Case report

Anesthetic Management of a Patient with Reactive Thrombocytosis due to Post-Trauma Splenectomy in a Patient Requiring Further Corrective Surgeries: A Case Report

Soumily Bandyopadhyay[1], Abhishek Singh[1], Babita Gupta[1]

Abstract

Thrombocytosis poses hemostatic and bleeding risks, especially in the perioperative period and in the presence of other risk factors. There is no defined upper cut-off limit for platelet count for elective surgeries and ideal mode of anesthesia in these patients, especially in reactive thrombocytosis. A 22-year-old male will be described with thrombocytosis post-splenectomy after trauma and was scheduled to undergo an open reduction and internal fixation (ORIF) procedure for the shaft of a femur fracture. Hematology evaluation was sought and the decision to go ahead with the surgery was taken since the patient had no symptoms or signs of thrombosis or bleeding and the surgery was urgent which would help the patient to mobilize early and prevent further risk. Informed written risk consent was obtained from the patient about the risk of thromboembolism perioperatively. Perioperative measures for thromboprophylaxis were taken and the procedure was done uneventfully under spinal anesthesia. Postoperatively Hydroxyurea was started and after an uneventful hospital course, he was discharged and asked to follow up in the hematology outpatient department (OPD). There are conflicts on the use of neuraxial anesthesia in patients with thrombocytosis. The risk of bleeding and thrombosis is considerably less in reactive etiology and hence we decided to go ahead with spinal anesthesia. Also, none of the studies have defined the upper safe limit of platelet count that is to be accepted for elective surgeries. Further studies are needed in patients with thrombocytosis undergoing urgent or emergent surgeries where deferring surgeries for optimizing platelet count is not an option to understand the risks associated and the suitable method of anesthesia.

1. Department of Anaesthesia, Pain Medicine and Critical Care, All India Institute of Medical Sciences, New Delhi, India

Corresponding Author:
Dr Abhishek Singh, Department of Anaesthesia, Pain Medicine and Critical Care, All India Institute of Medical Sciences, New Delhi, India
Email: bikunrs77@gmail.com

Keywords: Platelet count; Reactive thrombocytosis; Splenectomy; Bleeding; Thromboembolism; Perioperative period

Please cite this article as: Bandyopadhyay S, Singh A, Gupta B. Anesthetic Management of a Patient with Reactive Thrombocytosis due to Post-Trauma Splenectomy in a Patient Requiring Further Corrective Surgeries: A Case Report. J Cell Mol Anesth. 2023;8(3):214-7. DOI: https://doi.org/10.22037/jcma.v8i3.39601

Introduction

Thrombocytosis, defined as platelet counts (PC) >450,000/μL, maybe a preoperative finding during blood tests in patients presenting for surgery. It may be primary or clonal and secondary or reactive based on

its etiology. Primary thrombocytosis is associated with disorders of hematopoietic stem cells such as chronic myeloproliferative or myelodysplastic disorders including essential thrombocythemia, polycythemia vera, chronic myelogenous leukemia, and myelofibrosis. It is characterized by abnormalities in bone marrow morphology, platelet structure, and platelet function, resulting in an increased risk of bleeding and thromboembolism (1). Spontaneous bleeding resulting in haematuria, hemoptysis, melena, and epistaxis or arterial thrombosis leading to limb-threatening gangrene, cerebrovascular ischemia, mesenteric ischemia, and pulmonary embolism, etc are also known (2).

Reactive thrombocytosis, the most common form of thrombocytosis occurs in infection, tissue damage, chronic inflammatory disorders, malignancy, and hyposplenism. This is thought to result from a systemic acute-phase reaction leading to the overproduction of thrombopoietic factors that act on megakaryocytes or their precursors (1). It is a relatively benign condition with normal bone marrow, platelet structure, and function and usually does not require any intervention; however, the cause should be investigated and treated along with regular platelet count monitoring. Splenectomy is one of the main causes of extreme reactive thrombocytosis, with the platelet count peaking at 1 to 3 weeks and gradually returning to normal levels within a few months (1). Post-splenectomy thrombosis has mostly been reported in portal, mesenteric, and splenic veins. Myocardial infarction is rare and occurs mainly in patients with essential thrombocytosis (1).

