

Rotator Cuff Reactive Tendinopathy Related to Covid-19 Vaccine Administration: A Case Study from a Physiotherapy Perspective

Collins Ogbeivor*, Khawar S Siddiqui, Hamad AlKartani and Nouf Aldhwayan

Physical Rehabilitation Department, King Faisal Specialist Hospital and Research Centre, Riyadh, Saudi Arabia

***Corresponding Author:** Collins Ogbeivor, Physical Rehabilitation Department, King Faisal Specialist Hospital and Research Centre, Riyadh, Saudi Arabia.

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Abstract

Background: Shoulder injury related to vaccine administration (SIRVA) is a significant musculoskeletal issue that causes shoulder pain and disabilities and leads to low productivity and poor quality of life. Physiotherapy is one of the treatments for SIRVA; however, there is limited evidence in this area. Therefore, this case study aims to provide a better understanding of the physiotherapy management of SIRVA.

Method: This is a single case report of a patient with SIRVA that was treated with education and advice on scapular retraction during elevation, pendulum exercise, isometric exercises, supported and unsupported shoulder movements. These exercises were performed slowly in a pain-free range, 2 × 5 repetitions, 3 times per day and 4 - 5 times per week.

Results: Baseline shoulder pain (VAS) and SPADI scores were 8 (out of 10) and 87%, respectively. After 3 months, the patient showed significant improvement with no pain (rated 0 out of 10) and regained normal shoulder movements. He was able to perform his daily activities involving his shoulder, such as lying on it and lifting, without any pain.

Conclusion: This study has shown that using evidence-based conservative treatment improves clinical outcomes of SIRVA at 3 months. However, a further randomised control trial is needed to provide long-term effectiveness.

Keywords: SIRVA; Covid-19 Vaccine; Shoulder Pain; Rotator Cuff Tendinopathy; Physiotherapy

Introduction

Shoulder injury related to vaccine administration (SIRVA) is a condition that causes shoulder pain and disability, affecting lifting, reaching, and lying on the injected arm [1]. SIRVA was first studied by Atanasoff, *et al.* in 2010, who coined the term after examining 13 cohorts with shoulder injuries due to post-vaccination. Recently, MacMahon, *et al.* [2] defined SIRVA as an immune-mediated inflammatory response to a vaccine injection in the territory of the subacromial bursae or synovium, leading to shoulder pain and loss of function. However, there is currently no concrete evidence supporting the theory of an immune-mediated inflammatory response to vaccine antigens. While COVID-19 vaccine injection side effects include mild pain, soreness, muscle ache, feeling tired, and fever that lasts usually for 1 or 2 days, some participants' symptoms persisted for more than 6 months [3]. Various shoulder dysfunctions have been reported, such as subacromial bursitis, rotator cuff tendinopathy, adhesive capsulitis, subcortical bone osteitis, and fluid accumulation in the deltoid [4-8]. SIRVA could be due to a lack of proper needling techniques of the vaccine injection into the subdeltoid or shoulder joint, which triggers an inflammatory response to the tissues in the shoulder region [1,9]. Physiotherapy is common in the treatment of SIRVA [1,2], but there is

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a lack of comprehensive information on the management of the condition. This case study aims to provide a better understanding of the management of SIRVA from a physiotherapy standpoint.

Case Presentation

A 54-year-old man experienced severe left shoulder pain and loss of range of motion after receiving a pneumococcal vaccine in the left deltoid region, nine days after receiving the COVID-19 vaccine in the same area. He had a history of vitamin D deficiency, irritable bowel syndrome, and allergic rhinoconjunctivitis. Clinical examination showed tenderness in the left superior-lateral arm and limited and painful movement (Figure 1). Shoulder tests revealed a catching sensation in the rotator cuff tendons during left shoulder elevation. He tested positive for Neers, Hawkins-Kennedy, and painfully arc sign tests and had a loss of muscle power in the left shoulder and arm. The biochemical evaluation was unremarkable, and X-rays showed no fractures or gross soft tissue abnormalities (Figure 2). Ultrasound-guided injection was performed with lidocaine and Kenalog into the left glenohumeral joint. The ultrasound scan showed intact rotator cuff tendons and no significant joint effusion or subacromial subdeltoid bursitis. The posterior labrum was unremarkable, but there was limited external rotation and mild distension of the biceps tendon sheath, indicating adhesive capsulitis/frozen shoulder (Figure 3). The sonographer suggested that the patient might benefit from fluoroscopic guided steroid injection and distention in addition to physiotherapy.

