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FRACTURES OF THE BONES IN THE ANKLE JOINT

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SUMMARY

Introduction: *Ankle fractures are usually frequent in emergency departments worldwide, with an incidence of 187/100,000 inhabitants per year. Especially the type B fracture according to Weber's classification, which may lead to long-term osteoarthritis in approximately 14%. It is essential to recognize that stability in the ankle joint is the fundamental pillar in the correct treatment strategies in ankle trauma.*
Objective: *to describe current information related to ankle bone fractures, etiology, anatomy, epidemiology, mechanism of action, presentation, classification, evaluation, prognosis, treatment and complications of ankle fractures.*
Methodology: *a total of 38 articles were analyzed in this review, including review and original articles, as well as clinical cases, of which 26 bibliographies were used because the other articles were not relevant to this study. The sources of information were PubMed, Google Scholar and Cochrane; the terms used to search for information in Spanish, Portuguese and English were: ankle fracture, fractura do tornozelo, ankle, tibia, fibula, ankle fracture.*
Results: *Bimalleolar ankle fractures occur in a quarter of the patients and trimalleolar fractures in the remaining 5% to 10%. The incidence of ankle fractures is close to 187 per 100,000 inhabitants per year. Open fractures are infrequent, representing only 2 % of all fractures of the ankle joint. In children, these injuries are also frequent, occupying the second place after hand and wrist injuries, especially in those between 10 and 15 years of age. Likewise, pediatric ankle fractures occur in a 2:1 male to female ratio, representing 5% of all fractures in children and approximately 9% to 18% of all fissure injuries.*
Conclusions: *the ankle joint is complex, in gynglimus, formed by the fibula, the tibia and the talus and also deeply related to the ligamentous complexes. The bony anatomy that provides stability is formed by the distal part of the tibia and fibula, its articulation with the talus and with each other. Generally ankle fractures are caused by different trauma mechanisms such as impact, twisting and crushing injuries. Ankle injury depends on several factors such as mechanism, chronicity, bone quality, patient's age, magnitude, direction, impact velocity and foot position. A complete and comprehensive medical history is essential in the medical evaluation. X-rays are the first-line adjunctive tests that aid in the evaluation of an injury that impacts the ankle. The classification system is important for the treatment decision. The treatment of fractures of the ankle bones can be performed conservatively or surgically, depending on certain criteria, and immobilization should be performed afterwards to reduce the risk of complications. It is essential to follow the ATLS scheme in order to define and manage any alteration that may be life-threatening for the patient. Ankle fracture-dislocation requires urgent manipulation to recover the ankle mortise.*
KEY WORDS: *fracture, ankle, tibia, fibula, bones.*

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INTRODUCTION

Ankle fractures are a common occurrence in emergency departments worldwide, with an incidence of 187/100,000 inhabitants per year, especially type B fractures according to Weber's classification, which can lead to long-term osteoarthritis in approximately 14%(1).

It is essential to recognize that stability in the ankle joint is the fundamental pillar in the correct treatment strategies in ankle trauma.a stable and normal ankle can be conceptualized as one that can move along its physiological limits; however, conceptualizing instability within a fracture is a relatively more difficult, because in instability, the physiological limits are exceeded actively or passively proving that the stabilizing structures are insufficient. Usually, the stability of the ankle is passively ensured by the compliance of the bones that form the joint, the ligaments that surround the joint and the nearby extrinsic muscles; these often lose their stabilizing competence through trauma(2,3).

METHODOLOGY

A total of 38 articles were analyzed in this review, including review and original articles, as well as cases and clinical trials, of which 26 bibliographies were used because the information collected was not important enough to be included in this study. The sources of information were Cochrane, PubMed and Google Scholar; the terms used to search for information in Spanish, Portuguese and English were: ankle fracture, fractura do tornozelo, ankle, tibia, fibula, ankle fracture.

The choice of bibliography exposes elements related to ankle bone fractures; in addition to this factor, etiology, anatomy, epidemiology, mechanism of action, presentation, classification, evaluation, prognosis, treatment and complications of ankle fractures are presented.

