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Case Report

Traumatic uterine rupture: A rare complication of vehicle accidents ☆

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ARTICLE INFO

Article history:

Received 8 November 2023

Revised 2 February 2024

Accepted 6 February 2024

Keywords:

Pregnancy

Trauma

Motor vehicle accident

Uterine rupture

ABSTRACT

The rupture of the gravid uterus is a rare complication of trauma. It is reported in less than one percent of pregnant women who are victims of road accidents. The authors report the case of a 26-year-old nulliparous patient presented with a uterine rupture resulting in fetal death at 32 weeks of gestation following a nonpenetrating abdominal trauma in a road traffic accident. An extreme emergency operation and abdominal laparotomy confirmed the imaging findings and led to conservative treatment of the uterus and a splenectomy.

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Introduction

Pregnant women are frequently victims of road accidents in 7%–8% of pregnancies [1]. Clearly, the most frequent and significant cause of severe blunt trauma involving the pregnant woman is automobile collision. It is a major cause of maternal and fetal morbi-mortality and the leading cause

of nonobstetric maternal mortality in the United States [1].

Post-traumatic uterine ruptures are relatively rare but extremely serious. They complicate only 0.6% of serious road accidents [2]. Urgent and multidisciplinary care is therefore essential.

We report the case of a uterine rupture following a road accident resulting in a fetal death at 32 weeks gestation.

Abbreviations: CT, computed tomography; FAST, focused abdominal sonography for trauma; SMUR, Mobile emergency and resuscitation structures.

☆ Competing Interests: The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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<https://doi.org/10.1016/j.radcr.2024.02.020>

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Observation

A 26-year-old woman, in the 32nd week of her first pregnancy (Gravida 1, Para 1) was admitted after a car skid. She was a front-seat passenger not wearing a seatbelt in an airbag-equipped car. The driver was rolling at a high speed (110 km/hour) and lost control of the vehicle which has led to the car swerving off uncontrollably.

Immediately alerted, the mobile emergency and resuscitation structures (SMUR) were present at the accident site nearly 15 minutes later. Extrication of the 2 passengers was technically difficult. The passenger was in a state of hemodynamic shock and in respiratory distress.

Hemodynamically, the patient initially presented with hypotension of 70/40 mmHg, stabilizing at 110/80 mmHg after intravascular volume expansion induced by intravenous infusion of 1000 mL of crystalloids (Ringer Lactate). On the respiratory level, the patient was tachypneic with a respiratory rate of 45 cycles/min with cold extremities and cyanosis. The neurological state was altered with a Glasgow score of 6/15. Upon admission, the patient was presented with triple hemodynamic, respiratory, and neurological distress; therefore, she was intubated straight away at the site of the accident, a c-spine collar was applied, the patient was placed in a left lateral recumbent position and received a noradrenaline infusion. The driver was alive and had only minor injuries. Within 60 minutes overall, the patient had been transferred to the emergency room of a tertiary referral hospital.

An emergency biological assessment revealed anemia at 8 g/dL. An abdominal ultrasound exam showed a large echogenic peritoneal effusion. Fetal heart-beats were absent. Once the patient was stabilized, she underwent a body scan in order to establish a preoperative injury assessment. The CT scan showed a major hemoperitoneum (>1 Liter), a huge fundal wall tear of the uterus, and a fetus in the abdominal cavity testifying to a large uterine rupture (Figs. 1 and 2). Multiple spleen lacerations were documented along with a pelvic fracture without any lesion of the urinary tract.

Head CT showed a depressed right frontoparietal skull fracture associated with a hemorrhagic contusion and a right temporal bone fracture involving the otic capsule. Ultimately, the patient was rushed to the operating room. Surgical exploration confirmed the diagnosis of uterine rupture: intra-abdominal fetus and an expelled placenta through a large disruption of fundal uterine wall. The uterine rupture was located on the anterior face of the uterus, approximately 6 cm of length, and it was vertical, linear and nonshredded. A three-plan uterine suture was performed after fetal evacuation and uterine revision. The administration of 45 IU of oxytocin and 500 µg of sulprostone was necessary to prevent a uterine atony. Thus, a conservative treatment in order to preserve fertility was accomplished. Systematic exploration of the rest of the abdominal cavity found a shattered spleen leading to a splenectomy. Blood loss was estimated at approximately 2 to 3 liters. Postoperatively the rate of hemoglobin was controlled at 8 g/dL and 2 O negative packed red cells blood were transfused. The patient remained stable. She underwent a secondary surgery for the right frontoparietal fracture. Her