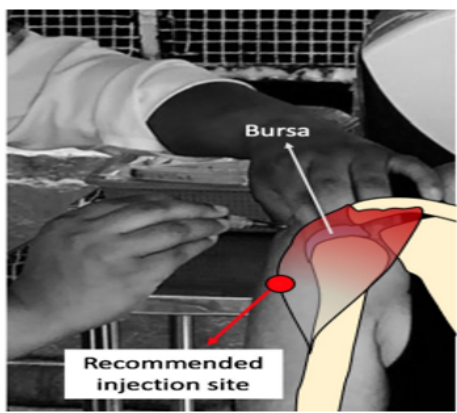


Figure 1: Recommended site for Covid-19 injection.



Figure 2: Anteroposterior (AP) plain radiograph of the patient's left shoulder joint that was normal.

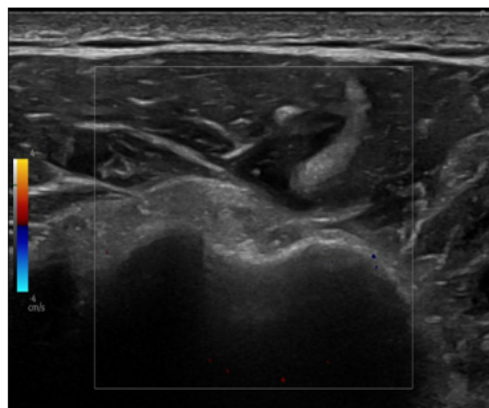


Figure 3: The ultrasound of the left shoulder revealed mild distention of the biceps tendon sheath and limited external rotation, which is likely indicative of adhesive capsulitis or a frozen shoulder.

Physiotherapy approach

The patient’s physiotherapy treatment was influenced by the work of Lewis, *et al.* [10] which focused on the management of reactive tendinopathy. The treatment included education and advice on the potential correlation between the patient’s diagnosis and the COVID-19 injection, rest to reduce rotator cuff tendon loading, and pain relief modalities like acupuncture. The treatment also involved a series of exercises such as Codman pendulum exercises, isometric exercises, biomechanical unloaded intervention, and shoulder symptom modification techniques. The exercises were done slowly in a pain-free range, 2 x 5 repetitions, 3 times per day, and 4 - 5 times per week from baseline to 4 weeks follow-up. At 6 weeks follow-up, the patient had improved and was able to load the shoulder tendons by performing active long-lever shoulder movements in a pain-free range with no irritation. The patient was advised to progress to unsupported shoulder flexion, external rotation, and horizontal abduction using a red color resistance band in standing and side lying, gradually increasing pain to 5/10 VAS within the limits of their tolerance [11]. At 12 weeks follow-up, the patient reported full recovery and was advised to continue with their normal activities.

Results

The patient initially reported severe left shoulder pain (10/10 on VAS) and limited mobility with a high SPADI score (92.3%). After 4 weeks, there was slight improvement in symptoms with a pain score of 8/10 on VAS and the SPADI score was 87%. However, at the 6-week follow-up, the patient experienced significant pain reduction (2/10 on VAS) and improved function, with a much lower SPADI score of 11.5%. By the 12-week follow-up, the patient had returned to his baseline level of shoulder function and was able to perform daily activities without pain (See table 1, figure 4 and 5).

Measures	Week 0	Week 4	Week 6	Week 12
Visual Analogue Scale (VAS) (0 - 10)	10	8	2	0
SPADI score (0 - 100%)	92.3	87	11.5	0

Table 1: VAS and SPADI baseline and outcome measures at week 0, 2, 4, 6 and 12.

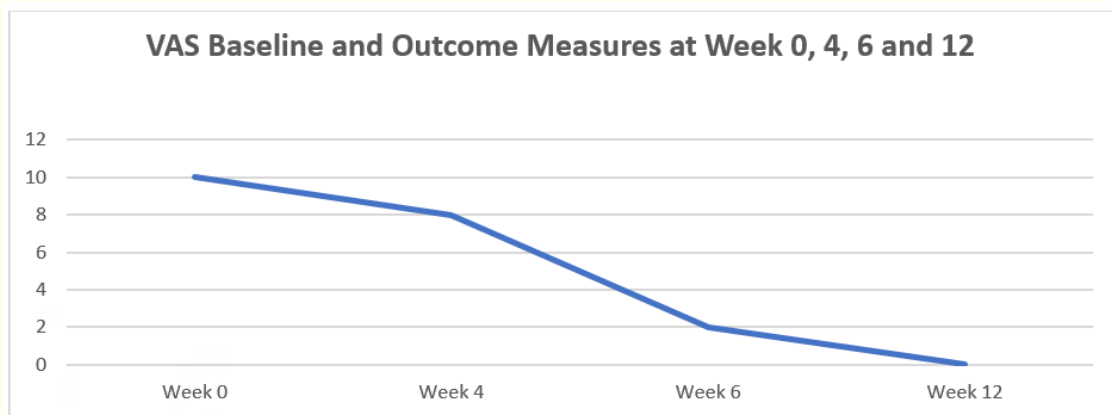


Figure 4: VAS baseline and outcome measures at weeks 0, 4, 6 and 12.