DEVELOPMENT

Etiology

Fractures of the ankle most of the time are caused by different types of trauma: Impact injuries: consequence of a descent from a height with repercussions on the distal portion of the tibia and fibula against the talus.
Twisting injuries: such as the forces presented in some types of trips, falls and sports injuries.
Crush injuries: as in those caused by traffic accidents or when the ankle is trapped under a heavy artifact.
The level of bone comminution and soft tissue damage is proportionally linked to the energy of the trauma(4).

Epidemiology

The literature suggests that ankle fractures have sharply increased in incidence since the 1960s. Being more common in older women, however, they are not considered to be fragility fractures. Most ankle fractures are isolated, approximately two thirds. Bimalleolar ankle fractures occur in a quarter of patients and trimalleolar fractures in the remaining 5% to 10%. The incidence of ankle fractures is close to 187 per 100,000 inhabitants per year. Open fractures are infrequent, representing only 2 % of all fractures of the ankle joint. Fractures of the posterior malleolus account for 7-44% of all ankle fractures. Ankle fractures account for 9% of all ankle fractures. These fractures are closely related to high body mass index(5-9).

Regarding children, these injuries are also frequent, occupying the second place after hand and wrist injuries, especially in those between 10 and 15 years of age. Similarly, pediatric ankle fractures occur in a 2:1 male to female ratio, representing 5% of all fractures in children and approximately 9% to 18% of all fissure injuries. Triplanar fractures account for 5% to 15% of ankle fractures in children and occur in adolescents with a mean age of 13 years and 5 months and a range of 10 to 17 years(10-12).

Anatomy

The ankle joint is complex, in gynglimus, formed by the fibula, tibia and talus and also deeply related to the ligamentous complexes. The bony configuration of the ankle joint is primarily responsible for stability. The bony anatomy that provides stability is formed by the distal part of the tibia and fibula, their articulation with the talus and with each other. The distal articular surface of the tibia together with the medial and lateral malleoli generate a cavity or mortise, this creates a compact articulation with the dome of the talus. The articular surface of the lower leg is concave in the anteroposterior plane and convex in the lateral plane. It is wider at the front to be congruent with the talus. This provides intrinsic safety, particularly between loads. The dome of the talus is trapezoidal in configuration, 2.5 mm wider anteriorly than posteriorly. The body of the talus is almost completely covered by articular cartilage. The medial malleolus connects to the medial part of the talus and has 2 small tubercles, anterior and posterior, which aid in attachment to the superficial and deep deltoid ligament. The lateral malleolus provides lateral support to the ankle joint. The ankle is functionally dependent on the subtalar joint and the talonavicular joint because they have a sequence of ligamentous stabilizers that function synergistically when the rearfoot is displaced. There are no articular areas between the distal tibia and distal fibula. The distal tibia is covered with articular cartilage on the medial aspect. The syndesmosis is located between the distal ends of the tibia and fibula. Its function is to withstand axial, rotational and translational forces, in addition to preserving the structural integrity of the shroud. It is formed by different ligaments such as:

A. Anteroinferior tibioperoneal ligament.
B. Posteroinferior tibioperoneal ligament.
C. Transverse tibioperoneal ligament.
D. Interosseous ligament.

In addition, the deltoid ligament provides support to the medial aspect of the ankle. It consists of a superficial component formed by the tibio-scaphoid ligament, tibiocalcaneal ligament and the superficial tibiotalar ligament; and a deep component in which the intra-articular or deep tibiotalar ligament, the peroneal

