# Laparoscopic duodenduodenostomy in cases of neonatal duodenal obstruction owing to preduodenal portal vein

Ahmed Arafa[a], Hadeer M. Nasreldin[a], Ahmed H. Ahmed[b]

[a]Department of Pediatric Surgery, Faculty of Medicine, Cairo University, Cairo, [b]Department of Pediatric Surgery, Faculty of Medicine, Menia University, Menia, Egypt

Correspondence to Ahmed Arafa, MD, Department of Pediatric Surgery, Faculty of Medicine, Cairo University, Cairo 11511, Egypt. Mobile: 01111546746; e-mail: drahmedarafa1@gmail.com

**Received:** 15 August 2022
**Revised:** 02 September 2022
**Accepted:** 05 September 2022
**Published:** 05 April 2023

**The Egyptian Journal of Surgery** 2023, 41:1118–1121

**Introduction**
Preduodenal portal vein (PDPV) is a rare anomaly. It represents only 4% of all cases of duodenal obstruction where the portal vein passes longitudinally in front of second part of the duodenum.
**Patients and methods**
We had four cases of newborn with PDPV presented with duodenal obstruction: two cases associated with total situs inversus, one case had polysplenia, one case had cardiac abnormalities, who presented clinically with duodenal obstruction. The four cases were discovered with PDPV accidently intraoperatively. Laparoscopic duodenoduodenostomy was done for all our cases.
**Results**
Overall, four cases had a mean age at operation of 6 days. The mean weight at operation was 3 kg. The mean operative time was 90 min. There was no conversion to open surgery. We had no postoperative complication, no anastomotic leakage, or stenosis. We started feeding on the third postoperative day. The mean postoperative hospital stay was 8 days.
**Conclusions**
Laparoscopic duodenoduodenostomy technique is safe in cases of PDPV.

**Keywords:**
Laparoscopic duodenduodenostomy, neonatal duodenal obstruction, preduodenal portal vein

Egyptian J Surgery 2023, 41:1118–1121

1110-1121

## Introduction

Preduodenal portal vein (PDPV) is a rare anomaly. It is only 4% of all cases of duodenal obstruction where the portal vein passes longitudinally in front of the second part of the duodenum [1]. This anomaly may be due to embryonic anomaly resulting from persistent caudal anastomosis between the vitelline veins [2].

The first laparoscopic duodenduodenostomy was done in duodenal atresia in neonates by Bax *et al*. [3] and Rothenberg [4].

Less than 100 cases were reported to have PDPV and less than 50% of them were obvious cause of obstruction. It is important to know this anomaly to avoid injury to the portal vein [5,6]. There may be associated duodenal obstruction, due to this anomaly or in combination with typically coexisting anomalies [5,6].

## Patients and methods

A total of four neonates presented with duodenal obstruction to Cairo University Hospital and Menia University Hospital in the period of 5 years from 2017 to March 2022. They had bilious vomiting since birth.

Abdominal erect radiograph was done for all of our cases and revealed a double bubble sign (Fig. 1).

Overall, two cases associated with total situs inversus, one case had polysplenia, and one case had murmur on cardiac examination. Cardiac anomalies were confirmed by echocardiography.

Nasogastric decompression of the stomach and correction of dehydration and electrolyte disturbance were done.

Laparoscopic duodenoduodenostomy was done for all our cases.

The surgeon stood at the foot of the operating table. On his left side, there was the camera assistant, and on his right side, the scrub nurse stood. The laparoscopic tower was put at the head of the operating table. A 5-mm trocar was inserted (open method) through the umbilicus. The pressure was maintained at 5 mm

Hg, whereas the flow was maintained at 2 l/min. Then, two additional 3-mm trocars were inserted: one was introduced in the in right midclavicular line below umbilicus by one cm and the other was inserted at left midclavicular line above umbilicus by 1 cm.

