

Mucosal Injury during Pyloromyotomy: A Report of Three Cases and Review of Literature

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ABSTRACT

Mucosal perforation/injury during pyloromyotomy is a rare and frantic complication. The classical technique of repair is a full-thickness approximation (both mucosal repair and serosal repair) and re-pyloromyotomy at the opposite site. Alternatively, the simple primary mucosal repair is also reported. Such mucosal injury can be repaired with equal efficacy using both the classical full-thickness repair and pyloric rotation and primary closure technique in terms of complications and outcome. Here, we describe three cases of iatrogenic mucosal injury, which were treated successfully by full-thickness repair in two cases and one case with a primary mucosal repair.

KEYWORDS: Electrolyte, full-thickness, mucosal perforation, primary mucosal repair, pyloric stenosis, pyloromyotomy

INTRODUCTION

Idiopathic hypertrophic pyloric stenosis (IHPS) is a common condition and can be operated either by open method (Ramstedt or Tan and Bianchi) or laparoscopic approach.^[1] A pyloric mucosal injury (PMI) during the pyloromyotomy increases morbidity and even death if unrecognized. The rate of mucosal injury is slightly higher in the laparoscopic than the open procedure (2.4% versus 5%). A mucosal injury can be managed either by a full-thickness repair (FTR) of the perforation or primary mucosal repair (PMR). The literature says the PMR is comparable to the FTR in terms of complications and outcome.^[2] Here, we present three such cases of mucosal perforation that we managed successfully in our institution.

CASE REPORT

Case 1

A 6-week-old male child presented with non-bilious, projectile vomiting, and his mother noticed a swelling over the epigastrium with visible movements [Figure 1]. He was severely dehydrated and had low blood pressure with tachycardia. We resuscitated the child with fluids and potassium supplementation for 5 days. Initial arterial blood gas (ABG) analysis was suggestive of severe hypokalemia (Na 138.2 mmol/L, K 2.14 mmol/L).

Potassium bolus was given at the dose of 0.5 meq/kg over 1 hour followed by potassium supplementation in the form of half-strength DNS + KCL (100:2). Potassium was corrected, but the child developed hypernatremia (Na 154 mmol/L, K 3.9 mmol/L). He was resuscitated with 1.5 times IV fluid (after estimating free water deficit) to correct the serum sodium. After 48 hrs, serum electrolytes became within the normal limit, and he was posted for open pyloromyotomy (OPM). There was an accidental mucosal breach at the duodenal end of the pylorus. We repaired the mucosa with 4-0 catgut and closed the muscular layer with Vicky 3-0, followed by re-pyloromyotomy at the opposite side. The postoperative (PO) period was uneventful, and gradual feeding was started after two days with a pediatric solution. He was discharged on the 8th PO day (POD).

Case 2

A 4-week-old female child presented with recurrent non-bilious vomiting and lethargy for one week and was being treated with medical therapy elsewhere. Ultrasonography showed a pyloric wall thickness of 5 mm. The patient had extreme dehydration and

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Figure 1: Preoperative picture shows a visible movement of the dilated stomach in the epigastrium in a 6-week old male child with hypertrophic pyloric stenosis

dyselectrolytemia, for which she was resuscitated with IV fluids and potassium supplementation for 6 days before OPM. At the end of the operation, a small leak was found on the distal (duodenal end) exposed mucosa. We performed PMR by two interrupted sutures with 5-0 polydioxanone, no FTR/re-pyloromyotomy was done [Figure 2]. The patient got a COVID 19 infection with IGG titer 69 AU/ml (positive > 16 AU/ml) on the 3rd POD. Blood parameters which include complete hemogram, C-reactive protein, CK-MB, D dimer, renal and liver function tests, and chest X-ray were within normal limit. The body temperature, SpO₂, and other danger signs were monitored closely. We started oral feeding on the 5th POD and gradually increased the amount. She got discharged on the 8th POD. An upper GI contrast study showed the normal passage of dye beyond the duodenum [Figure 3].

Case 3

Another patient, a 7-week-old male child, was admitted with features of IHPS. We corrected the dehydration, dyselectrolytemia and performed OPM [Figure 3]. There was an accidental PMI that was repaired in FTR (mucosal and muscle) with vicryl 4-0, and a re-pyloromyotomy was done at the opposite side of the pylorus. PO period was uneventful. Feeding was started on 3rd POD with a pediatric solution and gradually shifted to breastfeeding. He was discharged on 9th POD.

DISCUSSION

The operative techniques of IHPS have evolved from OPM to laparoscopic pyloromyotomy over time. However, OPM is appraised for its reliability and has fewer perioperative complications. The overall mortality rate of IHPS is 4.9%, and that depends on the age (below 2 weeks), presentation (≥ 14 days of symptoms), the severity of dehydration and hypokalaemia,

