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CASE STUDY

Effect of low-dose radiotherapy in rotator cuff calcific tendinitis: A case report

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Abstract

Rotator cuff calcific tendinitis (RCCT) is an acute or chronic painful condition due to the presence of calcific deposits inside or around the tendons of the rotator cuff. Effective treatment of RCCT is crucial for restoring shoulder function, alleviating pain, and enhancing the patient's quality of life. The treatment of RCCT is mainly divided into surgical and non-surgical treatment. Conservative treatment has been regarded as the first-line therapy, but the effectiveness of these treatments is still not well-established. When conservative treatment fails, invasive treatment, either minimally invasive or surgical, is usually indicated. Nowadays, low-dose radiotherapy has been used for the treatment of various benign conditions, including calcific tendinitis. We presented a 56-year-old female patient with intense pain and limited mobility of her left shoulder. X-rays and ultrasound of the left shoulder showed a massive oval calcification along the greater part of the m. supraspinatus measuring 41x8mm. The patient was first treated with diclopram, peranton gel, and rest. After that, it was decided to try low-dose radiotherapy. It was performed on the Vitalbeam radiotherapy platform with a conformal technique in doses of Gy 8 and 10 fractions. After the last fraction, the pain gradually disappeared and mobility was regained. The ultrasonography control 2 months after the last session showed the total disappearance of the calcification. The use of low-dose radiotherapy for benign conditions is a topic of ongoing debate in the medical community. In this case, low-dose radiotherapy proved to be an adequate method of choice without accompanying side effects, resulting in complete healing and improvement of quality of life.

Keywords: shoulder pain · rotator cuff calcific tendinitis · low-dose radiotherapy

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Introduction

Rotator cuff calcific tendinitis (RCCT) is an acute or chronic painful condition due to the presence of calcific deposits inside or around the tendons of the rotator cuff (Moya et al., 2018). These conditions represent 6.8% of all painful shoulders. The mean age of onset varies between 40 and 60 years (Bureau, 2013). Females are more affected than males (57–76%), and typically, calcifications are more frequent in the dominant shoulder (Vinanti et al., 2015). RCCT is also common in athletes who engage in repetitive overhead movements and sports injuries.

The supraspinatus tendon is the most frequently affected area, with 80% of cases occurring there. This is followed by the lower side of the infraspinatus tendon, which accounts for 15% of cases, and the preinsertional area of the subscapularis tendon, which is involved in 5% of cases. In 20% of instances, these deposits may not cause any symptoms, while in others, they can lead to low-grade pain. This pain may be accompanied by either a sudden or gradual limitation in the range of motion. (Chianca et al., 2018; Zappia et al., 2016).

The etiology of RCCT is multifactorial, and its pathogenesis is not fully understood. Common factors include aging, overuse, mechanical shock, smoking, and family inheritance, and studies of familial susceptibility have shown that genetics also play a role in the pathogenesis of rotator cuff disease. Sport injury and degeneration are two common mechanisms of RCCT (Longo et al., 2019; Weber & Chahal, 2020).

The calcification of the rotator cuff is due to the deposition of hydroxyapatite crystals. The pathogenesis of calcifications is still under discussion, and several classifications are available to describe it (Oliva et al., 2012).

Uhthoff and Loehr (1997) have delineated three stages in the progression of calcific tendinitis: the precalcific stage, the calcific stage, and the postcalcific stage. In the precalcific stage, tenocytes (tendon cells) undergo fibrous metaplasia, leading to avascular areas within the tendon. The calcific stage is further divided into three phases: formative, resting, and resorptive. During the formative phase, calcium crystals begin to accumulate within the tendon, typically asymptomatic and chronic. In the resting phase, the calcium deposits remain stable but can cause focal thickening of the tendon, potentially leading to impingement syndrome due to compression or irritation. The resorptive phase involves the body reabsorbing the calcium deposits, often resulting in an acute inflammatory response as calcium crystals spread to the nearby subacromial bursa, tendons, or adjacent bone, causing significant pain and inflammation. In the postcalcific stage, the tendon undergoes repair and remodeling facilitated by fibroblasts, with new blood vessels developing to revascularize the tendon. These stages illustrate the evolution of calcific tendinitis, from initial cellular changes and calcium deposition to eventual reabsorption and subsequent tendon repair and remodeling.

Effective treatment of RCCT is crucial for restoring shoulder function, alleviating pain, and enhancing the patient's quality of life. The treatment of RCCT is mainly divided into surgical and non-surgical treatment (Ramme et al., 2019). Treatment decisions will be made in light of the evolutionary stage, the degree of symptoms, and the response to initial treatments (Moya, 2021). Conservative treatment has been regarded as the first-line therapy, including rest, nonsteroidal anti-inflammatory drugs (NSAIDs), physiotherapy, corticosteroid injection, dry needling, or shock wave therapy (Cheng, 2015). However, the effectiveness of these treatments is still not well-established and also depends on the size and position of calcification. When conservative treatment fails, invasive treatment, either minimally invasive or surgical, is usually indicated (Moya et al., 2018).

