CASE REPORT

Uterine incarceration in a primigravid retroverted bicornuate uterus

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SUMMARY

Uterine incarceration is a rare complication that usually occurs after the first trimester of pregnancy. It leads to increased maternal and/or fetal morbidity and mortality. Risk factors include retroversion of uterus and other pelvic abnormalities. Clinical presentation includes severe abdominal and pelvic pain symptoms. Patients can present with concurrent urinary symptoms due to increasing distortion of adjacent structures from the enlarging uterus. A high clinical suspicion of uterine incarceration is confirmed with ultrasound. More advanced imaging such as MRI can be used as an adjunct to ultrasound imaging. Progression from expectant management to intervention is recommended as soon as possible to prevent complications such as uterine rupture and fetal demise. In subsequent pregnancies, close monitoring with serial ultrasounds is warranted to monitor for recurrence of incarceration which has been reported in a few rare cases.

BACKGROUND

Uterine incarceration occurs 1 in 3000–10 000 pregnancies in which the gravid uterus is trapped in the pelvis by the subpromontory sacrum.¹ Normal position of the uterus can be described as retroverted/retroflexed or anteverted/anteflexed. The anteverted position is the more common presentation, present in 80% of women. The retroverted presentation occurs in up to 20% of women.² During pregnancy, the uterus enlarges and rises out of the pelvis to accommodate the growing fetus before the 14th week of pregnancy. If the uterus remains in the retroverted position, the fundus becomes wedged below the sacral promontory, where it continues to enlarge. As a result, the posterior pelvis becomes too small to accommodate the increasing size of the fundus which causes the anterior lower uterine wall to thin and balloon into the upper abdomen. An 'inverted polarity' of the uterus occurs so that the fundus is now caudal rather than cephalic.³ With this new orientation of the uterus, the bladder and the cervix are pulled up into the abdominal cavity towards the umbilicus.⁴ Owing to this movement, the internal os of the cervix becomes located above the symphysis pubis. Several risk factors have been implicated in the pathogenesis of uterine incarceration. These include a history of uterine malformation, prior pelvic surgery causing pelvic adhesions, pelvic inflammatory disease, uterine fibroids and endometriosis.^{4–5} These factors inhibit the fundus of the enlarging uterus from ascending out of the sacral hollow. In this report, we present an unusual case

of a 23-year-old gravida 1 para 0 with a retroverted, septate uterus who presented with severe abdominal pain and decreased fetal heart tones during routine monitoring. Ultrasound and MRI confirmed the presence of uterine incarceration. Subsequent intervention via manual reduction resulted in successful resolution of uterine incarceration. This case highlights the importance of maintaining a high clinical suspicion along with the use of appropriate imaging modalities, and early intervention before 20 weeks of pregnancy which can lead to improved pregnancy outcomes in patients with incarcerated uterus.

CASE PRESENTATION

The patient is a 23-year-old primigravida with a known Mullerian duct abnormality including a septae present in the fundal region of the uterus and a retroverted position of the uterus. Her medical and surgical history was insignificant. She does not smoke, drink alcohol or use illicit drugs. Her family history was not contributory. Her uterine position was monitored in early pregnancy to determine whether the gravid uterus would rise out of the pelvis by 15-week gestation. To facilitate this process, she was instructed to attempt spontaneous version with knee–chest positions. By 15-week gestation, the patient complained of severe back pain as the uterus enlarged. The uterine fundus became fixed against the sacrum due to the persistent retroverted position of the uterus. Fetal decelerations were observed during minimal uterine contractions as the fetus was trapped in the lower uterus. Imaging at 16 weeks and 4 days showed that the fetal head was compressed in the lower uterus rather than moving freely within the uterus. The fetal chest was trapped between the anterior and posterior walls of the uterus at the site of version of the retroverted uterus. The cervix was located anteriorly with the bladder forming the inferior boundary and the pubic symphysis being the anterior boundary (figure 1). These findings suggested a posterior incarceration of the uterus. A risk factor for the uterine incarceration included the septate uterus.

INVESTIGATIONS

A trans-abdominal ultrasound demonstrated a 7 mm linear band extended from fundus to the inferior pole of the uterus (figure 2). This configuration did not suggest a true septae or true bicornuate uterus. MRI without contrast confirmed the presence of a retroverted gravid uterus as seen in figure 1. MRI showed two communicating uterine endometrial cavities that represent a septate uterus

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Figure 1 MRI abdomen confirmed the presence of a retroverted gravid uterus.

