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INTERMEDIATE

CASE REPORT: CLINICAL CASE

Complex Management Decisions in a Professional Athlete With Recurrent Pericarditis

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ABSTRACT

A 32-year-old professional athlete developed chronic recurrent pericarditis despite standard medical therapy. Etiology included postpericardiotomy syndrome, viral, or COVID-19 vaccine related, all potentially exacerbated by intense exercise. Treatment and return-to-play decisions were complicated by potential side-effect profile of therapies and ability to limit exercise as a professional athlete. (**Level of Difficulty: Intermediate.**) (J Am Coll Cardiol Case Rep 2022;4:1090–1093) © 2022 The Authors. Published by Elsevier on behalf of the American College of Cardiology Foundation. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

HISTORY OF PRESENTATION

A 32-year-old female athlete presents for a cardiology follow-up appointment 3 months postoperative from cardiothoracic surgery (CTS). She reports an episode of discomfort in her left anterior chest radiating to her scapula, which occurred suddenly while playing tennis a few weeks prior that abated with several days of rest and over-the-counter nonsteroidal anti-inflammatory medications (NSAIDs). Four days later, she experienced another episode while training that was a constant, dull chest pain, worse with deep inhalation and while lying flat with a resting tachycardia. Six days before her first episode, she received her first dose of an mRNA COVID-19 vaccine coinciding with returning to more intensive training in preparation for competitive tennis. Vitals on presentation included blood pressure 105/67 mm Hg, heart rate 95 beats/min, and respirations 22/min. Exam was without murmurs, gallops, or rubs, no signs of volume overload or jugular venous distention and lungs clear on auscultation.

LEARNING OBJECTIVES

- To identify the clinical signs, timing, laboratory, and imaging findings of pericarditis.
- To understand the complex nature and unique considerations in advising athletes with pericarditis.

PAST MEDICAL HISTORY

The patient was a professional tennis player for more than 10 years. Approximately 2 months before her initial symptoms, she underwent surgical correction of a stenotic and regurgitant bicuspid aortic valve

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and root phenotype aortopathy with a bio-Bentall procedure. Her postoperative course was complicated by new-onset atrial arrhythmia, treated with transesophageal echocardiography-guided direct-current cardioversion (Figure 1A).

DIFFERENTIAL DIAGNOSIS

Differential includes postpericardiotomy syndrome (PPS), viral pericarditis, and COVID-19 vaccine-related pericarditis.

INVESTIGATIONS

Electrocardiogram showed diffuse J-point/ST-segment elevation and PR segment depression (Figure 1B). Inflammatory markers were elevated with erythrocyte sedimentation rate of 20 mm/h (normal <15 mm/h) and ultra-sensitive C-reactive protein 181.2 mg/L (normal <3.1 mg/L). Echo revealed a normal-functioning bioprosthetic valve with a trivial circumferential pericardial effusion (Figure 1C), which was new compared with echo obtained 5 weeks postoperatively. Cardiac magnetic resonance (CMR) imaging showed moderate circumferential pericardial effusion and mild to moderate pericardial delayed enhancement (Figure 1D) but no evidence of constrictive physiology. She was diagnosed with acute pericarditis with active inflammation.

MANAGEMENT

She was started on colchicine 0.6 mg twice a day and ibuprofen 800 mg 3 times a day, in addition to aspirin 81 mg, and instructed to refrain from engaging in strenuous physical activity until fully recovered. Her symptoms resolved within weeks but returned after increasing physical activity on 2 separate occasions over the next month, each abating with reducing exercise and continued medical therapy. Two months later, the patient was asymptomatic with normal serum inflammatory markers while still on therapy; however, given the multiple flares, she was diagnosed with chronic recurrent pericarditis. Although she was tolerating therapy with improvement in symptoms, repeated flares with increased physical activity were concerning, and she was advised to continue medical therapy and refrain from activity with goal heart rate <100 beats/min.

