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Operative Techniques in

Sports Medicine

Sternoclavicular Joint Arthritis: Arthroscopic and Open Resection

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Symptomatic sternoclavicular joint arthritis is relatively uncommon. Most patients can be treated successfully by nonoperative measures. However, in a few patients, despite adequate nonoperative treatment, symptoms persist. Open excision arthroplasty and, more recently, an arthroscopic technique have been described for the management of resistant cases. In this article, the anatomy and pathophysiology of sternoclavicular (SC) joint arthritis have been described. The operative techniques and results of open excision arthroplasty are reviewed. The clinical results of most series are good, although the case numbers are low. This may be partly owing to a relative reluctance to undergo surgery because of concerns of potential damage to posterior mediastinal vascular structures. The results for arthroscopic SC excision arthroplasty and the operative technique are described. The clinical results for the arthroscopic technique are comparable to those of the open series but with less perioperative morbidity. Excision arthroplasty for patients with SC arthritis resistant to nonoperative measures is only considered rarely. However, the results for open and arthroscopic excision arthroplasty, although from relatively small series, appear to be consistently good.

KEYWORDS sternoclavicular joint, sternoclavicular arthroscopy

Introduction

The shoulder consists of 4 joints: the sternoclavicular (SC), acromioclavicular, glenohumeral, and scapulothoracic joints, which function together in a coordinated manner to allow movement of the upper limb. Pathology of the SC joint (SCJ) is relatively common but arguably has received the least attention. In a postmortem study, SCJ osteoarthritis was present in more than 60% of individuals older than 60 years.[1] Although SCJ osteoarthritis is most often asymptomatic, it is still the most common cause of SCJ pain and swelling.[2,3] However, the SCJ is subject to the same pathologies that occur in all other diarthrodial joints about the shoulder, including degenerative and inflammatory arthritis, infection, and traumatic conditions. The following review summarizes SCJ anatomy and pathophysiology, with a special emphasis on arthritis. Pertinent clinical features and management options have been discussed along with new developments in the treatment of SCJ osteoarthritis.

Anatomy

The SCJ lies subcutaneously and is both readily visible and palpable. It forms the only true articulation between the axial skeleton and the upper limb.[4] The medial end of the clavicle articulates with the superior-medial manubrium in a shallow, relatively incongruent saddle joint. A dense fibrocartilaginous disk separates the joint into 2 synovial cavities.[5] The exact role played by this intra-articular disk in the degenerative joint is not clear.[6] The intra-articular disk ligament originates from the junction of the first rib and sternum, passes through the SCJ, and attaches on the posterior and superior aspect of the medial clavicle.

Both the intra-articular disk and the disk ligament confer passive stability to this inherently unstable joint. Additional stability is provided by the anterior and posterior SC ligaments, the interclavicular ligament superiorly, and an extracapsular

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costoclavicular (rhomboid) ligament running from the first rib to the inferomedial border of the clavicle (Fig. 1A). Dynamic stability is provided by the action of the subclavius muscle.[7] The joint moves as a result of the forces placed upon it by the movement of the scapula on the chest wall.

A number of important anatomical structures lie behind the SCJ which are at risk during procedures in the region (Fig. 1B). The brachiocephalic vein, formed by the confluence of the subclavian and the internal jugular veins, lies posterior to the SCJ bilaterally. However, the arterial supply varies between both the sides. The subclavian artery runs behind the left SCJ whereas the brachiocephalic trunk passes posterior to the right SCJ.[8]

Pathophysiology

Primary Osteoarthritis

Postmenopausal women are thought to be more susceptible to SCJ arthritis than either men or premenopausal women are, but the exact mechanism for this is unclear. Other risk factors include performing manual labor and chronic SC instability.[4,5] Radiographic moderate to severe degenerative joint changes have been found at postmortem in more than 50% of individuals older than 60 years.[9] Other postmortem studies have shown degenerative changes in the SCJ in all patients after the fifth decade.[1,10]

