CLINICO-EPIDEMIOLOGICAL STUDY OF LATERAL ANKLE SPRAINS IN PATIENTS ATTENDING A TERTIARY CARE CENTRE IN NEPAL

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ABSTRACT

Lateral ankle sprains are the most common injuries among the general population and athletes. The rate of recurrence of these injuries and their progression to chronic ankle instability is common. The study was performed to study the clino-epidemiological aspects of lateral ankle sprains in a tertiary care setting. This type of study has not been studied to date in our patient cohort and the results of the study can help to draw important guidelines in diagnosis and treatment of these injuries. All skeletally mature patients of both sexes with lateral ankle sprains were taken into the study. Relevant history, clinical examination, areas of tenderness, and anterior drawer test in plantar flexion and neutral were performed. A radiographic evaluation of the patient was performed to rule out bony injury. The total number of patients was 86. These injuries were seen in 46.5% of overweight or obese patients. The most common mechanism of injury is twisting injury in 52 patients (60.5%), followed by road traffic accidents and sports injuries, with 10 patients (11.6%) in each. Most of the ankle sprains were grade I injuries (72 patients, 83.7%), while 12 (14.0%) were grade II, and 2 (2.3%) were grade III injuries. This study has provided a comprehensive clinical and epidemiological overview of lateral ankle sprains in tertiary care setting in Nepal. It has highlighted the need for patient education regarding ankle sprains.

KEYWORDS

Lateral ankle sprain, mechanism of injury, sports injuries

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INTRODUCTION

Lateral ankle sprains (LAS) are common musculoskeletal injury which occurs in 45% of athletic injuries.[1] The anterior talofibular ligament (ATFL) and calcaneofibular ligament (CFL) are commonly involved.[2] Inversion and internal rotation are the most common mechanism in these injuries.[3] LAS are highest among other injuries in terms of recurrence[4] and previous history of sprain is an important risk factor for LAS.[5] History of the patient with ankle sprain should be taken in detail to know the mechanism of injury, sports involvement, surface of injury, position of the foot rolling, hearing of popping sound, fall on the ground, immediate weight bearing status, swelling, or clinical assessment of the different ligaments and ruling out the high ankle sprain or the syndesmotic injury of the ankle is a critical assessment.[6] Ottawa Ankle Rules is an important tool to rule out bony injuries and avoids needless x-rays.[7] American Medical Association (AMA) classification system for LAS is very important to diagnose, treat and plan rehabilitation of these injuries.[8,9]

This study was aimed to study the clinical and epidemiological aspects of lateral ankle sprains in a tertiary care setting. This study will serve as a landmark to draw important findings in Nepali population and will help to develop guidelines in diagnosis and treatment of these injuries in general.

MATERIALS AND METHODS

Ethical approval from the Institutional Review Committee of Nepal Medical College (Ref. No. 28-080/081) was obtained. All patients with lateral ankle sprain attending the emergency and outpatient's department of Orthopedics Department of Nepal Medical College Teaching Hospital from November 2023 to April 2024 were enrolled in the study after obtaining informed consent. Total 86 patients were into the study in this time period. It is a descriptive cross-sectional study. All skeletally mature patients of both sexes with lateral ankle sprains and patients with avulsion fracture of the anteromedial tip of lateral malleolus were taken into the study. People with pre-existing lower limb conditions like bone and joint infection, trauma, tumors, advanced osteoarthritis, inflammatory arthritis, metabolic diseases etc were excluded from the study. Patients with high ankle sprain or syndesmotic injury were excluded from the study. Patients with isolated deltoid ligament sprain, midfoot / forefoot pain and ankle fractures including medial malleolus and/or lateral malleolus or other bony injuries around the ankle were excluded from the study. Demographic and other required data were entered in the proforma. Relevant history was taken and clinical examination was performed and findings were noted. Areas of tenderness, anterior drawer test in plantar flexion and neutral, medial side pain and tenderness for deltoid ligament injury were performed and findings were recorded. The injuries were graded and noted in the proforma. High ankle sprain was ruled out clinically by Squeeze test in all patients. Radiographic evaluation of the patient was performed to rule out bony injury or bony avulsion fracture. The data were entered in SPSS-16. The data was processed, and results were obtained. Descriptive statistics was presented in the form of frequency, percentage, mean and standard deviation. Level of significance was set at p value <0.05.

