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Case Report

Leukemoid-Like Reaction in a Post-Coronary Artery Bypass Grafting Surgery Patient

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ABSTRACT

A leukemoid reaction in post-cardiac surgery is uncommon. Few cases in the literature have reported a leukemoid-like reaction; furthermore, there are only a handful in cardiac surgery. The diagnosis of leukemoid reactions can be problematic for physicians. Even though leukemoid reactions are benign, in severe cases, excessive white blood cells can lead to tissue damage. Additionally, fatal conditions like malignancies can present similarly. Therefore, it is necessary to perform broad laboratory investigations. We present a case of a patient who had significant postoperative hyperleukocytosis following coronary artery bypass grafting (CABG). Various investigations were performed to rule out any sinister cause, like post-operative infections and malignancy; however, they came out negative. Furthermore, she did not develop any signs or symptoms during her stay or after discharge, and she was diagnosed with a leukemoid-like reaction and progressed to a good outcome. This case highlights the importance of avoiding unnecessary investigations and treatment, especially in resource-limited settings.

Keywords: Coronary Artery Bypass, Extracorporeal Circulation, Immune Response, Leukocytes, Leukemoid Reaction.

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INTRODUCTION

A leukemoid reaction is defined as a significant increase in white blood cell count. Most studies adhere to the cut-off value of 50,000/mm3.[1] It can be a paraneoplastic manifestation of a variety of cancers.[2] Other causes include stress, infection, surgery, severe haemorrhage or acute haemolysis and inflammation.[3] The inflammatory response to cardiac surgery is well known. Not much is known and studied about the incidence and course of leukemoid reactions.[4] Here we are presenting a case of leukemoid like reaction in post-operative cardiac surgery, the incidence of leukemoid reactions is below 1%.

CASE REPORT

A 51-year-old female, known case of hypertension, was admitted to the cardiology ward due to angina (Canadian Cardiovascular Society Grade-II). The patient was diagnosed with double vessel disease based on angiography. Echocardiography revealed good left ventricular function with an ejection fraction of 55%. The physical examination, along with the pre-operative investigations, were all unremarkable. Therefore, the patient was planned for coronary artery bypass grafting surgery (CABG) and was admitted under cardiac surgery department. She was revascularized using the left internal mammary artery and a left great saphenous vein graft. The duration of cardiopulmonary bypass (CPB) was 176 minutes (aortic cross-clamp time of 87 minutes). Surgery went well, without any intraoperative complications, and the patient remained haemodynamically stable thereafter. She was extubated within 120 minutes in the surgical ICU. Investigations done on the day of surgery revealed mild leukocytosis (12,300/mm3) with significant neutrophilia (85.15%), lymphocytosis (3.3%), and monocytosis. The chest X-ray revealed mild basal atelectasis, which is a common complication in post-CABG patients.[5] Urine analysis was normal. On the first post-operative day, the leukocytes increased to 40600/mm3, which further elevated to 46000/mm3 on the second day. First-line (cefoperazone + sulbactam, meropenem) antibiotics were switched to second-line (linezolid, piperacillin + tazobactam) due to rising total leukocyte count (TLC), assuming ongoing infection. The patient was asymptomatic throughout the course. The blood, urine, and sputum cultures were sent and showed no growth in 48 hours. Laboratory analysis for infectious (bacterial and parasitic) causes yielded no positive results. The TLC count increased to 48,000/mm3 on the third day and 49,000/mm3 on the fourth day after the operation, still with no signs of infection.

C-reactive protein level was marginally increased at 21 mg/L. Peripheral blood smear showed a significant increase in white blood cells, mainly

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neutrophils, with a slight shift towards immature forms such as myelocytes and band forms. Reactive lymphocytes were also found. Red blood cells were primarily of normal size, and platelets were present in sufficient numbers. Additional examinations, such as serum procalcitonin tests, were not conducted because of constraints in resources and delays in reporting. Chest X-rays and ultrasound abdomen revealed no abnormality. The chest, abdomen, and pelvis computed tomography (CT) were postponed and were planned to be obtained at the follow-up.

