

Management of bimalleolar fracture in pregnancy

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Abstract

Ankle fracture is one of the most common fractures in adults and among pregnant women. In pregnancy, the treatment must be prompt because of the risks and complications that could involve both mother and fetus. In this article, we reported the management of a patient with a bimalleolar fracture in pregnancy, its treatment, and evolution.

Keywords: bimalleolar fracture, ankle fracture, pregnancy, treatment

Introduction

The talocrural joint is composed of the medial malleolus - the distal epiphysis of the tibia, the lateral malleolus - the epiphysis of the fibula and the trochlea of the talus [1].

Ankle fractures are among the most common fractures in adults with an incidence of 174 cases per 100,000 people per year [1,2]. In a study carried out between 2000 and 2016, it has been observed that the presence of ankle fractures is the most common, and fractures tend to occur most frequently in the second and third trimesters of pregnancy. Of 114,673 live births, 33 women were identified with fractures during pregnancy. Fractures of

the ankle have been identified in 39.3% of the minimal-trauma fractures [3].

Malleolar fractures can involve bone damage and/ or ligament ruptures. Anatomically, the malleolar fractures can be of the medial malleolus with the deltoid complex and the lateral malleolus with the lateral ligaments. If an ankle fracture involves more than a malleolus, the fracture will be called bimalleolar [4].

Case Report

We report the case of a 39-year-old gravida 2, para 1, female, 35 weeks pregnant, who suffered a domestic accident because of which she attended the Orthopedic Emergency Room

of University Emergency Hospital Bucharest. Physical examination revealed pain at anterior and posterior mobilization of the right ankle, local deformation and complete impotence. According to the protocol, two radiographs - anterior-posterior incidence (Fig. 1) and lateral incidence (Fig. 2) were performed, under lead-type protection, with the consent of the obstetrician.



Fig. 1 Radiography in anterior-posterior incidence of the right ankle - note the peroneal malleolus fracture

Clinical and para-clinical examinations established the diagnostic of bimalleolar fracture of right lower leg - peroneal malleolus fracture, posterior marginal fracture and deltoid ligament rupture. The next step was the surgical treatment with the reduction and osteosynthesis with one-third tubular plate and 6 screws for the peroneal malleolus, a diastasis screw for the tibiofibular diastasis and the suture of deltoid ligament.

From the obstetrical history of the patient, we noted that she received antithrombotic treatment with Enoxaparin 0.4ml/ day for inherited thrombophilia with heterozygous

mutation on the gene of Factor V Leiden and heterozygous mutation on the gene of MTHFR (methyl-tetra-hydro-folate reductase). During the first trimester, she had an infection with *Ureaplasma urealyticum*, which was treated according to the antibiogram. All blood-group incompatibility was also detected with absent antibodies anti-A and a mild form of anemia. During hospitalization, blood samples were collected, which were unremarkable. Fetal ultrasound examination and non-stress test were performed daily. The postoperative progress of the patient was favorable under antibiotic protection and pain medication. She was discharged 3 days after the surgery.



Fig. 2 Radiography in lateral incidence of the right ankle - note the posterior marginal fracture

Discussion

According to the Weber classification, ankle fractures are divided into 3 types: type A-distal fractures of tibiofibular syndesmosis, type B - at the level of syndesmosis, type C proximal

of syndesmosis [4]. The treatment of ankle fractures can be conservative (non-surgical) or surgical [1].

In the case of a stable fracture, with non-displaced or only slightly displaced fragments, the conservative treatment can be considered, depending also on the associated pathology of the patient [1]. In these situations, high or low orthosis or joint immobilization are used with a walker or a vacuum shoe or in a gypsum device with periodic radiography [1,5].

Surgical treatment is necessary in case of significant displacements or grossly dislocations fractures (the most common - type B and C fractures) and serves to restore the anatomical function and position of the joint; plate and/ or screws can be used [1].