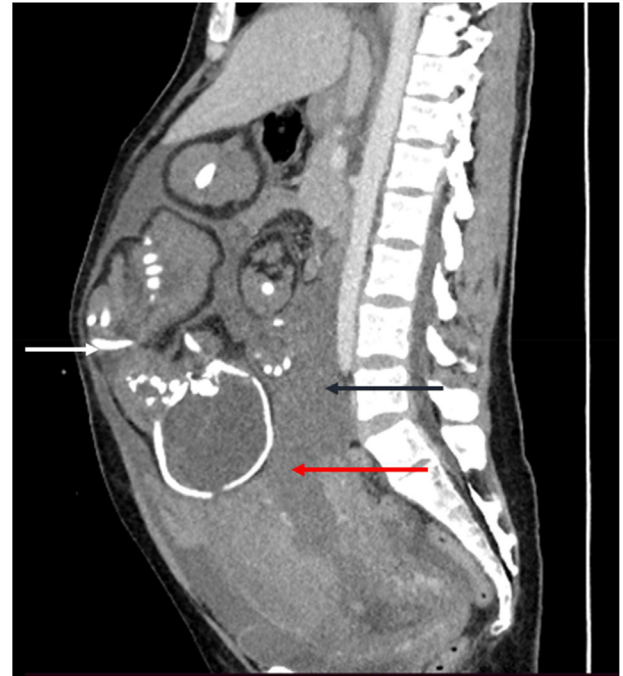


Fig. 1 – Sagittal section of a contrast enhanced CT scan at a portal venous phase highlighting a substantial discontinuity in the uterine wall at the level of the uterine fundus (red arrow), a major hemoperitoneum (black arrow) and a fetus immediately under the anterior abdominal wall (white arrow).

postoperative course was uncomplicated and was discharged 20 days later.

Discussion

Trauma represents the leading cause of non-obstetric maternal death in pregnant women [3]. The epidemiology of public road accidents involving pregnant women is hitherto unknown in Tunisia and the available data are mainly American.

Motor vehicle accidents account for nearly 49% of non-penetrating abdominal trauma during pregnancy [3]. Complications due to trauma don't only include maternal consequences that may lead to death but also pregnancy-related unique outcomes. Obstetric complications are of variable severity, depending on the severity of the trauma and whether or not a seat belt is worn. It is reported that wearing a seatbelt correctly reduces maternal death from 33% to 5% [8].

Premature labor and premature rupture of the membranes are the most common obstetric complications [4]. Rare but extremely serious complications involving maternal and fetal prognosis are associated with severe trauma including uterine rupture, placental abruption, and fetomaternal hemorrhage. These complications frequently lead to fetal demise [4]. Fetal death occurred in 15% of blunt trauma and was mainly due to maternal death and placenta abruption [5].

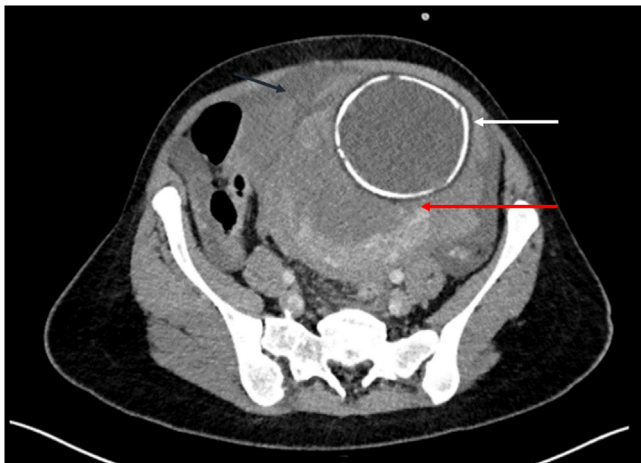


Fig. 2 – Axial section of a contrast enhanced CT at portal venous phase confirming a defect in the uterine wall (red arrow), a fetus located in the abdominal cavity beneath the anterior abdominal wall (white arrow) along with hemoperitoneum (black arrow).

Rupture of gravid uterus is reported in less than 1% of pregnant women involved in automobile car accidents [6]. The sudden increase in intra-abdominal pressure and deceleration phenomena are the main factors determining uterine rupture. Crosby and colleagues have shown that at the time of trauma, intrauterine pressure can be increased to values 10 times higher than that seen during labor within pregnant primates. This sudden increase in intrauterine pressure could explain its rupture [7].

The clinical exam can sometimes easily suggest the diagnosis of uterine rupture: abdominal pain, a precarious hemodynamic state contrasting with light vaginal bleeding, acute loss of uterine contractions, irregular uterine contour, abdominal tenderness, palpable fetal parts and fetal distress objectified by fetal monitor and ultrasound exam. However, a physical exam is generally difficult in unconscious patients and the presence of other associated intraabdominal organ lesions may be misleading. In fact, clinical and biological signs in traumatized pregnant women can be disrupted by physiological changes during pregnancy.