In recent years, low-dose radiotherapy has become a common treatment for various benign conditions, such as calcific tendinitis. Enhanced knowledge of radiotherapy's mechanisms and the release of comprehensive safety and efficacy guidelines have contributed to a renewed interest in this treatment method. Today, low-dose radiotherapy comprises 10–30% of the daily procedures in many Radiation Oncology departments in Germany, where painful osteoarticular degenerative disorders are the most commonly treated benign conditions (Álvarez et al., 2019).

Case Report

A 56-year-old female patient presented to the physiatrist with intense pain and limited mobility of her left shoulder. Her profession as a dentist further complicated the situation, preventing her from working. Active mobility was 75 degrees of anterior flexion, 10 degrees of external rotation, and internal rotation at the L5 level. Passive mobility was limited by pain.

X-rays of the left shoulder showed a massive oval calcification along the greater part of the m.

supraspinatus measuring 41x8mm (Figure 1). The patient was first treated with diclopram, peranton gel, and rest. A 56-year-old female patient presented to the physiatrist with intense pain and limited mobility of her left shoulder. Her profession as a dentist further complicated the situation, preventing her from working. Active mobility was 75 degrees of anterior flexion, 10 degrees of external rotation, and internal rotation at the L5 level. Passive mobility was limited by pain.

X-rays of the left shoulder showed a massive oval calcification along the greater part of the m. supraspinatus measuring 41x8mm (Figure 1). The patient was first treated with diclopram, peranton gel, and rest.

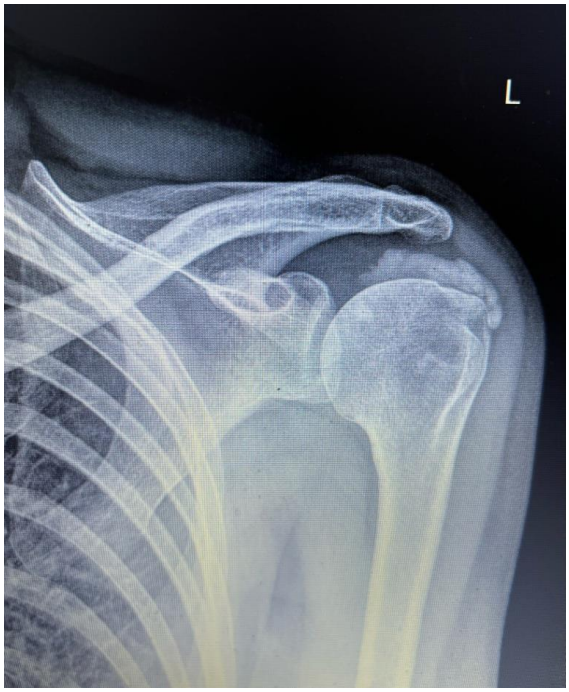

Figure 1. Left shoulder X-ray - calcification of the m. supraspinatus

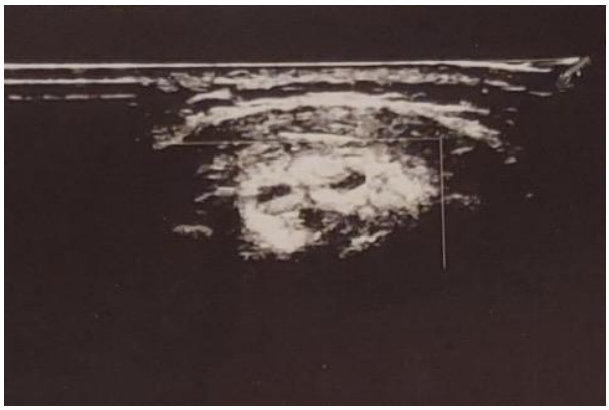

Figure 2. Left shoulder ultrasonography-calcification of the m. supraspinatus

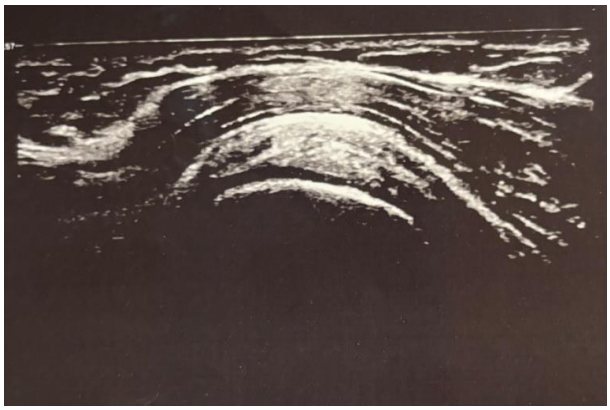

Figure 3. Left shoulder ultrasonography after therapy

After a month, a control ultrasound examination of the left shoulder was performed, where it was evident that the architecture of the left shoulder was significantly damaged due to the presence of a complex calcification with a diameter of about 38 mm (Figure 2). Because of the size of the complex calcification, radiation therapy or surgery was indicated.

