Sonographic and Magnetic Resonance Evaluation of Patent Prolapsed Vitellointestinal Duct in a Neonate: A Case Report

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ABSTRACT

Omphalomesenteric duct can result in various forms of anomalies due to the failure of its absorption. Various presentations can be in the form of patent vitelline duct, Meckel's diverticulum, sinus tract, fibrous band, umbilical polyp prolapsing over the umbilicus or enteric fistula. It is important to diagnose these various anomalies in neonates with ultrasonography (USG) and magnetic resonance imaging (MRI) which are radiation free modalities. We present the case of a 20-day-old male baby who was having partial intestinal obstruction, umbilical discharge and slight herniated content from the umbilicus. The neonate underwent USG and MRI studies and was diagnosed with prolapsed vitellointestinal duct. In general, diagnosis of patent prolapsed vitellointestinal duct is difficult on clinical examination on the first look. In addition to being radiation hazards-free, USG and MRI help in the confirmation of the diagnosis as the anatomical details are well delineated by these modalities. This helps in early management as these types of pathologies can lead to many fatal complications.

Keywords: Omphalomesenteric duct, Ultrasound, MRI, Prolapsed vitellointestinal duct

INTRODUCTION

Vitellointestinal duct (VID) is embryonic communication between the yolk sac and the primitive mid gut. This includes vitelline duct, artery and vein. In the early embryonic phase, yolk sac acts as a prime source of nutrition for the growing fetus.[1] Yolk sac stalk is connected to midgut during the development of fetus. It obliterates subsequently during 5th-10th weeks of period of gestation. There may be partial or incomplete or complete failure of this obliteration which leads to different spectrum of congenital anomalies. These anomalies are found in 2%-3% of population. In majority of cases it presents as Meckle's diverticulum.[2] Other anomalies include patent vitelline duct, sinus tract, fibrous band, umbilical cyst and polyp.[3] The fibrous band attached to umbilicus in later life has got no implications and remains asymptomatic in adult life. Any neonate presenting with bleeding, intestinal obstruction, umbilical drainage or prolapsed in the form of hernia is direct clue for these types of pathologies. Simultaneous presence of these anomalies may happen in some cases.

CASE REPORT

A male baby of age 20 days presented with vomiting and poor weight gain with partial intestinal obstruction. There was a flower like pink, prolapsing lesion at his umbilicus with umbilical discharge. There was no history of fever. The baby was of poor socioeconomic background from a rural region. The delivery was conducted normally in the village without reporting to any hospital and was uneventful. The baseline investigation was within normal limits. The neonate was first subjected to Ultrasonography (USG) examination with high frequency linear probe (7.5 MHz). There was a hypo to anechoic bulge seen at the umblical site of abdominal wall which was extending to the deeper planes (**Figure 1a and 1b**).There was also evidence of dilated midgut bowel loops depicting partial bowel obstruction. (**Figure 1c**)

After USG the neonate was subjected to magnetic resonance imaging (MRI) abdomen to confirm the diagnosis after proper sedation. MRI had shown clearcut prolapsing gut contents in T2WI and after fat suppression, VID had been visualised as hyperindense outpouching (**Figure 2a and 2b**). Fastfield echo (FFE) axial section shows structures in line with the protruding outer flower like mass (Figure 2c). T2WI sagittal section shows the wall defect and out pouching contents and T2WI coronal section shows hyperintense rounded lesion depicting PVID (**Figure 2d and 2e**). The child had been contemplated for transumblical exploration, resection and anastomosis.

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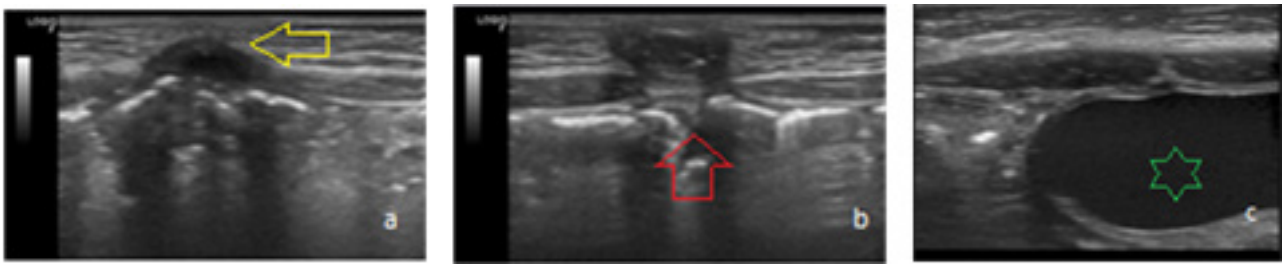

Figure 1: Ultrasonography images (USG) in transverse plain with 7.5 MHz linear probe. **a**) hypo- to anechoic midline bulge seen in the umbilical region at the site of abdominal wall defect (yellow arrow). **b**) clear abnormality is visualised in slightly deeper plane (red arrow). **c**) dilated loop is seen still in deeper plane in the abdomen (green star)

