

## Two Bubbles – But with a Twist

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### SECTION 2 – ANSWER

#### CASE

A 3-day-old male neonate presented with multiple episodes of bilious vomiting for 1 day. The neonate was born at 38 completed weeks through the vaginal route and did not require any resuscitation after birth. The baby was on exclusive breastfeeding after birth. Antenatal ultrasonography was done at 18 weeks and at 32 weeks was normal.

#### INTERPRETATION

The abdominal radiograph was suggestive of a double bubble appearance and the presence of some bowel gas in the left lower abdomen [Figure 1]. Ultrasonography of the abdomen revealed a superior mesenteric vein with the mesentery swirling around a centrally placed superior mesenteric artery [Figure 2]. This classical whirlpool



**Figure 1:** Abdominal X-ray showing double bubble appearance of bowel and presence of bowel gas in left lower abdomen

sign is suggestive of malrotation with midgut volvulus. Exploratory laparotomy and a complete Ladd's procedure were performed. Intraoperative findings included a complete 360° of malrotation with volvulus and thick fibrous bands between the colon across the duodenum onto the retroperitoneum. The proximal duodenum was moderately dilated, rest of the small and large bowels were healthy. The neonate gradually improved and was discharged on the 12<sup>th</sup> postoperative day.

Double bubble sign in the abdominal X-ray classically suggests duodenal atresia. Annular pancreas, malrotation with midgut volvulus, and duodenal web are some other causes which can have a similar radiographic appearance. Bilious vomiting with or without abdominal distension is the common clinical presentation in all these entities.<sup>[1]</sup> In



**Figure 2:** Sonographic image showing "whirlpool sign," rotation of superior mesenteric vein and bowel around superior mesenteric artery

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the classical double bubble sign, the proximal left bubble represents a distended stomach and the distal right bubble represents distended proximal duodenum, and there is a complete absence of bowel gas beyond the duodenum.<sup>[2]</sup> Distal bowel gas may be observed in partially obstructing anomalies such as duodenal web or duodenal stenosis. A possibility of malrotation with midgut volvulus should be considered if the stomach is distended but the proximal duodenum does not appear to be dilated, as in this case. The presence or absence of distal bowel gas depends on the complete or partial nature of bowel obstruction in the volvulus.<sup>[2]</sup>

Midgut volvulus remains as a surgical emergency, as delay in surgery can lead to intestinal ischemia and gangrene.<sup>[1,3]</sup> The classic ultrasonographic sign (whirlpool sign) in malrotation-associated midgut volvulus corresponds to the clockwise wrapping of the superior mesenteric vein and mesentery around the superior mesenteric artery.<sup>[3-5]</sup> The sensitivity, specificity, and positive predictive value of the whirlpool sign have been reported to be around 92%, 100%, and 100%, respectively.<sup>[5]</sup> An ultrasonographic evaluation in cases of suspected duodenal atresia may be of help to rule out the possibility of malrotation, and at the same time, it can help to expedite surgical procedures and avoid an upper gastrointestinal barium study.

## Declaration of patient consent

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

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## Conflicts of interest

There are no conflicts of interest.

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