On the sixth post-operative day, the TLC began to decrease to 33000/mm3 (neutrophils 93.69%, lymphocytes 3%, and monocytes 1.26%). Thus, a provisional diagnosis of leukemoid-like reaction post-CABG was made and the patient was discharged with a follow-up appointment one week later. On her next visit, the TLC was 7800/mm3, with neutrophils 77.72%, eosinophils 0.31%, monocytes 6.5%, and lymphocytes 14.98%, confirming the diagnosis of a leukemoid-like reaction. After discussion with the multidisciplinary team, further investigations were not performed.

DISCUSSION

The leukemoid reaction was first reported in 1926 by Krumbhaar.[6] However, due to its rare incidence, investigating the pathogenesis of the leukemoid reaction has remained difficult.[4,7] Leukemoid reactions in a postoperative cardiac patient are concerning for infections or un-masked haematological malignancies.[4] In cardiac surgery, it can be caused by inflammation due to the combination of surgical trauma and the cardio-pulmonary bypass circuit, causing ischemic reperfusion injury.[9] Talking about the case, there was an increase in TLC without a known source; all the investigations were unremarkable for infections, so we labelled it as a leukemoid-like reaction based on previous literature by Padmakumar *et al*.[8] This case report brought to attention that leukemoid-like reactions in post-cardiac surgery must be kept in mind in cases of extremely elevated TLC.[10] It is not only going to improve the clinical skills of doctors, but it will also benefit the patient by preventing the unnecessary administration of antibiotics, preventing prolonged hospital stays, and reducing financial costs, especially in setups where patients are non-affordable.

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Authors' Contribution

Following authors have made substantial contributions to the manuscript as under:

UA & MS: Data acquisition, data analysis, critical review, approval of the final version to be published.

JAK & IAK: Study design, data interpretation, drafting the manuscript, critical review, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

REFERENCES

1. Hoffman R. Hematology: Basic Principles and Practice. 4th ed. Elsevier Churchill Livingstone; 2005. Available from: https://doi.org/10.1016/B978-0-443-06619-3.X5001-6
2. Robinson WA. Granulocytosis in Neoplasia. Ann N Y Acad Sci 1974; 230(1): 212-218. https://doi.org/10.1111/j.1749-6632.1974.tb20531.x
3. Sakka V, Tsiodras S. Update on Etiology and Diagnostic Evaluation of Leukemoid Reaction. Eur J Intern Med 2006; 17(6): 394-388. https://doi.org/10.1016/j.ejim.2006.03.013
4. Halkes CJ, Dijstelbloem HM, Eelkman Rooda SJ, Kramer MH. Extreme Leucocytosis: Not Always Leukemia. Neth J Med 2007; 65(7): 248-251. https://doi.org/10.1016/S0300-2977(07)70117-6
5. Tanner TG, Colvin MO. Pulmonary Complications of Cardiac Surgery. Lung 2020; 198(6): 889-896. https://doi.org/10.1007/s00408-020-00393-9
6. Krumbhaar EB. Leukemoid Blood Pictures in Clinical Conditions. Am J Med Sci 1926; 172(4): 519-532. https://doi.org/10.1097/00000441-192610000-00005
7. Granger JM, Kontoyiannis DP. Etiology and Outcome of Extreme Leukocytosis. Cancer 2009; 115(17): 3919-3923. https://doi.org/10.1002/cncr.24444
8. Padmakumar G, Ravikrishnan J, Jayakumar P, Prasad K. Leukemoid-like Reaction in Post-CABG Patient. Indian J Anaesth 2014; 58(3): 315. https://doi.org/10.4103/0019-5049.130794
9. Drury NE, Ali A, Mussa S, Webb ST, Rege KP, Wallwork J. Acute Leukaemoid Reaction Following Cardiac Surgery. J Cardiothorac Surg 2007; 2: 1-3. https://doi.org/10.1186/1749-8090-2-1
10. Portich JP, Faulhaber GA. Leukemoid reaction: A 21st-century cohort study. Int J Lab Hematol 2020; 42(2): 134-139. https://doi.org/10.1111/ijlh.13172