

## **Diagnosis of uterine torsion during cesarean section: a case series**

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### **Abstract**

*Partial rotation of the uterus up to 45 degrees is a common physiological finding during pregnancy whereas uterine torsion is pathologic and defined as rotation greater than 45 degrees. Torsion of up to 720 degrees has been reported; with most cases occurring between 90 degrees and 180 degrees. While uterine torsion in pregnancy requires emergent intervention, the incidence is unknown. Most cases of uterine torsion are diagnosed intra-operatively at emergent cesarean section following non-specific clinical presentation, such as fetal heart rate decelerations or bradycardia, severe abdominal pain, hypotension, or vaginal bleeding. In this case series, we report on two cases of one woman with gravid uterine levorotation of 180 degrees and another with gravid uterine dextrorotation of 180 degrees.*

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### **Introduction**

Dextrorotation of the uterus up to 45 degrees around the long axis or the junction between the cervix and the corpus is a normal finding during pregnancy with respect to the relationship between the gravid uterus and sigmoid colon.<sup>1</sup> However, if this is greater than 45 degrees, it is defined as uterine torsion and has been reported in the literature to twist as much as 720 degrees. Most reported cases of uterine torsion range between 90 degrees and 180 degrees dextrorotation. There are instances of levorotation in uterine torsion, but these are less common. While its incidence is unknown, uterine torsion may occur regardless of parity, pregnancy status, or gestational age and reports of gravid uterine torsion in the preterm period of the third trimester are more common.<sup>2</sup>

Most cases have non-specific associated symptoms, including fetal

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heart rate decelerations and maternal bradycardia, severe abdominal pain, hypotension, or vaginal bleeding. Approximately 11% are asymptomatic.<sup>2</sup> Therefore, it typically is not identified until intra-operative evaluation in the setting of an emergent cesarean section.<sup>1</sup> Other symptoms may include failure to progress in labor, uterine atony, hemorrhagic shock, urinary and intestinal symptoms, placental abruption, fetal distress, or intrauterine fetal demise.<sup>1-3</sup> Uterine torsion carries a significant fetal mortality rate estimated at 12% to 18%.<sup>2,4</sup> The associated maternal mortality rate is dependent on the stage of pregnancy, with higher rates reported in the late second trimester and decreasing thereafter. Similarly, the greater the degree of torsion the higher the maternal mortality rate.<sup>5</sup> Additionally, while a rare event, it is possible for torsion of uterine arteries to result in ischemia and subsequent necrosis of the uterus, requiring a hysterectomy.<sup>5</sup>

## **Case Presentation**

### Case 1

A 36-year-old female G4P1112 at 36 weeks and 3 days gestation by early ultrasound following intrauterine insemination presented to labor and delivery with concern for onset of labor with contractions occurring every 5 minutes. Her previous obstetric history was complicated by a history of preterm rupture of membranes at 33 weeks and 5 days with subsequent vaginal delivery 7 years prior and a history of one cesarean section 4 years prior due to breech presentation at 37 weeks and 6 days. On presentation to OB triage, her

cervix was found to be 3 cm dilated, which was an unchanged exam from the office visit 6 days prior. Given her regular contractions and desire to have a vaginal birth after cesarean, she remained in triage for a repeat cervical exam as per the labor protocol. Just prior to subsequent evaluation, the patient felt significant fetal movement that was associated with fetal heart rate deceleration to 50-60 beats per minute via continuous cardiotocography, which was then confirmed by bedside ultrasound. Despite repositioning, the deceleration persisted, and she was immediately taken to the operating room, where fetal bradycardia was again confirmed. Following standard aseptic technique, an emergent repeat cesarean section under general anesthesia was performed. A low transverse hysterotomy was made and a male infant in cephalic presentation weighing 2,755 grams was delivered. Apgar scores were 8 at 1 minute and 9 at 5 minutes. At the time of delivery, cord arterial and venous blood gases were within normal limits at 7.26 and 7.23, respectively. After placental delivery, the uterus was exteriorized and found to be levorotated 180 degrees with the hysterotomy having been made along the posterior uterine wall. Upon easy reduction of the levorotation, the anterior uterine segment was found to be under-developed while the posterior uterine segment was well-developed. The cesarean section was complicated by post-partum hemorrhage secondary to uterine atony with a quantitative blood loss of 1444 mL by surgical suction. Hemorrhage was controlled by the expeditious repair of the posterior hysterotomy as well as a bleeding site

over the left anterior broad ligament. She was transfused with 2 units of packed red blood cells in response to the uterine atony. The patient was discharged to home after meeting all post-operative goals and obtaining contraceptive counseling with a serum hemoglobin level of 8.2 on post-operative day 2.

### Case 2

A 22-year-old female G1P0 at 24 weeks and 3 days gestation by last normal menstrual period presented as a transfer from a referral hospital for preterm premature rupture of membranes. Her pregnancy was complicated by a medical history of obesity with a BMI of 40, Factor V Leiden heterozygous mutation and a history of pulmonary embolism for which she was on prophylactic Lovenox. Premature rupture of membranes was confirmed by sterile speculum exam with pooling, ferning, and positive nitrazine without concern for preterm labor as her cervix was closed on visual inspection. Ultrasound estimated the gestational age to be 23 weeks and 4 days with an estimated fetal weight of 738 grams and cephalic presentation. She was given betamethasone and started on prophylactic antibiotics. Her preterm workup was overall unremarkable with a negative urine drug screen, urine culture, and sexually transmitted infection workup. The concern for chorioamnionitis was low considering she remained afebrile with normal range heart rate measurements, non-purulent discharge, and non-tender gravid abdomen. She was stable on the antepartum service until hospital day 19 at 27 weeks and 0 days gestation when

