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Sacroiliitis Following Third (Booster) Dose of Moderna SARS-CoV-2 Vaccination Treated Successfully With Sacroiliac Joint Injection

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Background: Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) rapidly spread across the world causing the coronavirus disease 2019. Due to high infectious spread, 2 messenger RNA vaccines, Pfizer-BioNTech and Moderna, were the first SARS-CoV-2 vaccines authorized in the United States.

Case Report: We report a rare case of a 19-year-old woman who developed isolated sacroiliitis following the third (booster) dose of the Moderna vaccination.

Conclusions: While most vaccine adverse effects are self-resolved, we describe a unique case of isolated sacroiliitis after the SARS-CoV-2 vaccination, which was then successfully treated with sacroiliac joint injection after failing medical management.

Key words: COVID-19, sacroiliitis, pain management, sacroiliac joint injection, Moderna, vaccination, case report

BACKGROUND

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) emerged in Wuhan, China in December 2019 and rapidly spread across the world causing the coronavirus disease 2019 (COVID-19). The World Health Organization officially declared the disease a global pandemic in March 2020. Although most patients develop mild-to-moderate symptoms, up to 5% of the population have experienced acute respiratory distress, septic shock, and multiorgan failure (1). At the time of writing, 558 million cases have been reported worldwide, with 6.36 million deaths recorded (2).

Due to high infectious spread, 2 messenger RNA (mRNA) vaccines, Pfizer-BioNTech (BNT162b2) and Moderna (mRNA1273), were the first SARS-CoV-2 vaccines authorized in the United States. Vaccinations soon began in December 2020 (3,4). The BNT162b2 vaccine was deployed in 2 doses, which showed 95% efficacy in preventing COVID-19 infections from 7 days until 2 months after the second vaccination. After the second dose, efficacy against COVID-19 waned to 90% within 2-4 months and 84% within 4-6 months (5). Similarly, the mRNA1273 vaccine released in a 2-dose fashion with a 94.1% efficacy in preventing COVID-19 (6)

The emergence of the B.1.617.2 variant (otherwise known as delta variant) of SARS-CoV-2, in May 2021, raised the question of whether reduced efficacy was due to waning immune response of the initial 2-dose vaccine. This decline in efficacy suggested the need for a third (booster) dose of the BNT162b2 vaccine. A third BNT162b2 dose was shown to significantly increase the magnitude of the immune response in patients from a clinical trial when administered 7-9 months after the primary 2-dose vaccine (7). Consequently, in December 2021, the US Food and Drug Administration authorized a third BNT162b2 dose in persons 16 years and older

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who received the primary 2-dose vaccination at least 6 months prior, with the release of a third mRNA1273 vaccination following afterwards.

The following case details the clinical course of a patient who developed isolated sacroiliiitis shortly after receiving a third (booster) for the SARS-CoV-2 vaccination. The patient ultimately underwent sacroiliac (SI) joint injection with significant improvements in pain and functional status.

CASE PRESENTATION

Patient is a 19-year-old woman with no significant medical history who initially presented to the emergency department at an outside hospital with complaints of severe right leg pain, which developed 6 hours after receiving a booster shot for the SARS-CoV-2 vaccination. Workup at that time included x-ray negative for fractures and ultrasound negative for deep vein thrombosis. She was subsequently discharged with pain medications. She presented again 6 days later with inability to bear weight on her right leg and pain refractory to nonsteroidal anti-inflammatories (NSAIDs), hydrocodone-acetaminophen, and gabapentin. She stated her leg pain originated in the right buttock region, near the SI joint, and radiated to lateral and posterior thigh. She is normally active and an elite soccer player, who denied any previous injuries or recent trauma. Physical therapy was started as well, but severely limited due to pain.

At this time, further workup included magnetic resonance imaging of lumbar spine and SI joints, which revealed right sacroiliitis involving the inferior two-thirds of the joint (Fig. 1). She was later admitted to the hospital for further workup. Patient was subsequently referred to pain management for interventional procedure with plans of SI joint injection, once cleared from infectious disease. Infectious workup included blood cultures, QuantiFERON tuberculosis, human immunodeficiency virus antigen and antibody, chlamydia, gonorrhea, rapid plasma reagin, hepatitis B surface antigen, core antibody, hepatitis C antibody, and SARS-CoV-2 RNA all of which were negative. Rheumatologic was significant for elevated C-reactive protein (15.8 mg/L) and erythrocyte sedimentation rate (64 seconds), but negative for cyclic citrulline peptide, myeloperoxidase antibody, rheumatoid factor, and human leukocyte antigen-B27.