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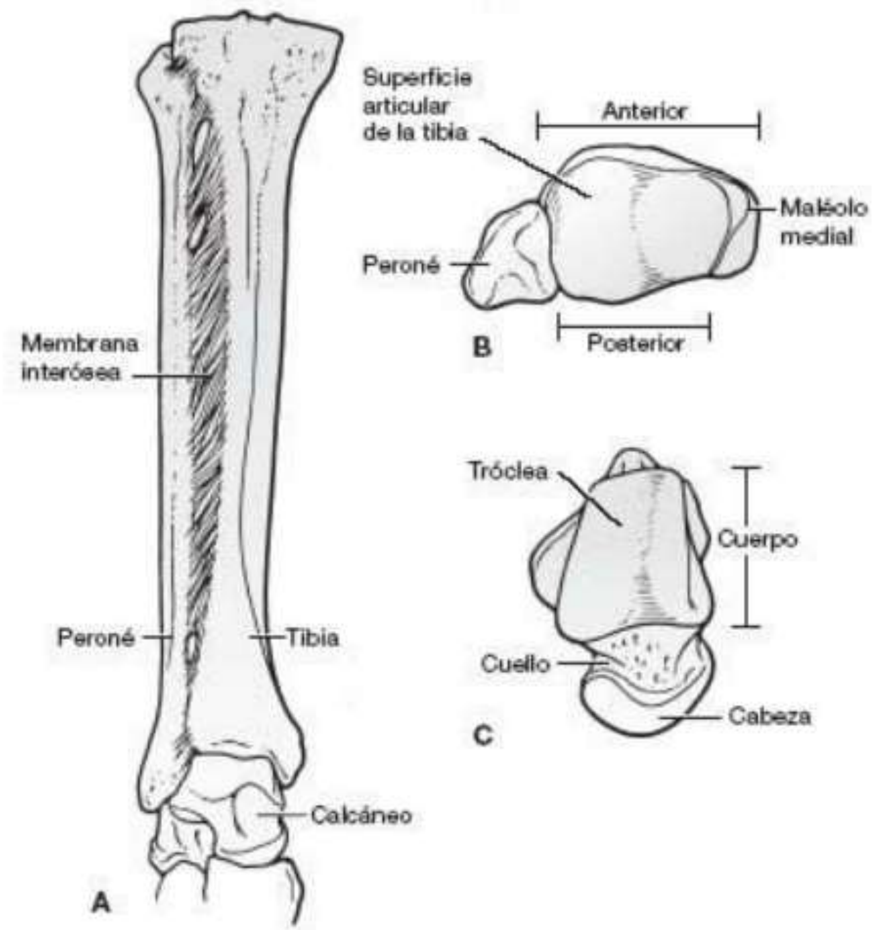
collateral ligament, the anterior astragaloperoneal ligament, the posterior astragaloperoneal ligament and the calcaneoperoneal ligament are present. A lateral displacement of 1 mm of the talus decreases the contact surface by 40%. The normal range of motion of the ankle is 30° dorsiflexion and 45° plantar flexion. Gait studies have shown that a minimum of 10° of dorsiflexion and 20° of plantar flexion is required for normal gait. The ankle flexion axis is between the distal portions of both malleoli and has 20° of external rotation with respect to the knee axis. Rupture of the syndesmosis can reduce tibioperoneal overlap. When a junctional tear is associated with a fibula fracture, the talus may be displaced 2 to 3 mm laterally, even when the deep deltoid ligament is intact(2,4-6,13).

Figure 1. Ankle anatomy



Source: Bucholz RW, Heckman JD, Rockwood CA, Green DP. Rockwood & Green's(6)

Figure 2. Collateral ligaments and anterior syndesmosis.

Source: Bucholz RW, Heckman JD, Rockwood CA, Green DP. Rockwood & Green's(6)

Mechanism of Action

Ankle injury depends on several factors, such as mechanism (axial versus rotational force), chronicity (recurrent ankle instability can lead to chronic ligamentous laxity and distort ankle biomechanics), bone quality, patient age, magnitude, direction, impact velocity and foot position.

Rotational injury is the mechanism most commonly associated with fracture of the posterior malleolus. Similarly, posterior malleolus fracture is seen in pronation-abduction, because abduction results in avulsion of the syndesmosis with failure of the lateral malleolus, which usually results in a posterior malleolus fracture. Infrequently, injury mechanisms such as axial loading and shear fracture of the posterior malleolus are combined. The torsion generated by a spiral fracture of the distal tibia can also cause a fracture of the posterior malleolus, being common in cases of high fibula fracture(5,6,14,15).

In ankle fracture-dislocations the functional prognosis is not the best due to the fact that they present greater damage to the ligaments surrounding the ankle joint(16-18).

Clinical Assessment

A complete and comprehensive medical history is essential in the medical evaluation. The following are needed: medical history, history and injury history, evaluation of the risk of venous thromboembolism.
Trauma patients should be evaluated with the ATLS algorithm to rule out any life-threatening injuries:
A: airway management and cervical spine stabilization.
B: Respiration
C: Circulation and hemorrhage control.
D: inability to assess neurological status
E: Exposure

Neurovascular status, soft tissue and proximal fibula status should be assessed using the Ottawa ankle standards.In case of pain or tenderness in any of the malleoli, complementary imaging tests are recommended:
Bone tenderness at the posterior edge or tip (within 6 cm) of the lateral or medial malleolus.
Patients unable to bear weight at the time of injury or in the ED.
Weight bearing will be observed by the patient's ability to take four steps(4,19).