RESULTS

The total number of patients was 86. The age of the patients ranged in place from 18 to 70, with a mean age of 33.72 and an SD of 13.16. Forty-six patients (53.5%) were male, and the remaining 40 patients (46.5%) were female. The prevalence of lateral ankle sprain in this study is 1.23%. The body mass index (BMI) of 44 patients is normal, only 2 are underweight, and the remaining 40 patients (46.5%) are overweight or obese. The most common mechanism of injury is twisting injury in 52 patients (60.5%), followed by road traffic accidents and sports injuries, with 10 patients (11.6%) in each. The side of involvement is almost 50% on each side, with right side involvement at 48.8% (42 cases) and left side involvement at 51.2% (44 cases). Out of 10 patients with sports-related injuries, 8 injured while playing football, and only 2 were able to continue playing after the injury. Ninety-three percent (80 patients) inward rolling of their foot during the injury, while only 6 patients (5%) are outwards rolling their foot. Twenty patients (23.3%) had heard a popping sound while the injury occurred. All of the patients were able to move their foot after injury, while only 20 (23.3%) patients fell down during injury. Immediate weightbearing was possible after the injury in 68 (79.1%) patients. About 40 % patients had injured their ankle on the road, and few on the stairs while 20 (23.3%) patients injured while walking on gravel and 16 (18.6%) patients had injury while walking on the footpath. More than half (55.8%) of the patients did not do anything before seeking medical attention but about 18.6% patients performed massage and applied over the counter analgesic gel over the injured area

and 18.6% patients had used ice packs before seeking medical attention. The immediate intervention performed by patients can be seen in Fig. 1. The majority of the patients (85.7%) presented either immediately or within a few days of injury to the hospital to seek medical advice. Seventy patients (81.4%) experienced ankle sprain for the first time, while 18.6% of patients had experienced recurrent injuries. Only two patients had recurrent ankle sprains more than 5 times. Although 16 patients experienced recurrent sprains, only 10 sought previous treatment, out of which only 2 underwent physiotherapy, and the remaining 8 were treated only with the RICE protocol. The mean VAS score is 4.58 with an SD of 1.61, meaning most of the patients experienced mild to moderate pain, and only a few experienced severe pains. Most of the patients presented with limping (62.8%) or normal weightbearing (30.2%), while only a few patients (7.0%) were unable to bear weight. Most of the patients (75.0%) had swelling around the lateral malleolus, while 14.0% had swelling around both malleoli, and 7.0% had gross swelling around the ankle and foot. Tenderness was present over the ATFL in 93.0% of patients, while 18.0% of patients had tenderness over the CFL, and only two patients had tenderness over the PTFL. Deltoid ligament tenderness was present in eight patients. The anterior drawer test in plantar flexion was positive in 14 patients (16.3%), while the anterior drawer test in neutral was positive in only two cases. There was no bony abnormality in the majority of patients (88.4%), while 11.6% (10 patients) had an avulsion fracture of the tip of the lateral malleolus due to the pull of the ATFL (Fig. 2). Most of the ankle sprains were grade I injuries (72 patients, 83.7%), while 12 (14.0%) were grade II, and 2 (2.3%) were grade III injuries.

