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## Case Report

# A case of uterine incarceration with unrecognized uterine torsion ☆,☆☆

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## ABSTRACT

Fetal imagers are tasked with diagnosing complex fetal anomalies, but maternal abnormalities that may impact the pregnancy are also of utmost importance to recognize and report. Two rare obstetrical complications are uterine incarceration and torsion which can lead to increased maternal/perinatal mortality. Uterine incarceration occurs secondary to a retroverted uterus that becomes retroflexed and entrapped within the pelvis during the first trimester of pregnancy. Uterine torsion is rotation of more than 45° around its long axis. We report a rare case of an incarcerated uterus with presumed spontaneous resolution on follow-up MRI that was ultimately recognized to be uterine torsion at the time of delivery. Knowledge of these entities may help aid in timely detection and diagnosis of complex imaging presentations and avoid downstream complications.

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## Introduction

Fetal MRI has become an important imaging modality in the assessment of fetal anomalies, abnormal placentation, and uterine abnormalities when ultrasound is insufficient for complete characterization or visualization. Fetal imagers are tasked with diagnosing complex fetal anomalies, but maternal abnormalities that may impact the pregnancy are also of utmost importance. Two rare obstetrical complications are uterine incarceration and torsion which can lead to increased maternal/perinatal mortality due to nonspecific presentation and rarity leading to delays in diagnosis [1–3]. Uterine

incarceration occurs secondary to a retroverted uterus that becomes retroflexed as the uterus enlarges due to a deep sacral cavity, adhesions, fibroids, or uterine anomalies [3]. Uterine torsion is rotation of more than 45° around its long axis and has similar etiologies to incarceration [4–6].

We describe a rare case of an incarcerated uterus on initial pelvic MRI that appeared to have spontaneous resolution on follow-up fetal MRI. The patient was ultimately recognized to have uterine torsion at time of delivery. Knowledge of these rare complications and recognition of several pathognomonic imaging findings can aid in early identification and early delivery planning.

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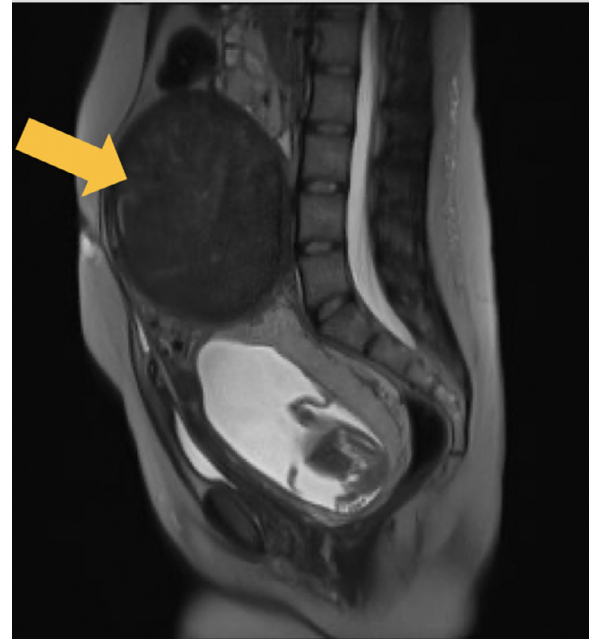
## Case report

A 24-year-old primigravid woman at 16 weeks 3 days gestation underwent an outside fetal ultrasound for sex determination where multiple fetal abnormalities were noted including a congenital diaphragmatic hernia, abnormal cranium, widespread orbits, and a large approximately 15 cm uterine fibroid. The large left diaphragmatic hernia was found to contain stomach, bowel, liver, and spleen, and it displaced the heart to the right side of the chest. The cervix was not visualized and further imaging was difficult to obtain secondary to the large uterine fibroid. On physical exam, the amniotic sac could be palpated through the pelvic vaginal mucosa and the gestational sac was felt to be located in the posterior cul-de-sac. She was asymptomatic at that time. The patient was referred to Maternal-Fetal Medicine. Repeat fetal ultrasound and physical exam corroborated the outside obstetrician's findings and therefore an MRI was ordered for further investigation.

