Role of Gray Scale and Power Doppler Ultrasonography of Hand Joints in Evaluation of Disease Activity in Rheumatoid Arthritis

Thesis

Submitted for the Partial Fulfillment of the Master degree in **Radiology**

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2017

سورة التوبة الآية (١٠٥)

Acknowledgment

- First and foremost, I thank **ALLAH** who gave me the strength to accomplish this work.
- Special thanks to **Prof. Dr.Maha Khalid Hassanein Abd El-Ghaffar,** Professor of Radiodiagnosis, Faculty of Medicine -Ain Shams University, for giving me the honour to work under her supervision.
- Special thanks to **Dr.Mohamed Mamdouh Mohamed,** Lecturer of Radiodiagnosis, Faculty of Medicine-Ain Shams University, for his sincere guidance and effort during this study.
- To my great parents, my husband and pretty daughter **(Zahraa),** Thank you for your support and patience.

Dhay Kadhim Bdaiwi

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List of Abbreviations

ACPA	**:**	Anti–citrullinated protein antibodies.
ACR	**:**	American collage of rheumatology.
bDMARD	**:**	Biological disease modifying antirheumatic drugs.
C	**:**	Capitate.
CBC	**:**	Complete blood count.
CCP	**:**	Cyclic citrullinated peptide.
CRP	**:**	C-reactive protein.
DIP	**:**	Distal interphalangeal joint.
DMARD	**:**	Disease modifying antirheumatic drug.
ERA	**:**	Early rheumatoid arthritis.
ESR	**:**	Erythrocyte sedimentation rate.
FDCs	**:**	Frequently follicular dendriticcells.
H	**:**	Hamate.
L	**:**	Lunate.
MAX	**:**	Maximum.
MCP	**:**	Metacarpophalangeal joint.
M-CSF	**:**	Macrophage-colony stimulating factor.
MIN	**:**	Minimum.
MSKUS	**:**	Musculoskeletal ultrasound.
Neg	**:**	Negative.
NK cells	**:**	Natural killer cells.

NSAIDs	**:**	Non-steroidal anti-inflammatory drugs.
P	**:**	Pisiform.
PD	**:**	Power Doppler
PIP	**:**	Proximal interphalangeal joint.
Pos	**:**	Positive.
RA	**:**	Rheumatoid arthritis.
RANKL	**:**	Receptor activator for nuclear factor κB ligand.
RF	**:**	Rheumatoid factor.
S	**:**	Scaphoid.
Td	**:**	Trapezoid.
Tm	**:**	Trapezium.
Tr	**:**	Triquetrum.
US	**:**	Ultrasonography.

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Introduction

Rheumatoid Arthritis (RA) is a complex autoimmune and progressive inflammatory disease that involves the joints and leads to their destruction with functional disability. It mostly involves the finger joints in the hands and wrist joint. The prevalence of rheumatoid arthritis (RA) is 1% in the general population worldwide ***(Fattahi et al., 2012).***

There are multiple types of anti-rheumatic drugs called disease-modifying drugs (DMARDs), which have been classified as biological and non-biological according to their origin. The former have been used as a second-line therapy in difficult-to-control patients, with a significant increase in costs and higher incidence of adverse effects compared with non-biological drugs. The goal of therapy is to control synovitis and systemic inflammation, prevent joint damage, improve the quality of life and prevent cardiovascular morbidity associated with the disease ***(Machado et al., 2016).***

In the past decade, musculoskeletal ultrasonography (MSUS) has been extensively used by an ever-growing number of rheumatologists in both research studies as well

as in daily clinical practice. The need to monitor individual patients, along with the recognition that MSUS can depict subclinical synovitis and enthesitis, have been the main drivers behind the escalating utilization of MSUS. In addition, MSUS has the potential to reliably guide treatment interventions (e.g., needle aspiration, intra-articular injections) and was shown to have profound effects on disease classification and physician decision making Progress in practice was accompanied by an increasing need for organized education regarding the use of MSUS ***(Peter et al., 2016).***

Ultrasound has become an imaging method that is routinely used in daily practice by many rheumatologists for both assessing disease activity and monitoring therapy in RA patients. Previous studies have shown an almost parallel decrease in clinical and US parameters in patients with RA after treatment, highlighting the utility of US for monitoring disease activity ***(Rosa et al., 2016).***

Doppler US is used for diagnosing synovial inflammatory activity in arthritis, it is well-known that Doppler signals may be seen in healthy wrist and finger joints and in relation to entheses, and therefore it is necessary to distinguish such signals from pathological

signals when evaluating joints and entheses. An important part of the OMERACT tenosynovitis scoring system is the Doppler signal both in the tendon sheath and in the tendon, and it is therefore important to obtain knowledge of the normal flow in these areas ***(Mads et al., 2016).***

Aim of the Work

The aim of the work is to emphasize the role of gray scale and power Doppler ultrasonography as disease activity marker in Rheumatoid arthritis of hand joints.