شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكروفيلم

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MONA MAGHRABY

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جامعة عين شمس

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قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات

يجب أن

تحفظ هذه الأقراص المدمجة بعيدا عن الغبار

MONA MAGHRABY

Musculoskeletal MRI Findings of Haematological Diseases

Thesis

Submitted for partial fullfillment of Master Degree in Radiodiagnosis

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CONTENTS

List of abbreviations	
AVN	**Avascular necrosis**
DCE	**Dynamic contrast enhanced**
DFX	**Desferoxamine**
FSE	**Fast spin echo**
MRI	**Magnetic resonance imaging**
MSK	**Musculoskeletal**
PD	**Proton density**
SCA	**Sickle cell anemia**
SE	**Spin echo**
SI	**Signal intensity**
STIR	**Short tau inversion recovery**
TIC	**Time intensity curve**
WIs	**Weighted images**

INTRODUCTION

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Hematopoiesis, the formation of blood cells, starts and exists only in the yolk sac of the fetus for the first 6 weeks. Between the sixth and twentieth weeks of age, the reticuloendothelial system, the liver and spleen, take over the process of blood cell formation. **(Murali et al., 2015)**

From the sixteenth week، hematopoiesis commences in the bone marrow at the same time with the development of bone cavities. From then on, bone marrow remains the primary site for hematopoiesis. **(Burdiles et al., 2009)**

Hematologic diseases comprise a set of prevalent yet clinically diverse diseases that can affect any organ system. Blood components originate within bone marrow; it therefore comes as no surprise that hematologic disorders frequently involve bone and associated tissues causing significant alterations in the bone marrow and may have relevant side effects on the skeleton. **(Martinoli et al., 2011)**

Magnetic resonance imaging (MRI) is the only imaging method that enables direct visualization of the bone marrow with high anatomical resolution and excellent soft tissue contrast. **(Silva et al., 2013)**

However, before discussing the MRI findings and technique for evaluating musculoskeletal involvement by hematological disease, it is helpful to first review the normal anatomic distribution, composition, maturation pattern and normal MRI appearance of bone marrow.

AIM OF THE STUDY:

To describe the musculoskeletal MRI findings in patients with hematological diseases.

BONE MARROW

NORMAL ANATOMY

BONE MARROW NORMAL ANATOMY

The adult human skeleton has multiple functions; mainly as a structural support for the rest of the body by providing muscles attachments and provide the environment for hematopoiesis within the marrow spaces. It also has a role in protecting internal organs and maintaining a reservoir of growth factors and cytokines. **(Taichman RS et al., 2005)**

We can subdivide the adult human bony skeleton into two parts, the axial skeleton and the appendicular one. The axial skeleton consists of the skull, vertebrae and the ribs as well as the sternum, while the appendicular skeleton consists of the bones of the extremities. **(Clark et al., 2008).**

The bone marrow is found within the central cavities of axial and long bones. It consists of hematopoietic tissue islands and adipose cells surrounded by vascular sinuses interspersed within a meshwork of trabecular bone arranged in a particular manner **(fig.1)**. **(Travlos et al., 2006)**

The main blood supply of healthy long bones was derived from the principal nutrient arteries **(fig. 2)**, which penetrate the cortex **(fig. 3)** and perfuse the medullary sinusoids, then exit via multiple small veins. **(Marenzana et al., 2013).**