It was decided to try low-dose radiotherapy. It was performed at the Oncology Institute of Vojvodina on the Vitalbeam radiotherapy platform

with a conformal technique in doses of Gy 8 and 10 fractions.

After the last fraction, the pain gradually disappeared and mobility was regained. The ultrasonography control 2 months after the last session showed the total disappearance of the calcification (Figure 3). The final result was the complete disappearance of the symptoms and the presence of full active and passive mobility.

The patient gave informed consent to have their details published in an open-access journal.

Conclusion

The use of low-dose radiotherapy for benign conditions is a topic of ongoing debate in the medical community. While radiation therapy has long been established as an effective treatment for certain malignant conditions, its use for benign conditions raises questions about potential benefits. Radiotherapy at low doses is relatively easy to administer, has few symptomatic side effects, and often provides good long-term control.

In this case, low-dose radiotherapy proved to be an adequate method of choice, especially in the case of such a complex massive calcification, resulting in complete healing and an improvement in the quality of life without any accompanying side effects.

References

Álvarez, B., López-Ruiz, J. R., & Navarro-Martín, A. (2019). Radiotherapy for osteoarticular degenerative disorders: When nothing else works. *Osteoarthritis and Cartilage Open, 1*(1), Article 100017.

Bureau, N. J. (2013). Calcific tendinopathy of the shoulder. *Seminars in Musculoskeletal Radiology, 17*(1), 80-84.

Cheng, J. H., & Wang, C. J. (2015). Biological mechanism of shockwave in bone. *International Journal of Surgery, 24*, 143-146.

Chianca, V., Albano, D., Messina, C., Maccagnano, C., Sbano, P., Sconfienza, L. M., & Silvestri, E. (2018). Rotator cuff calcific tendinopathy: From diagnosis to treatment. *Acta Biomedica, 89*(1-S), 186-196.

Longo, U. G., Berton, A., Papapietro, N., Maffulli, N., & Denaro, V. (2019). Genetic basis of rotator cuff injury: A systematic review. *BMC Medical Genetics, 20*, Article 149.

Moya, D. (2021). Case report: Focused shock waves as a treatment option in failed rotator cuff calcification surgery. *Journal of Regenerative Science, 1*, 51-54.

Moya, D., Ramón, S., Schaden, W., Wang, C. J., Guiloff, L., & Cheng, J. H. (2018). The role of extracorporeal shockwave treatment in musculoskeletal disorders. *Journal of Bone and Joint Surgery - American Volume, 100*(3), 251-263.

Moya, D., Ramón, S., Schaden, W., Wang, C. J., Guiloff, L., & Cheng, J. H. (2018). The role of extracorporeal shockwave treatment in musculoskeletal disorders. *Journal of Bone and Joint Surgery - American Volume, 100*(3), 251-263.

Oliva, F., Via, A. G., & Maffulli, N. (2012). Physiopathology of intratendinous calcific deposition. *BMC Medicine, 10*, Article 95.

Ramme, A. J., Smuck, M., Hunter, S. A., Friedman, L., Kennedy, D. J., & Tabb, L. P. (2019). Surgical versus nonsurgical management of rotator cuff tears: A matched-pair analysis. *The Journal of Bone and Joint Surgery - American Volume, 101*(19), 1775-1782.

Uhthoff, H. K., & Loehr, J. W. (1997). Calcific tendinopathy of the rotator cuff: Pathogenesis, diagnosis, and management. *Journal of the American Academy of Orthopaedic Surgeons, 5*(4), 183-191.

Vinanti, G. B., Pavan, D., Rossato, A., & Biz, C. (2015). Atypical localizations of calcific deposits in the shoulder. *International Journal of Surgery Case Reports, 10*, 206-210.

Weber, S., & Chahal, J. (2020). Management of rotator cuff injuries. *Journal of the American Academy of Orthopaedic Surgeons, 28*(5), 193-201.

Zappia, M., Castagna, A., Barile, A., Chianca, V., & Sconfienza, L. M. (2016). Multi-modal imaging of adhesive capsulitis of the shoulder. *Insights into Imaging, 7*(3), 365-371.