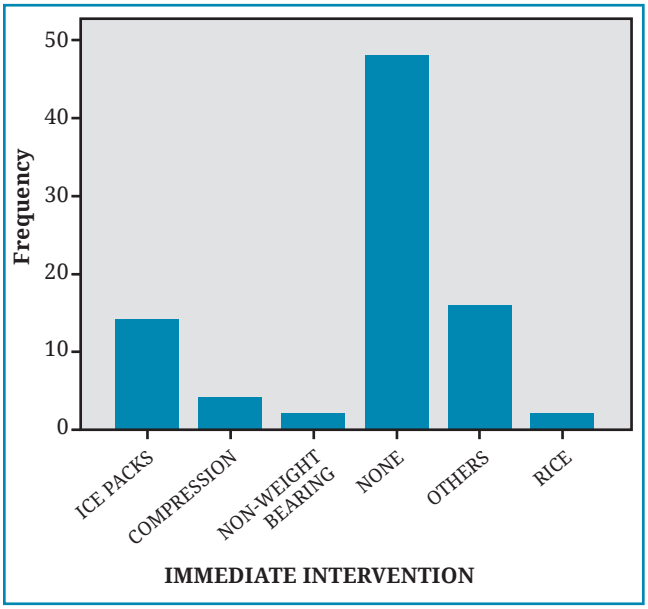

Fig. 1: Immediate intervention performed by patients actually shows the pattern of our patients' behavior towards an ankle injury.

Fig. 2: A patient with left ankle injury with an avulsion injury of the anterior talofibular ligament (ATFL).

DISCUSSION

This study of lateral ankle sprains (LAS) in patients at a tertiary care center in Nepal provides detailed clinical and epidemiological patterns of this common problem. The findings highlight key trends in demographics, injury mechanisms, and patient behavior, which align with global data, while also shedding light on the unique healthcare challenges in the region. The results reflect patterns seen globally, but also point to some unique challenges in patient behavior and healthcare access in the region.

Demographics and injury patterns: The study shows that lateral ankle sprains (LAS) occur almost equally between men and women, with 53.5% of the patients being male and 46.5% female. This nearly equal gender distribution is consistent with similar studies globally.[10,11] Some studies show a slight male predominance, particularly in sports-related injuries.[12,13] The average age of 33.72 years in this study indicates that young to middle-aged

adults, particularly those engaging in physical activities, are the most vulnerable to LAS, which has been authenticated by studies conducted in other places where active individuals are the most affected.[14,15]

Incidence of LAS: The incidence of lateral ankle sprain is 1,225 cases per 100,000 population, in other words 12.25 per 1000 person-years in our study. The incidence of lateral ankle sprain is 2-7 per 100 person-years according to previous studies published.[1] But these published data only included the patients presenting in the emergency department but we included the patient presenting in emergency and outpatient department both, as our late presenting patients directly were examined in the outpatient department. Other study which have studied the incidence from the general population data has found increased incidence rate compared to the incidence rate from the emergency data.[10] So this might also explain the increased incidence rate in our population.

BMI and LAS: In this study, 46.5% of the patients are overweight or obese. Among these patients, 30.2% were overweight and 16.3 patients were obese. This study has highlighted that high BMI is a risk factor for lateral ankle sprains. The patients with higher BMI have been attributed to higher rates of lateral ankle sprains in different studies.[16] Not only LAS but the development of chronic ankle instability also has been related to high BMI and also had significantly delayed recovery from ankle sprain at 6 months follow-up.[17]

Mechanism of injury and clinical presentation: The most common injury mechanism in our study is twisting injury (60.5%), followed by road traffic accidents (11.6%) and sports injuries (11.6%). These findings are consistent with the previously published literatures in different set of individuals.[12] Twisting is a primary cause of LAS can occur during sports, running or during household activities. Inversion of the foot or rolling of foot inwards during twisting of the ankle is seen in 93.0% of cases in our study, which typically causes anterior talofibular ligament (ATFL) injuries as reported in the literature as well.[12]

Most of the injuries were mild to moderate in severity, with 83.7% of patients diagnosed with grade I sprains. Among patients with LAS, high incidence of grade 1 sprains has been reported previously also in the literature.[12] This study also has highlighted the need of ankle radiographs in severe cases and in patients with persistent symptoms to identify the bony injury, especially the avulsion fracture of the ATFL which was identified in 11.6% cases.