At 6-month surgical follow-up, the patient discussed her desire to continue as a professional athlete and return to training in preparation for return to competition. Inflammatory markers remained normal, electrocardiogram and echo findings resolved (Figures 1E and 1F), and CMR showed near complete resolution of delayed pericardial enhancement (Figure 1G). She had kept her heart rate <100 beats/min except the week preceding follow-up when she attempted 1 session of training, achieving a heart rate of 120 beats/min, but her symptoms flared again briefly, resolving after 1 day. Given the continued flares with increased activity despite current medical therapy, steroids and/or an interleukin-1 modifying agent were considered, particularly given the bleeding risk of chronic NSAID use for this athlete's return-to-play.

ABBREVIATIONS AND ACRONYMS

CMR = cardiac magnetic resonance

CTS = cardiothoracic surgery

IL = interleukin

NSAID = nonsteroidal anti-inflammatory medication

DISCUSSION

The etiology of the initial pericarditis included PPS, viral, or COVID-19 vaccine related, all possibly exacerbated by resuming intense exercise.[1] PPS is an inflammatory disease of the pericardium that most commonly presents within 4 weeks after CTS (~80%), but can rarely present up to 3 months postoperative.[2] It is more likely to occur in younger patients[3] and after valve procedures.[4] Our patient's onset of acute pericarditis approximately 10 weeks after CTS potentially fits the pattern of PPS; however, the timing was less typical. Complicating this was the COVID-19 vaccine and resumption of higher-intensity exercise within a 2-week period coinciding with the pericarditis. Pericarditis and myocarditis have been documented as rare adverse effects of COVID-19 vaccination.[5] These complications are not well understood; however, the immunogenicity of mRNA may trigger proinflammatory and immunologic responses resulting in diffuse inflammation leading to myocardial and pericardial damage.[6] Although the incidence of PPS far outweighs pericarditis in vaccine recipients, the timing of our patient's COVID-19 vaccine in relation to onset of symptoms cannot be ignored. Further confounding this case was her increased training shortly after receiving the vaccine.

She was treated with NSAIDs/colchicine, standard first-line therapies,[7] and initially responded well. Given her career as a professional athlete, there were special considerations in determining treatment and recovery options because her livelihood was dependent on strenuous exercise. The 2015 American College of Cardiology/American Heart Association Eligibility and Disqualification Recommendations for Competitive Athletes with Cardiovascular Abnormalities are a common resource when guiding patients on returning to sport.[8] However, these recommendations

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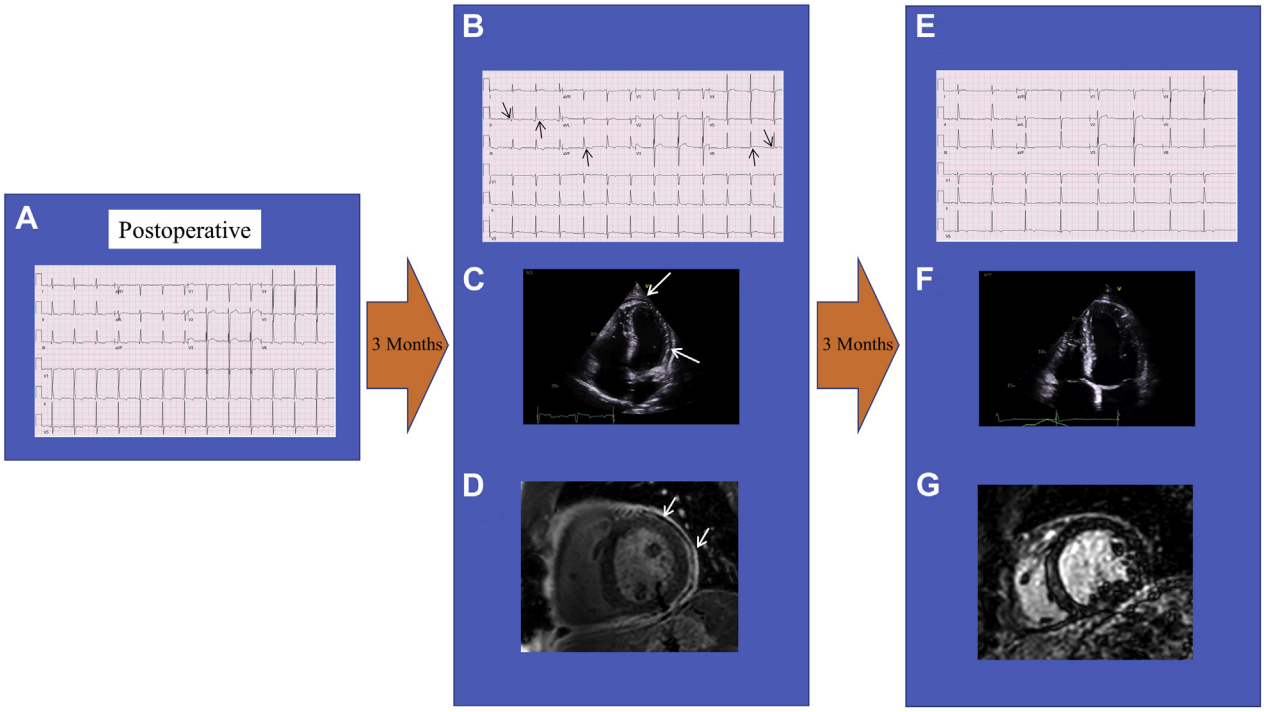
FIGURE 1 Timeline and Multimodality Imaging of Pericarditis in an Athlete