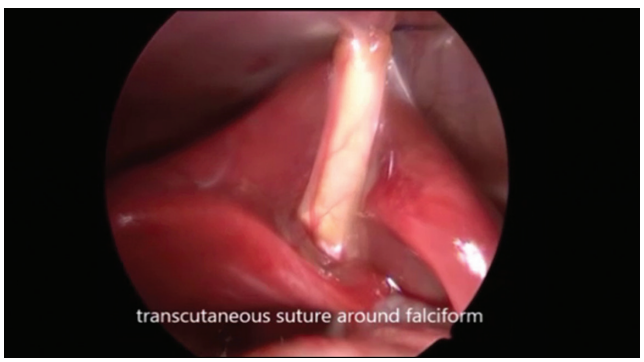
Three stay sutures were done transcutaneously (Figs 2–4): one through the falciform ligament to elevate the liver, the other into the gallbladder to allow good exposure to the duodenum, and the third one was introduced into the part of the duodenum distally to the portal vein to mobilize it to exclude distal duodenal atresia.

Portal vein was passed longitudinally on the distal end of first part of duodenum, and dissection of the portal vein from surrounding was done ensure intraoperative diagnosis of PDPV (Fig. 5).

**Figure 1**

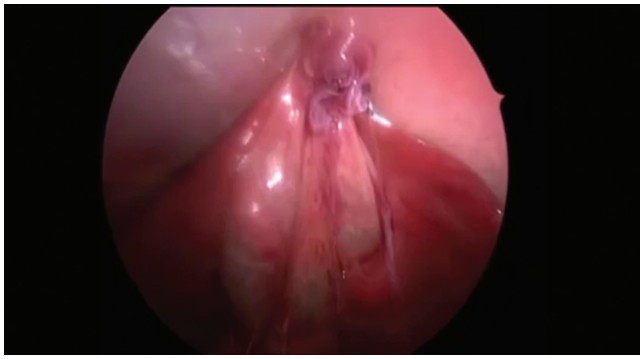
Abdominal erect radiograph shows a double bubble sign, in case of situs inversus.

**Figure 2**



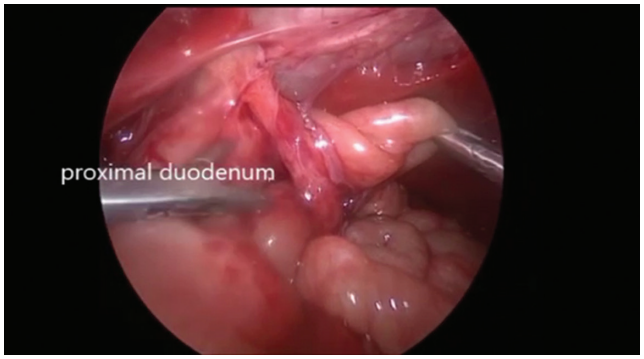

Transcutaneous suture around falciform.

**Figure 3**



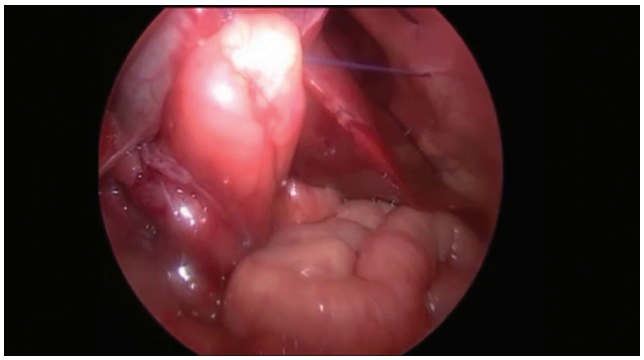
Transcutaneous suture to gallbladder to help good exposure to duodenum.

**Figure 4**



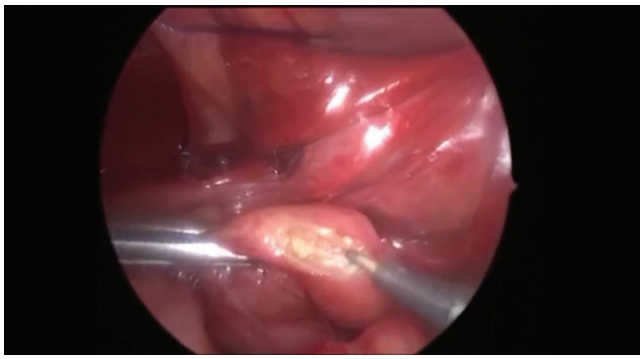

Transcutaneous suture into the distal part of the duodenum to exclude distal intestinal atresia in case of situs inversus.

