Myocarditisand autoimmune disease post Bariatric surgery: case report.

Abstract

Post bariatricsurgeryinducedmyocarditis in setting of autoimmune disease is rarely encountered in clinical practice. However, till date only few cases of bariatric surgery induced myocarditis in setting of connective tissue disease (CTD) have been reported. The following report illustrates the case of a 39-year-old female suffering from myositis who exhibited a nutritional deficiencymyocarditis following biliopancreatic diversion surgery(BPD). Using the Dallas criteria, this case of acute onset myocarditis following surgery was found to be in 'probable' category. The mechanism of myocarditis in patients suffering from CTD is incompletely understood. It has been suggested that the myocarditiscould result from virus mediated immunomodulation or due to Giant cell myocarditis, nutritionalcardiomyopathy. The report calls for cautious surgery performance in the setting of suspected nutritional cardiomyopathy like our case as injudicious act might increase the risk of deleterious myocarditis and increase the mortality.

Keywords: myocarditis, autoimmune disease, biliopancreatic diversion, nutritional deficiency

Introduction

Acute myocarditis is defined as an acute inflammatory disease of the myocardium, caused by a variety of infectious (e.g., viral, bacterial) and noninfectious conditions (including cardiotoxins, hypersensitivity reactions, systemic disorders, and radiation) [11]. Myocarditis is an inflammatory disease of the heart with major public health impact. Thorough understanding of its immunopathogenesis is crucial for accurate diagnosis and effective treatment. Myocarditis refers to an inflammatory process in the heart that can be initiated by various factors. The most common cause of myocarditis is viral infection [12].

Case report

A 39-year-old female patient known case of diabetes mellitus, hypothyroidism, post biliopancreatic diversion (BPD)with duodenal switch, Laparoscopic cholecystectomy 2008, Post Abdominal liposuction with pre umbilical hernia repair 2019, chronic Multiple nutritional deficiency and depression. Presented to emergency departmentwith complaints of;shortness of breath at rest with orthopnoea& paroxysmal nocturnal dyspnoea for 14 days, along with some chest discomfort & occasional palpitations and lower limbs oedema. She also was complaining of lower limb weakness. On physical examination her chest showed bilateral fine basal crepitation. She wastachycardia with low blood pressure, andgeneralized weakness. Blood testshowed elevated cardiac enzymes with increasing CK which is not correlating to the CKMB, elevated BNP,hypomagnesemia and hypocalcemia. The significant laboratory findings included, fluctuating Zinc level and selenium was low normal.

She was admitted to the cardiac care unit as a case of acute heart failure, and managedaccordingly. She was received IV replacement of multi- vitamins and micronutrients.Cardiac work up showed RBBB with wide spread T wave inversion in the ECG. The Echocardiogram was found to be dilated cardiomyopathy with sever biventricular dysfunction and low ejection fraction (25-30%) with severe global impairment of

systolic function with grade III diastolic dysfunction, left atrium moderately dilated, Moderate MR, Moderate TR, RVSP 65, Trivial pericardial effusion.Cardiovascular MRI suggestive of sub-acute myocarditis.The end myocardial tissue biopsy showed; Myocyte hypertrophy with focal interstitial fibrosis. Focal myocyte vascular changes consistent with myocyte injury. Negative for myocarditis, vasculitis and granulomas. Negative for amyloid and iron. The histological features are nonspecific and can be seen in a wide range of pathological conditions including cardiomyopathies and post myocarditis.

Patient was referred to rheumatology team andneurology team for high CK and skeletal myopathy. Nerve conduction study done, showed sever myopathy change.Rheumatology investigation showed positive ANA, anti-SSB, Ro2-52 Ab positive Femur/Thigh MRI was done showed Signs suggestive of interval regression of polymyositis in both thighs. With diagnosis of SLE / Sjogren disease with inflammatory myositis

The Rheumatology team treat the patient by prednisone.The patient heart failure condition was improved clinically.

Her condition was slowly improved. She wasdischarged home after one month of multidisciplinarytreatment team.

3 weeks later patient was admitted with worsening heart failure patient stabilized and transfer to advance heart failure centre forend myocardial tissue biopsy and for further management. At the advance heart failure centre she developed cardiogenic shock requiring intubation and mechanical ventilation. Patient treated in Intensive care unit accordingly. Rheumatology team started Azathioprine, IVIG, and cyclosporinewith steroids.