Ankle fractures present in multiple ways, ranging from difficulty to inability to walk, accompanied by pain, swelling and deformity. Special attention should be paid to the neurovascular status of the extremity, to the soft tissue injury and compare it with the contralateral one. It is necessary to touch the fibula in all its extension if possible, looking for pain. It is also necessary to perform the pressure maneuver 5 cm proximal to the intermalleolar axis, for a probable lesion of the syndesmosis. Ankle dislocations are clinically evident and should be reduced and immobilized quickly to preserve lesions in the talar dome and to maintain neurovascular congruence(5,6).

Imaging assessment

X-rays are the first-line adjunctive tests that aid in the evaluation of an injury that impacts the ankle. Some studies suggest not to delay an urgent reduction of the obviously deformed ankle by obtaining X-rays. It is recommended to request anteroposterior, lateral and mortise projections.

Anteroposterior projection: the 10 mm tibioperoneal overlap is anomalous and indicates a lesion of the syndesmosis. An increase of the tibioperoneal radiolucent space greater than 5 mm is abnormal and indicates a lesion of the syndesmosis. Displacement of the talus with a difference in width greater than

2 mm between the top of the medial and lateral joint spaces is pathological showing medial or lateral rupture.

Lateral projection: here it is possible to differentiate the fractures of the posterior tibial tuberosity and the outline of the lesion of the fibula, in addition it manages to show the fractures by avulsion of the talus by the anterior capsule. The dome of the talus must be aligned under the tibia and be congruent with the articular surface of the tibia.

Mortise view or mortise projection: it is essential to evaluate the ankle mortise (lateral malleolus, tibial plateau, medial malleolus and dome of the talus). It is performed with the foot in 15° to 20° of internal rotation to remediate the intermalleolar axis. A medial radiolucent space greater than 4 mm to 5 mm is not normal and demonstrates a lateral offset of the talus.

Astragalocrural angle: the angle created by the intermalleolar line and a line parallel to the distal articular surface of the tibia should be 8° to 15°. This can vary by a maximum of 2 to 3 degrees compared to the uninjured side. A tibioperoneal overlap of 1 cm demonstrates a rupture of the syndesmosis. A displacement of the talus > 1 mm is considered abnormal.

Sometimes it is useful to perform a stress projection, forcing the foot into external rotation while keeping the ankle in dorsiflexion to diagnose a medial injury related to an isolated fibula fracture. Computed tomography allows better delineation of the bony anatomy, particularly in those with injuries to the articular surface of the tibia. This study is widely used to examine fracture configurations, the degree of bone comminution, the articular surface and for surgical planning in complex fractures. Nuclear magnetic resonance can help in hidden cartilaginous, ligament or tendon injuries and stress fractures(4-6,20,21).

Classification

Years of research on ankle fractures have generated several classifications that focus on the mechanism of injury as well as its correlation with the type of fracture. The most common classifications recognized and used by most practitioners are those of Lauge-Hansen and Danis-Weber. Both classifications should be considered in order to correlate fracture, mechanism of injury and optimal treatment(9,14).

The Lauge-Hansen classification admits four types of injuries, based on a sequence of "pure" injuries, each of which is divided into stages of increasing severity. It is based on cadaver studies. The system takes into account:

1) the position of the foot at the time of injury.
2) the direction of the deforming force.

Supination-adduction comprises 10 to 20% of ankle fractures. Besides being the only type involved in medial displacement of the talus.

Stage I: transverse avulsion fracture of the fibula, distal to the joint, or a rupture of the lateral collateral ligaments.

Stage II: vertical fracture of the tibial malleolus.

Supination-external rotation covers 40% to 75% of malleolar fractures.

Stage I: rupture of the anterior syndesmosis (anterior tibioperoneal ligament) with or without an avulsion fracture of its tibial or peroneal insertions.

Stage II: the typical spiroid fracture of the distal part of the fibula, extending from the anteroinferior zone towards the posterosuperior zone.