Lateral ankle sprains in athletes has been reported commonly in football players[12] which has also been shown in our study, where 8 out of 10 patients with sports related injuries, occurred while playing football. Football is a sport where quick changing of directions and rapid foot movements is very common during play which is the cause for LAS. Although basketball and American football also are mentioned in the literature but those sports are not commonly played as much as football in our part of the world.[12]

Recurrence and patient behavior: Recurrence rates of ankle sprains have been shown in different literatures ranging from 12-47%.[18,19] Although our study also has highlighted the occurrence of recurrent LAS in patients, and the percentage is 18.6% which also matches with the results of the literature published.[20] Recurrence rates and chronicity are higher in athletes as shown by literatures.[20] Previous literature has shown that the recurrence in LAS is commonly due to lack of proper rehabilitation and early return to activity.[1] Only two patients with recurrent LAS had undergone physiotherapy and most of them only were following RICE therapy. In a developing country like ours where no set protocol for LAS exists, patient compliance is lacking and there is no government sponsored health system, patients usually present late and patients do not fully comprehend to the physician's advice. This practice is contrary to the developed countries where structured rehabilitation protocols are followed to prevent recurrent LAS and the development of chronic ankle instability (CAI). Significant reduction of recurrence rates are observed with structured rehabilitation protocols.[1]

Patient behavior regarding this injury in our study is different and definitely noticeable. Over half of the patients (55.8%) did not perform any prior management before seeking medical advice, while a significant number of the patients used home remedies like massage and over the counter analgesic gels. Patients try home remedies and massage at home before visiting a medical facility. The reason behind this probably is that most patient being able to bear weight with minimal discomfort at the ankle in majority of the cases. In this study, patients presenting to our center after days or weeks after injury is common (67.4%). Probably due to cultural differences, financial issues and lack of government sponsored health cost coverage, patients presenting to the medical facility is delayed in our part of the world. In contrast, in the developed countries people report to the medical facility early and

receive required early intervention so that their outcome can be expected to be better.

Patients in our study had a mean visual analogue scale (VAS) score of 4.58 which indicates that most of the patients experienced mild to moderate pain which is consistent with other published literature which evaluated pain in LAS.[1] As the grade of ankle sprain is grade I in 83.7% and grade II in 14.0% of cases, patients with these grades of injury are expected to have mild to moderate pain as has been highlighted in the literature.[21] Majority of the patients (93.0%) were able to bear weight despite their injury. This also highlights that the majority of injury were of low-grade ankle sprains. Most of the patients had swelling around the lateral malleolus (75.0%), which indicates injury of the lateral ligaments in these patients. So most of the patients with ankle sprains injured their lateral ligaments which is also comparable to the other studies.[22] As our study highlights that the injury of the lateral ligaments are common and they always pose a risk of recurrence leading to chronic ankle instability in these patients, which also supports the need of early assessment and intervention in these patients to prevent chronic ankle instability.

Limitations and future directions: This study has provided an insight into the epidemiology of LAS in a tertiary care hospital in Nepal. It has also ignited orthopedic surgeons taking care of ankle sprains, to develop a consensus on rehabilitation protocol for Nepal or at least the need of rehabilitation in patients with lateral ankle sprains has been highlighted. There are some limitations to consider. The sample size is relatively small and thus this limits the findings of this study to be generalized to a larger population. In addition, the study has not looked into the long-term effects and outcomes of the treatments that is why it is unable to comment on the progression of the acute injury to a chronic instability. In the future, a large cohort study with longer follow-up in Nepal might help to know the progression of these injuries and their outcome. Also, role of rehabilitation and physiotherapy can be highlighted by comparing the results of outcome in patients treated with or without rehabilitation.

In conclusion, this study has provided a comprehensive clinical and epidemiological overview of lateral ankle sprains in tertiary care setting in Nepal. The findings are consistent with the global data. It has highlighted the need of patient education regarding ankle sprains, role of BMI and the importance of physiotherapy and rehabilitation to prevent recurrent injuries and long-term complications in these patients.

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