Scholars Journal of Medical Case Reports
Abbreviated Key Title: Sch J Med Case Rep
ISSN 2347-9507 (Print) | ISSN 2347-6559 (Online)
Journal homepage: https://saspublishers.com

OPEN ACCESS

Radiology

Volvulus of the Common Mesentery in the Newborn: The Critical Role of Early Diagnosis by Doppler Ultrasound – A Case Report

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DOI: https://doi.org/10.36347/sjmcr.2025.v13i10.001 | **Received:** 04.06.2025 | **Accepted:** 12.08.2025 | **Published:** 06.10.2025

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Abstract | **Case Report**

Small Bowel Volvulus on the Common Mesentery is a twisting of the small intestine, often caused by congenital intestinal malrotation. This pathology constitutes a surgical emergency, requiring rapid diagnosis and immediate management to prevent severe complications such as intestinal infarction. Surgical treatment, consisting of detorsion of the intestine and repositioning of the organs, with an excellent prognosis in the absence of intestinal necrosis. We report the case of a female newborn, 4 days old, preterm at 34 weeks and 6 days gestation. She was initially admitted at 2 days of life for neonatal respiratory distress and presented with bilious vomiting and cessation of transit on day 3. Plain abdominal X-ray showed a 'double bubble sign,' and Doppler ultrasound revealed a 'Whirlpool sign,' which led to the diagnosis of small bowel volvulus on the common mesentery.

Keywords: Volvulus of the Common Mesentery, Doppler Ultrasound, Plain Abdominal X-ray.

INTRODUCTION

Small Bowel Volvulus on the Common Mesentery is a twisting of the entire small intestine around the superior mesenteric axis. It is most often due to intestinal malrotation [1,2]. This is a surgical emergency requiring rapid diagnosis and immediate management. Ultrasound combined with Doppler plays a crucial role in early diagnosis, allowing for the detection of abnormalities in the positioning of the superior mesenteric vessels.

We report the case of a female newborn, admitted on day 2 of life, in whom a small bowel volvulus on the common mesentery was diagnosed through ultrasound combined with Doppler.

PATIENT AND OBSERVATION

We present the case of a 4-day-old female newborn, born preterm at 34 weeks and 6 days of gestation. She was delivered vaginally in a twin pregnancy to a 34-year-old mother, group B positive, with no known consanguinity or cardiac conditions. The maternal history included poor prenatal monitoring, premature rupture of membranes, and an untreated urinary tract infection. The clinical examination noted a pink, reactive newborn who moves spontaneously, with a birth weight of 1.5 kg. The abdomen is soft and non-distended, and a positive probe test was observed with the anus in place, perforated. Blood culture was positive for *Staphylococcus hominis*.

Initially admitted on day 2 of life for neonatal respiratory distress. On day 3, she presented with bilious vomiting and cessation of transit for one day, evolving in the context of apyrexia and general condition deterioration.

The plain abdominal X-ray revealed gastroduodenal distension, presenting the “double bubble sign” (Fig. 1). Doppler ultrasound highlighted the 'whirlpool sign' (Fig. 3). This finding is consistent with primary neonatal volvulus on the common mesentery.

Figure 1: Plain abdominal X-ray showing the "double bubble sign"

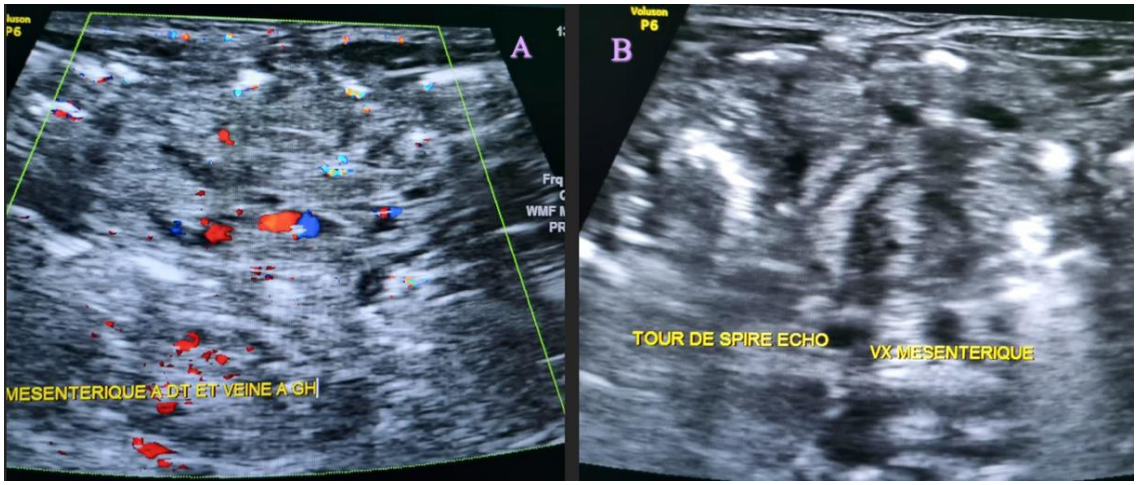

Figure 2: Ultrasound appearance (B) and Doppler ultrasound appearance (A) of small bowel volvulus on the common mesentery

