Orthopaedics & Traumatology: Surgery & Research 102 (2016) 657–661

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Original article

Prospective observational study of midtarsal joint sprain: Epidemiological and ultrasonographic analysis

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ARTICLE INFO

Article history:
Received 2 March 2016
Accepted 2 May 2016

Keywords:
Sprain
Midtarsal joint
Foot
Trauma

ABSTRACT

Introduction: Foot and ankle injuries (FAI) are very common, with about 6000 cases per day in France. Unlike lateral ankle sprain (LAS), the diagnosis of midtarsal joint sprain (MJS, also known as Chopart's joint sprain) is not widely known. This prospective study aims to detail the epidemiology of MJS and compare it to LAS.
Patients and method: The study was conducted within our institution over a period of 16 months. Patients with clinical signs predictive of MJS without radiographic bone lesion underwent ultrasound assessment. MJS was diagnosed in case of at least 1 lesion of the dorsal midtarsal joint ligaments.
Results: A total of 2412 patients consulted for FAI; 188 had clinical and radiographic criteria for ultrasound examination. Eighty-two cases of MJS were diagnosed (3.4% of FAIs). Sports injuries were more frequent in MJS ($P = 0.04$), and mechanisms more varied than in LAS, with inversion injury in 75% of cases and plantar hyperflexion in 22%. Sprain was severe in 70% of cases, with complete ligament tear. Clinical and ultrasound analyses correlated in only 40% of cases of MJS, versus 98% for LAS.
Conclusion: MJS is frequent, difficult to diagnose clinically, and often severe. Clinical presentation and injury mechanisms differ from ankle sprain. Ultrasound seems to be an indispensable tool in diagnosis.

1. Introduction

Midtarsal joint sprain (MJS, also known as Chopart's joint sprain) has been little studied. Foot and ankle injuries (FAI) are the most frequent traumas seen in consultation in France: about 6000 per day [1]. Lateral ankle sprain (LAS) is the most frequent diagnosis, whereas MJS is less well-known and less frequently considered.

The midtarsal joint comprises the talonavicular joint medially and the calcaneocuboid laterally. It lies along an oblique superior-to-inferior medial-to-lateral axis at 45° to the horizontal, and forms a hinge allowing naviculocuboid displacement in supination (inferomedial) and pronation (superolateral) [2,3]. It is stabilized by dorsal ligaments (from medial to lateral: talonavicular [TNL], bifurcated [BL] and dorsal and plantar calcaneocuboid [CCL] [4]). Plantar ligament lesions are rare and secondary either to high-energy trauma causing joint fracture-dislocation [5] or to forced eversion [6].

The present study concerned sprain involving the 3 dorsal ligaments of the midtarsal joint, with trauma comparable to that found in LAS: i.e., mainly forced inversion of the foot [7,8].

We suspect that, in FAI management in A&E departments, MJS is often overlooked and mistaken for LAS [9]. As treatment is specific, precise identification seems essential to avoid functional sequelae due to misdiagnosis.

The present prospective study analyzed the frequency and epidemiology of MJS and detailed clinical characteristics and diagnosis on a precise ultrasound protocol.

2. Patients and methods

2.1. Inclusion criteria

A single-center prospective study enrolled patients in the Accident and Emergency department of our institution, between June 1st, 2012 and September 30th, 2013. Patients presenting with FAI at admission underwent standardized clinical examination, with a report-form detailing signs predictive of MJS: audible crack at trauma, total persistent functional impotence (inability to place the foot on the ground), ecchymosis or hematoma adjacent to the midtarsal joint, and/or pain on palpation of the dorsal side of the joint or joint mobilization. The form also recorded the principal location

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http://dx.doi.org/10.1016/j.otsr.2016.05.008
1877-0568/

of pain reported by the patient, according to 4 regions: adjacent to the medial collateral ligament of the ankle, lateral collateral ligament, talonavicular joint or calcaneocuboid joint. AP ankle view in 30° internal rotation, lateral ankle view and AP and three-quarter foot views were systematically taken in all cases of FAI.

In case of ≥ 1 sign (predictive of MJS without radiographic bone lesion, other than bone avulsion of the ligament insertion), ultrasound examination of all foot and ankle ligaments was performed by an experienced radiologist specialized in osteoarticular radiology, using a 10–12 mHz ultrasound probe; results were recorded for each ligament of the foot (dorsal talonavicular and Lisfranc ligaments) and ankle (lateral and medial planes and tibiofibular ligaments). Results were classified as normal or sprain, in 3 grades [10]: grade 1, benign, with simple ligament stretching; grade 2, moderate sprain with partial ligament tear or partial bone avulsion; and grade 3, severe sprain, with complete tear or complete bone avulsion.

