Bowel Obstruction in Pregnancy Review of Imaging Modalities



Figure 1: Contrast CT demonstrating caecal volvulus in G2P1 at 25 weeks.

G. Wende BSc MD (gabriella.wende@health.wa.gov.au), R. Cohen BSc MD GradCertHPE, R. Murphy MBBS FRACGP FRANZCOG, C. Platell MBBS PhD FRACS

Background

- Bowel obstruction during pregnancy occurs 1 in 2,500 deliveries, and carries significant maternal-fetal mortality.¹
- Clinical diagnosis is difficult as examination is unreliable.²
- Diagnostic imaging should not be delayed as there is need for rapid life-saving intervention.²
- Imaging modalities need to identify the obstruction, the underlying pathology, and the presence of complications.

Case

A 38-year-old G2P1 presented at 25-weeks with five days of right-upper quadrant abdominal pain, vomiting and constipation.

Investigations

- No significantly deranged bloodwork.
- CT (abdo/pelvis): Caecal volvulus with twisting of the mesentery in the right upper quadrant and a dilated caecal pole and free fluid (Figure 1).

Management

- Urgent laparotomy identified caecum herniating into the lesser sac.
- Progressed to reduction of internal hernia and right hemicolectomy.
- Discharged on post-operative day seven.
- Induced at 39 weeks, delivering a healthy neonate, without any complications.

Imaging Modalities

Computed Tomography

Deterministic effects:

- Effects on fetus depend on estimated fetal ionising radiation dose (EFIRD) and gestational age.³
- EFIRD of 50mGy is the threshold dose for deterministic adverse effects to the fetus.³
- Single phase CT abdo/pelvis EFIRD is 25mGy.³

Stochastic effects:

 1mGy increase EFIRD = increase in childhood cancers by 0.017% (1st trimester) and 0.004% (2-3 trimesters)³

Proposed Management Algorithm (adapted from Webster et al. 20154)

Contrast Agents

Iodinated contrast

- Crosses placenta⁶
- Theoretically affects fetal thyroid⁶
- Neonatal thyroid testing required⁶

Magnetic Resonance

Provides multiplanar images without ionising radiation Results in poorer image resolution.

Typically less accessible and longer scanning time. ⁵ Requires expert interpretation Effects⁵

- Fetal acoustic noise exposure
- Thermal heating
- Magnetic field disturbs cell migration and differentiation in first trimester (not recommended in first trimester).⁵

Gadolinium

- Crosses placenta⁶
- Dissociated to toxic free ions in amniotic fluid⁶
- Animal studies: supra-clinical doses causes growth restriction and congenital malformations⁶



References

- 1. Coleman MT, Trianfo VA, Rund DA. Nonobstetric emergencies in pregnancy: trauma and surgical conditions. American journal of obstetrics and gynecology. 1997;177(3):497-502.
- 2. Connolly MM, Unti JA, Nora PF. Bowel obstruction in pregnancy. Surgical Clinics of North America. 1995;75(1):101-113.
- McCollough CH, Schueler BA, Atwell TD, Braun NN, Regner DM, Brown DL, et al. Radiation Exposure and Pregnancy: When Should We Be Concerned? RadioGraphics. 2007;27(4):909-917.
 Webster P, Bailey MA, Wilson J, Burke D. Small bowel obstruction in pregnancy is a complex surgical problem with a high risk of fetal loss. Annals Of The Royal College Of Surgeons Of England. 2015;97(5):339-344.
- 5. Nicolaou S, Kai B, Ho S, Su J, Ahamed K. Imaging of Acute Small-Bowel Obstruction. American Journal of Roentgenology. 2005 2005/10/01 [cited 2019/04/06];185(4):1036-1044.
- 6. American College of Obstetricians and Gynecologists. Guidelines for diagnostic imaging during pregnancy and lactation. ACOG Committee opinion. 2017;130(4).