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Management of the Multiple Traumatic Injuries in a Pregnant Woman Following Motor Vehicle Collision: A Case Report

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ABSTRACT

Trauma in pregnancy poses a unique challenge for clinicians, as two patients need to be managed simultaneously. The treatment priorities are the same as for the non-pregnant trauma patient: optimum resuscitation of the mother. Furthermore, pregnancy-related anatomic and physiological changes need special consideration while resuscitating the pregnant lady. We report a case of a 27-year-old pregnant woman at 31 weeks of gestation involved in a severe motor vehicle collision. Managing polytrauma in a pregnant patient, encompassing obstetric evaluation, extensive diagnostic imaging, and multidisciplinary surgical intervention. Surgery was promptly performed, and the patient had a successful outcome. This case highlights the importance of prompt, coordinated management in pregnant trauma patients to ensure optimal recovery. Despite the difficulties, the patient's follow-up results indicated a positive outcome.

Keywords: Ankle fracture; case report; fracture management; maternal polytrauma; motor vehicle accident; Open reduction and internal fixation (ORIF); subtrochanteric fracture.

INTRODUCTION

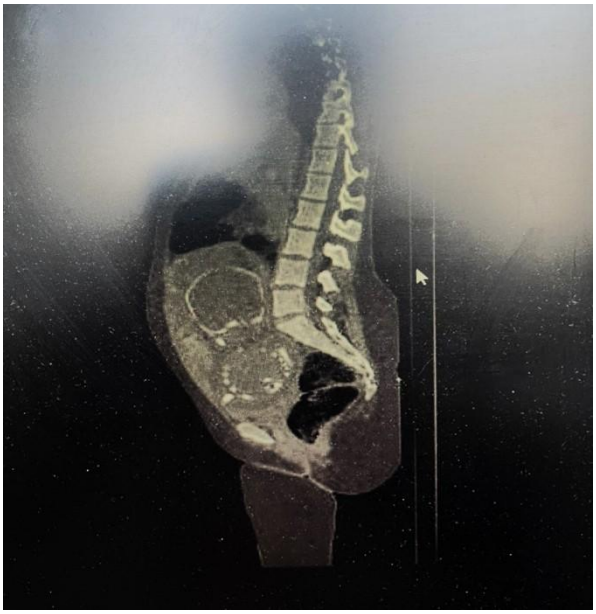
Managing polytraumatic injuries during pregnancy is especially challenging because both maternal and fetal well-being must be carefully balanced. Effective care requires quick decision-making, well-coordinated communication, and teamwork among multiple medical specialists. This case shows the importance of a multidisciplinary approach when treating a pregnant patient with complex injuries. Here, we describe a case of a 27-year-old woman at 31 weeks of gestation with severe polytrauma. In the following report, we review our case, followed by a discussion of the primary management of the urgent case and the necessary Surgical interventions. Based on existing studies reporting an overall healing rate of 98.2% for open reduction and internal fixation, our approach achieves stable fracture repair without complications.[1]

CASE

A 27-year-old pregnant woman at 31 weeks of gestation was involved in a severe motor vehicle collision in the following manner: seated adjacent to the right-hand vehicle driver, collided with an oncoming car carrier. Upon the patient's arrival, Immediate obstetric evaluation was initiated, and an obstetric Ultrasound examination was conducted. Regrettably, no fetal heart activity was detected. A computed tomography (CT) scan was performed and showed the fetus in the uterine cavity (Fig.1).

After a complete blood count revealed a hemoglobin level of 88 g/L, transfusion of compatible blood products, matching both blood group and Rhesus factor (A(II) RH(+), was promptly initiated.

FIGURE 1. A computed tomography (CT) scan shows the fetus's presence in the uterine cavity



Diagnostic imaging studies were then pursued to assess the extent of injuries sustained comprehensively. Utilizing a conservative approach, a Focused Assessment with Sonography in Trauma (FAST) study and a CT scan were performed in polytrauma mode, focusing on the left hip joint, left humerus, and right ankle and tibia. The radiographic examination further elucidated the nature of the injuries, revealing a basal fracture of the neck of the left femur, a comminuted fracture of the diaphysis of the left femur (Fig.2), and a fracture of the lateral condyle of the fibula with a resultant downward protrusion of the ankle (Fig.3).

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FIGURE 2. Radiographic imaging revealed a basal fracture of the neck of the left femur and a comminuted fracture of the diaphysis of the left femur

FIGURE 3. Radiographic imaging shows a fracture of the lateral condyle of the fibula with a resultant downward protrusion of the ankle

In alignment with conservative medical principles, anti-tetanus immunization was administered to mitigate the risk of infectious complications. Overall, a meticulous and conservative approach was employed to guide diagnostic and therapeutic interventions, prioritizing patient safety and well-being.

Indication for surgical treatment

Given the complexity of injuries and the advanced stage of pregnancy, a multidisciplinary approach involving trauma specialists, neurologists, and radiologists was employed to develop a comprehensive management strategy.[2] In light of the significantly lower limb injuries and the contraindication for natural childbirth, expedited surgical intervention was deemed necessary. A cesarean section was subsequently performed, followed by orthopedic repair of the lower limb fractures, following established management protocol.[3]

Description of the sequence of surgery

The procedure was conducted under general anesthesia. The operative approach involved a longitudinal incision on the mid-lateral surface of the left thigh extending from the lesser trochanter to the lateral epicondyle of the femur, as well as a 5cm incision proximally from the lesser trochanter on the mid-lateral surface of the thigh. Additionally, a 10 cm incision was made in the anterior area of the right medial malleolus, and a similar incision was made in the middle third of the right lateral malleolus, with the center of the fracture extending approximately 14 cm.

