. The experience and encouraging results of other endoscopic procedures encouraged us to start performing laparoscopic pyloromyotomy.

Many studies have been done for this procedure but this is our first ever national study done.

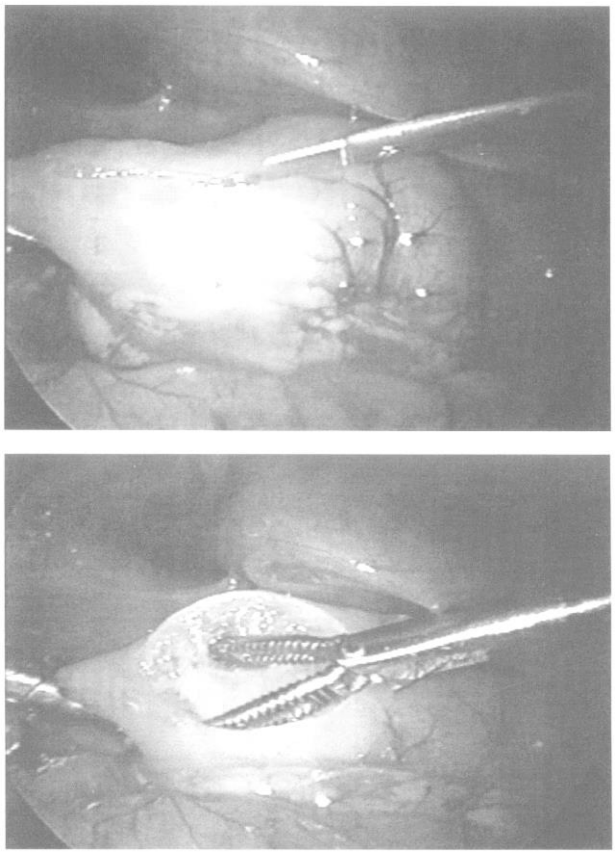
MATERIALS & METHODS

Study conducted at private hospital at Nawabshah Sind from sept 2009 to Dec 2010, 14 cases selected which were stabilized and fit for laparoscopic procedure. They were without serious fluid or electrolyte imbalance, and without other pathologic conditions that could increase the risk of the operative procedure. The procedure was performed under general endotracheal anesthesia with standard monitoring, and special attention was paid to the control of ventilated CO_2.

Standard STORTZ instruments were used, including two 3.5mm ports and 5.5 -mm port, a 5-mm 0-degree telescope, a pyloromyotomy spreading forceps for splitting, endoknife, a standard Babcock forceps. The camera port was established through a supraumbilical incision, and the other two ports were placed in each upper abdominal quadrant. After Pneumoperitoneum, which was maintained at a pressure of 8- 10 mm Hg, the pylorus was fixed by using a standard Babcock forceps which was introduced through the right upper quadrant port and placed on the first part of the duodenum, which was pulled slightly up and laterally to expose the avascular plane of the enlarged pylorus.

Endoknife was placed through the left upper quadrant port. The seromuscular incision was made in the direction of the pyloroduodenal junction toward the antrum, in a manner similar to that used in the open method. The pyloromyotomy spreading forceps was used for muscular splitting at an angle of approximately 45 degrees to the plane of incision, enables good muscular splitting. When the desired level of muscular spreading and adequate mucosal visualization were achieved, special attention was paid to visual assessment of the mucosal integrity and possible bleeding sources. When both conditions appeared to be satisfactory, we closed the supraumbilical incision in two layers, including the fascia. Both upper incisions were closed with skin sutures only.

Surgery time ranged from 45 to 60 minutes in the initial 5 cases then shortens to 30 – 45 minutes in last 5 cases The first feeding was established 8 hours after the procedure with saline solution, and feeding was advanced to formula as tolerated.



Figures: Steps of Laparoscopic Pyloromyotomy

RESULTS

Table No.1. Laparoscopic pyloromyotomy cases 14

Serial Number	Age (d)	weight (kg)	operating time (min)
1	23	3.4	50
2	36	4.2	55
3	32	4.6	60
4	27	5.2	45
5	33	3.8	57
6	35	3.3	40
7	26	5.4	43
8	22	4.7	45
9	41	4.3	40
10	36	4.5	35
11	24	3.6	35
12	36	5.2	40
13	37	3.4	30
14	35	4.9	32

DISCUSSION

Laparoscopic surgery for infants as well as older children is well established nowadays. Our initial selection of patients for laparoscopic pyloromyotomy were not seriously compromised that gave us confidence that the procedure was safe and allowed us to proceed. Infants tolerate pneumoperitoneum of up to 8- 10 mm Hg with out change of the parameters of ventilation during anesthesia. With the evacuation of capnoperitoneum, they were immediately taken off the ventilator, and no further procedures were required that's why co2 monitoring is important in every patient. Despite the fact that Downey 4 and Greason et al.9 strongly support the modification of Tan et al.3,11,12 with 2-mm stab incisions without laparoscopic ports, our experience in working without ports was

Good . Instrument manipulation and replacement and maneuvering proved to be technically as easy as through the ports when the incisions were too small.