**Figure 5**



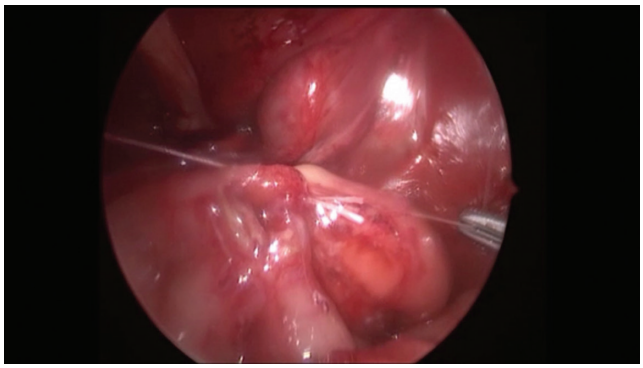
PDPV after dissection of portal vein from surrounding, in case of situs inversus. Portal vein divides first part of duodenum into proximal and distal. PDPV, preduodenal portal vein.

**Figure 6**



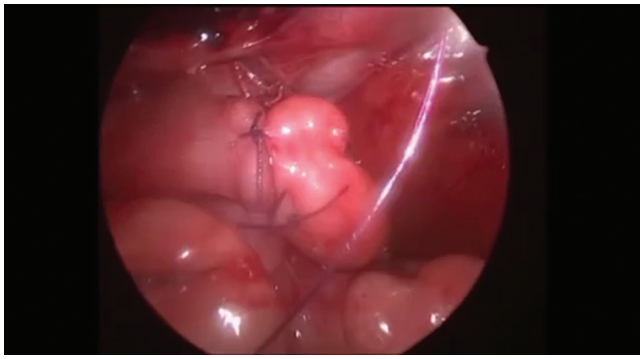
Incision of duodenum away from portal vein by electrocautery hook.

**Figure 7**



Posterior layer anastomosis by vicryl 5/0 interrupted sutures.

**Figure 8**



Anterior wall of duodenoduodenal anastomosis.

Transverse incision was made using electrocautery hook, on either side of portal vein, away from portal vein, to avoid portal stenosis after anastomosis was performed (Fig. 6).

Side-to-side duodenduodenostomy was done by vicryl 5/0 interrupted sutures (Figs 7 and 8 and Table 1).

## Results

The four cases had a mean age at operation of 6 days. The mean weight at operation was 3 kg, and the weight range was 2.5–3.5 kg. The mean operative time was 90 min, and the range of operative time was 80–100 min. There was no conversion to open surgery. We had no postoperative complication, no anastomotic leakage, or stenosis. We started feeding on the third postoperative day. Mean postoperative hospital stay was 8 days.

## Discussion

In only 4% of all cases of duodenal obstruction the portal vein passes longitudinally in front of the second part of the duodenum [1]. Knight was the first one to report a case concerning this congenital disorder in 1921 [7].

Mordehai *et al*. [5] and Esscher [6] documented that less than 100 cases have PDPV and less than 50% of them were obvious causes of obstruction. They reported associated duodenal obstruction, due to this anomaly or in combination with typically coexisting anomalies.

Kim *et al.* [8] also documented that PDPV was directly responsible for duodenal obstruction in only one of three cases. Moreover, Rusu *et al.* [9] had two cases of PDPV, where one of them had obstruction owing to this anomaly, but in all our cases, duodenal obstruction was caused by preduduodenal portal vein.

