

## MRI WHIRLPOOL SIGN IN MIDGUT VOLVULUS WITH MALROTATION IN PREGNANCY

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**Midgut volvulus is a rare complication of pregnancy with high morbidity and mortality rates. Clinical diagnosis may be difficult in pregnant women. Ionizing radiation imaging modalities are not advised. Ultrasonography (US) is safer but sometimes is unable to reveal the characteristic whirlpool sign of midgut volvulus.**

**Magnetic resonance imaging (MRI) contributed to confirm diagnosis in our case.**

**We present here a case of 34-year-old pregnant woman at 14 weeks of gestation who presented with abdominal pain, nausea and vomiting. US was not conclusive. MRI revealed the typical whirlpool sign of midgut volvulus.**

**Key-word: Intestines, volvulus.**

Midgut malrotation is a congenital intestinal anomaly which can predispose to a volvulus. It affects commonly the pediatric age group and the incidence is gradually decreased with age. Failure to diagnose the midgut volvulus during pregnancy carries a high mortality and morbidity rate for both mother and fetus.

The potential hazards from ionizing radiation techniques as computed tomography (CT) on pregnancy make US is ideal to diagnose acute abdomen during pregnancy, but the displacement of intra-abdominal organs with the enlarged uterus makes some limitation of US role.

In this case we used MRI as another reliable imaging technique to confirm the diagnosis of midgut volvulus during pregnancy.

### Case report

A 34-year-old pregnant woman presented at 14 weeks gestation with subacute abdominal pain associated with intermittent nausea and vomiting for one month before. She had no relevant medical history except non complicated pregnancy with normal vaginal delivery six years ago.

The clinical examination revealed a distended abdomen with epigastric pain on palpation. Laboratory examination was normal.

Ultrasound showed a vascular intestinal mass in the epigastric area without any other intra-abdominal abnormalities (Fig. 1).

MRI was advices to confirm the origin of this mass, which revealed a characteristic whirlpool sign of midgut volvulus (Fig. 2). The patient has

been transferred immediately to the operation room for surgery which confirmed the radiologic diagnosis.

### Discussion

Midgut malrotation is a type of congenital intestinal anomalies resulting from a complete nonrotation or an incomplete counterclockwise rotation of the primitive intestinal loop around the superior mesentery artery (SMA) during fetal development. The failure to complete rotation results in a narrow base of the mesentery, which can predispose to neonatal midgut volvulus and may be a bowel obstruction (1).

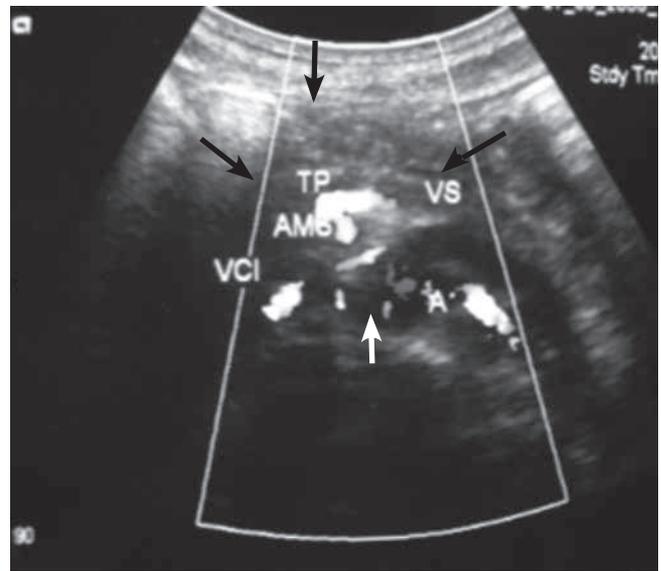


Fig. 1. — Transverse US: non specific mass in the epigastric area (arrows).

Midgut volvulus is a rare complication of pregnancy. Until 1990 there are only 10 cases of midgut volvulus in pregnancy have been reported (2). Since that date we found only 4 other cases in the literatures.

The risk of volvulus is highest between 16 and 20 weeks of pregnancy when the uterus moves from the pelvis to the abdomen and at 36 weeks when the fetal head descends into the pelvis (3).

The clinical symptoms of intestinal volvulus such as vomiting and abdominal pain and distension can be masked with pregnancy which gives the radiology a critical role to diagnose midgut volvulus.

The diagnosis of gut malrotation is generally made by means of upper gastrointestinal (UGI) contrast study particularly in the pediatric age group. UGI can easily show the duodenum and duodenojejunal flexure located to the right of the spine (1).

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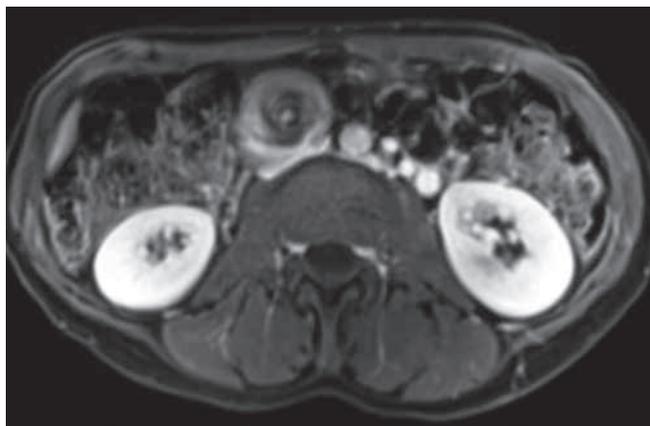


Fig. 2. — Abdominal MRI: axial T1-weighted slices after contrast injection showing the whirlpool sign enables the imaging diagnosis of midgut volvulus. Clockwise rotation of the small bowel (duodenum and jejunum) around the axis of the superior mesentery artery and vein.

CT scan with or without UGI contrast study may be more contributory for the diagnosis of midgut volvulus in adult group because of its high availability. The above two techniques carry high fetal and maternal risks from radiation.

MRI has been used safely in our patient to confirm the diagnosis because she was allergic to iodine.

US has been demonstrated as valid in pediatric population (4), and has been reported in adults (5). In adults, US is feasible but without the same relevance than in pediatric patients (5).

In pregnancy, both CT and MRI have contra-indications: CT for irradiation and MRI in 1<sup>st</sup> and 2<sup>nd</sup> trimes-

ter. Both techniques are sometimes used in pregnancy when balance between risk and benefit has been discussed for outcome of mother and the fetus (6).

The safety committee for the Society of Magnetic Resonance Imaging has indicated that "MRI may be used in pregnant women if other non-ionizing forms of diagnostic imaging are inadequate or if the examination provides important information that would otherwise require exposure to ionizing radiation". It is recommended that pregnant patients be informed that, to date, there has been no indication that the use of clinical MR imaging during pregnancy has produced deleterious effects (7).

## Conclusion

Mid-gut volvulus is a rare complication of pregnancy. Late diagnosis can carry a high mortality and morbidity rate for both mother and fetus. Clinical diagnosis is often difficult and delayed due to unspecific symptoms in pregnant women.

Ultrasonography is the first-line diagnostic tool in acute abdomen during pregnancy but it can be inconclusive where MR imaging can play an important role in diagnosis of midgut volvulus.

For our patient, surgical intervention was based on the MRI diagnosis.

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