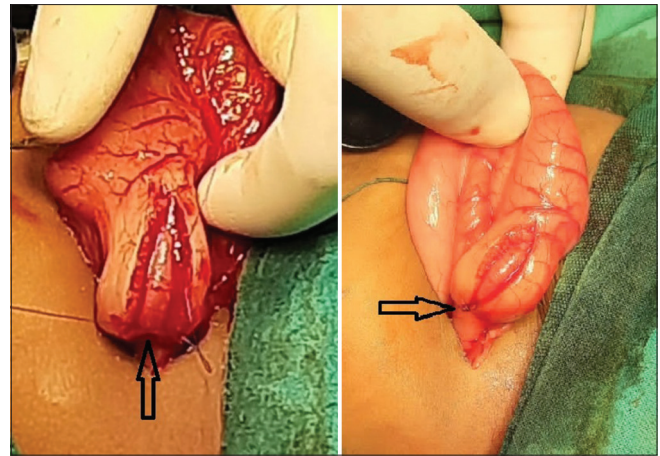


Figure 2: Intraoperative pictures show interrupted suturing of the pyloric mucosal perforation with 5-0 polydioxanone suture in a 4-week old female child with pyloric mucosal injury detected during open pyloromyotomy

prolonged preoperative hospital stay, and unnoticed PMI.^[3] The operative complication can be either inadequate pyloromyotomy (IPM) or pyloric mucosal perforation (PMP). An inadequate pyloromyotomy will cause persistent vomiting in the PO period and may require a second myotomy if a persistent obstruction is observed in the upper GI contrast study.

A PMP occurs due to the overzealous spreading of the muscle layers in order to avoid an IPM. The elevated risk of PMI is observed when operating on a small infant with early occurring symptoms/older patient with long duration symptoms, and during laparoscopy.^[4] Laparoscopic pyloromyotomy carries an elevated risk of both IPM and PMP. Although the laparoscopic group claims that the rate of intraoperative misadventure is inversely proportionate to the skills and experience of the surgeon. Slightly higher rates of PMP and IPM are usually in the initial learning curve of laparoscopy.^[5] The PMI almost always occurs towards the distal (duodenum end) end, as we see in our cases. An iatrogenic PMI may even occur by senior surgeons' hands with utmost caring. We suppose that the way of performing the pyloromyotomy, the instruments used for, and overzealous myotomy are the seeds of undesirable PMI.

The traditional and popular concept of repair is FTR and re-pyloromyotomy to the opposite side.^[6] PMI without re-pyloromyotomy is also described by many others. Royal *et al.* said that a PMI can safely be repaired using the traditional FTR or PMR.^[7,8] The technique of repair does not affect the outcome, probably because of the high vascularity of the stomach and no pancreatic-biliary reflux or obvious distal obstruction. In our series, two cases were managed by traditional FTR and one case with PMR. We started a delayed feeding in the case of PMR, though the definite influence of delayed

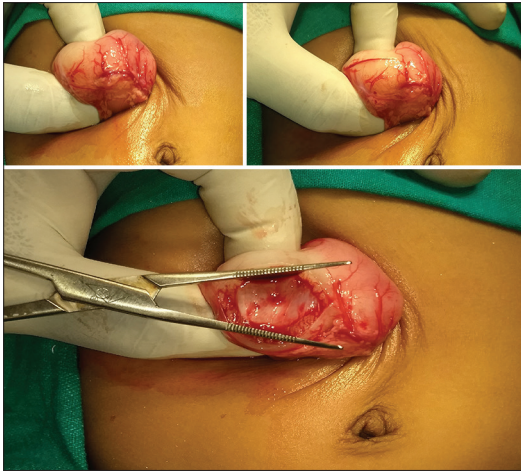


Figure 3: Intraoperative pictures show the technique of open pyloromyotomy by a specially designed pyloric spreader in a case of 7-week old male child

feeding was not clarified in the literature. Interestingly, and against our expectations, senior and experienced surgeons do adhere strictly to the traditionally accepted principles and guidelines. They may find it easier to lay dogma aside. From our cases, we can presume that the adequate pyloromyotomy or PMI must be diagnosed promptly and should repair the PMP according to the surgeon's method of choice.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient (s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be

made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Nofal AH, Almetaher HA, Ebeid AE. Pyloromyotomy for infantile hypertrophic pyloric stenosis using a modification of the Tan and Bianchi circumumbilical approach. *Ann Pediatr Surg* 2016;12:1-4. doi: 10.1097/01.XPS.0000472825.56322.24.
2. Chalya PL, Manyama M, Kayange NM, Mabula JB, Massenga A. Infantile hypertrophic pyloric stenosis at a tertiary care hospital in Tanzania: A surgical experience with 102 patients over a 5-year period. *BMC Res Notes* 2015;8:690.
3. Trobs RB, Burghardt L, Bahr M, Nissen M. Do immaturity, dehydration or alkalosis predispose to intraoperative complications at pyloromyotomy? *Open J Pediatr* 2016;6:203-12.
4. Kim SS, Lau ST, Lee SL, Schaller R Jr, Healey PJ, Ledbetter DJ, *et al.* Pyloromyotomy: A comparison of laparoscopic, circumumbilical, and right upper quadrant operative techniques. *J Am Coll Surg* 2005;201:66-70.
5. Adibe OO, Nichol PF, Flake AW, Mattei P. Comparison of outcomes after laparoscopic and open pyloromyotomy at a high-volume pediatric teaching hospital. *J Pediatr Surg* 2006;41:1676-8.
6. Gundu A, Ramappa K. Clinical study and management of infantile hypertrophic pyloric stenosis 2014;101:40-2.
7. Ein SH, Masiakos PT, Ein A. The ins and outs of pyloromyotomy: What we have learned in 35 years. *Pediatr Surg Int* 2014;30:467-80.
8. Waldron LS, Shawn D, Peter S, Muensterer OJ. Management and outcome of mucosal injury during pyloromyotomy-An analytical survey study. *J Laparoendosc Adv Surg Tech* 2015;25:1044-6.