Pelvic MRI was performed at 16 weeks 6 days gestation. T2 HASTE images demonstrated a large 14.5 × 10.5 × 10.0 cm intramural fibroid. Although it extended superior to the uterus, the fibroid was localized to the lower uterine segment of the retroverted and incarcerated uterus (Figs. 1 and 2). The cervix was abnormally stretched and coursed along the right antero-lateral aspect of the uterine body (Fig. 3).

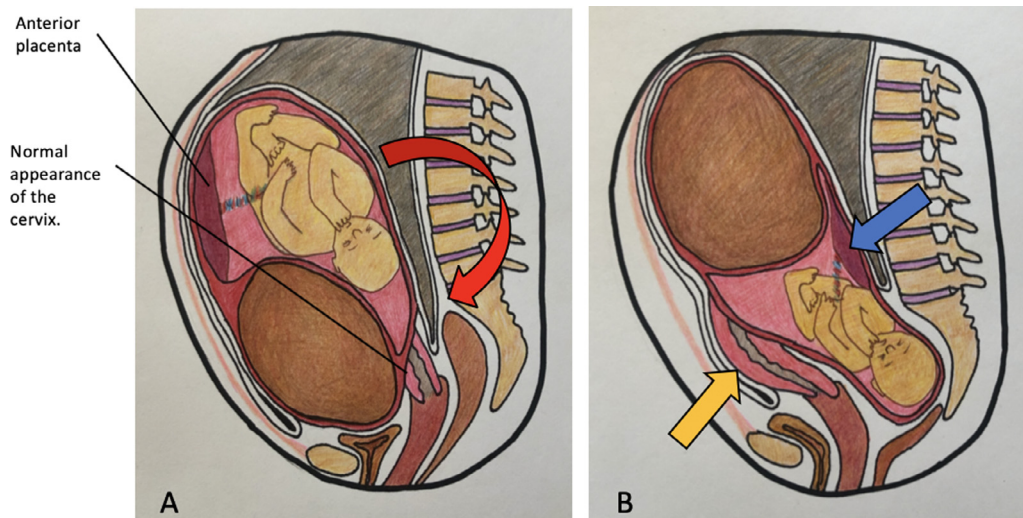
In the absence of symptoms, the patient was managed conservatively with observation. She experienced an episode of severe abdominal pain at 19 weeks 5 days while on vacation, which was ultimately attributed to dehydration. Otherwise, she remained asymptomatic.

Given the presence of the large left congenital diaphragmatic hernia, the patient returned at 28 weeks 3 days gestation to undergo fetal MRI. At that time, the uterine incarceration appeared to have resolved (Figs. 4 and 5). In retrospect, the cervix was visualized on several sagittal images and appeared