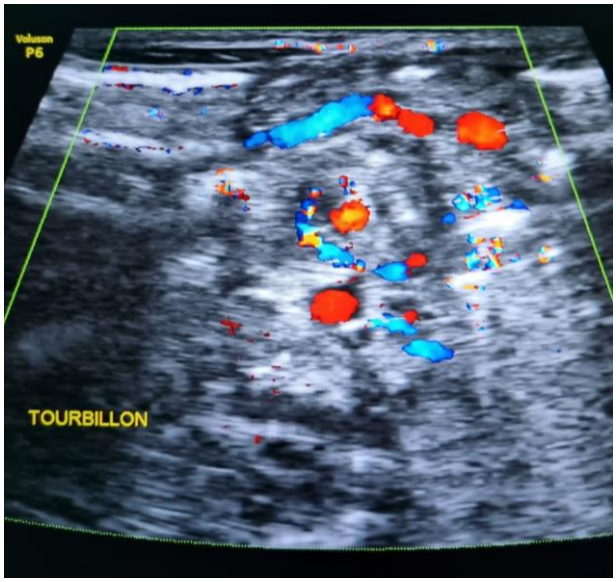

Figure 3: Doppler ultrasound showing the 'whirlpool sign,' with inversion of the positioning of the mesenteric vessels

DISCUSSION

Small bowel volvulus on the common mesentery is a twisting of the entire small intestine around the superior mesenteric axis. The risk of intestinal infarction makes it a surgical emergency, requiring rapid diagnosis and urgent treatment [1]. It is most often caused by intestinal malrotation [2]. Volvulus results

from an abnormal rotation of the primitive intestinal loop during its reintegration into the peritoneal cavity. The fixation of the small intestine is ensured by the root of the mesentery, which results from three successive counterclockwise rotations of 90° around the superior mesenteric axis. The diagnosis is typically clear in the presence of duodenal obstruction with bilious vomiting, occurring after a free interval of several hours or days in a newborn who had been fed normally and passed meconium within the expected timeframe [1].

The most formidable complication in the context of the common mesentery is total small bowel volvulus [3,4].

A plain abdominal X-ray can be suggestive of a volvulus due to an abnormal rotation of the primitive intestinal loop if it reveals gastroduodenal distension, presenting as a double bubble sign. The first bubble corresponds to the dilated stomach, and the second bubble is related to duodenal distension, with little or no air distally, depending on whether the obstruction is complete. The plain abdominal X-ray may be normal, though it cannot rule out an intestinal rotation anomaly [2].

Ultrasound combined with Doppler allows for the detection of signs of intestinal ischemia, highlighting thickening of the intestinal walls, increased peripheral vascular resistance, and intra-abdominal fluid collection [5].

In the case of volvulus on the common mesentery, inversion of the mesenteric vessels associated with a spiral appearance of the vessels is suggestive of the diagnosis: “Whirlpool sign”. This refers to the direct observation in transverse epigastric section of the wrapping of the superior mesenteric vein and mesentery in a clockwise direction around the axis of the superior mesenteric artery [6,7]. This sign is even more easily visualized using color or energy Doppler.

The risk of intestinal infarction explains the urgency of the surgical procedure. It involves detorsion of the volvulus, repositioning the intestine into a non-complicated common mesentery position, with the small intestine on the right and the colon on the left to prevent recurrence; the ectopic location of the cecum justifies an additional appendectomy. The prognosis is excellent in the absence of intestinal necrosis [1].

CONCLUSION

Small bowel volvulus on the common mesentery is a twisting of the small intestine around the superior mesenteric axis, often secondary to congenital intestinal malrotation. The symptoms are primarily characterized by bilious vomiting.

Radiological investigations, particularly the plain abdominal X-ray, may reveal characteristic gastroduodenal distension in the form of a double bubble, suggestive of high intestinal obstruction. Additionally, ultrasound combined with Doppler helps identify signs of intestinal ischemia (wall thickening, fluid collection) and visualize the Whirlpool sign, indicative of mesenteric vessel twisting, which is pathognomonic of volvulus.

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