(figure 3). The fetus was located on the right side of the uterus with a portion of the fetus and gestational sac extending into the left side (figure 3).

TREATMENT

Multiple outpatient attempts to manually dislodge the fundus from the true pelvis were unsuccessful with and without tocolytics. The patient had intractable lower back pain, unable to be alleviated with analgesics. Restitution of the incarcerated uterus under epidural analgesia was attempted via the vaginal and rectal route. She was placed in McRoberts position to enlarge space in vagina. With ultrasound guidance, the uterine fundus was cupped through the vaginal vault and with direct pressure the fundus was elevated out of the pelvis. With the use of the wider hand expansion method, the entire uterine fundal region was cupped and was moved to the midabdomen position. She

Figure 2 A trans-abdominal ultrasound demonstrated a 7 mm linear band extended from fundus to the inferior pole of the uterus.

Figure 3 Abdominal MRI showed two communicating uterine endometrial cavities that represent a septate uterus. The fetus was located on the right side of the uterus with a portion of the fetus and gestational sac extending into the left side.

was placed into a supine position and ultrasound showed the uterus to remain in the midabdominal position. The cervix position moved from severely anterior position to posterior position. Successful uterine version was achieved with fetal heart tones ranging from 150 to 160 bpm and there was complete resolution of back pain.

OUTCOME AND FOLLOW-UP

Patient underwent successful vaginal delivery at 38 weeks with a viable male neonate. She continued to follow-up in the postpartum clinic with no further complications.

DISCUSSION

Incarceration of the uterus typically occurs by 14–16 weeks of gestational age with rare presentations during the third trimester.³ Common symptoms include dysuria with or without urinary symptoms such as urinary frequency, urinary incontinence or urinary retention. Patients may also complain of either abdominal or suprapubic pain and pelvic discomfort. Other gastrointestinal symptoms due to the compression of rectum such as constipation and/or tenesmus have also been reported.^{4 5} Vaginal bleeding is a not so uncommon presentation in patients with uterine incarceration. Physical examination findings include inability to visualise cervix with speculum and inability to palpate the external os on pelvic examination secondary to severe anterior displacement of cervix behind pubic symphysis. On a rectovaginal examination, a large soft, smooth, non-tender mass can be felt in the cul-de-sac. Because of retroversion, the fundal height may be underestimated than that expected for gestational age. This is partly because of the difficulty in palpating the uterus abdominally. In patients with over distended bladder, the abdomen may appear distended and can interfere with accurately measuring the fundal height. An accurate diagnosis of this condition is made primarily by maintaining a good index of clinical suspicion.

Further confirmation of the diagnosis is via ultrasound examination and MRI. Ultrasound findings in the first half of the pregnancy include cervix that appears thin and elongated as it is pulled anterior to the uterus, a superiorly displaced bladder as the gestational age increases, and a fundus with the fetus positioned posteriorly against the sacrum.⁴ MRI can be a useful adjunct in cases of diagnostic uncertainty especially during the late second and third trimesters.⁶ MRI in patients with uterine incarceration characteristically includes freestanding T-shaped multilayer myometrium on sagittal image, small cleft-like cystic lesion between the bladder and the sacculaton on axial images corresponding to the elongated cervix and caudal portion of the uterus.⁷ Additional findings include an inferiorly displaced fundus below the sacral promontory with the displacement of the vagina to the dorsal spine, displacement of the cervix to the ventral and cephalad position along with asymmetric thickening of the posterior uterine wall because of sacculaton.⁷

Maternal complication, such as urinary retention, is a common complication due to the cephalad displacement of the cervix and upper vagina as it lifts the bladder neck and compresses the urethra. This can further lead to hydronephrosis, urinary tract infection and occasionally bladder rupture.⁵ Incarcerated uterus can also result in peritonitis, sepsis, renal failure and maternal death.⁸ Fetal complications include spontaneous abortion due to disturbed uterine vascular supply, preterm labour and/or shoulder dystocia.⁵ Decreased blood flow to the placenta can lead to oligohydramnios and fetal growth restriction.⁹ It is estimated that fetal demise could be as high as 33% during the second trimester. Rare complications that have been reported include uterine rupture due to uterine wall necrosis, development of cervicovaginal fistula, rectal gangrene and thrombosis. As in the case presented above, fetal heart tones may be affected adversely during physiological uterine contractions. The physician should consider the possibility of ectopic pregnancy, adnexal torsion, appendiceal abscess, posterior fibroid, uterus didelphys and unconnected rudimentary horn as part of the differential diagnosis. Ultrasound may be a useful tool in excluding the previously noted differentials.