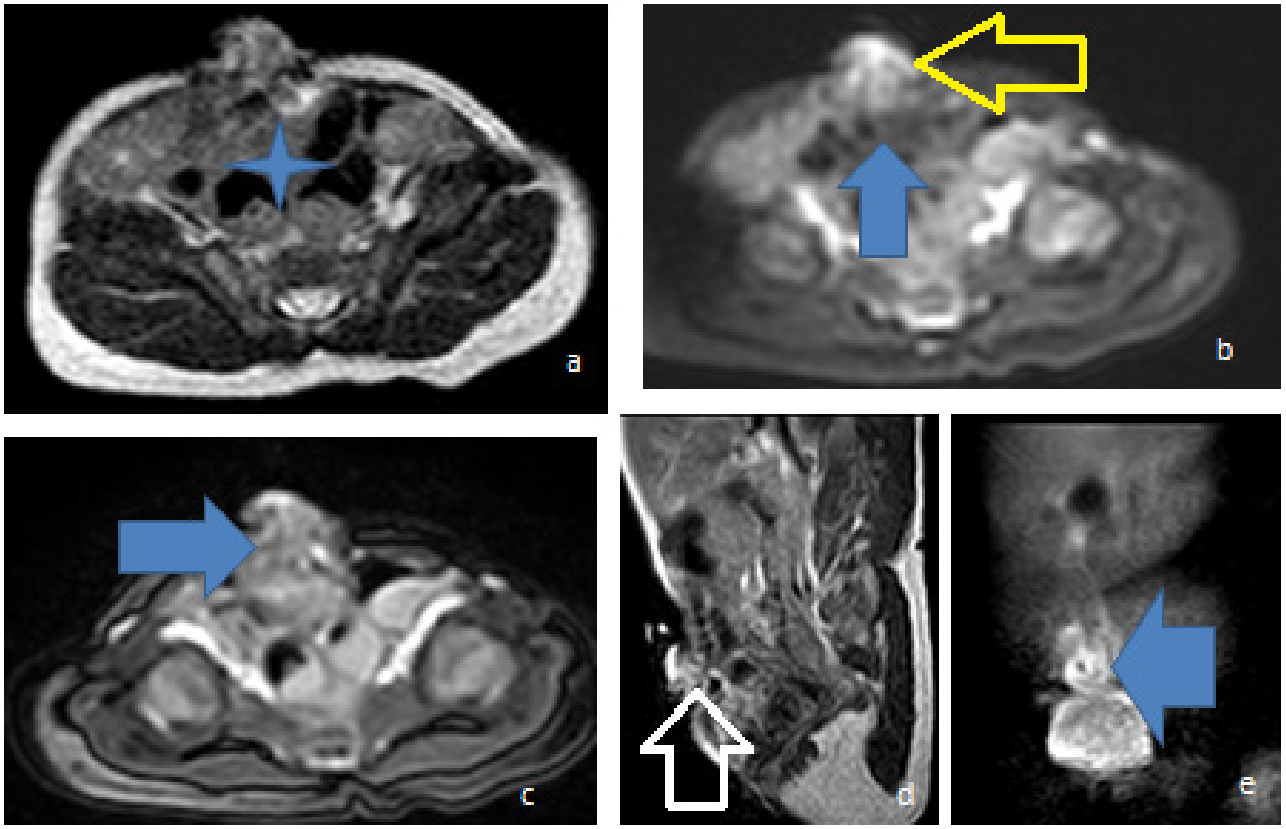

Figure 2: MRI abdomen of the neonate. **a**) axial T2WI shows prolapsing gut contents (blue star). **b**) T2WI with fat suppressed sequence shows hyperintense protruding VID (yellow arrow) and gut loops within abdomen (blue arrow). **c**) Fastfield echo (FFE) axial section shows structures in line with the protruding flower like mass (horizontal blue arrow). **d**) T2WI sagittal section shows the wall defect and outpouching contents (upwards white arrow). **e**) T2WI coronal section shows hyperintense rounded lesion depicting PVID (horizontal blue arrow).

DISCUSSION

Vitellointestinal duct (VID) is also called as omphalonesenteric duct which is a long narrow tube joining the yolk sac to the fetal midgut. It disappears during fifth to seventh fertilisation week corresponding to ninth gestational week. There can be many anomalies in different forms in the process of obliteration. It is called as prolapsed VIT (PVID) if seen after birth at the umbilical site.[4] The overall incidence is 2% and 0.0063-0.067% in neonates and infants respectively.[5] There may be single anomaly or associated with other anomalies. Sometimes there is total obliteration of this embryonic duct but the remnant may persist at either of the end with umbilicus or bowel as a cyst. These findings can be picked up during routine imaging for some other purpose as incidental findings. The diagnosis is very important as the management differs both in patent VIT and discharging sinus. Clementte EJI (2021) had emphasised the role of multimodality in the diagnosis where one modality scores over other keeping in view about the radiation-free evaluation. Ultrasonography is the most suitable diagnostic modality for the earliest diagnosis because of its inherent advantages for the pediatric population.[6] Though this is not superior to laparoscopy but with the help of MRI the diagnosis can be made near to the completion.[7,8] This anomaly can lead to intestinal obstruction in later life.[9]

Vane DW et al (1987) conducted the study among 217 children (mean age 2.4 years) with vitelline duct anomalies where 85 (40%) had symptomatic lesions. In further distribution, 48 presented with rectal bleeding, 28 with intestinal obstruction, 5 with abdominal pain and four with bilious umblical drainage. Surgical intervention involved was bowel resection, divertculectomy and excision of the patent vitelline duct.[10] Moore TC (1996) emphasises on the presentation and the likelihood of the surgical contemplation. Most of the symptoms appear during the first two years of the life in the form of fecal fistulas at the umbilicus, intussusceptions/prolapse of ileum at the umbilicus, melena, intestinal obstruction and anaemia.[11]

CONCLUSION

Patent vitellointestinal duct anomaly is a challenging task to diagnose. A lot of importance lies in the diagnosis. The clinical evaluation and the imaging modalities have both got pivotal roles in their own ways. The total further management lies on these bases.

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