Sometime because of little difficulty we ultimately decided to perform our procedures via cannulas, as originally described by Alain et al.2 and later supported by Ford et al.,7 to have enough mobility with the instruments.

0-degree 5mm camera enabled good visualization of the pylorus, especially when the duodenum was slightly pulled to the right and anteriorly. Having in mind the risk for perforation with claw-type grasping forceps emphasized by Ford et al.,7 we completely abandoned using this instrument. Rather we hold with Babcock forceps.

Atraumatic grasping forceps provide adequate strength with moderate pressure for all duodenal manipulations without the risk for perforation.

We made the incision with great caution, keeping in mind the experience of Downey 4 and trying to fulfill two basic requirements: a sufficiently long incision and a "one-cut" procedure to achieve one plane of muscular splitting to avoid the effect known as "railroad tracking" and a difficult multiplane myotomy. A standard arthrothomy knife enables a precise and safe incision, and all procedures have to be performed under visual control.

We were doubtful about muscle splitting. Our experience with pyloromyotomy spreading forceps for splitting when applied as described above, from the left side at a 45-degree angle to the plane of incision, proved effective despite the fact that we could not completely avoid slipping out. Repeated gentle splitting enables good muscular retraction and mucosa bulging. Avoiding forceful pushing toward the mucosa prevents mucosal tear. We had to keep in mind the "no-spread zone" and did not force the spreader in the lateral recesses of the pyloric incision, which is the weak point and the most common site of perforation. The use of a

spatula for the rotation maneuver as the initial spreading or the maneuver for breaking down the fibrous bands as advocated by Alain et al.8 could be helpful, but in our experience, these maneuvers could be performed satisfactorily by using the hook-form preparation forceps. Our impression is that the hookform preparation forceps can be reliably used for splitting the muscular layer, as in the open surgery.

In our experience, the method of Hamada et al.10 of electrocoagulating the plane of incision before the incision is made is not necessary. When the incision is made on the plane of the "avascular zone," bleeding is rare. Insertion and manipulation with the spreading forceps usually last 5 to 10 minutes, which was approximately one fifth of the total operative time by the end of our series. This technique will not prevent a small amount of bleeding after the incision and spreading. Minor bleeding can be controlled with bipolar electro coagulation.

Perforation usually not happens but when happens can be stitched or re- myotomy can be done.

Finally mucosal integrity can be assessed by injecting air through N/G tube and produce bulging of the mucosa to evaluate the success of the procedure. Once the procedure was finished, all ports were removed, the capnoperitoneum was evacuated, and the incisions were closed. Considering the experience of two omental extrusions reported by Ford et al.,7 we closed the supraumbilical incision in two fascia/skin layers.

A total average procedure time of 50 minutes in our first five cases compared with 30 minutes for the last three underscores the significance of the learning curve of laparoscopic pyloromyotomy.

CONCLUSION

One cannot conclude on the basis of short series of 14 cases but some facts are encouraging in our series .

The advantages are less operative stress, a shorter hospital stay, a better cosmetic result, and no reported wound

infections. The only disadvantage is more operating time but only in initial learning curve as compared to conventional open method. Another important observation is based on our experience and by different authors it is obvious that chances of mucosal perforation and an inadequate myotomy are a bit more frequent than in open surgery during learning curve.4,5,7

Therefore, the question remains whether laparoscopic pyloromyotomy during the learning phase is as safe and effective as open surgery. Open pyloromyotomy, with a good outcome, rare mortality, and little morbidity, still remains the gold standard in the operative treatment of infantile hypertrophic pyloric stenosis in most pediatric surgery centers worldwide. However, laparoscopic pyloromyotomy has found its place in pediatric surgery. The size and general condition of a baby and surgeon experience are the factors that should be considered before the therapeutic approach is chosen. In our opinion, during the learning phase, the indication for laparoscopy should be decided on a case-by-case basis, and an experienced laparoscopic surgeon should perform the surgery. A proper selection of patients is helpful in increasing confidence and operative comfort.

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Address for Corresponding Author:
Dr Ali Raza Brohi
Associate Professor & Head
Paediatric Surgery Dept:
Peoples University of Medical & Health Sciences,
Nawabshah
92 300 3209000