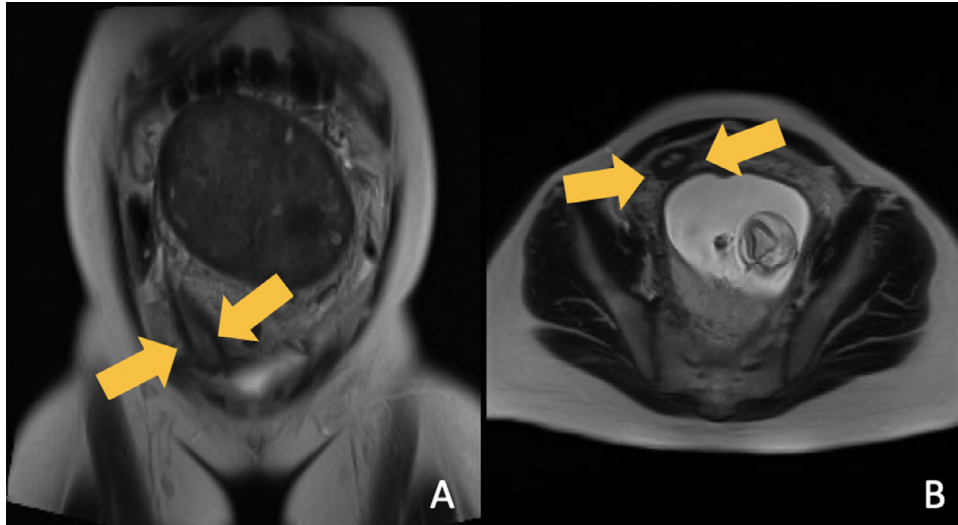


**Fig. 1 – Initial MRI performed at 16 weeks 6 days gestation. The uterine fundus is retroverted and incarcerated within the pelvis. T2 HASTE sagittal image demonstrating the large 10.5 × 14.5 × 10 cm intramural fibroid in the lower uterine segment, which is predominantly T2 dark, although there are scattered foci of internal T2 hyperintensity (yellow arrow). (Color version of figure is available online.)**

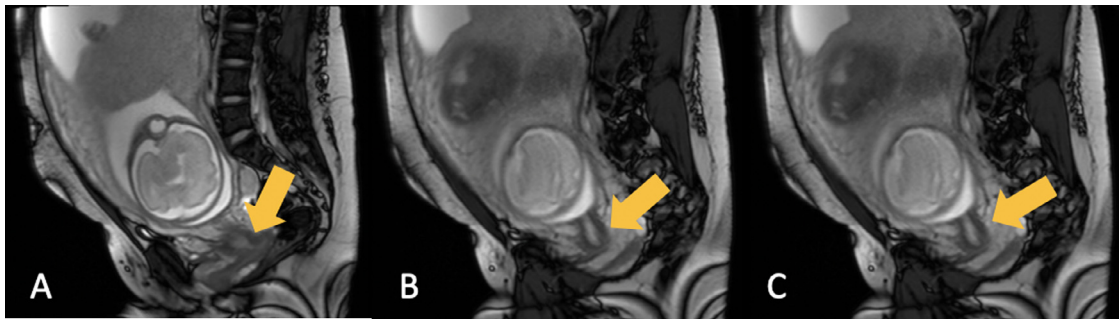
kinked at the cervicovaginal junction. Although the placenta was previously recognized to be on the anatomic anterior uterine wall when accounting for retroflexion, the placenta appeared to be posterior fundal on the follow-up MRI (Fig. 6). Therefore, evidence of uterine torsion was present in the early



**Fig. 2 – (A and B) Artistic rendering of a (A) normal pregnancy with a 15 cm uterine fibroid in the lower uterine segment and (B) a comparison with the incarcerated uterus as in the presented case. Notice the now posteriorly oriented placenta (blue arrow) and the anterior, stretched cervix (yellow arrow). (Color version of figure is available online.)**



**Fig. 3 – (A and B) Initial pelvic MRI performed at 16 weeks 6 days gestation. T2 HASTE coronal (A) and axial (B) images of the abdomen and pelvis demonstrating an abnormally stretched cervix coursing along the right anterolateral aspect of the uterus (yellow arrows). (Color version of figure is available online.)**



**Fig. 4 – (A, B, and C) Follow-up fetal MRI performed at 28 weeks 3 days gestation. Sagittal TrueFISP images demonstrate that the uterine retroversion had resolved with partial necrosis of the uterine fibroid. In retrospect, the cervix (arrows) is only partially visualized on several images and appears kinked at the cervicovaginal junction. The normal straight cervix is usually demonstrated on a single image.**

third trimester. Fig. 7A-C is an artistic rendering to illustrate how the incarcerated uterus torsed.

