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Effect Of Therapeutic Ultrasound In The Management Of Shoulder Calcific Tendinopathy-Case Study

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Abstract:
Introduction: Ultrasound therapy is used to treat calcific tendinitis of the shoulder; its efficacy has not been rigorously evaluated. In this case report patient with symptomatic calcific tendinitis is verified by radiography. Patient received continuous ultrasound (frequency, 1 MHz; intensity, 1.5 W per square centimeter; 7-minute period for 10 sessions of ultrasound (five times in a week for two week) to the area over the calcification.

Case Report: A 60-year-old man was presented with complaints of acute left-shoulder pain. patient underwent a course of therapeutic ultrasound. The outcome measures were the Visual analog scale (VAS) and patient perceived improvement (PPI). Following treatment, the patient reported improvements in both pain and function as measured by the VAS and PPI.

Conclusion: In this case report, therapeutic ultrasound for the treatment of shoulder calfication resulted in improvement in all recorded measures of pain and function. The promising outcome of this single case report highlights the need to further evaluate through more structured controlled trials the efficacy of therapeutic ultrasound in the treatment of shoulder calcification.

Key Words: Continuous Ultrasound, Calcific Tendinopathy, Shoulder

Introduction: Calcific tendinitis may present as an acute or chronic condition, often associated with the rotator-cuff tendons of the shoulder[1]. Of the rotator-cuff tendons, the supraspinatus is most commonly affected, followed by the infraspinatus, teres minor, and subscapularis[2]. Calcific tendinitis typically affects people between the ages of 30 and 60 and has been reported at higher rates in women than in men[3]. In 1941, Bosworth noted an incidence rate of 2.7% when fluoroscopically examining 6,061 patients over a 2-year period. Speed reported rates as high as 7.5% to 20% in asymptomatic shoulders and 6.8% in symptomatic patients[4].

Refior noted calcium deposits in 21% of 195 shoulder autopsies[5].

There is conflicting evidence regarding the occurrence of rotator-cuff tears in the presence of calcific tendinitis[5-7]. That rotator cuff tears may owe some of their existence to calcium deposits and the defects in the tendon that are left behind on removal or resorption of the deposits[8].

Calcific tendinopathy involves a reactive calcification process relying on cellular mediation, allowing for both the infiltration and removal of calcium from the affected area[9]. Presence of inflammatory and cellular proliferation agents, metabolic factors, and mutations in gene expression for calcium-deposit formation in tendinous tissues[10].Calcifications are incidental radiographic findings in asymptomatic patients. In most cases, they are located 1 to 2 cm from the

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insertion of the supraspinatus tendon on the greater tuberosity. Approximately 50% of patients with calcific tendinitis have shoulder pain, with acute or chronic painful restrictions of the range of motion of the shoulders and thus limitation of the activities of daily living[11,12].

Ultrasound therapy with an intensity ranging from 0.5 to 2.0 W per square centimeter of body-surface area is widely used for the treatment of painful musculoskeletal disorders[13]. Calcifications of the shoulder resolved after ultrasound therapy[14]. Calcific tendonitis occurs in 2.5%–7.5% of healthy shoulders in adults[15].39-62% of those being seen in medical centers for shoulder pain. Right shoulder is more frequently affected but there is no evidence to support predisposing factors[16].

Evaluation: Calcific tendinitis is a soft tissue injury that can only be conclusively diagnosed via imaging, it is important to rule out other shoulder pathologies. It is recommended that the initial images include the anteroposterior view in neutral, internal, and external rotation[17]. Imaging will provide definitive proof of calcific build-up through what appear to be "bone spurs". An ultrasound image of the area is also advised, as this will rule out or rule in any differential diagnosis of soft tissue injuries such as a rotator cuff tear[18] . 20-46.4 % of all cases are bilateral in nature[19]. Only 35% of cases are symptomatic, so bilateral imaging and examination can detect calcified deposits in an asymptomatic shoulder, if one side is already experiencing calcific tendinitis.

The chief patient complaints to expect in calcific tendinitis are:

1- Night pain, causing loss of sleep[17]
2- Constant dull ache.
3- Pain increases considerably with AROM[16].
4- Decrease in ROM, or complaint of stiffness[16,19]
5- Radiating pain up into the suboccipital region, or down into the fingers[16,17].

• Observation-check bilaterally for swelling, atrophy or scapular movement that will indicate compensation for decreased humeral movement.
• Palpation-attention to any swelling, temperature difference, point tenderness. Most specifically, the supraspinatus tendon, as it is the most commonly affected[17]. The infraspinatus, teres minor, subscapularis, and biceps tendons are also involved and follow in incidence in the afore-mentioned order[16].

• AROM and PROM-pain and decreased ranges may be present in any, or all planes (depending on tendon(s) involved). Observe end feel, may be empty 2˚ to pain.
• MMT's-may demonstrate decrease from contralateral side or be limited by pain.

Radiological examination using X-ray was done prior to commencement of therapy and confirmed shoulder calcification. A repeat X-ray was performed at completion of follow-up after 2 week.

