Preduodenal portal vein: Its rare association with Meckel's diverticulum in a Pediatric Patient

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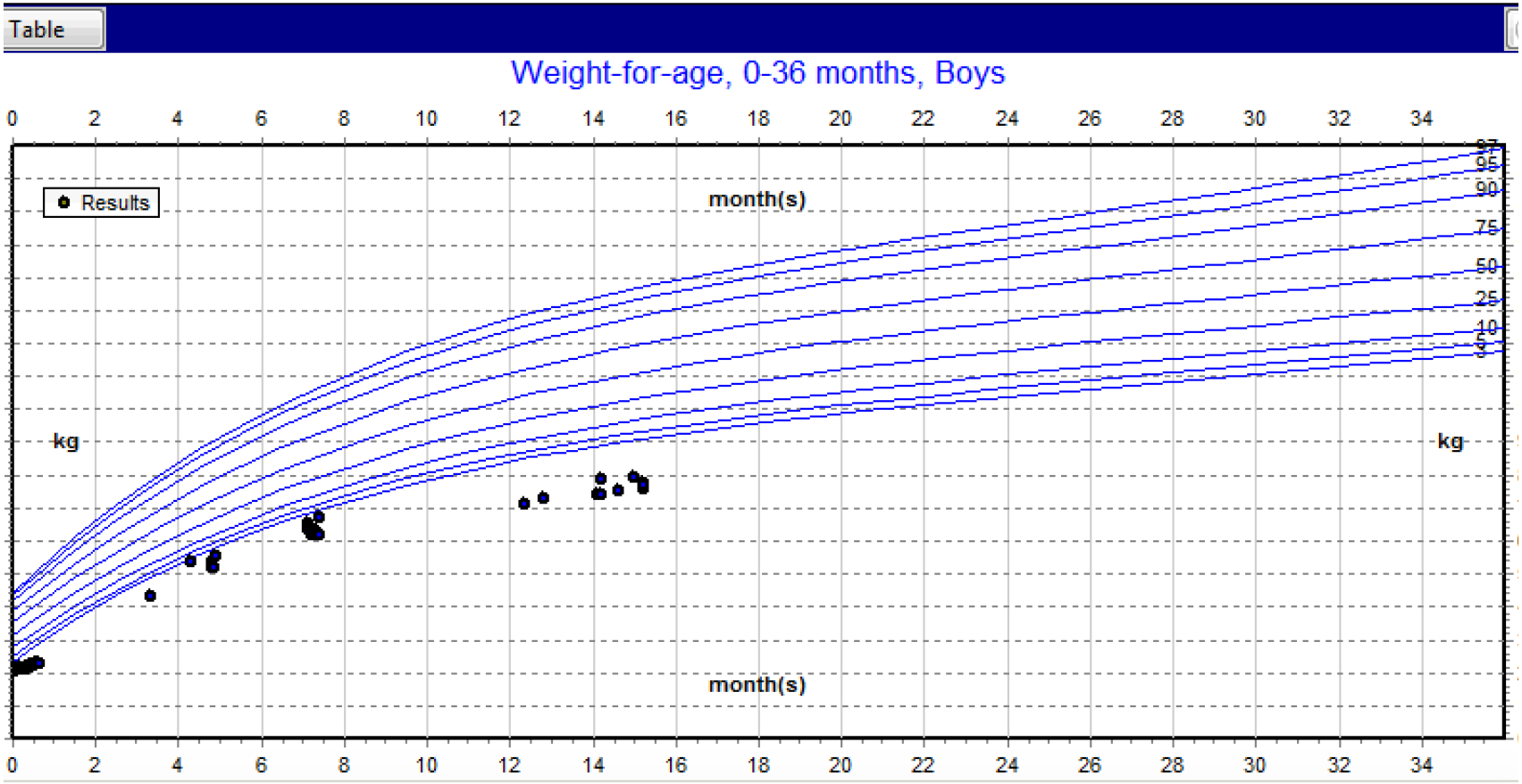
Conflict of Interest