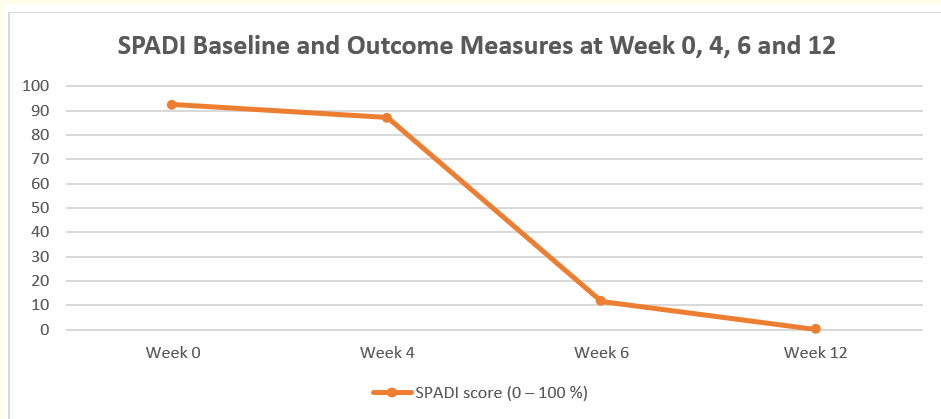


Figure 5: SPADI baseline and outcome measures at weeks 0, 4, 6 and 12.

Discussion

This case study examines a patient who experienced left shoulder pain and dysfunction after receiving a COVID-19 vaccine [1]. While there have been reports in the literature of a link between vaccine injection into the shoulder and inflammatory conditions such as rotator cuff tendinopathy and adhesive capsulitis, there is still no clear understanding of the underlying cause due to a lack of experimental evidence [2]. Several theories have been proposed, including improper injection technique and certain patient characteristics, but the injection technique itself can be modified to reduce risk [1,2,6]. In this case, the patient had a thin build and small deltoid muscle, but it is unknown whether the injection was properly administered.

This study has shown that physiotherapy management for rotator cuff-related shoulder pain and adhesive capsulitis can be successful in improving clinical outcomes such as reduced pain and improved function [10,12]. This includes education and advice, relative

rest, pain relief modalities, biomechanical unloading, and loading of shoulder interventions, as well as shoulder symptom modification techniques. Patients who received individual education and advice about their condition achieved self-efficacy and improved outcomes [13-16]. Lifestyle changes such as controlling stress, smoking, diet, and sleep hygiene can also have a positive impact on treatment outcomes [17,18]. Evidence suggests that dietary control can improve tendon healing and symptoms, while smoking has detrimental effects on rotator cuff tendons [19]. Nutritional status should also be taken into account in treatment.

The management of reactive shoulder tendinopathy involves load reduction, pain relief modalities, and manual therapy to reduce pain and restore movement and function. Previous research supports these strategies [10,12], but further scientific investigation such as randomized control trials is necessary to prove their long-term effectiveness. Isometric shoulder and arm contraction is used to facilitate the contraction of scapulothoracic muscles, stabilize the scapular, and control rotator cuff tendons [12,20]. Sustained isometric contractions performed in the direction of pain and weakness may alleviate shoulder pain [21,22]. Biomechanical reloading of the shoulder is performed in a controlled and graduated manner using scapular and scapulohumeral strengthening exercises in flexion/extension and external rotation to improve motor control and function [23]. These exercises are recommended to be performed up to a pain level of 5/10 VAS [11,24].

Conclusion

Complications such as SIRVA can occur after receiving the COVID-19 vaccine. It is not yet clear how the vaccine injection causes inflammation in the shoulder's soft tissues, and further research is needed. Following evidence-based treatment guidelines can improve clinical outcomes, with reduced shoulder pain and improved movement and function. While caution is advised in interpreting the results of this single case study, it serves as motivation for future research, particularly when conducting randomized controlled trials is challenging.

Data Availability

This is not applicable because this is a single case study.

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Contributors

The study was managed and conceived by CO and KSS, who also contributed to its design. CO served as the clinical consultant and guarantor, collected data, and provided important input on all drafts. All authors collaborated on the manuscript's redrafts.

Ethical Approval

Not required, but publication approval was received from the Officer of Research Affairs with approval number 2235096.

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Conflict of Interests

The authors have declared that no competing interests exist.

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