The main inclusion criterion was an ultrasound lesion in at least 1 of the 3 dorsal midtarsal ligaments. MJS could be associated with other ligament lesions, constituting 3 groups: isolated MJS (MJSi), MJS with LAS (MJS + LAS), and isolated LAS (LASi). Other associations and normal ultrasound results were excluded from the study (Fig. 1).

2.2. Epidemiology

Clinical and ultrasound characteristics were first studied in the overall MJS population. Comparison of clinically painful regions and lesion location on ultrasound showed concordance between the two. Comparison was then made between clinical characteristics in the MJSi and LASi groups.

2.3. Statistics

Quantitative variables were compared between groups on Student *t* tests and qualitative variables on Chi^2 tests, using R Project® software. The significance threshold was set at $P < 0.05$.

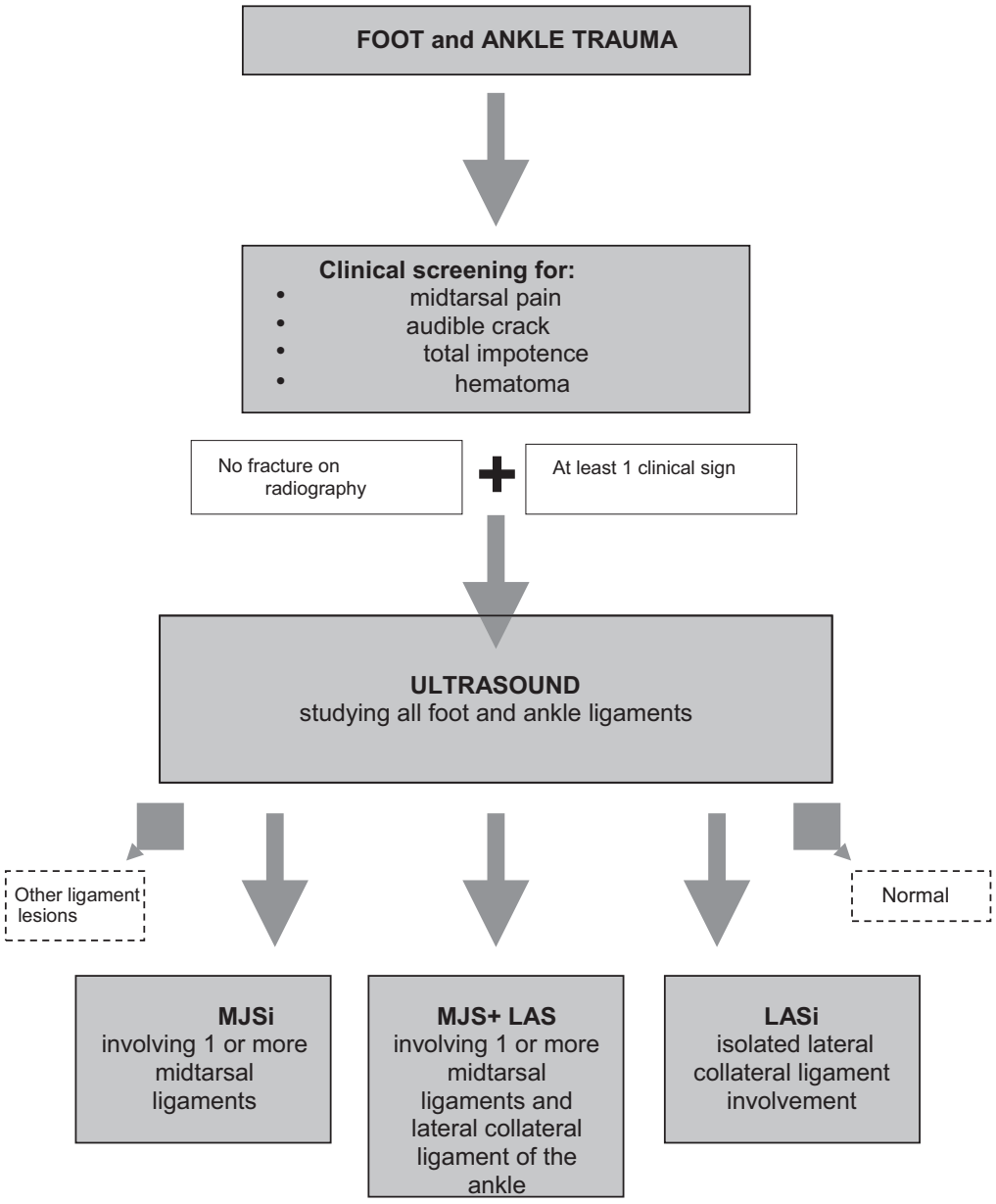

Fig. 1. Study flowchart.