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RESEARCH ARTICLE OPEN ACCESS

SURGICAL VERSUS CONSERVATIVE MANAGEMENT OF ANKLE FRACTURES IN DIABETICS

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ABSTRACT

Background: To assess the likelihood of complications when dealing with ankle fractures in individuals diagnosed with diabetes. Here, we present the outcomes of treating 20 patients who had sustained displaced malleolar fractures. ***Patients and Methods:*** between June 2022 and September 2022,20 patients having ankle fracture had been managed. ***Results:*** We classified treatment-related issues as minor or significant. A minor complication was defined as a superficial infection or necrosis at the wound's edge, whereas a significant complication included a profound infection, necrosis at the wound's edge, dehiscence requiring surgical intervention, amputation, malunion, or death. Cases of postoperative erythema that did not require treatment were omitted from our analysis. ***Conclusion:*** Diabetic individuals who sustain ankle fractures often face a significantly increased likelihood of encountering surgical complications. Particularly among older diabetic patients with lower activity levels, especially those reliant on insulin, it may be more advisable to accept less-than-optimal alignment and imperfect healing rather than exposing them to the potential serious complications associated with surgical procedures. In diabetic patients with displaced ankle fractures managed non-surgically, imperfect alignment and healing were common outcomes, but they typically resulted in minimal discomfort. In such situations, choosing non-operative treatment might be the preferred approach due to the substantial risks associated with surgical interventions and the willingness of older patients with less active lifestyles to tolerate less-than-ideal alignment.

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INTRODUCTION

Approximately 6% of the world's population is afflicted with diabetes mellitus, and diabetics are prone to a variety of systemic complications resulting from microangiopathy and peripheral neuropathy[1]. Individuals with diabetes may sustain ankle fractures as a result of a singular traumatic event or, less frequently, as a result of repetitive stress on a neuropathic (Charcot) joint. The standard treatment for dislocated intra-articular ankle fractures is open reduction and internal fixation. Considering the presence of microangiopathy, peripheral neuropathy, and a heightened susceptibility to infection, it is reasonable to anticipate that surgical interventions may increase the likelihood of complications. However, there is a limited amount of data available regarding the results of surgical procedures in diabetic individuals who have displaced ankle fractures.

PATIENTS AND METHODS

In this study our hospital treated patients diagnosed with diabetes mellitus for malleolar fractures between June and September 2022. According to comprehensive classification 2, these fractures were classified as type-44 fractures. Notably, distal tibia (plafond) fractures and talus fractures were precluded from the study. Tables I through III contain detailed patient and fracture information, as well as treatment methodologies and outcomes. Radiographs of the ankle taken before, during, and after treatment were reviewed by an independent party. The decision to operate on diabetic patients with ankle fractures was not determined by randomization, but rather by the surgeon's assessment. Patients with poor health or minimal functional demands, for whom the surgical risk was deemed unjustifiable, typically opted for nonoperative treatment. Surgical interventions adhered to the AO (Arbeitsgemeinschaft für Osteosynthesefragen) technique's guiding principles.

RESULTS

We identified 20 patients with diabetes mellitus and fractures of the malleolus (see Table 1). Thirteen members of the diabetic group relied on insulin, while the remaining seven managed their condition with diet and/or oral hypoglycemic agents. Prior to pursuing treatment, their diabetes had been present for an average of 18 years. There were five unimalleolar, five bimalleolar, and ten trimalleolar fractures (see Table II). We defined minor treatment complications as superficial infections or wound edge necrosis, and major treatment

complications as deep infections, wound edge necrosis, dehiscence requiring surgical intervention, amputation, malunion, or death. Postoperative erythema not requiring treatment was excluded from our analysis. 9 out of 20 patients experienced complications, which is a statistically significant finding.

Table I. Details of the diabetic patients

	Diabetic group (n=20)
Mean age in years	60
Age range in years	40-70
Male	5
Female	15

Table II. Fracture patterns in the diabetic group

Fracture pattern	Diabetic group (n=20)
Unimalleolar	5
Bimalleolar	5
Trimalleolar	10

Table III. Incidence of complications in the diabetic group

	Diabetic Group	
	Operative treatment (n=15)	Non-operative treatment (n=5)
Complication		
Wound edge necrosis	1	0
Deep wound sepsis	2	0
Malunion	1	3
Amputation followed by death	2	0
Total (%)	6(31.6)	3(55)

5 of the 15 diabetics who underwent surgical treatment had significant wound issues. These complications included wound edge necrosis requiring local flap closure in one patient, profound wound infections resulting in septic arthritis in two patients, and severe infections resulting in amputation and mortality in two patients. While there was no statistically significant difference in the overall complication rate between insulin-dependent and non-insulin-dependent diabetic patients, it is notable that four of the five diabetics who developed wound complications after surgery were insulin-dependent, as were the two patients who died. We observed significant correlation between peripheral neuropathy or angiopathy and the risk of developing complications. Non-operatively treated diabetic patients with ankle fractures did not encounter cutaneous or soft tissue complications. However, three out of five patients experienced some loss of reduction and malunion, but these malunions resulted in minimal symptoms and all patients maintained functional lower extremities.