Therefore, knowing certain physiological changes that the pregnant woman's body undergoes is essential to the patient's management. For instance, the increase of maternal plasma volume, red cell blood mass, and cardiac output contribute to the increase in maternal blood volume resulting in moderate clinical signs of hypovolemia, hence a delay in the diagnosis of shock within pregnant women may occur [7].

This diagnostic delay is due to increased tolerance to acute blood loss and a relatively reassuring clinical presentation. Blood pressure can be maintained while the perfusion of the uterus and other organs is decreased resulting in fetal hypoxemia [5]. Thus, maternal resuscitation remains the major priority.

As with any polytrauma patient, the initial management of a pregnant woman victim of trauma consists of securing the airway, ensuring effective breathing, and maintaining ad-

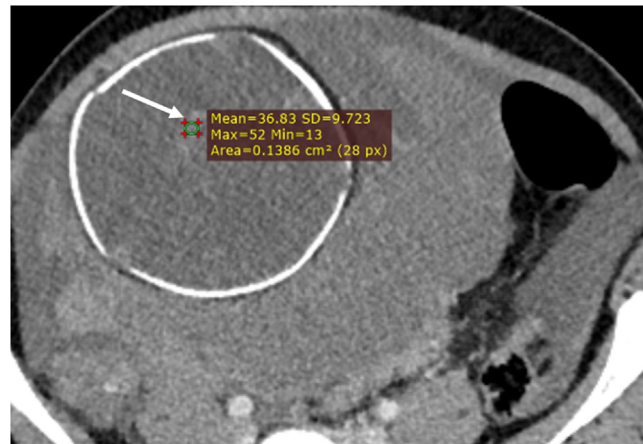


Fig. 3 – Axial section of a contrast-enhanced CT scan showing fetal intraventricular hemorrhage (white arrow).

equat blood circulation. Lifesaving measures might be inevitable such as endotracheal intubation in our case. It is recommended to transport the patient in a left lateral recumbent position as the compression of the vena cava by the gravid uterus can reduce cardiac output to 30% by restricting blood return to the heart [8]. The alteration of the hemodynamic state indicates significant blood loss and very reduced uteroplacental flow. Intravascular volume expansion is recommended for seriously injured victims via 2 large bore needles using crystalloid infusion. If necessary, O-negative blood should be transfused in order to avoid Rh alloimmunization while waiting for type-specific blood.

The diagnosis of uterine rupture is not determined by CT, it relies mainly on clinical examination, fetal heart monitoring, and abdominal ultrasound. Physical examination of the abdomen is extremely important in order to rule out uterine and intra-abdominal organ lesions even though it is less informative in unconscious or pregnant patients. FAST is a quick a sensitive tool that can be useful in the ER to detect intraperitoneal effusion and to quantify blood loss. Its sensitivity approaches 83% in detecting intraperitoneal fluid in pregnant blunt trauma patients [9].

The CT scan is rarely performed for diagnostic purposes since the positive diagnosis is primarily based on clinical examination, ultrasound, and fetal heart rate monitoring. Yet, it should not be deferred or withheld for fear of fetal exposure to radiation as maternal prognosis is a priority especially in the context of polytrauma as in our case. It helps to assess maternal and fetal lesions as well as other associated trauma injuries. However, imaging studies should not postpone an urgent exploratory laparotomy, sometimes the only life-saving measure. In our case, the scan allowed the diagnosis of uterine rupture by visualizing the uterine fundal wall defect and the extrauterine position of the fetus. It also assessed the extent of hemoperitoneum and even detected an intra-ventricular hemorrhage in the fetus (Fig. 3). The scan also identified other post-traumatic injuries, including splenic involvement. These observations warranted immediate surgical intervention.

Conservative treatment is recommended if there is a desire for subsequent pregnancy as in the case presented.

The fundal scar is fragile and predisposes to recurrence of uterine rupture. Therefore, close monitoring of following pregnancies is essential and a cesarean section is discussed systematically. In case of an uncontrollable hemorrhage or a very shredded uterus, a hemostatic hysterectomy is indicated. A multidisciplinary approach is hence necessary for a better outcome for both the mother and her fetus.

Conclusion

Post-traumatic uterine rupture is indeed rare, and it involves both the maternal and fetal life prognosis. Early and appropriate management involving the emergency physician, gynecologist, surgeon, and radiologist is essential to ensure immediate care and for subsequent pregnancies.

Patient consent

I, author of this article can confirm that we have obtained written, informed consent from the patient for the publication of her case, including the disclosure of results from biological and imaging tests, while ensuring that no personal information will be disclosed. This consent is in compliance with the necessary ethical and privacy considerations for the preparation and submission of our case report article.

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