- None

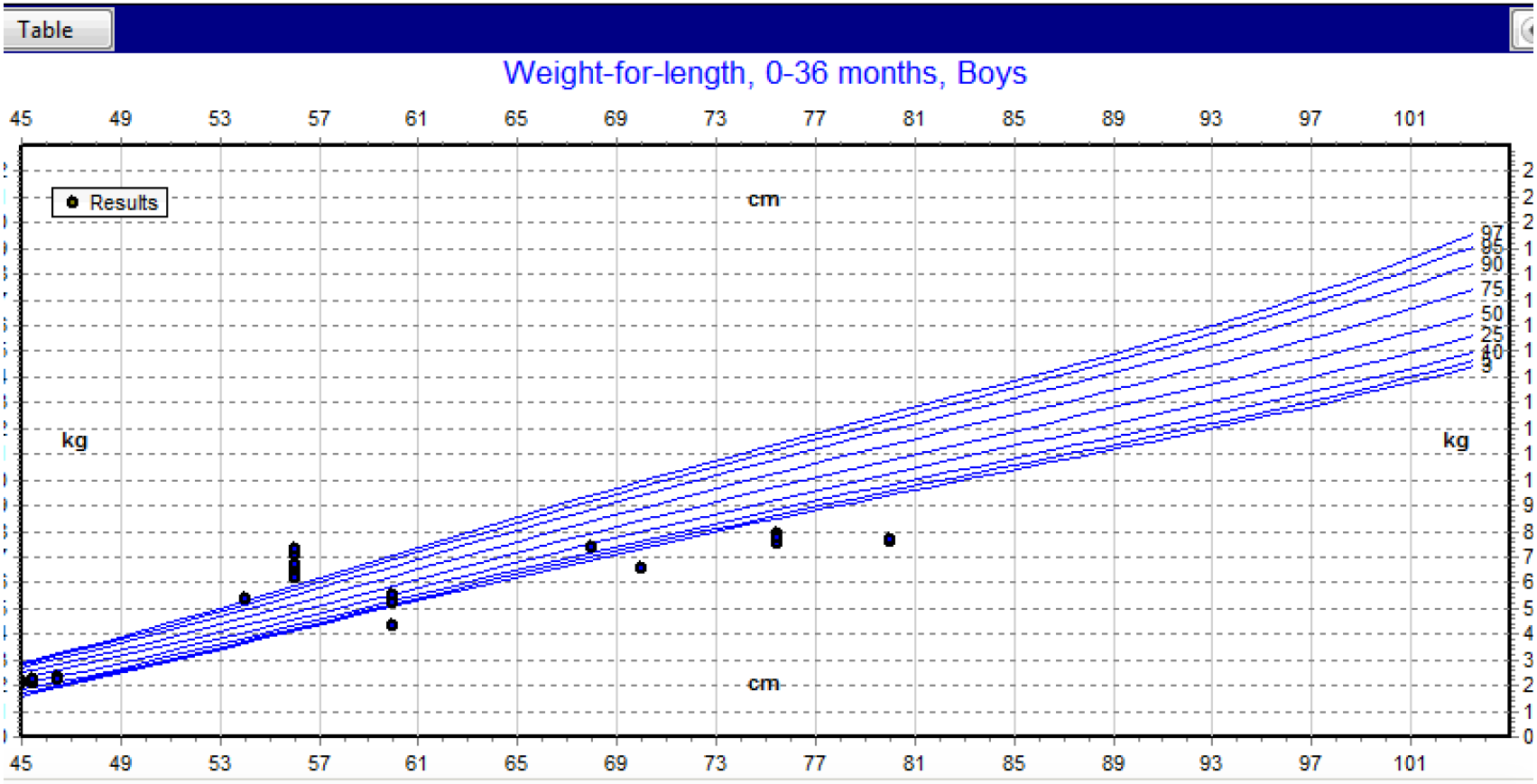
Case

- A 14 month old male with a history of heterotaxy syndrome s/p cardiac surgery for left atrial isomerism and complete AV canal defect was admitted with:
  - Failure to thrive
  - Non-bililous, non-heme containing and non-projectile emesis
- Physical exam, including vitals, were within normal limits