Fig. (1-A) 60 years old housewife. Preoperative x ray (lateral view)

Fig. (1-B) 60 years old housewife Preoperative x ray (AP view)

Fig. (1-C) X rays at 6 weeks (AP view)

Fig. (1-D) X rays at 6 weeks (lateral view)

Fig. (1-E) X rays at 3 months: union (AP view)

Fig. (1-F) X rays at 3 months: union (lateral view)

Fig. (1-G) X rays at 6 months: union (AP view)

Fig. (1-H) X rays at 6 months: union (lateral view)

Fig. (2-A) 62 years old housewife. Preoperative x ray

Fig. (2-B) X rays at 6 weeks (AP view)

Fig. (2-C) X rays at 6 weeks (lateral view)

Fig. (2-D) X-ray at 6 month showing loosening of screw

Fig. (2-E) Deep infection of the wound at 6 month

Fig. (2-F) Debridement of the wound

DISCUSSION

In the case of ankle fractures in diabetic patients, surgical intervention is frequently associated with a high incidence of severe wound complications, whereas non-surgical management is frequently associated with malunion. Consistent with previous research, these findings demonstrate that diabetes mellitus is a risk factor for complications following ankle fractures. 3-5 There was a 42% risk of complications among diabetics, including an 8.5% mortality rate and a 17% incidence of profound infections. The study's primary focus was on diabetes mellitus, but it also accounted for other significant risk factors, such as patient age, fracture type, and the attending surgeon. The incidence of surgical complications remained unacceptablely high despite the deliberate selection of patients with the "best risk" profiles for surgical procedures. Individuals with diabetes who sustain traumatic ankle fractures have a significantly increased risk of developing complications.

This contrast is accentuated when the increasing incidence of complex fractures, including an increased proportion of trimalleolar and bimalleolar fractures, is considered. The underlying causes of this increased incidence of complications are complex and involve a number of contributing factors. Diabetes increases an individual's susceptibility to wound infections. In addition, their wound recovery is impaired due to microangiopathies (problems with small blood vessels) and macroangiopathies (problems with large blood vessels). In addition, disturbances in nociception (sensation of pain) and proprioception (awareness of body position) can lead to delayed detection of pressure sores and ulcers caused by plaster casts, as well as incorrect weight-bearing prior to the healing process, which results in malunion. In our study, ankle fractures treated without surgical intervention were not associated with any cast-related complications. However, Zinar and Brown4 found that 50% of diabetic patients with ankle fractures who received cast treatment experienced epidermis disintegration. When peripheral neuropathy is present, open reduction and internal fixation were suggested.

Fig. (3). pre and post operative x-ray of medial malleolus fracture

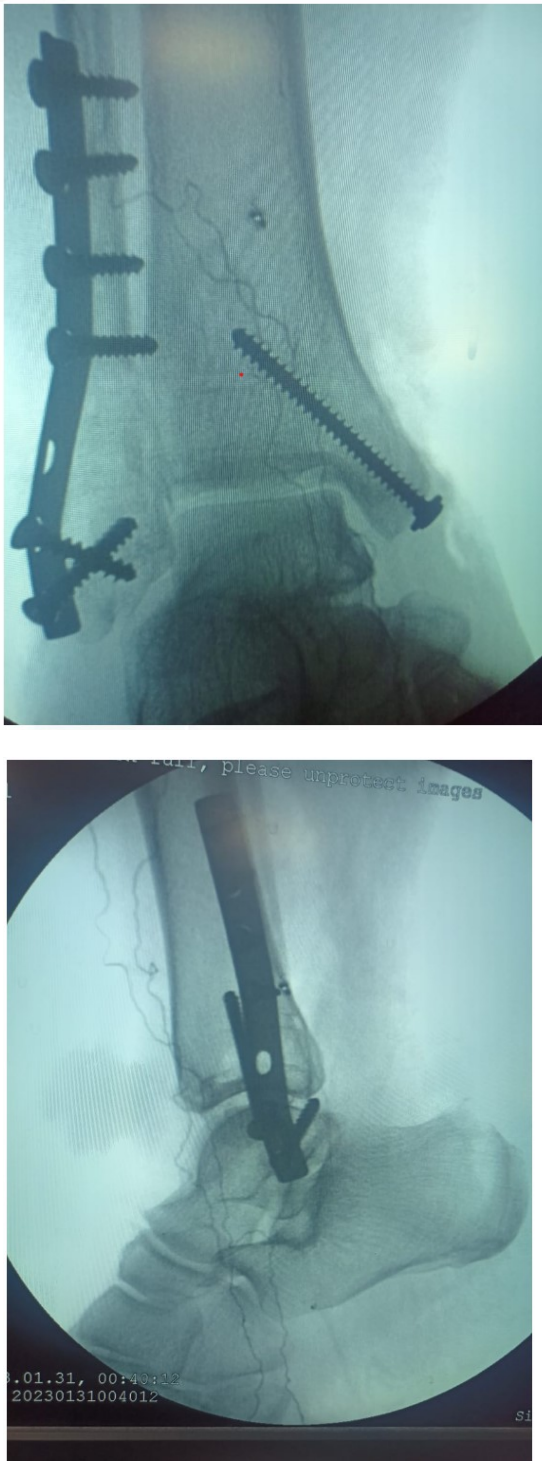

Fig (4). Pre and post operative x-ray of bimalleolar fracture ankle

It is essential to note that their surgical complication rate was 40%, which makes it difficult to support this recommendation. To reduce the risk of malunion and pressure ulcers from casts, it is recommended to conduct routine radiological evaluations and make cast adjustments with adequate cushioning and broad, uniform support. While the majority of diabetic patients in our study who received non-surgical treatment developed malunion, their symptoms remained relatively mild, and all of their lower limb function was preserved. It is crucial to note that our primary focus in this report was on the incidence of surgical complications; we did not conduct formal evaluations of functional outcomes.

CONCLUSION

In diabetic patients who suffer ankle fractures, there is a notably elevated occurrence of complications when surgery is involved. Particularly in older diabetic individuals with reduced activity levels, especially those dependent on insulin, it might be more advisable to consider accepting a loss of alignment and malunion instead of exposing them to the potentially severe complications associated with surgical procedures. When surgical intervention becomes a necessity, the findings from our study can provide a more precise prognosis and enable thorough discussions with the patient regarding the surgical risks involved.

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