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The Role of MRI in assessment of acromial morphology in association with rotator cuff tear

Thesis

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List of Abbreviations

Abb.	Full term
Ac	Acromion
AHD	Acromio-humeral distance
Cl	Clavicle
Co	Coracoid process
FSE	Fast spin-echo
GHL	Glenohumeral ligament
GRE	Gradient echo
IGHL	Inferior glenohumeral ligament
IS	Infraspinatus
LAA	Lateral acromial angle
MGHL	Middle glenohumeral ligament
MRI	Magnetic resonance imaging
OA	Os Acromiale
PASTA	Partial-thickness articular-surface tendon avulsion
RCT	Rotator cuff tear
SS	Supraspinatus
SSc	Subscapularis
SST	Supraspinatus tendon
T1W	T1-weighted
T2W	T2-weighted
T2WI	T2-weighted imaging
TM	Teres minor

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ABSTRACT

***Background*:** The pathogenesis of rotator cuff tear (RCT) remains controversial. The acromion portion of the scapula and its morphology may be attributable for a variety of shoulder disorders such as RCT.

***Aim of the work*:** The purpose of this article is to throw light on the role of MRI in the assessment of morphological characteristics of different acromial shapes in association with RCTs.

***Patients and Methods*:** This study was carried out at Ain Shams Teaching Hospital Radiodiagnosis Department. We used MRI prospectively to image the shoulders of patients who presented to the radiology department with suspected RCT. Their ages ranged between 24 and 73 years with a mean age 48 years. Data were tabulated and manipulated using SPSS (vi 16), and the level of significance was less than 0.05.

***Results*:** Significant correlation between partial thickness tear and type I acromion was found (p value 0.02). Type-III acromion was the most commonly encountered acromial shape in patients with full thickness tear, yet no significant correlation was found ($P > 0.05$). The acromial thickness, AHD, AI and LAA were significantly different in patients with RCT compared to control group ($P < 0.001$).

***Conclusion*:** Thicker acromion, shorter AHD, smaller LAA and larger AI are associated with rotator cuff tear. The types of acromion showed no significant correlation with full thickness tear.

***Keywords*:** Magnetic resonance imaging, acromial morphology, rotator cuff tear.

INTRODUCTION

The acromion is a posterior shoulder landmark, formed as a posterolateral extension of the scapular spine, superior to the glenoid. It articulates with the clavicle and is the origin of the deltoid and trapezius muscles. Variation in the shape of the acromion can endorse variety of pathologies such as impingement syndrome and rotator cuff tear (RCT) ***(Mansur et al., 2013).***

Rotator cuff disorder is one of the most common disorders of the shoulder. It is a common cause of chronic shoulder pain in adults. The specific etiology of a RCT has not been fully elucidated, but it has been considered to result from a combination of intrinsic and extrinsic factors. Intrinsic factors include degenerative changes, hypovascularity, and microstructural collagen fiber abnormalities. Recognized extrinsic factors include subacromial impingement, tensile overload and repetitive use ***(Hassan et al., 2018).***

The pathogenesis of RCT seems to be related to the morphology of the acromion which is usually assessed through the five commonly used parameters on standard plain radiographs including the acromial type, acromial slope, acromial tilt, lateral acromial angle and acromial index ***(Balke et al., 2013).***

X-rays are useful to assess lateral extension of the acromion on the anteroposterior view whereas lateral view allows to analyze the anterior coverage. Ultrasound is the only dynamic technique but MRI is the best tool to depict rotator cuff disease ***(Pesquer et al., 2018).***

MRI of the shoulder provides detailed images of structures within the shoulder joint, including bones, tendons, muscles, and vessels. MRI is a noninvasive medical test that helps diagnose and treat medical conditions. MRI uses a powerful magnetic field, radio-frequency pulses, and a computer to produce detailed pictures of organs, soft tissues, bone, and virtually all other internal body structures ***(Hassan et al., 2018).***

The acromial shape can be classified into four types: type I (flat), type II (curved), type III (hooked) and type IV(convex) ***(Balk et al., 2013).***