Once the infectious process was ruled out, the patient underwent right SI joint injection, in which a spinal needle was inserted into the inferior portion of the right SI joint and 6 mg of betamethasone and 2 mL of 0.25% bupivacaine was injected (Fig. 2). Postprocedure, the patient was able to tolerate passive leg motion and started ambulating the next day. Patient received informed consent for treatment and this description of case presentation.

DISCUSSION

Vaccination plays an integral role in diminishing the spread of the COVID-19 pandemic. With billions of doses of vaccines administered, many may question the safety and adverse effects related to vaccination. In the randomized control trial for the mRNA1273 vaccine, the most common adverse effects included pain after injection, erythema, induration, and tenderness, which resolved over the following 4-5 days (8). Systemic adverse effects, such as fever, headache myalgias, and arthralgias, occurred in 54.9% after the first dose and 79.4% after the second dose in the mRNA1273 group (8).

Upon literature review, one other case (9) has been reported of sacroiliitis occurring after vaccination, reportedly after the second dose of the BNT162b2 vaccine. Management of this case was initiated with corticosteroid therapy and level 2 painkillers, which did not improve the patient's condition. Subsequent SI joint puncture, thought to have relieved pressure on the joint, rest, and NSAID treatment for one week were sufficient to relieve pain and return patient autonomy (9).

Other reports associating COVID-19 and inflammatory musculoskeletal symptoms have been previously recorded, specifically during active infection; however, isolated cases of sacroiliitis are rare. There have been 2 reported cases (10) of sacroiliitis specifically in the status-post COVID-19 infection period, both of which were managed with months of NSAID therapy. Interventional therapies were not required to treat either of these patients.

Sacroiliitis occurring after COVID-19 vaccination is a rare and intriguing phenomenon that requires more study. Although recommended treatment is unclear at this time, SI steroid injection mixed with long-acting amide local anesthetic has shown initial promise. Ultimately, this association is rare and should not prevent any qualifying individual from receiving the COVID-19 vaccine. More literature is required to imply causation, but the COVID-19 vaccine could possibly be a new etiology for sacroiliitis.

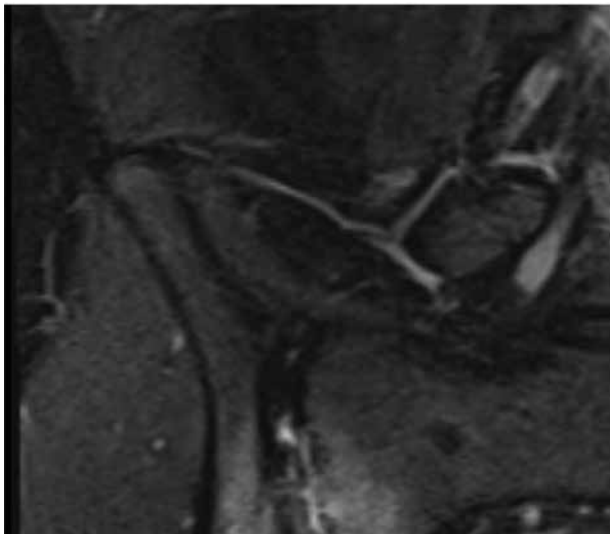

Fig. 1. Coronal STIR image showing inflammation of inferior two-thirds of SI joint.
STIR, short tau inversion recovery sequence; SI, sacroiliac.

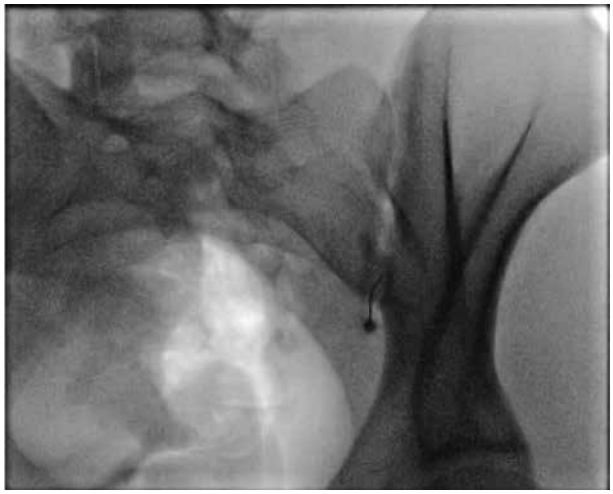

Fig. 2. Right SI joint injection.
SI, sacroiliac.

CONCLUSIONS

With the rapid spread of SARS-CoV-2, vaccinations are a primary tool in preventing COVID-19 and minimizing severity of symptoms in diseased individuals. The high rollout of vaccinations does not come without adverse effects, most of which will be self-resolved. Here, we describe a unique case of isolated sacroiliitis developing after a third dose of the mRNA1273 vaccine, which was successfully treated with SI joint injection after failing medical management.

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