Post-operative management should include the treatment with antithrombotic medication until full mobilization of the ankle and physiotherapy is needed [1].

In the case of pregnant women with orthopedic trauma, it is important to pay special attention to the fact that both maternal and fetal complications and risks must be taken into account [6]. An adequate management includes a multidisciplinary team of orthopedic, obstetrician and anesthetist physicians [7]. In the case reported by us, orthopedic treatment had to take into account the fact that it was a patient pregnant in 35 weeks with inherited thrombophilia in treatment. After the clinical examination, an X-ray in two incidents was performed in order to establish the diagnosis. For a 35-week pregnancy, X-rays could be performed, with the consent of the obstetrician, with lead-type protection, and the diagnosis of a bimalleolar fracture of right lower leg was established. From the anesthetic point of view, spinal anesthesia was performed with the lateral decubitus of the patient to prevent hypotension with inferior vena cava syndrome. As a surgical technique, a lateral approach was performed on the right ankle (Fig. 3) with fracture detection. The reduction and osteosynthesis was performed with a plate and 6 screws and a diastasis screw (Fig. 4) and a medial approach to the right ankle with the detection of a complex lesion of the deltoid for

which suture was practiced.



Fig. 3 Intraoperative aspect – the lateral approach of the right ankle



Fig. 4 Intraoperative aspect – the osteosynthesis materials used: the plate and the 6 screws were used for the peroneal malleolus fracture and the diastasis screw was used for tibiofibular diastasis

Postoperative treatment consisted of antibiotic, antithrombotic, pain and tocolytic medication. Ultrasonography fetal and fetal CTG examinations, pre- and postoperative, did not show changes beyond the limits. The patient was discharged 3 days after the surgery with the need of orthopedic follow up at one, 3 and 6 weeks, and continued obstetric weekly consultations.

Some specialists underline the importance of quick reaction regarding the management of fractures in patients in the third trimester of pregnancy in order to decrease fetal and maternal morbidity and mortality [7]. In the case reported by us, the patient underwent surgery in the first 24 hours after the fracture in order to avoid fetal and maternal complications.

Acute post-operative complications include wound hematoma, wound-edge necrosis, or

post-operative infection (up to 2%) [1]. The complications are frequently in elderly patients or complexed injuries [1,8].

As a long-term complication, the most important one is ankle arthrosis, whose treatment is a prosthetic ankle joint or an ankle arthrodesis [1,9].

In a reported case, an 8 weeks pregnancy patient suffered a right bimalleolar ankle fracture after a motor vehicle accident. The treatment was surgical with the reduction and internal fixation of the fracture [10]. 24 hours after the surgery, the patient was diagnosed with acute tarsal tunnel syndrome [10]. The tarsal tunnel syndrome is defined as the compression of the calcaneal, medial plantar and lateral plantar nerves (branches of the tibial nerve) and typically is a chronic condition [10-15]. The patient was treated with an urgent tarsal tunnel release as in the case of a carpal tunnel syndrome associated with a distal radius fracture, because of the similarity of the syndromes [10,16,17].

In our case, we had no acute complications, except for swelling and ecchymosis typical for a fracture. Thromboembolic complications are an acute severe complication, which must be prevented after a surgery. The incidence of venous thromboembolism in patients with leg injury who have been immobilized for at least 1 week with no antithrombotic medication, has been estimated between 4.3-40% [18,19]. The incidence of deep vein thrombosis and pulmonary embolism in operated ankle fracture have been estimated at 0.17% (database of English NHS Hospitals) [18,20]. Pregnancy, immobilization, recent hospital admission are some risk factors for thromboembolic complications [18,21-23]. For these reasons, we decided to administrate antithrombotic medication – Enoxaparin 0.4 ml.

Conclusion

This case illustrated the importance of multidisciplinary management in the case of a pregnant woman with bimalleolar fracture. It is important to react quickly because a maternal

trauma increases the risk of fetal loss, preterm birth, placental abruption, or even fetal and maternal death.

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