Stage III: rupture of the posterior syndesmosis (posterior tibioperoneal ligament) or a fracture of the posterior malleolus.

Stage IV: transverse fracture by avulsion of the medial malleolus or a rupture of the deltoid ligament(4-6).

Pronation-abduction covers 5% to 20% of malleolar fractures.

Stage I: transverse fracture of the medial malleolus or a rupture of the deltoid ligament.

Stage II: rupture of the syndesmosis or a fracture by avulsion of its insertions.

Stage III: transverse or short oblique fracture of the distal end of the fibula at or above the syndesmosis; causing a lateral comminution or a butterfly wing fragment.

External pronation-rotation It accounts for 5% to 20% of malleolar fractures.

Stage I: transverse fracture of the medial malleolus or a rupture of the deltoid ligament.

Stage II: rupture of the anterior syndesmosis (anterior tibioperoneal ligament) with or without fracture by avulsion of its insertions.

Stage III: spiroid fracture of the distal fibula at or above the syndesmosis extending from anterosuperior to posteroinferior.

Stage IV: rupture of the posterior tibioperoneal ligament (posterior syndesmosis) or an avulsion fracture of the posterolateral portion of the tibia(5,6).

The Danis-Weber classification is based primarily on radiographic criteria at the level of the fibula fracture. The more proximal, the greater the risk of syndesmosis rupture and instability. It presents three types:

A: Fracture of the fibula below the level of the horizontal articular surface of the tibia. Equivalent to Lauge-Hansen supination-adduction.

B: Oblique or spiroid fracture of the fibula, produced by external rotation at or near the level of the syndesmosis. Equivalent to Lauge-Hansen supination-eversion injury.

C: Fracture of the fibula above the level of the syndesmosis generating a rupture of the syndesmosis almost always associated with a medial injury. It includes Maissonneuve and corresponds to stage III of the Lauge-Hansen pronation-eversion or pronation-abduction fractures(4-6,9,22).

Figure 3. Fracture of the ankle bones classified as Dennis Weber type C and treated surgically.

Source: The Authors.

Variants of these fractures

Maisonneuve: traditionally associated with a fracture of the proximal third of the fibula, it is an external pronation-rotation type injury; it is essential to differentiate it from a fracture of the fibula produced by a direct impact. It requires surgical treatment. This mixes a fracture of the proximal fibula with tibioperoneal syndesmosis and injury of the deltoid ligament with or without fracture of the medial malleolus.

Curb fracture: avulsion fracture of the posterior part of the tibia caused by a stumble.

Bosworth fracture-luxation: the fibula dislocates posteriorly, the tibial edge of the posterolus blocks the reduction of the fibula and therefore requires surgical treatment.

LeForte-Wagstaffe: fracture by avulsion of the anterior tubercle of the fibula produced by traction of the anterior tibioperoneal ligament.

Tillaux-Chaput: avulsion of the anterior border of the tibia generated by the anterior tibioperoneal ligament, tibial equivalent of the LeForte-Wagstaffe fracture.

Tuberosity fractures of the medial malleolus: fracture of the anterior tubercle and fracture of the posterior tubercle.

Dorsal pronation-flexion fracture: displaced fracture of the anterior articular surface(4-6,23).

Treatment

The treatment of ankle bone fractures can be conservative or surgical, depending on some criteria, and immobilization should be performed after the treatment to reduce the risk of complications such as defective consolidation. Patients present stiffness, weakness, pain, swelling and a reduced ability to participate in activities due to the fracture and subsequent immobilization(24).

The main goal of treatment is to anatomically restore the ankle joint, maintaining anatomical rotation and length of the fibula. In fractures that are obviously displaced, a closed reduction should be attempted in the emergency, which will help to reduce the edema produced by the injury, as well as minimize stress on the articular cartilage, reduce the risk of skin injury and reduce pressure on the neurovascular structures. Reduction takes priority over imaging. Careful cleaning should be performed on open wounds and abrasions in addition to proper draping according to severity. It is recommended to leave the phlyctenas intact and cover them with a well-padded sterile dressing. After fracture reduction it is suggested to use a posterior U-splint to provide stability to the fracture and comfort to the affected person, also use local ice, keep the affected limb elevated and perform a post reduction imaging(5,6).