Secondary Causes

Trauma and Instability

Dislocations of the SCJ constitute 1% of all joint dislocations and 3% involving the upper limb.[11] A significant force, applied at a particular vector, is required to disrupt the strong ligaments that confer stability to the joint. Typically, these injuries occur in young active men because of high-energy mechanisms such as road traffic accidents, sporting injuries, and falls from a height.[4,12] SCJ dislocations can be caused by either direct or indirect trauma, with the dislocation classified as either anterior or posterior. Indirect anterolateral and posterolateral directed forces are most common and result in anterior and posterior dislocations, respectively, while a direct force to the medial end of the clavicle may also result in a posterior dislocation.[13] Overall, anterior dislocations occur more commonly than posterior dislocations.[12,14] Atraumatic conditions such as abnormal muscle patterning, capsular laxity, infection, inflammatory arthritis, and clavicular deformity may also result in instability.[15] The long-term sequelae after an acute dislocation treated nonoperatively include painful degenerative SCJ changes.[11]

Inflammatory Arthritis

Despite its synovial membrane lining, the SCJ is often overlooked during routine clinical examination in patients with inflammatory arthritis.[16] Pannus formation with subsequent SCJ degenerative disease has been shown to occur in up to one-third of patients with rheumatoid arthritis.[16,17] Ankylosing spondylitis, Reiter syndrome, and enteropathic and psoriatic arthritis can also involve the SCJ.[4] SCJ involvement occurs in 90% of patients with severe psoriatic arthropathy, but this appears to be clinically significant in only half of them.[18] Gout and pseudogout are both also known to affect the SCJ.[4]

Infection

Septic arthritis should be considered in all cases of unilateral, painful swellings of the SCJ. The presentation may be acute or chronic and is typically associated with spontaneous swelling, which may be mistaken for joint subluxation.[19] As with all septic arthritides, the long-term sequelae include subsequent degenerative disease and joint destruction.[19] Common pathogens include staphylococci and streptococci. Pseudomonas

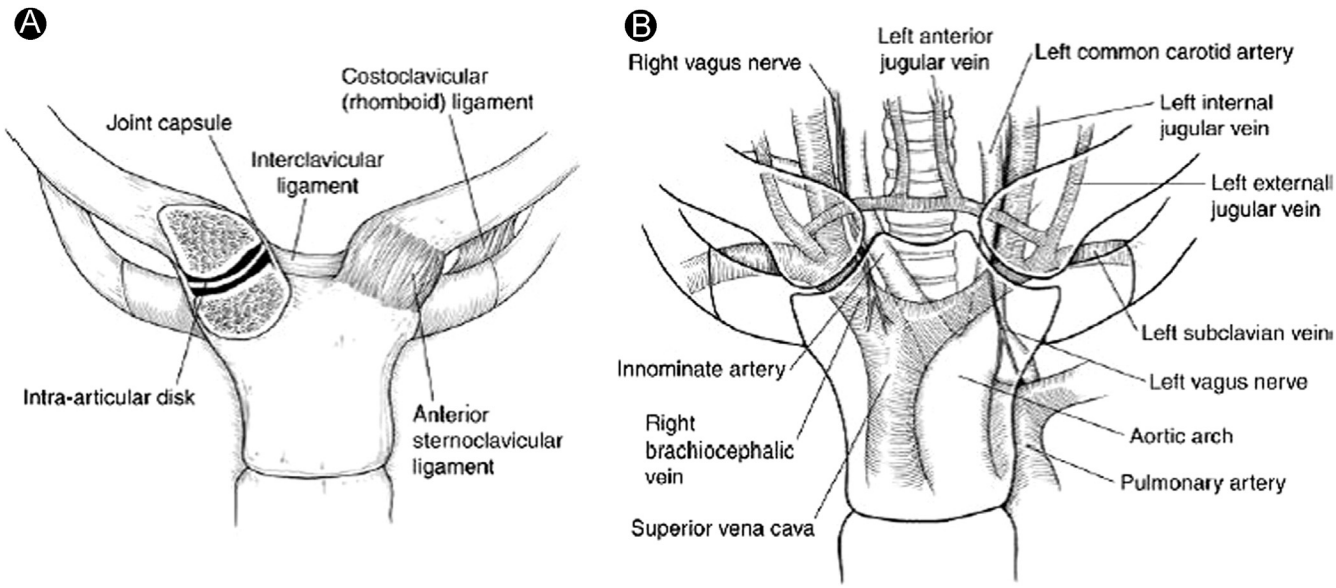

Figure 1 Sternoclavicular joint. (A) Bony and ligamentous anatomy and (B) retrosternal anatomy. (Reprinted with permission from Higginbotham and Kuhn.[5])