Growth Chart



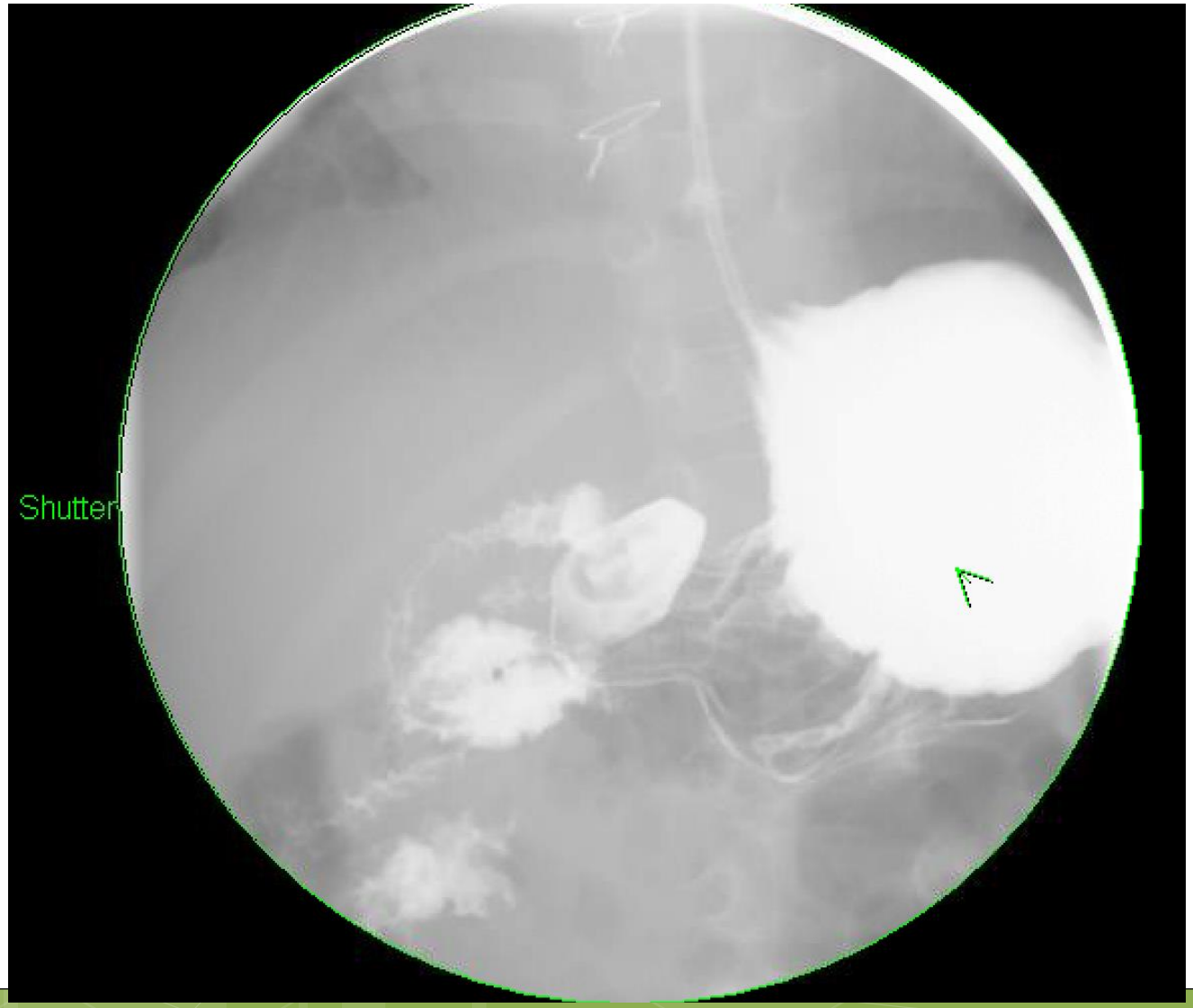
Growth Chart



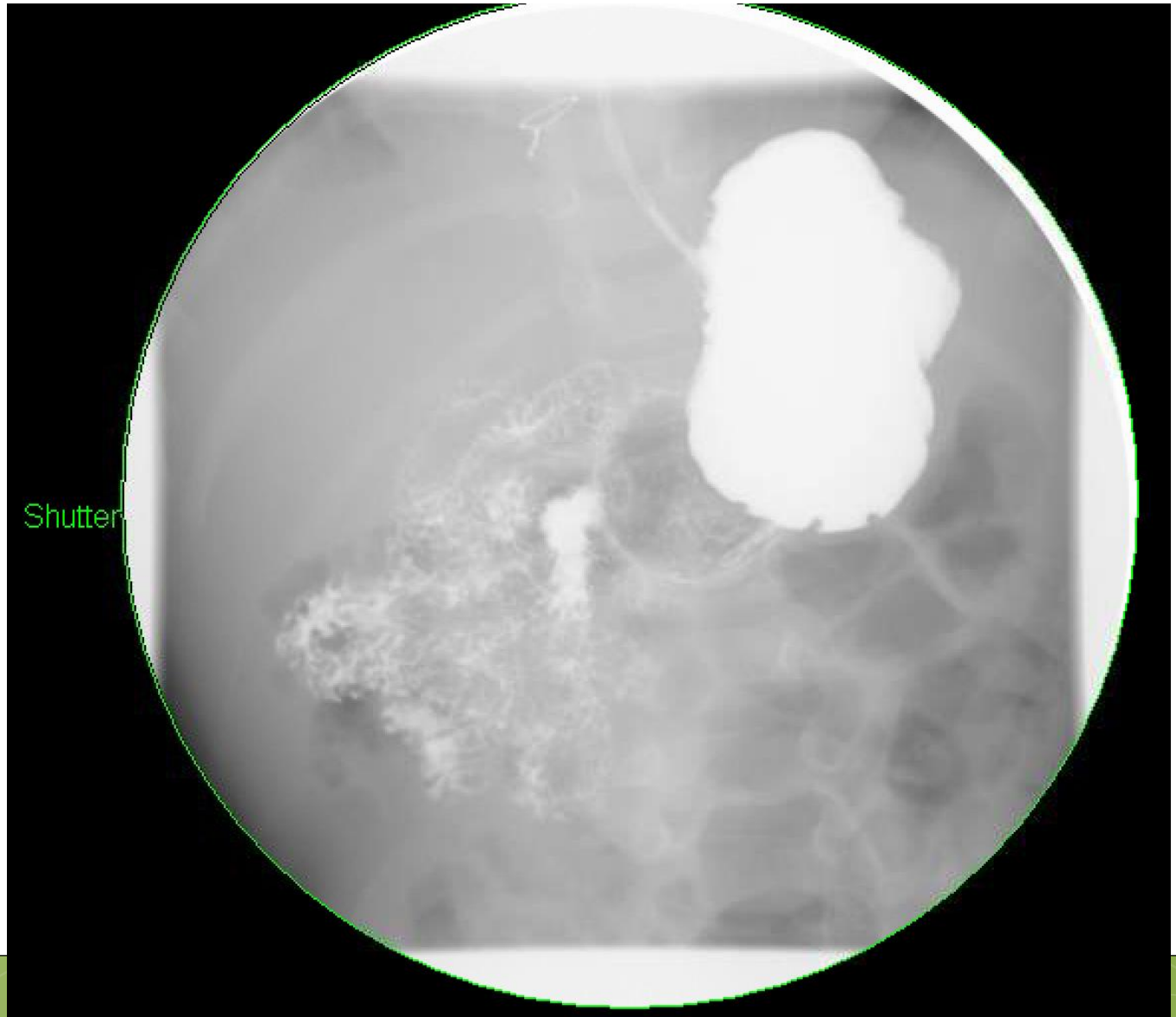
Case

- Upper GI series demonstrated a malrotation
- Laboratory workup was insignificant
- Pediatric Surgery team was consulted
  - Decision was made to do a laparoscopic Ladd’s procedure to correct the malrotation

