Case report

Bilateral shoulder arthritis in COVID-19 patient after prolonged mechanical ventilation assist: a case report

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ABSTRACT

Prolonged immobilization and, in particular, mechanical ventilation, have been linked to muscle atrophy. Anecdotal reports in the literature describe rhabdomyolysis as a potential late complication of COVID-19 infection which, in severe cases, may coexist with fluid collections. We report a case of a 28-year-old patient that had been recently hospitalized with SARS-CoV-2 pneumonia, with need for invasive ventilation support. Days after being discharged, the patient presents with retrosternal thoracalgia irradiating to the left upper limb. On physical examination, abduction and external rotation were limited due to pain complaints and there was soft tissue swelling of the corresponding shoulder and arm. Imaging evaluation was essential to establish the underlying condition, revealing bilateral arthritis communicating with large rotator cuff collections, which was considered of septic nature.

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Introduction

Coronavirus disease-2019 (COVID-19), an atypical pneumonia caused by severe acute respiratory virus 2 (SARS-CoV-2), has emerged in 2019. Clinical findings in COVID-19 pneumonia go beyond the respiratory tract, which can be explained by the ubiquitous nature of its major entry receptor, angiotensin-converting enzyme 2 (ACE-2). ACE-2 is found in the endothelium of small vessels, bowel, smooth muscle, skeletal muscle and synovial tissue [1].

COVID-19 is mostly known for causing pulmonary manifestations, but can also result in multiple extra-pulmonary conditions [2,3]. Several reports in the literature have reported on cardiac, neurologic, abdominal, dermatologic, ocular and, less commonly, musculoskeletal manifestations. Current musculoskeletal complications reported in patients with COVID-19 infection, however, are anecdotal.

Case report

A 28-year-old male patient, otherwise healthy, attended a health center with symptoms of fatigue, anosmia and dyspnea for progressively shorter efforts. SpO2 levels were 55%, which improved to 75% with nasal cannula oxygen therapy.

The patient was hospitalized and evaluated at an emergency department. A chest radiography was ordered which revealed bilateral lung infiltrates. RT-PCR swab tested positive for SARS-CoV-2 infection and the patient was admitted in a COVID-19 infirmary unit.

Non-invasive ventilation support was unsuccessful and there was need for intubation and invasive mechanical ventilation with ventral decubitus positioning. Two days after admission, Escherichia coli and methicillin-sensitive Staphylococcus aureus were detected on sputum culture and confirmed superinfection, which led to prescription of an 8-day regimen of amoxicillin. Blood culture also revealed methicillin-resistant Staphylococcus aureus, which was dismissed.

There was steady clinical improvement in the subsequent days and the patient was extubated and eventually discharged.

Seven days later, however, the patient attended the emergency department of our hospital with complaints of retrosternal thoracalgia irradiating to the left upper limb, which had reportedly started shortly after transfer from the intensive care unit to the infirmary in the previous hospital.

On physical examination, abduction and external rotation were limited due to pain complaints. There was soft tissue swelling of the shoulder and arm, fever, and increased levels of C-reactive protein. Hemoculture and urine culture proved negative. A chest radiograph and thoracic CT were performed which showed typical changes compatible with sequelae of Covid-19 pneumonia (Fig. 1).

Due to poor progression of the condition, he was admitted for further investigation and treatment planning. Taking into account the previous blood culture that had been dismissed, gentamicin was prescribed and administered throughout the whole length of hospital stay.

Thoracic CT with intravenous contrast administration performed 9 days after admission revealed scapulothoracic synovitis, with multiple intra-muscular collections that showed continuity with the glenohumeral joint. On the right shoulder, there was also scapulothoracic synovitis and less pronounced joint fluid (Fig. 2).

Bilateral shoulder magnetic resonance imaging (MRI) with intravenous contrast administration was performed, due to persistent shoulder pain and weakness. Findings included infraspinatus fossa and subscapular fossa collections on the left shoulder, extending and communicating with the glenohumeral joint, with capsular thickening and increased signal intensity post-gadolinium administration (Fig. 3); the right shoulder showed similar changes but they were less pronounced. These features were suggestive of septic arthritis and rotator cuff collections, possibly associated with myonecrosis.

Aspiration of the infraspinatus fossa collection was performed and 20 cc of seropurulent fluid was sent for analysis. An 8,5 Fr drainage catheter was left on the left infraspinatus collection, but was removed the day after due to patient complaints of discomfort. Evaluation of the aspirate included both direct and culture tests for Mycobacterium tuberculosis, anaerobic and aerobic bacteria, which were negative.

There was some improvement of left shoulder range of motion, after physical rehabilitation exercises. Patient was eventually transferred to another hospital with indication to continue physical therapy and rehabilitation exercises.

Discussion

Prolonged immobilization and, in particular, mechanical ventilation, have been linked to muscle atrophy and considered a risk factor for development of heterotopic ossification around the shoulder [4,5,6].

Patients who survive after prolonged mechanical ventilation are prone to develop delirium, lung damage, muscle atrophy and weakness. Even after resolution of the pulmonary symptoms, reconstitution of normal cognitive and physical aptitude requires a long-term rehabilitation process, where physical and occupational therapists play a fundamental role [2].

A potential late complication of COVID-19 infection is rhabdomyolysis [7,8], a life-threatening condition with a diagnosis that is mainly clinical, manifesting as myalgia, fatigue, pigmenturia and acute renal failure [9]. Imaging findings include enlargement of the affected muscles, which may be heterogeneous and hypodense on CT.

MRI is the best modality to depict extent and severity of injury, with hyperintense signal on fluid-sensitive sequences and heterogeneous enhancement following intravenous contrast administration [10]. An alternative presentation may show rim enhancement. In severe cases, myonecrosis may coexist in the form of small heterogeneous muscle foci with hyperintense signal on fluid-sensitive sequences with rim enhancement.

Aside from rhabdomyolysis, a few cases of arthritis associated with COVID-19 infection have been reported
Fig. 1 – Chest x-ray (A) and thoracic CT (B) performed at admission at our hospital show typical findings of COVID-19 pneumonia, namely bilateral peripheral ground glass opacities with greater involvement of the lower lobes.

Fig. 2 – Post-contrast Thoracic CT (axial view) performed 9 d after admission at our hospital reveals rotator cuff collections and glenohumeral joint fluid with capsule enhancement on the left shoulder. There is some heterogeneity and enhancement of the right infraspinatus muscle.
Patient consent

Written informed consent was obtained from the patient.

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