Case Report

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Duodenal obstruction due to a preduodenal portal vein

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ABSTRACT

An infant presented with clinical signs and symptoms suggestive of a pyloric stenosis. On abdominal ultrasound, pyloric stenosis was excluded, and other causes for proximal duodenal obstruction, such as a duodenal web or annular pancreas, were suspected. At surgery, the cause was found to be due to an anterior portal vein or preduodenal portal vein, compressing the duodenum. There were no associated findings such as midgut malrotation, duodenal web and congenital anomalies. The treatment was a diamond-shaped duodeno-duodenostomy anterior to the portal vein. The patient improved after surgery.

Key words: Congenital, duodenal obstruction, portal vein, ultrasound

INTRODUCTION

Pre-duodenal portal vein is a rare congenital occurrence where the portal vein passes anterior to the duodenum, causing duodenal obstruction. Clinically, infants present with features of upper gastro-intestinal tract obstruction. This case report highlights the important radiologic, surgical and clinical issues pertaining to this condition.

CASE REPORT

A 5-month-old baby girl was referred to the paediatric department at Steve Biko Academic Hospital for failure to thrive with non-bilious projectile vomiting since the age of two weeks. The infant was fed breast milk only. There was no significant antenatal history, and there were no complications at birth. The mother was known to have diabetes and hypertension.

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Clinically, the patient appeared dehydrated, with sunken eyes, was restless, irritable and had pale skin. She had a distended abdomen, no palpable mass, and there were no features of sepsis. The provisional diagnosis was a hypertrophic pyloric stenosis. A nasogastric tube was inserted, and it drained freely. An intravenous line was inserted to rehydrate patient.

Biochemical results demonstrated low sodium of 123 mmol /l (normal: 136 – 145 mmol/l), low chloride of 57 mmol/l (normal: 98 – 107 mmol/l), low potassium of 3.3 mmol/l (normal: 4.1 – 5.3 mmol/l), high urea of 5.2 mmol/l (normal: 1.4 – 5.0 mmol/l) and high creatinine of 35 mmol/l (normal: 14 – 34 mmol/l).

A supine abdominal radiograph [Figure 1] demonstrated a distended stomach and an air-fluid level in the distended first part of duodenum (D1), with a change in bowel calibre distal to D1. This is suggestive of partial duodenal obstruction as in a duodenal web and PDPV obstruction.

The ultrasound images showed distended stomach, distended D1 with normal relaxation, and contraction of the pylorus was visible [Figure 2]. This, together with the



Figure 1: Supine abdominal radiograph showing the dilated stomach and distended first part of the duodenum (D1). Gas is seen in the distal bowel, suggesting a partial obstruction, at the level of D1

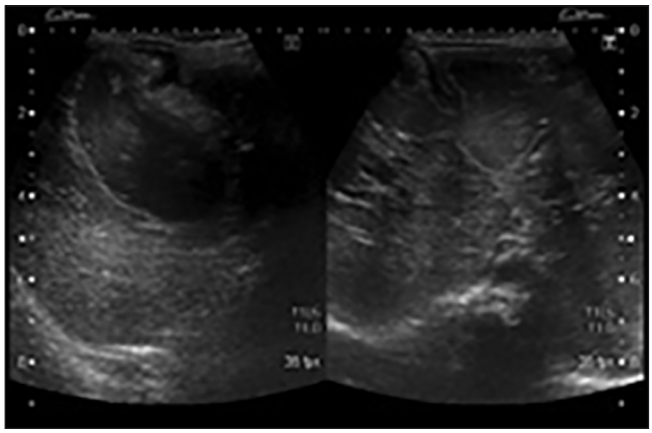


Figure 2: Abdominal ultrasound image with a linear probe positioned transverse in the epigastrium, demonstrating a relaxed (right) and a contracted (left) pylorus, in keeping with a peristaltic wave passing through the non-elongated pyloric channel, a feature not seen in HPO. In addition, there is no muscle wall thickening and no other feature to suggest HPO

lack of the pyloric muscle wall thickening, excluded the diagnosis of a HPO, which was initially suspected on this patient. A diagnosis of duodenal web was postulated in light of the radiologic findings in this patient. A contrast study was then performed to exclude the presence of malrotation. The results were inconclusive as minimal contrast passed distal to the site of obstruction.

The patient was stabilized and taken to theatre. A supra-umbilical transverse incision was made. The stomach and first part of the duodenum were distended. The portal vein crossed over the first part of the duodenum anteriorly. [Figure 3] A diamond-shaped duodeno-duodenostomy was performed anterior to the portal vein with PDS 5-0, and the abdomen was closed with PDS 3-0 and vicryl 4-0 sutures [Figure 3].

There was malrotation with Ladd's bands associated with this preduodenal vein. The Ladd's bands were divided, and the small bowel mesentery was broadened, which is performed during the Ladd's procedure.

Postoperatively, total parenteral nutrition was administered, and small volume oral feeds were started on day six and gradually advanced. The baby developed a spiking temperature on day seven post – surgery. Enterococcus faecalis and *Klebsiella pneumonia* were found on blood cultures, and patient was given appropriate antibiotics. The patient recovered well.