Patient condition was gradually improved and discharged after four month. During admission cardiac transplant team involved for work up however she was not eligible for heart transplant due to the presence of anti-myocyte AB.

Four months later she presented again to emergency department with body ache, pain, dyspnea, fever and cough for 4 days, upon presentation she was found hypotensive admitted under internal medicine in stepdown but later on the same day her condition worsened when she required intensive care admission. Upon admission to intensive care she became more hypotensive, requiring high doses of vasopressors (norepinephrine and vasopressin) with signs of low perfusion so she was intubated and mechanically ventilated, and connected to continuous noninvasive cardiac monitoring which revealed significant drop of cardiac output (EF < 10%) Patient showed worsening course as she developed refractory shock status on mega doses of vasopressors also she developed multi organ failure and disseminated intravascular coagulopathy. Next day she grew gram negative bacilli in the blood (she was started already on wide spectrum antibiotics)

Patient developed refractory septic / cardiogenic shock requiring maximum dose of inotropes and vasopressors, unfortunately her condition not improved and she passed away.

Discussion

This patient is a known case of post biliopancreatic diversion, which is a malabsorptive procedure for obesity management. This procedure's well-known side effects include nutritional

deficiencies of micronutrients, trace elements, and albumin. A few Similar cases have been reported (1), (2). The etiology includes autoimmune and inflammatory conditions and exposure to toxic agents. However, complications such as heart failure or arrhythmias may worsen, especially in the early postoperative period (3). There is emerging evidence for immunosuppressive therapy in some instances that are considered related in this respect. Despite our diligent search, we found few cases of novel immunosuppressant drug-induced myocarditis in the setting of autoimmune disease in the published literature resulting from an overly aggressive immune system (4). The nutritional deficiency is associated with an immunocompromised state which contributes to cardiac dysfunction as myocarditis; however, 11% reduction in coronary events was observed in subjects taking selenium replacement (5).

In this case the reversal of the primary procedure (BPD) would improve the patient current nutritional deficiencies as well as the maximum absorptive benefit of the immunosuppressive medication; however, No solid evidence is there that this patient cardiac disease is related to micronutrient deficiencies as consequences of the malabsorption effects of BPD and no guarantee for improvement of her cardiac conditions after reversal of BPD. Therefore, the timing of the reversal procedure should be set after reaching maximum optimization of her current conditions. Moreover, 33% of myocarditis patients required mechanical circulatory support (MCS) or cardiac transplantation (6). However, this is not the case in this patient because there is HLA incompatibility for heart transplantation with the risk of rejection and the fear of malabsorption to medications. Furthermore, the autoimmune nature of systemic disease would have a high chance of recurrence after transplant and failure of the procedure.

Despite immunological dysregulation that made the patient more vulnerable to opportunistic infections, documented cases typically result in myocarditis, according to the literature. (7). 50-80% of myocarditiscases has no cause is ever found, and infectious is reported in 1-5% of patients as compared to nutritional deficiency which is caused by 17-35% (8). However, Virus-induced abnormal immunomodulation in cardiac patients is believed to be a key factor for the development of carditis during concomitant immunosuppressive therapy (9, 10). Infection causes the innate immune system in the heart to become more active in viral myocarditis. Chronic inflammation that is exacerbated by excessive or ongoing activation can cause myocardial remodeling and damage, which ultimately results in cardiac dysfunction. This, in this scenario, could emerge the myocarditis.Furthermore, Carsten et al. describe that the persistence of infection and development of dilated cardiomyopathy have been linked to the patient's genetic background.(10) From this perspective, this might have played a role in the development of myocarditis in this patient.

In this case we could not know which is triggering the myocarditis, is it malabsorption post BPD leading to malnutrition, autoimmune disease could be the cause however autoimmune disease itself could be caused by malnutrition, or just a simple viral infection causing myocarditis.

Conclusion:

The current case report urges cautious action in the presence of a propensity for myocarditis since random dietary deficits of the biliopancreatic diversion surgery could have detrimental consequencesin the autoimmune inflammatory myositis disease patients.

This might include looking into the underlying autoimmune inflammatory myositis in routine clinical practice before undergoing biliopancreatic diversion surgery.

Further research is required to determine the relationship between weight reduction surgery, autoimmune disease, and heart disease specially the myocarditis.

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