Rotator Cuff Tear
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Volume Editor

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Preface

Basic Science and Rotator Cuff Repair: Where Have We Arrived?

The history of rotator cuff tendinopathy probably started in 1834 when Dr. Smith attributed shoulder pain to ‘rupture of the rotator cuff tendon’. One century later, in 1934, Dr. Codman showed that most lesions occur on the articular side of the cuff tendons, in agreement with the hypothesis that Dr. Charles S. Neer would develop in 1972, when he wrote that ‘the coraco-acromial ligament and the anterior third of the acromion are responsible for a characteristic syndrome of disability of the shoulder’. However, the pathogenetic mechanisms leading to rotator cuff tendinopathy are still debated. Intrinsic causes, such as changes in vascularity and cellular metabolisms related to ageing, and extrinsic causes, such as subacromial impingement or microtrauma in repetitive overhead movements, are currently considered as the main aetiological factors [1–3]. The rotator cuff tendons play an important role in stabilizing the humeral head. When a massive cuff tear is present, superior migration of the glenohumeral rotation centre occurs during abduction, and a decreased ability of glenohumeral elevation may occur, given the importance of the supraspinatus tendon in beginning the glenohumeral abduction [4, 5]. The long head of the biceps brachii (LHB) stabilizes the glenohumeral joint limiting abnormal translations. LHB may be affected by a wide range of pathologies, from instability (with tendon subluxation) to tendosynovitis to tendon rupture [6]. Rotator cuff tears (RCTs) and tendinopathy of the LHB are the leading causes of shoulder pain with a prevalence for RCTs of 20% in the general population. This prevalence increases with age [7], and RCTs negatively affect patients’ quality of life [8].

RCTs have been divided into full- and partial-thickness tears, and several classifications are available for both of these conditions. The importance of classifications resides in the fact that for each specific degree of rotator cuff pathology, a specific treatment should be indicated. However, this is still not well established. Although conservative measures are the first-line therapy, there is evidence for poor spontaneous tendon healing based on histological data [1]. As a consequence, partial-thickness RCTs may progress to full-thickness tears, and pain and dysfunction may
Persist; in a similar fashion, conservatively managed full-thickness tears can be the cause of discomfort in high-demanding subjects, such as athletes or people who need a wide shoulder range of motion for working activities. Surgical management has developed over time, especially thanks to arthroscopic assisted surgery. Full-thickness tears are generally repaired placing one or two rows of anchors to re-attach the ruptured tendon to its footprint. A great debate is still ongoing about the advantages of using a single- or double-row anchor construct. Biological, biomechanical, and clinical studies have been conducted to establish the superiority of one technique over the other, but no clinical differences have been found, and currently there seems to be little clinical evidence in favour of using a double-row technique, which requires more time and is more expensive and technically demanding [9]. Augmentation with acellular soft tissues could be a possible method to increase tendon function for massive RCTs, but there are contrasting data on its effectiveness in improving functional outcome and, although uncommon, there is the risk for infectious or non-infectious inflammatory response [10]. Platelet-rich plasma is a recent technique developed to speed up tendon healing and to reduce pain. However, its mechanism of action is still unclear, and its long-term effectiveness needs to be assessed [11].

Partial-thickness tears may be surgically addressed with different techniques. Debridement with or without acromioplasty may be a valid option reaching favourable results in tears involving less than 50% of the tendon thickness, while a formal tendon repair is generally advocated for tears involving more than 50% of the cuff thickness. Many options are available to repair the ruptured tendon (conversion to full-thickness and subacromial repair, transtendon repair, or transosseous repair) and all techniques lead to a relatively high rate of good to excellent results [12]. The tendon of LHB must be accurately assessed, being responsible for many of the symptoms. Tenotomy is related to a greater incidence of cosmetic deformity, but it is does produce satisfactory results. However, there is no univocal consensus regarding which technique should be preferred [13, 14].

Although we purport to know more about the pathogenesis, diagnosis and management of rotator cuff pathology, we are far from the target. Our efforts should be directed at trying to find the treatment that best fits the specific need of each patient. For this reason, the need for randomized trials is mandatory, and the continuing research for the golden treatment should be a must.

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References