Role Of Magnetic Resonance Imaging In Evaluation Of Ankle Lesions

THESIS

Submitted for partial fulfillment of
MD. Degree in Radiodiagnosis

By

Marwa Farouk Mohammad Badr

M.B., B. Ch., MSc. in Radiodiagnosis

Under Supervision of

Professor Dr. Mamdouh Ahmed Ghoneim
Professor of Radiodiagnosis
Faculty of Medicine
Ain Shams University

Professor Dr. Mounir Sobhy Guirguis
Professor of Radiodiagnosis
Faculty of Medicine
Ain Shams University

Assist. Professor Dr. Aya Yassin Ahmed
Assistant Professor of Radiodiagnosis
Faculty of Medicine
Ain Shams University

Faculty of Medicine
Ain Shams University
2016

ABSTRACT

MRI is the preferred modality for most types of musculoskeletal abnormalities. The strength of MRI in imaging physiologic processes is due to its combined strengths of high detail, multi-planar imaging capability, lack of ionizing radiation, and sensitivity to physiologic changes. The utility of MRI in the investigation of these patients with ankle trauma has rapidly expanded over the last decade, because the advent of MRI and its unsurpassed ability for soft tissue characterization. MRI has the unique capability to evaluate osseous, ligamentous, tendinous, and muscular injuries about the ankle, with a single imaging study.

Key word

MRI- Ankle- Ankle lesions- Ankle pathology

ACKNOWLEDGMENT

First and formost I feel always deeply indebted to ALLAH the most kind and most merciful.

I would like to express my great thanks and gratitude to **Dr. Mamdouh Ahmed Ghoneim**, professor of Radiodiagnosis, faculty of Medicine, Ain shams University, for his generous help, continuous encouragement and valuable comments that are necessary for achieving this work.

I would like to express my deepest thanks to **Dr. Mounir Sobhy Guirguis**, professor of Radiodiagnosis, faculty of Medicine, Ain shams University, for his great kind support and valuable remarks.

I would like also to express my deepest thanks to **Dr. Aya Yassin Ahmed**, assistant professor of Radiodiagnosis, faculty of Medicine, Ain shams University, to whom I am greatly pleased to have had the opportunity to learn from her creative advice and expanded experience.

I wish also to express my sincere appreciation to my husband, family and friends, for their cooperation and helpful assistance through this work.

Marwa Farouk Badr

List of tables

. . . . . .

List of charts

List of figures

List of figures (cont.)

. . . . . .

List of figures (cont.)

List of abbreviations

GSV	Greater saphenous vein
TA	Tibialis anterior
EHL	Extensor hallucis longus
ATV	Anterior tibial vessels
DPN	Deep peroneal nerves
EDL	Extensor digitorum longus
PT	Peroneus tertius
PL	Peroneus longus
PB	Peroneus brevis
LSV	Lesser saphenous vein
PTT	Posterior tibialis tendon
FDL	Flexor digitorum longus
PTv	Posterior tibial vessels
Tn	Tibial nerve
FHL	Flexor hallucis longus
PST	Posterior subtalar joint
ADM	Abductor digiti minimi
MM	Medial malleolus
LM	Lateral malleolus
SPR	Superior peroneal retinaculum
RMG	Retromalleolar groove
EDB	Extensor digitorum brevis
IER	Inferior extensor retinaculum
ATFL	Anterior talofibular ligament
CFL	Calcaneofibular ligament
MST	Middle subtalar joint
FR	Flexor retinaculum
SMSL	Superomedial portion of the spring ligament
TN	Talonavicular
IOTC	Interosseous talocalcaneal

List of abbreviations (cont.)

ST	Sinus tarsi
CN	Calcaneonavicular
QP	Quadratus plantae
PA	Plantar aponeurosis
SN	Saphenous nerve
FDB	Flexor digitorum brevis

Contents

Page

Introduction & Aim of work

﴾ INTRODUCTION ﴿

Nowadays, magnetic resonance imaging (MRI) is the preferred modality for most types of musculoskeletal abnormalities. The strength of MRI in imaging physiologic processes is due to its combined strengths of high detail, multi-planar imaging capability, lack of ionizing radiation, and sensitivity to physiologic changes. MRI also excels in the ability to distinguish various types of tissues on the basis of water and fat content. Because MRI provides a wide range of choices for imaging in the form of various pulse sequences and options, it allows for a very comprehensive evaluation of an injury in a fairly short period of time, ***(Trovinger et al., 2012)***

The utility of MRI in the investigation of these patients with ankle trauma has rapidly expanded over the last decade, because the advent of magnetic resonance imaging (MRI) and its unsurpassed ability for soft tissue characterization. MRI has the unique capability to evaluate osseous, ligamentous, tendinous, and muscular injuries about the ankle, with a single imaging study. MRI also allows for characterization of injury based on known biomechanical patterns, ***(Kavanagh and Zoga, 2006)***

Although CT is good at showing a displaced fragment and the size of the talar dome defect in osteochondral lesions of the talus, MRI is better at showing the integrity of the overlying articular hyaline cartilage and the underlying bone marrow. Edema-sensitive MRI is used to detect osteochondral lesions of the talus that are radiographically occult and also is used to stage known lesions to assess for healing potential or need for surgery, ***(Schreibman and Bruce, 2008)***

MRI is very useful in establishing the diagnosis of posterior ankle impingement syndrome, the pathology associated with it as well as potential other pathology is well demonstrated with MRI. Identification of the offending structures via MRI provides a valuable roadmap in cases where operative intervention becomes necessary, ***(Howell, 2010)***

In cases of rheumatoid arthritis, MRI is preferred to CT when cross sectional imaging is required. MRI after the administration of intravenous contrast well demonstrates abnormally vascularized synovium and thickened pannus as well as small cortical erosions before they become radiographically apparent.

MRI is extremely sensitive for marrow inflammation detection, but it is not specific for the inflammation caused by

infection. The bone marrow edema caused by infection looks just like the bone marrow edema caused by a stress response as well as the edema caused by a non-healing fracture or even a healing fracture. For this reason, it is easier to rule out osteomyelitis by MRI than it is to confirm its presence. The diagnosis of osteomyelitis can be presumed when MRI shows not only marrow edema but also abscess in the adjacent soft tissues or a sinus tract communicating from the infected bone to the skin.

Ankle soft tissue tumors are common, and MRI is useful in determining the tissue type as well as demonstrating the relationship of the mass to the adjacent anatomic structures.

Ankle osseous tumors are much less common than soft tissue tumors. Like all bone lesions, these tumors should be initially evaluated radiographically. MRI, however, is useful in localizing tumors and staging their extent.

MRI is the best method to evaluate all of the ankle tendons at once for tears or tenosynovitis. It is the best way to evaluate masses arising from either the soft tissues or bones of the extremities. MRI is extremely sensitive for the detection of bone marrow and soft tissue edema/inflammation, and as such is it useful for the detection of conditions that may be radiographically occult, including stress fractures, osteochondral