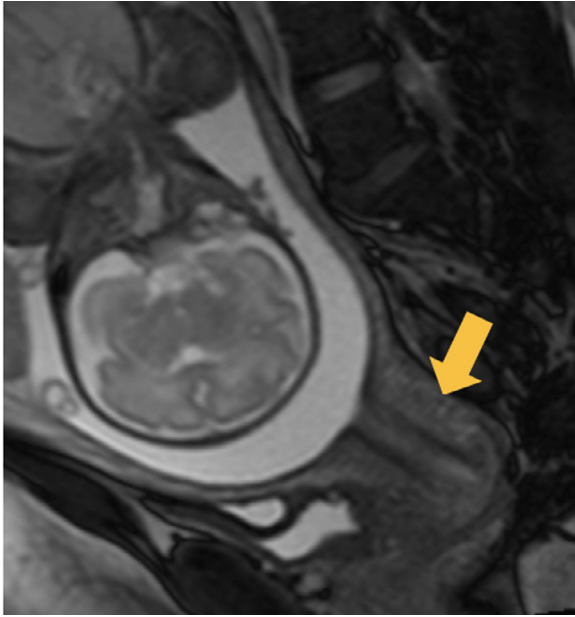
The patient underwent scheduled induction at 39 weeks and 3 days gestation for the multiple fetal anomalies. Due to failure to progress and arrest of cervical dilation at 4 cm, the delivery method was converted to Cesarean section. Upon incision, the obstetricians identified the broad ligament and posterior uterine wall as well as 180° uterine torsion with the left infundibulo-pelvic vessels coursing across the anterior aspect of the uterus. A high posterior transverse hysterotomy was performed, and a live male infant was delivered successfully. The patient had an uneventful recovery and was discharged 3 days later. Due to the location of the high posterior hysterotomy, trial of labor in future pregnancies is not recommended. After 3 months in the neonatal intensive care unit, the infant was placed on palliative care and died from complications secondary to the multiple fetal anomalies.

## Discussion

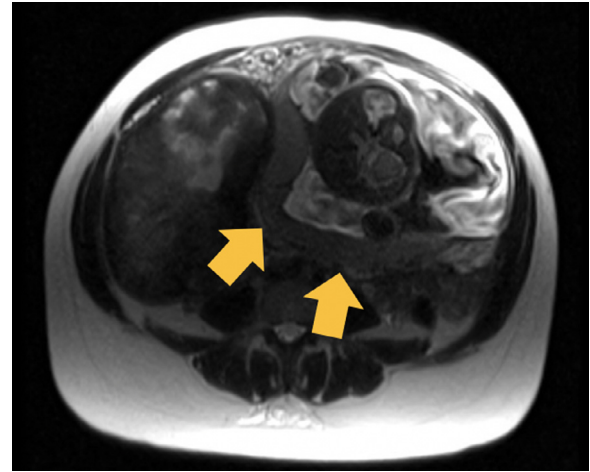
Although fetal ultrasound remains the primary tool for prenatal diagnosis, fetal MRI can be helpful in cases of central nervous system, genitourinary, and thoracic abnormalities in addition to cases where ultrasound acoustic windows are limited [7,8]. In our presented case, fetal MRI not only added value to further assess fetal anomalies and limited acoustic windows, but also to diagnose maternal abnormalities that ultimately influenced treatment and delivery.

Fetal imagers must maintain a low diagnostic threshold for the detection of maternal anatomic abnormalities, such as uterine torsion/incarceration. Uterine torsion is an urgent condition that is often caused by uterine anomalies such as large fibroids or pelvic adhesions that needs to be treated with emergent laparotomy to reduce maternal and fetal morbidity





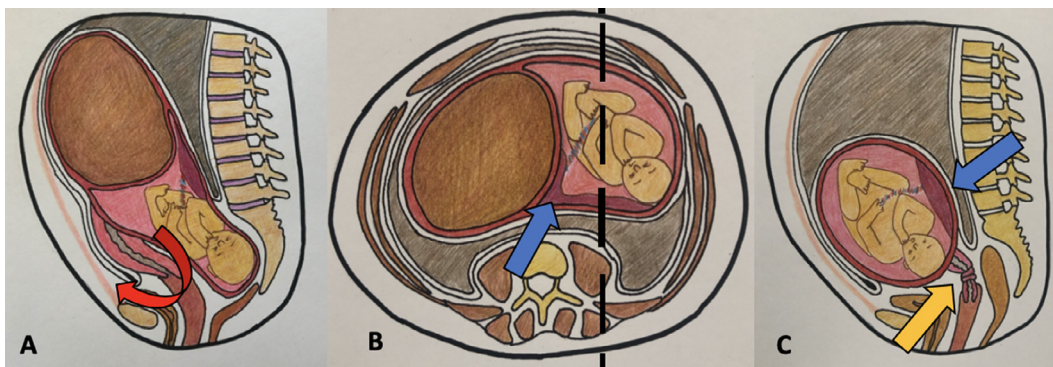
**Fig. 5 – Normal pregnancy for comparison. Sagittal TrueFISP image demonstrating a normal straight cervix (yellow arrow) that is visualized on a single image. (Color version of figure is available online.)**



