

Clinical Outcomes of Combined Focused Extracorporeal Shock Wave and Ultrasound-Guided Needling Therapy for Chronic Calcific Tendinitis of the Shoulder

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INTRODUCTION: Various kinds of conservative treatments for chronic calcific tendinitis of the shoulder have been reported. Focused shock wave (FSW) therapy for chronic calcific tendinitis of the shoulder is one of the conservative treatments which was effective in about 70-80%. Although there are several reports indicating favorable clinical outcomes for both FSW and ultrasound-guided needling therapy individually, there were few studies using their combined application. The purpose of this study was to assess the clinical outcomes of the combined approach involving FSW and ultrasound-guided needling therapy for chronic calcific tendinitis of the shoulder.

METHODS:

Between March 2019 and March 2023, a total of 220 patients with 237 shoulders (consisting of 77 men and 143 women) with shoulder pain persisting for over six months due to calcific tendinitis of the shoulder were enrolled in this study. The average age of the patients was 54.1±9.5 years, and the mean disease duration was 30.1±31.6 months. Among the affected shoulders, 150 were on the right side, 53 on the left side, and 17 were bilateral. Before starting focused shock wave (FSW) therapy, ultrasound-guided needling therapy was employed, wherein the calcification was penetrated using 18G needle with normal saline irrigation of the calcification (the presence of calcification backflow was observed during irrigation until its cessation) following local anesthesia. FSW was performed under ultrasound guidance to precisely target the calcium deposits, using a maximum tolerable energy total of 5000 shots or 800mJ once a month. The FSW treatment, conducted using one manufacturer's shock wave delivery system, continued until the disappearance of symptoms or calcium deposits. At the final follow up, the resorption rate (including complete resorption, partial resorption, or no change), the number of treatments administered, and the clinical scores (UCLA score and Constant score) were evaluated. The radiological characteristics of the calcium deposits before treatment were assessed according to the Molé classification (type A: dense and homogeneous with clear contours, type B: dense and fragmented with clear contours, type C: heterogeneous with soft contours, type D: dystrophic calcifications at the insertion of the rotator cuff tendons in continuity with the tuberosity), and CT values were measured from the axial plane using a CT scanner. Furthermore, the clinical outcomes were compared between the group with complete resorption and the group with refractory symptoms. Statistical analysis was performed using Welch's t-test for two groups and the Kruskal-Wallis test for multiple groups, with a significance level set at $p < 0.05$.

RESULTS: The complete resorption rate reached 82.7% among 196 shoulders, while partial resorption was observed in 37 shoulders (15.6%), and no change was observed in 4 shoulders (0.9%). The mean number of FSW and ultrasound-guided needling therapy sessions was 4.0±2.6 and 2.4±1.8, respectively. The UCLA and Constant score significantly improved from 18.6±4.5 to 33.0±4.4 and from 68.8±13.8 to 95.0±8.5, respectively at the final follow up. At the final follow up, both the UCLA and Constant scores showed significant improvement, with values increasing from 18.6±4.5 to 33.0±4.4 and from 68.8±13.8 to 95.0±8.5, respectively. The pretreatment radiological assessment, based on the Molé classification, revealed 80 shoulders classified as type A, 99 shoulders as type B, 28 shoulders as type C, and 30 shoulders as type D. The number of treatments was significantly higher in Molé classification type B, which presented multiple fragmented calcifications with high density. The mean CT value prior to treatment was 698.4±248.0 HU. Regarding the complete resorption group, the mean number of FSW sessions was 3.8±2.5, while the refractory group received 4.9±2.9 sessions. Additionally, the mean number of ultrasound-guided needling sessions was 2.2±1.5 for the complete resorption group and 3.4±2.8 for the refractory group. The number of treatments was significantly lower in the complete resorption group. At the final follow up, the UCLA and Constant scores were 33.8±3.0 and 28.7±6.9 for the complete resorption group, and 96.5±6.8 and 89.0±12.3 for the refractory group, respectively. The clinical scores were significantly better in the complete resorption group. Furthermore, a higher proportion of the refractory group was observed in Molé classification type B, although no significant difference was noted in the CT value.

DISCUSSION AND CONCLUSION: The combined treatment involving FSW and ultrasound-guided needling therapy yielded favorable clinical outcomes, displaying a notable resorption rate for chronic calcific tendinitis of the shoulder. The clinical outcomes of the complete resorption group exhibited a significantly superior outcome, emphasizing the importance of closely considering the refractory radiological characteristics associated with Molé classification type B.

Figure 1. Molé classification

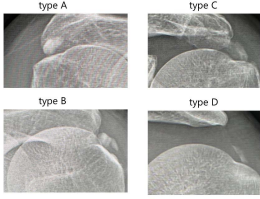


Figure 2. The clinical score before treatments and at the final follow-up

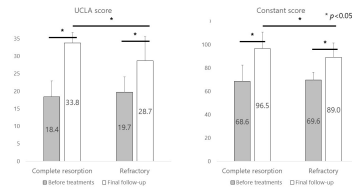


Figure 3. Relationship between Molé classification and the number of treatments