Conservative treatment

Indications for conservative treatment include:

Non-displaced, stable fractures with syndesmosis integrity; place a suropedic cast or suropedic orthosis and allow weight bearing to tolerance.

Displaced fractures that allow an anatomical reduction of the ankle mortise by closed manipulation; put a very cushioned posterior splint with a U-shaped component during the first days, while it has inflammation, then put an inguinopedic cast for 4 to 6 weeks to prevent rotation, making serial imaging examinations to verify the reduction and consolidation. When there is a correct healing, a suropedic plaster cast or an orthosis can be applied. Weight bearing is restricted until fracture healing.

Polytraumatized or unstable patient in whom surgery is contraindicated due to the condition of the extremity or the affected person; taking into account that most unstable fractures are best treated surgically(5,6,22).

Figure 4. Visualization of an ankle fracture intraoperatively.

Source: The Authors.

SURGICAL TREATMENT

Open reduction with internal fixation is indicated primarily for patients with an uneven ankle mortise who are suitable for surgery and have optimal soft tissue status. Unstable fractures that may result in displacement of the talus or widening of the ankle mortise.

Open reduction with internal fixation should be used when the general condition of the patient, soft tissues and edema around the ankle joint allow. Swelling, blistering and local soft tissue problems often resolve spontaneously within 5 to 10 days with the aid of local ice, compression bandages and elevation. Occasionally, a closed fracture with fundamental soft tissue injury or massive swelling requires reduction and stabilization with an external fixator to ensure definitive fixation of the previous soft tissue procedure. Fractures of the lateral malleolus distal to the syndesmosis can be fixed with a compression screw or K-wires. For fractures at or above the syndesmosis, it is important to restore the length and rotation of the fibula, where a compression plate and screws can be used. The procedure for medial malleolus fractures is controversial. As a general rule, when the deltoid ligament is torn, the talus follows the fibula. Guidelines for surgical fixation of the medial malleolus include concomitant injuries, persistent enlargement of the radiolucent space of the intima after reduction of the fibula, failure to achieve adequate reduction of the fibula, or sustained internal motion of the fracture. fibula. Fractures of the internal malleolus can usually be stabilized with cancellous screws or shrouds. Criteria for fixation of subsequent ankle fractures are more than 25% joint area involvement, more than 2 mm of motion, or sustained subluxation of the posterior talus. Posterior ankle fixation may be preferable to fusion fixation because the posteroinferior tibioperoneal ligament remains attached to the part. Fixation can be achieved through indirect reduction followed by placement of an anteroposterior compression screw or a plate and/or screws placed posteriorly through a separate incision. Fractures of the fibula in the articular area of the tibia may require fixation of the syndesmosis. After fixation of the medial and lateral malleolus, the syndesmosis should be tightened intraoperatively by pulling the fibula laterally with a bone hook or by forcing the ankle into external rotation. This being the case, instability of the syndesmosis can be detected clinically or through intraoperative fluoroscopy. Reduction of

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the distal tibioperoneal joint is obtained using a giant reduction forceps. A 1.5 cm to 2.0 cm transyndesmal screw is then placed 1.5 cm to 2.0 cm above the articular surface of the tibia from the fibula to the tibia. Posterior fixation of the ankle piece may obviate the need for syndesmosis fixation(5,6,22).

Very proximal fibula fractures with syndesmotic rupture can usually be managed with syndesmotic fixation without direct reduction and stabilization of the fibula. However, before fixation of the syndesmosis, it is necessary to ensure that the length and rotation of the fibula is restored. After the fracture is fixed, the limb is immobilized with a thick plaster splint and then progressively weight bearing is performed. Open fractures require emergency cleaning and debridement in the operating room. The external fixator may be used temporarily until the soft tissue improves. An extensible external fixator is mostly indicated as a temporary fixation procedure for unstable ankle fractures in cases of severe soft tissue swelling or open fractures. Stable immobilization is a basic preventive measure against infection and aids soft tissue healing. Plates and screws can be left exposed, but every effort should be made to cover the synthetic material. Primarily, there is no need to use an ischemic cuff in such cases. This leads to increased postoperative swelling and possible reperfusion injury. In the postoperative period, antibiotic prophylaxis should be continued.a series of debridements may be required to remove necrotic, infected or involved tissue(4-6).