However, extreme numbers>1000,000/μL are uncommon and may be encountered in myeloproliferative diseases or post-splenectomy (1). Regardless of the cause, thrombocytosis might result in hemostatic complications in the perioperative period; hence it should not be overlooked and a thorough understanding of its management and consequences is important.

Case Report

A 22-year-old male patient arrived at the emergency department as a non-responder due to a road traffic accident. The patient underwent a splenectomy on the same day and was transferred to the intensive care unit (ICU). The patient did not have any comorbidities. After three days of mechanical ventilation, the patient was extubated. Subsequently, he underwent orthopedic surgery for a fracture of the neck of the femur under combined spinal epidural anesthesia on the 8th day of admission which was uneventful. On the 15th day of admission, he was scheduled for an open reduction and internal fixation procedure for a left distal femur fracture. Upon evaluation, he was found to have a PC of 2,415,000/μL. On further evaluation, his platelet count was noted to have a gradually increasing trend from the 3rd day of admission, with a baseline value of 101,000/μL. The rest of the investigations were within normal limits. The most likely diagnosis was reactive thrombocytosis secondary to splenectomy. The patient was enquired about any bleeding episodes or history of headache, visual disturbances, or chest or abdominal pain and it was confirmed that there were none. General and systemic examination revealed no abnormalities. The patient was receiving tab aspirin 75 mg once daily. An urgent hematology evaluation was asked, which stated that the surgery should be performed only if it was an emergency/urgent case under consent for a high risk of perioperative thromboembolism (MI, stroke, etc). As the clinical scenario was consistent with reactive thrombocytosis, no bone marrow examination was performed. They had further asked to continue taking aspirin and undertake perioperative thromboprophylaxis measures such as pneumatic compression devices. We could not find any guidelines regarding the upper limit of platelet count that was allowable for surgeries or any studies related to the specific anesthetic plan to follow in such cases where surgery cannot be deferred for optimization of platelet count. Since our patient was asymptomatic and after discussion with the surgeons, it was decided to consider the case as it would allow early mobilization of the young patient, which would help in reducing the risk of perioperative thrombosis. We decided to proceed with spinal anesthesia for the above procedure at a platelet count (PC) of 2415,000 because hemorrhagic complications are known to occur in essential thrombocytosis, but not in reactive thrombocytosis. Adequate perioperative hydration was ensured. We closely monitored the patient intraoperatively for any electrocardiogram (ECG)

changes and drop in saturation or Glasgow coma scale (GCS). The procedure was uneventful. Postoperatively, the patient was monitored in the recovery room for 2 h and then sent to the ward and asked for a hematology follow-up. The patient was started on hydroxyurea postoperatively and aspirin was continued. His PC dropped to 1000000 on postoperative day (POD) 8 after starting hydroxyurea, following which he was operated on for a fracture of both bones left forearm under supraclavicular brachial plexus block without any complications. Despite continuing treatment, his PC increased to 1468000 on POD 10. However, the course at the hospital was uneventful and he was discharged on POD12 and asked for a hematology follow-up.