Kim *et al.* [8] reported associated gastrointestinal abnormalities and cardiac anomalies; one case had malrotation, another case had hiatus hernia, and one case had cardiac anomalies. However, in our cases, we

**Table 1 Presentation, postoperative complication, time to start feeding, hospital stay, and associated anomalies of these cases**

| Cases | Case 1 | Case 2 | Case 3 | Case 4 |
|---|---|---|---|---|
| Age of operation | 7 days | 6 days | 5 days | 6 days |
| Weight | 3 kg | 2.5 kg | 3 kg | 3.5 kg |
| Operative time | 90 min | 100 min | 90 min | 80 min |
| Conversion to open | No | No | No | No |
| Postoperative Leakage | No | No | No | No |
| Postoperative stenosis | No | No | No | No |
| Postoperative Feeding start | 3rd day | 3rd day | 4th day after once vomiting | 3rd day |
| Hospital stay | 1 week | 10 days | 10 days | 5 days |
| Associated anomalies | Situs inversus | Cardiac anomalies | Situs inversus | polysplenia |

had two cases associated with total situs inversus, one case of polysplenia, one case had cardiac abnormalities.

Mboya *et al.* [10] had only case that was diagnosed antenatally, whereas others were diagnosed intraoperatively. However, all our cases were intraoperative diagnosis.

Georgacopulo and Vigi [11] and Choi and Park [12] reported that duodenoduodenostomy or gastroduodenostomy was a good procedure to bypass the obstructed part by portal vein. However, Rusu *et al.* [9] reported two cases of PDPV, where duodenoduodenostomy was done in one case, and in the other case, duodenoduodenostomy was not performed as the occurred obstruction was not owing to PDPV, but owing to associated malrotation. Therefore, they did Ladd's operation. However, in all our cases, laparoscopic duodenoduodenostomy was done.

## Conclusions

Laparoscopic duodenoduodenostomy technique is safe in cases of PDPV.

### Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patients have given their consent for their images and other clinical information to be reported in the journal. The patient understands that his name and initials will not be published and due efforts will be made to conceal her identity, but anonymity cannot be guaranteed.

### Financial support and sponsorship

Nil.

### Conflicts of interest

There are no conflicts of interest.

## References

1 Grosfeld JL, Rescorla FJ. Duodenal atresia and stenosis: reassessment of treatment and outcome based on antenatal diagnosis, pathologic variance, and long-term follow-up. World J Surg 1993; 17:301–309.

2 Walsh G, Williams MP. Congenital anomalies of the portal venous system: CT appearances with embryological considerations. Clin Radiol 1995; 50:174–176.

3 Bax NM, Ure BM, van der Zee DC, van Tuijl I. Laparoscopic duodenoduodenostomy for duodenal atresia. Surg Endosc 2001; 2:217.

4 Rothenberg SS. Laparoscopic duodenoduodenostomy for duodenal obstruction in infants and children. J Pediatr Surg 2002; 37:1088–1089.

5 Mordehai J, Cohen Z, Kurzbart E, Mares AJ. Preduodenal portal vein causing duodenal obstruction associated with situs inversus, intestinal malrotation, and polysplenia: a case report. J Pediatr Surg 2002; 37:E5.

6 Esscher T. Preduodenal portal vein: a cause of intestinal obstruction? J Pediatr Surg. 1980; 15:609–612.

7 Knight HO. An anomalous portal vein with its surgical dangers. Ann Surg 1921; 74:697–699.

8 Kim SH, Cho YH, Kim HY. Preduodenal portal vein: a 3-case series demonstrating varied presentations in infants. J Korean Surg Soc 2013; 85:195–197.

9 Rusu S, Zaghal A, Muhammad S. Surgical decision making in preduodenal portal vein: report of two cases in neonates. Eur J Pediatr Surg Rep 2018; 6:e40–e42.

10 Mboya A, Khadir SK, Guillaume M-P, Massicot R, Flurin V, Lalioui A, *et al*. An exceptional cause of duodenal obstruction detected antenatally: a compressive preduodenal portal vein. J Pediatr Surg Case Rep 2013; 1:420–424.

11 Georgacopulo P, Vigi V. Duodenal obstruction due to a preduodenal portal vein in a newborn. J Pediatr Surg 1980; 15:339–340.

12 Choi SO, Park WH. Preduodenal portal vein: a cause of prenatally diagnosed duodenal obstruction. J Pediatr Surg 1995; 30:1521–1522.