Intraoperative diagnosis

Basal displaced fracture of the left femoral neck; An oblique fracture of the subtrochanteric area of the left femur; A transverse displaced fracture of the diaphysis of the left femur with a misalignment; Dislocation of the right ankle-tibia joint; Dislocation of the right ankle-heel joint; Fracture of the right ankle bone.

Surgical intervention 1: Osteosynthesis of the femoral diaphysis

After ensuring aseptic conditions, a longitudinal incision was made on the mediolateral surface of the left thigh, extending from the lesser trochanter to the lateral epicondyle.

Careful dissection of the skin, subcutaneous fat layer, and fascia was performed. The muscle was divided at the border of the vastus lateralis and medialis (intermedialis), allowing access to the femur. Upon reaching the femur, significant pathological changes consistent with the preoperative diagnosis were observed.

Given the principles of osteosynthesis and biomechanical stability, a diaphyseal plate was selected for fixation.[4] A large hematoma and clots were present between the broken fragments, necessitating thorough cleaning and irrigation. The bone fragments were mobilized, with temporary fixation achieved using bone clamps and wire cerclages.

Under Fluoroscopic guidance, satisfactory alignment of the fragments was confirmed. A diaphyseal plate was applied and secured with 14 screws, ensuring stable osteosynthesis (Fig. 4).

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FIGURE 4. Successful fixation of a femoral shaft fracture using a plate and screws, and cannulated screws

Osteosynthesis of the femoral neck fracture

An additional incision was made 5 cm above the lesser trochanter. The femoral neck fracture was corrected under Fluoroscopic control, and fixation was achieved with guidewires, followed by insertion of two 6.0-mm-diameter cannulated screws (Fig.4), providing robust stabilization. Fluoroscopic confirmation verified the satisfactory positioning of the fracture fragments.

The surgical wound was irrigated multiple times. The incision was closed in anatomical layers, with a blind Redon drain placed to manage postoperative drainage. Skin closure was completed using a combination of staples and donut-type sutures.

Surgical intervention 2: Open reduction and internal fixation (ORIF) of lateral malleolus fracture with ankle dislocation.

Upon immediate admission to the operating room, a radiographic assessment revealed a lateral malleolus fracture concomitant with ankle dislocation.

A surgical approach involving a mid-length incision (approximately 14 cm) targeting the lateral malleolus was executed to optimize fracture alignment. Subsequent exploration revealed complex pathology, including misalignment of the ankle bones vis-à-vis the calcaneus and tibia, resulting in multiplanar deformation. Additionally, a fracture of the posterior-medial edge of the ankle necessitated supplementary intervention, prompting a separate 10 cm incision in the anterior aspect of the medial malleolus. Intraoperatively, the ankle-tibia articulation was meticulously mobilized, circumventing medial osseous structures, while the ankle-calcaneal interface was addressed via lateral mobilization. Significant technical challenges were encountered during ankle bone mobilization, owing to its misalignment with the tibia and calcaneus.[4] Successful realignment of the ankle bone was achieved, initially securing it to the calcaneus with a single wire. Subsequent stabilization involved fixation of the ankle to the tibia using two additional transarticular wires (Fig. 5).

FIGURE 5. Realignment of the ankle bone and fixation of the ankle to the tibia in the posteroanterior view

Follow-up and outcomes

The postoperative radiographic assessment confirmed fragment stability and satisfactory alignment. The surgical site was thoroughly irrigated and layered closed, with a closed suction drain placed for postoperative drainage management.

At the 4-month follow-up visit, the patient was comprehensively evaluated, and radiographic imaging was performed to assess for any complications (Fig. 6). Absolute fracture stability and no further troubling events were observed.

FIGURE 6. Follow-up X-ray with absolute fracture stability

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DISCUSSION

This case underscores the complexities involved in managing polytrauma in pregnant patients, a scenario requiring prompt, yet carefully considered, medical and surgical interventions. Pregnancy introduces unique challenges, such as altered physiology and the need to ensure fetal safety, complicating the diagnostic and therapeutic process.

The loss of fetal viability, as observed in this case, adds significant emotional and ethical dimensions to the clinical decision-making process. Immediate obstetric evaluation and the use of FAST and CT imaging were crucial in determining both the extent of maternal injuries and the unfortunate fetal outcome. This highlights the importance of integrated imaging strategies that balance the need for comprehensive assessment to minimize fetal radiation exposure.[1]

The orthopedic injuries sustained, including the basal and comminuted femur fractures, necessitated meticulous surgical planning and execution. The use of diaphyseal plates and cannulated screws, guided by fluoroscopic control, exemplifies the precision required in such complex cases. The subsequent ORIF of the lateral malleolus fracture and ankle dislocation further demonstrates the challenges of achieving anatomical realignment in the context of multiple, severe fractures. Additionally, ORIF for ankle fractures is generally regarded as a satisfactory surgical intervention. However, it is important to acknowledge that postoperative complications are common.[5] Nevertheless, we achieved absolute fixation without any postoperative complications.

CONCLUSIONS

This case highlights the complexities of managing polytrauma in a pregnant patient, emphasizing the necessity of a multidisciplinary approach and meticulous planning. The integration of emergency medicine, obstetrics, radiology, and surgery is crucial to optimize maternal outcomes in the context of severe traumatic injuries during pregnancy.

Our treatment strategy, employing a multidisciplinary team of trauma specialists and radiologists, proved to be the best choice for this complex case. The successful outcomes of the surgical interventions affirm the efficacy of our approach and demonstrate our commitment to patient safety and optimal recovery.

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