Discussion

The main concern for anaesthesiologists when managing patients with thrombocytosis is to identify those at high risk and initiate appropriate measures. The incidence of hemostatic and hemorrhagic complications associated with reactive thrombocytosis is less than that associated with primary thrombocytosis (3). But due to the presence of prothrombotic risk factors, such as perioperative period, malignancy, age >60 years, counts greater than 1500,000/μL, prior history of thrombosis or hemorrhage, and coexisting cardiovascular disease, the incidence of thrombosis increases (2). Digital gangrene following radial artery catheterization and postoperative pulmonary thromboembolism have been reported (2). In patients with symptomatic disease, extreme thrombocytosis, and risk factors for thrombosis, elective surgery is deferred and they are started on therapy with low-dose aspirin (100-150 mg/day) and platelet-lowering drugs to target a PC <400,000/ μL (2). However, no specific cut-off value for the upper limit of platelet count that is acceptable for surgeries has been defined. Hydroxyurea, which is the treatment of choice in essential thrombocytosis is also used to lower the platelet count in secondary causes. However, thrombocytosis post-splenectomy is more resistant to treatment, and multiple-dose adjustments and longer treatment are required compared to other etiological conditions (5). Plasmapheresis may be performed for the rapid reduction of platelet count in life-saving clinical situations and evidence of ischemia (1). In emergency surgeries where it is not advisable to wait for the platelet lowering drugs to function, perioperative thromboprophylaxis such as adequate hydration, early postoperative ambulation, use of mechanical thromboprophylaxis measures like pneumatic compression devices, compression stockings, and pharmacological prophylaxis with aspirin should be ensured (2). Surgical blood loss and postoperative infection may worsen thrombocytosis and should be promptly managed (2).

There have been case reports on anesthesia in patients with essential thrombocytosis, but not in those with reactive thrombocytosis (2-4). There are no large-scale studies related to this topic. The case reports have suggested choosing the method of anesthesia based on preoperative platelet count, aggregation studies, and history of bleeding episodes. Neuraxial anesthesia is not contraindicated if the investigations are normal and there is no history of bleeding episodes. Kimura et al reported two cases of essential thrombocytosis. They used a combination of general anesthesia (GA) and epidural in the first patient with a normal platelet count after myelosuppression therapy. In the second case, as the platelet count was deranged, they chose only GA (4). Garcia et al reported the use of spinal anesthesia in a patient with essential thrombocythemia with normal preoperative investigations. However, Meyer et al reported a case of massive hemorrhage in a patient with thrombocythemia and an elevated platelet count following multiple epidural punctures. In another report by Bharat et al, they used general anesthesia along with femoral-sciatic nerve block in a patient who had undergone total knee arthroplasty with suspected essential thrombocytosis and with an elevated platelet count (4).

In our study, we proceeded with the surgery since it was an urgent procedure and the patient was asymptomatic and already receiving aspirin prophylaxis. The risk of thrombosis is low in patients receiving aspirin, despite a high platelet count (5). Spinal anesthesia was used as the chances of hemostatic and bleeding complications are known to be much lower in reactive etiology. Further studies are needed to evaluate and define the upper cut-off level of platelet count that is acceptable for elective surgeries

and the ideal method of anesthesia in patients with primary and reactive thrombocytosis.

Conclusion

There are no guidelines on the acceptable upper limit of platelet counts in elective surgeries and further large-scale studies are needed. The choice of anesthesia should be decided on a case-to-case basis, depending on the urgency of the surgery and the patient's history and investigations.

Acknowledgment

None.

Conflicts of Interest

The authors declare that there are no conflicts of interest.

References

1. Khan PN, Nair RJ, Olivares J, Tingle LE, Li Z. Postsplenectomy reactive thrombocytosis. Proc (Bayl Univ Med Cent). 2009;22(1):9-12.
2. Kiro K, Ganjoo P, Saigal D, Hansda U. Incidental thrombocytosis: Should it concern the anesthesiologist? J Anaesthesiol Clin Pharmacol. 2014;30(2):281-3.
3. Wajekar AS. Anaesthesia management in a patient with severe idiopathic thrombocytopaenia with antepartum haemorrhage for emergency caesarean section. Indian J Anaesth. 2015;59(10):689-90.
4. Bharath Kumar T, Madhusudan P. Anesthesia for a patient with thrombocytosis. Saudi J Anaesth. 2013;7(4):480-1.
5. Sarbay H, Akbayram S. Secondary severe thrombocytosis in a patient who underwent splenectomy due to hereditary spherocytosis and its treatment using hydroxyurea. Pan Afr Med J. 2019;32:175.