a sterile speculum exam was performed for patient-reported yellow increased discharge and abdominal cramping and was found to have a prolapsed cord. A hand was immediately placed in the vagina to elevate the fetal head and relieve pressure from the prolapsed cord, which was noted to be pulsatile. The patient was taken to the operating room for an emergency cesarean section under general anesthesia. A classical cesarean section was performed due to a poorly developed lower uterine segment which, given the gestational age, was not unusual. A male infant was delivered from cephalic presentation weighing 864 grams with Apgar scores of 5 at 1 minute and 9 at 5 minutes. Arterial and venous blood gases at birth showed a pH 7.33 and 7.22, respectively. Exteriorization of the uterus revealed a 180-degree uterine dextrorotation with a posterior classical hysterotomy. The uterine outline, fallopian tubes, and ovaries appeared normal. Upon internalization of the uterus, it appeared to naturally assume a 90 degrees dextrorotation position. The cesarean section was otherwise uncomplicated with a quantitative blood loss of 519 mL by surgical suction. Placental pathology returned later with probable chorioamnionitis and funisitis of the umbilical cord vessels. The patient did not exhibit signs of infection prior to delivery or postpartum, and her baby received antibiotics per protocol given prematurity. The patient was discharged to home on hospital day 22, post-operative day 3 meeting all postpartum goals. The baby was discharged to home on day of life 79, 38 weeks and 3 days post-menstrual age.

## **Discussion**

Uterine torsion is defined as rotation greater than 45 degrees and is a pathological finding typically diagnosed intra-operatively. The incidence is unknown but likely rare given the uncertainty of this diagnosis with potentially asymptomatic patients undergoing a vaginal delivery. While torsion may be asymptomatic, the most reported symptoms in the literature include abdominal pain, fetal bradycardia, maternal hypotension or vaginal bleeding. It has been estimated that approximately 11% of cases are asymptomatic.<sup>2</sup> Overall, uterine torsion is a surgical emergency given the increased risk of intrauterine fetal asphyxia and demise, maternal uterine atony, hemorrhagic shock, and uterine necrosis requiring hysterectomy that is likely secondary to compression of the uterine arteries.<sup>5</sup>

Although cases of uterine torsion are classically diagnosed during emergent cesarean section, pathognomonic signs prior to delivery have been cited in the literature. These include a spiral running urethra, a spiral running rectum, a twisted vagina, and “uterine artery pulsating in fornix anterior or posterior” on imaging, typically by bedside ultrasound.<sup>2</sup> Special attention should be given to placental location in subsequent ultrasounds, as a change in the location may suggest possible uterine torsion.<sup>6</sup> The upper wall of the vagina in a case of uterine torsion may have an X-shaped orientation on MRI, as opposed to the normal H-shape, and CT may show a whorled structure suggesting a twisted lower uterine segment.<sup>7,8</sup>

Management for these patients if diagnosed pre-operatively includes immediate exploratory laparotomy. As there is continued exploration of diagnostic steps for pre-operative diagnosis, the current favorable management techniques rely on identification of the torsed uterus intra-operatively with expeditious delivery of the fetus, detorsion of the uterus, and achievement of hemostasis in order to prevent fetal and maternal morbidity and mortality by asphyxia of the fetus, necrosis of the uterus, and possible uterine atony and hemorrhage. Regarding prevention, plication of the round ligament and uterosacral ligaments have been suggested to reduce recurrence in subsequent pregnancies, however, further examination into the necessity of these procedures is required given the rarity of the condition and potential damage to surrounding structures, notably kinking of the ureters during plication.<sup>9,10</sup>

Both of our cases were diagnosed intra-operatively but each with a different presentation of uterine torsion with one being symptomatic and the other asymptomatic. Case 1 shows that sudden fetal bradycardia may be an indicator for acute uterine torsion. Although it is uncertain at what point the torsion occurred, it possibly was immediately prior to fetal bradycardia given significant fetal movement reported by the patient. Once the torsion was identified intra-operatively, hemostasis was achieved, and the uterus returned to the abdomen after detorsion.

Case 2 demonstrates the coincidental intra-operative finding of uterine torsion.

There were no clinical signs or symptoms suggestive of torsion prior to the incision. The only clinical presentation was of a cord prolapse which is a known complication with ruptured membranes. This case further demonstrates that uterine torsion may be a chronic condition for the patient as the uterus returned to a 90 degree dextrorotated position upon replacement into the abdomen. A consideration for this potential pathologic finding, especially in subsequent pregnancies, would be plication of the round and uterosacral ligaments to reduce the risk of complications from uterine torsion. We note this as a possible limitation since we did not perform plication of the ligaments at the time of surgery.

Uterine torsion during pregnancy with an ultimate posterior hysterotomy site offers potential complications for future pregnancies. Hysterotomy sites on the anterior and posterior uterine wall will lead to further weakening of the myometrium, offering an increased risk of uterine rupture and abnormal placentation including placenta accrete spectrum. Recommendations for repeat cesarean section prior to labor onset in subsequent pregnancies should be offered for both patients given classical cesarean and multiple hysterotomy sites. It is important to offer contraceptive counseling given these risks, which was done prior to discharge for both patients, and importance of at least a 12- to 18-month interval for complete myometrial healing if another pregnancy is desired. The risk of recurrent uterine torsion should also be considered and discussed with the patient in a shared decision-making model when considering future fertility.

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