(A) Postoperative ECG after direct-current cardioversion. **(B)** Three-month ECG with J-point/ST-segment elevation and PR depression. **(C)** Three-month echocardiogram with new circumferential pericardial effusion **(arrows)**. **(D)** Three-month CMR with circumferential pericardial effusion and pericardial delayed enhancement **(arrows)**. **(E)** Six-month ECG with resolved changes. **(F)** Six-month echocardiogram with resolved effusion. **(G)** Six-month CMR with near resolution of delayed pericardial enhancement. CMR = cardiac magnetic resonance; ECG = electrocardiogram.

were not designed for professional athletes, are generally conservative, and are geared toward patients who can more reasonably limit their physical activity without consequence. In addition, the role of CMR in the evaluation of recurrent pericarditis for diagnosis, prognosis, and treatment has not been explored in the guidelines.[9] For pericarditis, current recommendations for athletes are only to return to full activity once symptoms have completely resolved and inflammatory markers have normalized.

The recurrent symptoms while on standard first-line therapy complicated our patient's treatment and return-to-play considerations. Prolonged high-dose NSAIDs or prednisone were not desirable options with the risk of adverse effects, particularly given the patient's athletic status. Interleukin-1 blockers such as rilonacept can be used as additional anti-inflammatory therapies, which may allow dose reduction or cessation of NSAIDs/steroids.[10] The use of guidelines and weighing risks and benefits in determining the course of treatment for professional athletes remains a challenge and should be individualized to include the patient's wishes and risk profile. In this case, a recommendation was made for the use of rilonacept to potentially resume training and return to competitive tennis while reducing the chance of recurrences with higher-intensity exercise.

FOLLOW-UP

Our patient continued management with NSAIDs/colchicine but was hesitant to commit to treatment with rilonacept because of personal concerns about self-injections and potential prolonged course of therapy. After considerable deliberation, she decided to retire from her sport, which she had contemplated at the time of her original surgical recommendation. She did not complete the full vaccination series, as the risk was considered high given the unclear etiology of the initial acute pericarditis. Over the coming months, she was able to slowly tolerate moderate-intensity

exercise without symptom recurrence and began tapering medications.

CONCLUSIONS

This case demonstrates a course of recurrent pericarditis with complex etiology, treatment, and return-to-play decisions. It highlights the potential of premature return to physical activity in the setting of acute pericarditis to exacerbate and lengthen the recovery period. This is of specific importance to professional athletes, who do not have the same flexibility to refrain from physical activity compared with the general population. For athletes, an individualized plan weighing the risks regarding the timing of return to activity should be considered.

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KEY WORDS athlete, COVID-19, exercise, pericarditis, postpericardiotomy, recurrence