CASE DESCRIPTION: A 60-year-old male patient presented to a Outpatient department with chronic left shoulder pain (soft tissue calcification over the greater humeral tuberosity). He was taking paracetamol regularly. He was fit and healthy and took no other regular medications. Patient was very active but despite regular use of simple analgesics now found that his shoulder pain limited his ability to perform even simple activities of daily living. He also suffered from increasing night pain. Clinical examination showed tenderness over his acromio-clavicular joint and limited active range of motion (ROM) secondary to pain. Passive ROM was marginally limited.

Treatment: Ultrasound was applied at a continuous wave frequency of 1 MHz and intensity of 1.5 W/cm^2. The transducer head had an area of 4.7 cm^2 and an effective radiating area of 4.1 cm^2. While sitting on a table, the patients placed an arm on their lap with their hand in a

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supinated position. Using slow circular movements, the physiotherapist applied the transducer head over the glenohumeral joint, covering an area of approximately 10 cm^2 for a 7-minute period for 10 sessions of ultrasound (five times in a week) for two week[20].

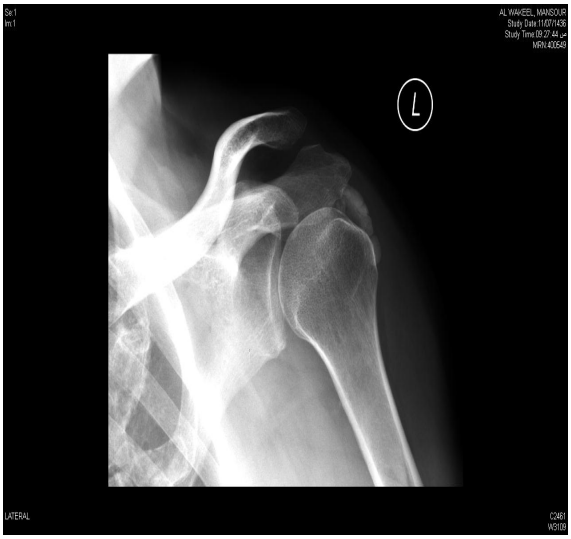

Fig 1- Pretreatment radiological examination

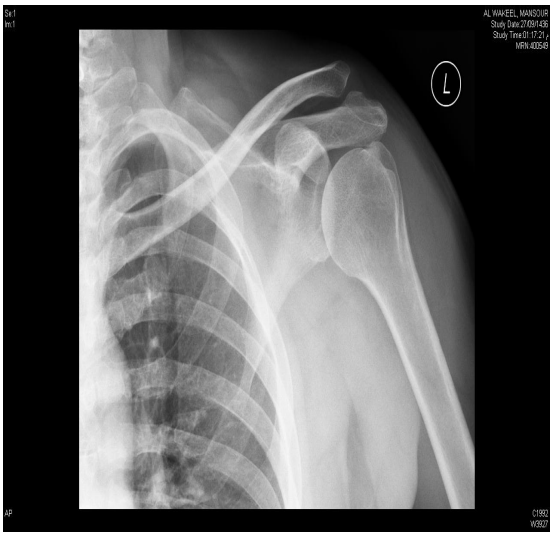

Fig 2- 2nd Repeat radiological examination after showing soft tissue calcification. week.

Discussion:

The prevalence of primary acute calcific tendinopathy is currently unknown. However, the natural progression of calcium-deposit resorption has led many investigators and clinicians to consider the role of conservative, noninvasive, nonsurgical methods of managing patients with calcific tendinopathy[10]. Many of the conservative treatment methods have focused on improving function, reducing pain, and eliminating calcium deposits within the affected tendinous structures, few have emphasized traditional rehabilitation or therapeutic exercises to manage this condition[9, 17]. In 20 to 30 percent of patients with calcific tendinitis of the shoulder, both shoulders are involved[11,12]. Ultrasound therapy may produce only localized effects, they included patients with bilateral calcific tendinitis in there study, and in these patients each shoulder underwent randomization. Ultrasound therapy was administered in a pulsed mode at an intensity (2.5 W per square centimeter) that is usually below the threshold of sensitivity and therefore not distinguishable from sham insonation. Second, the therapist who was in charge of randomization was also the one who switched the ultrasound generator from sham treatment to real treatment, depending on a patient's treatment assignment. Thus, no one directly involved in treatment knew the treatment assignments[21]. The cause and pathogenesis of calcifications of the rotator cuff are unclear[22]. In the acute phase of calcific tendinitis, spontaneous resorption may occur within a period of two to three weeks[12,23].

Ultrasound treatment is beneficial in patients with calcific tendinitis of the shoulder confirms preliminary data[14,24]. Ultrasound therapy alleviated symptoms in the short term. In the long term, the symptoms of calcific tendinitis may be selflimiting and improve independently from the resolution of the calcium deposit[21]. Ultrasound stimulates resorption of calcium deposits has not been established. It may stimulate the accumulation of peripheral-blood mononuclear cells by activating endothelial cells. It may also act indirectly by increasing the intracellular calcium levels[25].

These all study findings support the results of the present study.

CONCLUSION: In this case report, therapeutic ultrasound for the treatment of calcific tendinopathy resulted in improvement in all recorded measures of pain and function. The promising outcome of this single case report

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highlights the need to further evaluate through more structured controlled trials the efficacy of therapeutic ultrasound in the treatment of Calcific tendinopathy.

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