Internal fixation of this fracture is indicated when syndesmal instability, articular step greater than 1-2 mm, impaction of the tibial articular area and of the intercalary piece are observed(9).

A bimalleolar fracture is common, its most recurrent late complication is tibial osteoarthritis secondary to depletion defect or osteochondral impingement. The quality of the outcome of an orthopedic procedure depends on the centering of the talus and the outcome of the surgical procedure depends on the accuracy of the reduction of the fracture lesion(25).

Differential Diagnosis

Among some of the differential diagnoses we find:

A. Achilles tendon rupture.
B. Lateral collateral complex sprain.
C. Deltoid ligament sprain.

Prognosis

Those patients with stable fractures that do not require surgical repair, the prognosis is very good and can progressively bear weight and recover within 6 to 8 weeks. In those with unstable fractures undergoing surgical treatment, although full weight bearing may occur as early as 6 to 8 weeks, it may sometimes take longer for optimal functional results to be obtained(4,26).

Complications

Pseudoarthrosis: infrequent, but more in medial malleolus. Related to soft tissue interposition, conservative treatment, residual displacement, lateral instability causing shear forces through the deltoid ligament. When symptomatic, open reduction and internal fixation or electrical stimulation may be used. If internal fixation is not possible, excision of the fragment may be necessary.

Malposition consolidation: usually with shortening and malrotation of the lateral malleolus; the increase of the medial radiolucent space and the presence of a large posterior malleolar fragment predict not very encouraging results. It occurs in the medial malleolus when there is residual instability or when it consolidates in an elongated position.

Wound healing problems: necrosis of the skin edges can be observed in up to 3% of those affected, however this risk decreases when the inflammation decreases, when the ischemia cuff is not used and when the surgical procedure respects the soft tissues. The surgical procedure in the presence of cutaneous flictenas or abrasions increases the rate of complications to double.

Infection: less than 2% of closed fractures usually require serial debridement and possible arthrodesis as a salvage technique. Implants can be removed after fracture healing.

In addition to other complications such as, reflex sympathetic dystrophy, loss of ankle mobility, skin ulceration due to cast pressure, compartment syndrome of the leg or foot, ankle stiffness, prominent screws, chronic ankle instability, painful scarring, wound dehiscence, deep vein thrombosis, pulmonary embolism, tibioperoneal synostosis, loss of reduction, post-traumatic osteoarthritis (4-6).

There is little evidence in favor of early initiation of weight bearing and the use of a removable type of immobilization as to free physical exercise in the immobilization period after surgical fixation. There is also insufficient evidence for rehabilitation at the time of immobilization after conservative orthopedic treatment, as well as for stretching and manual therapy after the immobilization period. Individual clinical trials have shown that some electrotherapy modalities may be beneficial(24).

CONCLUSIONS

The ankle joint is complex, in ginglymus, formed by the fibula, the tibia and the talus and also deeply related to the ligamentous complexes. The bony anatomy that provides stability is formed by the distal part of the tibia and fibula, its articulation with the talus and with each other. Bimalleolar fractures of the ankle occur in a quarter of patients and trimalleolar fractures in the remaining 5% to 10%. The incidence of ankle fractures is close to 187 per 100,000 inhabitants per year. Open fractures are infrequent, representing only 2 % of all fractures of the ankle joint. Similarly, pediatric ankle fractures occur in a 2:1 male to female ratio, accounting for 5% of all fractures in children and approximately 9% to 18% of all fissure injuries. Generally ankle fractures are caused by different trauma mechanisms such as impact, twisting and crushing injuries. Ankle injury depends on several factors such as mechanism, chronicity, bone quality, patient's age, magnitude, direction, impact velocity and foot position. A complete and comprehensive medical history is essential in the medical evaluation. X-rays are the first-line adjunctive tests that aid in the evaluation of an injury that impacts the ankle. The classification system is important for the treatment decision. The treatment of fractures of the ankle bones can be performed conservatively or surgically, depending on certain criteria, and immobilization should be performed afterwards to reduce the risk of complications. It is essential to follow the ATLS scheme in order to define and manage any alteration that may be life-threatening for the patient. Ankle fracture-dislocation requires urgent manipulation to recover the ankle mortise.

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