**Fig. 6 – Follow-up fetal MRI performed at 28 weeks 3 days gestation. T2 haste axial image. As recognized on the prior pelvic MRI, the placenta is located on anatomic anterior fundal wall. On this follow-up MRI, the placenta again appears to be posterior (yellow arrows) rather than returning to the anterior pelvis. This serves as a sign of persistently abnormal uterine positioning and possible torsion. Increased heterogeneous signal intensity within the fibroidis consistent with degeneration. (Color version of figure is available online.)**

[2]. Uterine incarceration has similar etiologies and is caused by uterine retroversion that does not spontaneously return to a normal position by the 14th week of gestation and instead becomes entrapped behind the sacral promontory [3]. Uterine incarceration is only urgent if the patient is symptomatic with severe abdominal pain, inability to urinate, or inability to stool due to urinary/rectal obstruction. Symptomatic patients are usually unable to tolerate a full exam due to pain and

are taken to the operating room for an exam under spinal anesthesia to reduce the uterus out of the pelvis, often coupled with a vaginal pessary placement to prevent the uterus from returning to the pelvis. In rare cases where the patient is asymptomatic, the fetus should be closely monitored with serial ultrasounds and a Cesarean section should be



**Fig. 7 – (A, B, and C) Artistic rendering of the follow-up fetal MRI performed at 28 weeks 3 days gestation. The uterine incarceration appeared to have resolved, but in retrospect, the uterus had torsed around the long axis of the cervix. This resolved the retroflex/incarceration, but resulted in uterine torsion. (A) Prior uterine anatomy demonstrating uterine incarceration. The uterus subsequently torsed around the long axis of the cervix (red arrow). (B) Axial slice at the level of the mid uterus demonstrating that the uterus is no longer incarcerated, with fetal sac now at the same axial level as the uterine fibroid. However, the placenta still appears to be posteriorly located (blue arrow). (C) Sagittal plane at the level indicated by the dotted black line on the axial image demonstrating the posteriorly located placenta (blue arrow) as well as a twisted cervix (yellow arrow). Note that the uterine fibroid is out-of-plane on the sagittal slice and is not depicted. (Color version of figure is available online.)**

recommended if incarceration persists at the time of delivery due to inability to palpate the cervix, which is usually rotated between the bladder and the uterus. Both of these diagnoses can be easily missed on fetal ultrasound if there is no clinical concern or worrisome presentation [9].

Prior to future pregnancies, this patient would be strongly encouraged to have an abdominal myomectomy not only because of her history of prior incarceration, but also due to the size of her fibroid which was the direct cause of her incarceration and torsion. In addition, because her hysterectomy was performed in the contractile portion of the uterus, she will require Cesarean sections at 36-37 weeks for future deliveries.

Imaging findings of uterine torsion vary according to level and degree of torsion in addition to level of clinical suspicion. On ultrasound imaging, Doppler may be helpful to detect ovarian vessels wrapping around the uterus if the ovaries are involved in the torsion [6]. MR imaging may demonstrate the “whirlpool sign” where the uterine isthmus serves as the twisted pedicle [6]. In our case, the normal straight cervix was unable to be visualized on a single image and the cervicovaginal junction appeared kinked, indicating an abnormality was present. Imaging manifestations on fetal MRI are important for fetal imagers to readily recognize to properly anticipate and avoid further obstetric complications.

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