Upper GI: Malrotation



Upper GI: Malrotation



Intraoperative Findings

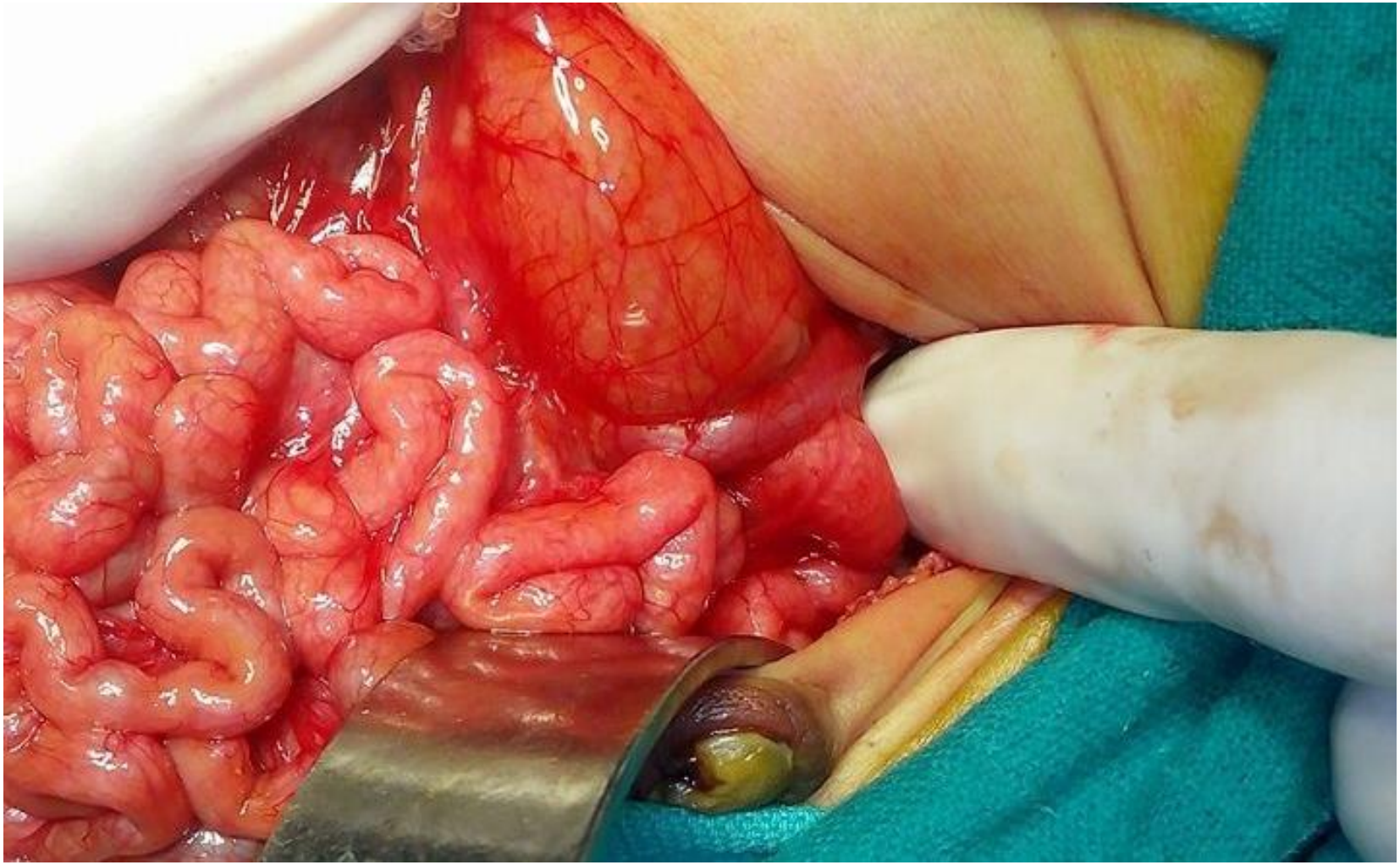
- A Meckel's diverticulum was appreciated approximately 2 ft from the ileocecal junction, which was removed
- Portal vein was found in the preduodenal space
- No duodenal obstruction or narrowing was noted.
  - Therefore, the preduodenal portal was left intact

PDPV

Ref 5

PDPV

Ref 5



Two week follow up

- Patient has done well with 1.5 pound weight gain since surgery
- No more episodes of emesis were reported