Recommendations for a patient who has been noted to have a retroflexed uterus in the first trimester include bimanual examination or trans-abdominal sonography at 16 weeks to determine whether the fundus has ascended into the abdominal cavity. After 16-week gestation age, the risk of incarceration increases, thus intervention is required. Optimal management of incarceration is between 16 and 20 weeks. Options for intervention include passive reduction, manual reduction, colonoscopic reduction, laparoscopic reduction and laparotomy prior to 20 weeks.¹⁰ Passive reduction is attempted by asking the patients to assume the knee-chest position for 10 min at least three times a day for 1 week. If this fails, manual reduction is performed under conscious sedation or regional anaesthesia.¹¹ Nitroglycerin can be given before the procedure to relax the uterus. The patient is placed in dorsal lithotomy position after emptying bladder. Then, mild-to-moderate cephalad pressure is applied to uterine pressure until it is released from the cul-de-sac. Alternately, a finger in the rectum can be applied to increase pressure. If this is unsuccessful, the patient is placed in the knee-chest position and the procedure is repeated. Ultrasound guidance may be helpful. Application of ring forceps to the cervix to provide counter traction to the movement of the fundus has been attempted previously. It has been postulated that the colonoscopy passed through the rectum to the proximal descending colon can generate sufficient external force to dislodge the uterus from the sacral promontory.¹² Seubert *et al*¹²

reported a case series of five incarcerated uterus refractory to manual reduction who successfully underwent colonoscopic reduction. Additionally, air insufflations with the formation of a loop can have a synergistic effect by creating anterior pressure through the rectal wall on the uterine fundus. Dierick *et al*⁷ have reported successful reduction by colonoscopic insufflations without complication in three out of four cases they attempted. Laparoscopic reduction of uterine incarceration is an evolving technique where reduction is achieved after pneumoperitoneum is achieved. Vaginal manoeuvres are initially attempted for manual reduction; if reduction is not achieved, the round ligaments are pulled using atraumatic instruments to free the fundus with concurrent pressure on the fundus from below. Exploratory laparotomy is rarely indicated with the exception of dense adhesion. Postreduction care of the incarcerated uterus includes placement of a Hodge pessary in the vagina for 5–7 days to maintain the upright position.^{4,5} Attempts to manually reduce the uterine incarceration are rarely successful after 20 weeks of gestation. The successful correction of incarceration should be confirmed by ultrasound: assessing fetal well-being and uterine position. If incarceration is noted after 20 weeks of gestation, reduction should be avoided since attempts are unlikely to be successful and can lead to fetal demise.⁴ The remainder of pregnancy should be monitored for preterm labour, preterm rupture of membranes, oligohydramnios and fetal growth restriction.⁴ If urinary retention occurs, treatment via self-catheterisation is recommended.

Normal vaginal delivery is contraindicated when the uterus is incarcerated. It has been recommended that C-section should be performed at 36 weeks.⁹ It is important to ascertain anatomical relationships via MRI as it has high sensitivity in delineating the structures prior to the C-section.¹¹ Owing to severely distorted anatomical relationships in this scenario, during C-sections, a vertical supraumbilical skin incision is recommended rather than low vertical incision. This is performed to avoid supracervical hysterectomy because the bladder, vagina and cervix are positioned ventrally and cephalad in uterine incarceration. After the initial incision to provide adequate exposure of the anatomy, the uterine incision should be performed. Amniocentesis can be performed to facilitate the repositioning uterus in preterm gestations. Recurrence is high in patients with underlying uterine abnormalities or adhesions.¹³

Learning points

- Uterine incarceration is a rare complication during pregnancy in which the gravid uterus is trapped in the pelvis by the subpromontory sacrum. It is more common in patients with uterine anomalies.
- Uterine incarceration is usually clinically diagnosed and with the use of ultrasound and/or advanced imaging such as MRI, the diagnosis is confirmed.
- Optimal management of incarceration is between 16 and 20 weeks with options for intervention including passive reduction, manual reduction, colonoscopic reduction, laparoscopic reduction and laparotomy prior to 20 weeks.

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