There was no vomiting documented ever after the surgery, and patient gained weight. She was discharged uneventfully after finishing her course of antibiotics. She is being followed up in the outpatient department and remains asymptomatic with regard

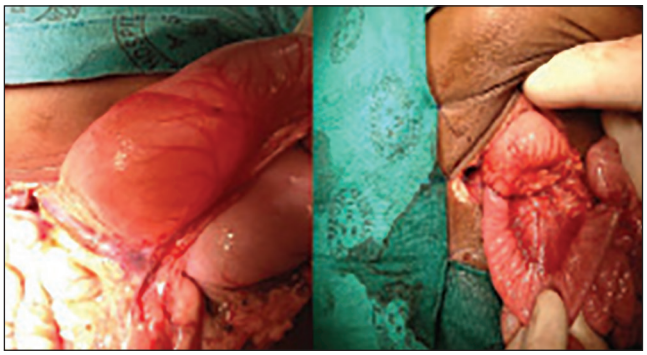


Figure 3: A photographic image showing PDPV with dilated D1 and normal distal duodenum and small bowel (right) and an image post duodeno-duodenostomy (left)

to the gastrointestinal system and continues to gain weight.

DISCUSSION

The presence of a preduodenal portal vein (PDPV) is an extremely rare congenital occurrence, and is a rare cause of duodenal obstruction. In PDPV, the portal vein passes anterior to the duodenum rather than posterior to it.[1-8] It is generally asymptomatic, but may co-exist with *situs inversus* and other anomalies like midgut malrotation, duodenal web, pancreatic, splenic or cardiac anomalies.[1-6,8]

PDPV was first described in 1921 by Knight, and the majority of the reported cases in the literature are children presenting with duodenal obstruction.[1-8]

The portal vein arises during foetal life by a systematic absorption of the interconnecting veins of the vitelline venous system. The two parallel vitelline veins are joined by three interconnecting veins—the cephalad branch within the liver, the middle branch posterior to duodenum, and the caudal branch anterior to duodenum. Later in development, the caudal and the cephalad branches anastomose, with the caudal part of the right vitelline vein and the cephalad part of the left vitelline vein, disappearing, leaving an S-shaped portal vein passing behind the duodenum. A variation in this process, in which the middle and the cephalad anastomosis disappear together with the left vitelline vein, accounting for an L-shaped caudal portal vein is known as the PDPV.[1,2,4]

Neonates with PDPV present with clinical features of upper gastro-intestinal tract obstruction. Abdominal radiographs may demonstrate distension of the stomach and proximal duodenum and a change in calibre of the small bowel distal to the level of partial obstruction, as was

evident in our patient.[9] These findings may be confirmed on contrast studies. Ultrasound may demonstrate a normal pylorus (which is one of the differential diagnoses) and a pre-pancreatic course of the portal vein on transverse or sagittal imaging. Similar findings may be found on computed tomography (CT) or magnetic resonance imaging (MRI).[9] The presence of PDPV should alert the radiologist to look for other associated anomalies that can lead to duodenal obstruction, and this will direct further imaging studies.[1-4]

The preferred treatment of duodenal obstruction caused by PDPV is duodeno-duodenostomy.[1-3,7,8] This procedure was performed in our patient. Preduodenal portal vein when unrecognized is at risk to injury during surgery in the vicinity such as during cholecystectomy, gastrectomy, portoenterostomy and pancreatectomy. A vigilant surgeon can prevent these complications by recognizing this anomaly early.[1-4]

CONCLUSION

PDPV is a rare cause of proximal GIT obstruction in a neonate. The diagnosis can be made radiologically by excluding common causes such as hypertrophic pyloric stenosis and by visualization of the PDPV passing anterior to the pancreas on ultrasound.

REFERENCES

1. Singala AK, Ramub C, Paulc S, Matthaic J. Preduodenal portal vein in association with midgut malrotation and duodenal web—triple anomaly? J Pediatr Surg 2009;44:e5-7.
2. Eltayeb AA. Preduodenal portal vein: A cause of duodenal obstruction in one case and incidental finding in another. Surgery 2012;2:1-3.
3. Baglaj M, Gerus S. Preduodenal portal vein, malrotation, and high jejunal atresia: A case report. J Paediatr Surg 2012;47:e27-30.
4. Shah OJ, Robbani I, Khuroo MS. Preduodenal portal vein with preduodenal common bile duct: An extremely rare anomaly. Am J Surg 2009;197:e43-5.
5. Ozbulbul NI. Congenital and acquired abnormalities of the portal venous system: Multidetecor CT appearance. Diagn Interv Radiol 2011;17:135-42.
6. Bernard LJ, Perry FA, Walker M. Preduodenal portal vein Causing Duodenal Obstruction with Bleeding Duodenal Ulcer. Ann Surg 1959;150:909-12.
7. Masumoto K, Teshiba R, Esumi G, Nagata K, Nakatsuji T, Yamagac S. Duodenal stenosis resulting from a preduodenal portal vein and an operation for scoliosis. World J Gastroenterol 2009;31:3950-3.
8. Choi SO, Park WH. Preduodenal portal vein: A cause of prenatally diagnosed duodenal obstruction. J Pediatr Surg 1995;10:1521-2.
9. Hernanz-Schulman M. Imaging of neonatal gastrointestinal obstruction. Radiol Clin North Am 1999;37:1163-86.

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