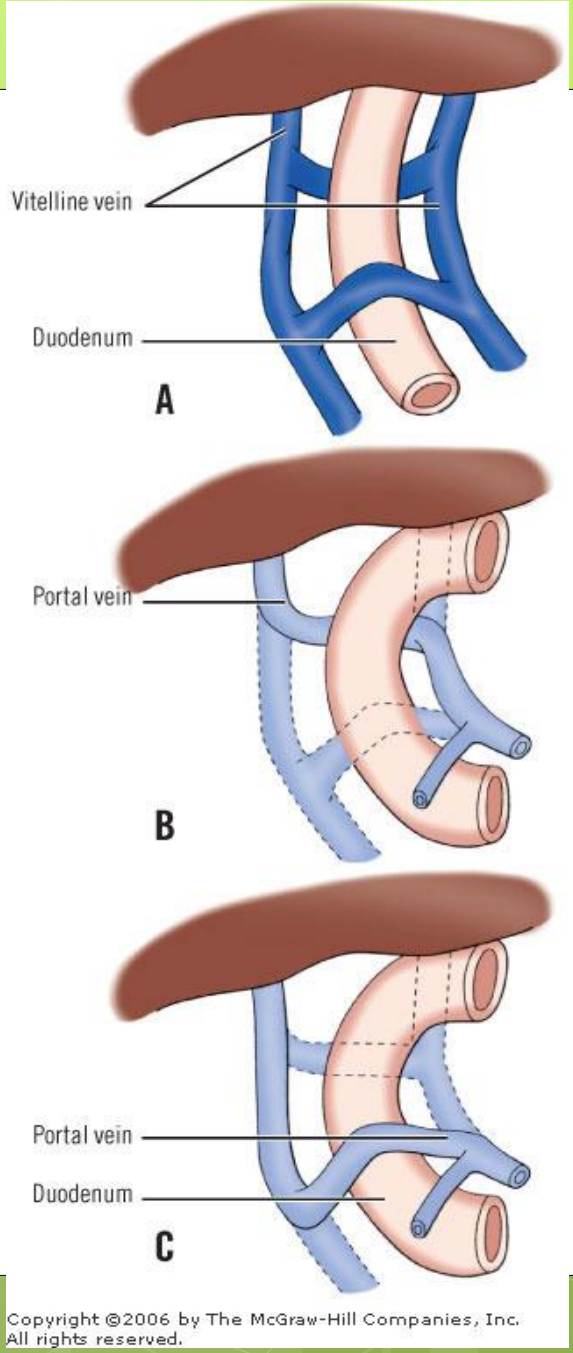
Discussion- What is PDPV?

- Preduodenal portal vein (PDPV) is a rare congenital anomaly
- Resulting from persistence of the primitive vitelline vein
- Rather than passing inferior and posterior to the pancreas, the portal vein crosses anterior to the duodenum and pancreas
- Usually an incidental finding in surgeries involving the GI tract
- Rarely associated with intestinal obstruction due to extrinsic compression of the duodenum

Preduodenal Portal Vein (PDPV)

- Although an incidental finding, PDPV is of great surgical importance as it can result in unexpected surgical complications secondary to accidental injury of the portal vein
- Awareness of this anomaly is essential for avoiding injuries during surgical correction of GI anomalies, such as malrotation

Embryologic Development



A. Two extrahepatic communications between vitelline veins early in the 6th week of gestation

B. Normal development. Cranial, postduodenal communicating vein persists as part of portal vein

C. Anomalous development. Caudal, preduodenal communicating vein persists, while cranial vein disappears[6].

PDPV is associated with:

- Heterotaxy syndrome
- Polysplenia syndrome
- Malrotation
- Duodenal atresia
- Duodenal web
- Annular pancreas
- Cardiac anomalies
- Biliary anomalies [7,8]

Anomalies associated with PDPV

- Yi et al reviewed the largest series of PDPV cases and found 323 reported cases of PDPV with multiple associated anomalies including:
  - intestinal malrotation (64%)
  - situs inversus (26%)
  - duodenal anomalies (26%)
  - pancreatic anomalies (22%)[9]

How rare is PDPV?

- In a single center, retrospective study, only 5 neonates were found to have PDPV[5]
  - All 5 of the patients were asymptomatic
  - Duodenal obstructions in all 5 patients were due to secondary malformations such as:
    - malrotation, duodenal web, duodenal atresia, and annular pancreas

How rare is PDPV?

- In another retrospective study over 10 years in a single center, out of 284 newborns who were symptomatic (bilious emesis, dehydration, and/or weight loss) only 2 patients were found to have PDPV[12]

PDPV outcomes and current opinions

- Approximately 50% of patients with PDPV present with symptomatic duodenal obstruction[1]
  - Caused either by the PDPV or the associated congenital anomalies

PDPV outcomes and current opinions

- If the PDPV causes duodenal obstruction, then bypass surgery is required
  - Duodenoduodenostomy or gastroduodenostomy that anteriorly bypasses the portal vein is the preferred method with good clinical outcomes[10,11]

Conclusion

- Our patient is rare, as to our knowledge there has not been any reported association of PDPV with Meckel's diverticulum
- Our patient also highlights the importance of the association between PDPV with other congenital malformations which may cause intestinal obstruction

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