



## Case Report

## Anaesthetic considerations in a case of post splenectomy reactive thrombocytosis

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## ABSTRACT

Traumatic injuries or haematological disorders are prime causes of splenectomy. Splenectomy increases the susceptibility to infections and pneumonia. We report a case report of preoperative incidental finding of postoperative reactive thrombocytosis, its importance, possible side effects and preventive and therapeutic management of its complications.

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## 1. Introduction

Splenectomy is usually performed for patients with severe splenic trauma, portal hypertension, splenomegaly due to hematologic diseases, or splenic tumors. Although the most commonly recognized sequela includes increased susceptibility to infections and pneumonia, recently, reactive thrombocytosis is being acknowledged as a potential post-splenectomy complication.<sup>1</sup> Thrombocytosis can be mild (500,000–700,000/mm<sup>3</sup> platelet count), moderate (700,000–900,000/mm<sup>3</sup> platelet count), severe (>900,000/mm<sup>3</sup> platelet count) or very severe (>1,000,000/mm<sup>3</sup> platelet count). Though reactive thrombocytosis is an incidental laboratory finding and is self limiting in most of the cases, it can lead to serious complications like thrombosis or haemorrhage. It can be lethal with acute thrombotic events like acute myocardial infarction, mesenteric vein thrombosis and pulmonary embolism. So, it is extremely important to take appropriate measures in order to avoid such major catastrophe. Measures like early mobilisation and adequate hydration are highly effective. Antiplatelet drugs can be

prophylactically used to avoid thrombo-embolic events. Some cases may require platelet lowering drugs also.

## 2. Case Report

We report a case of 19 year old female, who sustained road traffic accident with splenic laceration, fracture of pubic symphysis and bilateral mandibular fracture. For that she underwent splenectomy and external fixator application of pubic symphysis 15 days back and was now posted for open reduction and internal fixation of the mandibular fracture. On routine preanaesthetic check up, no other significant history pertaining to features suggestive of thrombo-embolism, was revealed. Her vitals were stable and all other blood reports and urine test were within normal limits except the platelet count which was found to be elevated to 8 lakhs/cumm. Considering the possibility of a laboratory error, we asked for a repeat count as well as a manual count to rule out fragmented red blood cells. Repeat platelet count done reported a further elevation to 10 lakhs/cumm. Noting the fact that patient had splenectomy 2 weeks before led to the diagnosis of post splenectomy reactive thrombocytosis was made and physician intervention sought. As the injury was 2 weeks back and total leukocyte count and

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urine routine and microscopy were normal, infection and inflammation as the cause of secondary thrombocytosis were ruled out. The surgery was deferred and patient was started on subcutaneous injection of low molecular weight heparin (enoxaparin 40 mg subcutaneous twice a day) in view of the rising trend of platelet count (up to 16 lakhs/cumm by now) and newly developed symptom of calf pain. The ultrasound Doppler of bilateral lower limbs done to check for vascularity of bilateral lower limbs was reported to be normal. Adequate hydration was maintained and the serial platelet counts started a declining trend. Enoxaparin was stopped after a week of administration and patient was taken up for surgery when the platelet count reduced to 5.5 lakhs/cumm. Routine standard anaesthesia was administered and care was taken to maintain good hydration throughout. Peri operative period was uneventful with no adverse thromboembolic event. She was advised for mobilisation and increased fluid intake at the time of discharge.

### 3. Discussion

The normal platelet count in adult ranges from 1.5 to 4.5 lakhs/cumm. Essential or primary thrombocythemia refers to increased platelet count due to mutations in the genes. It is a diagnosis of exclusion and is less common than secondary thrombocytosis. Reactive thrombocytosis refers to increased platelet count in response to either infection or trauma or surgery. Usually the count comes to normal value once the underlying condition is resolved. As normally spleen is a major site of destruction of platelets, splenectomy has been found to be one of the major cause of secondary thrombocytosis. Reactive thrombocytosis has been found in 3% to 13% of patients who had undergone splenectomy. Platelet counts after splenectomy have been reported to increase from 30% to 100% leading to a hypercoagulable state.<sup>2</sup> The increase in platelet count starts about 2 days following splenectomy, peaks at around 1 to 3 weeks and returns to normal levels in weeks, months or sometimes years. Iron deficiency and hemolytic anemia and cancer (lung, gastrointestinal, breast or ovarian cancer or lymphoma) can also cause thrombocytosis. As our patient underwent Splenectomy 15 days back, we had a high suspicion of diagnosis of post splenectomy reactive thrombocytosis.

Often patients are asymptomatic. Some may complain of headache, confusion, weakness, chest pain, shortness of breath, or nose bleeds, bloody stool, bruising, bleeding from mouth or gums. All these are suggestive of either blood clots or haemorrhage. Our patient developed calf pain for which ultrasound Doppler of bilateral lower limbs was done to rule out deep vein thrombosis.

Both essential thrombocythemia and secondary thrombocytosis can form blood clots obstructing the blood flow to major organs. These blood clots

can result in serious complications including venous thromboembolism, stroke, transient ischemic attack, myocardial ischemia and infarction. It can also cause some types of leukemia. Recent observational studies have reported that extreme thrombocytosis (platelet counts >600 to 800 K/ $\mu$ L) is associated with an increased risk for venous thromboembolism and may cause thrombotic events such as acute myocardial infarction, mesenteric vein thrombosis, and pulmonary embolism in patients after major trauma.<sup>3</sup> The overall incidence of venous thromboembolism, including DVT and pulmonary embolism, ranges from 12% to 29% among patients who have undergone splenectomies. In a large review of more than 37000 autopsies, the odds of fatal pulmonary embolism were 5-fold higher in persons with previous splenectomy compared with matched controls not having had splenectomy but with comparable trauma or similar surgery.<sup>2</sup> In a retrospective study of 120 patients with haematological disease who underwent splenectomy, 2.9% patients developed thrombosis post splenectomy.<sup>4</sup>

Since post splenectomy thrombocytosis is usually mild and transient, repeat counts with optimization of hydration is all that may be required in most cases. Some authors recommend starting antiplatelet agents for splenectomized patients with platelet counts greater than 15 lakhs/cumm only if there are additional cardiovascular risk factors. Aspirin is the drug of choice for the prevention of blood clots. It is most commonly used sole drug in patients who have low risk of developing thrombosis. For extreme thrombocytosis with evidence of arterial or venous thrombosis, patient may need cytoreductive agents like hydroxyurea and anagrelide. Interferon alpha is a platelet lowering drug not much used now owing to its serious side effects. Peri operative thromboprophylactic measures include maintaining good hydration to decrease hyper viscosity, ensuring early mobilisation, use of compression stockings which was ensured in our patient. Pharmacological thromboprophylaxis includes use of low molecular weight heparin, warfarin and aspirin. Currently there are no guidelines or recommendations on routine use of thromboprophylaxis in patients who have post splenectomy thrombocytosis. As reactive thrombocytosis has been shown to be an independent risk factor for thrombosis in patients otherwise at high risk for thrombosis, including trauma patients, the western trauma association 2020 algorithm recommended that most trauma patients should be initiated on early and higher doses of enoxaparin.<sup>5</sup> Accordingly our patient was started on enoxaparin prior to surgery and any untoward side effects were avoided. Sarbay et al suggested that treatment is not required in patients who are asymptomatic and have a platelet count below 1,500,000/mm<sup>3</sup> after splenectomy. However, their further research concluded that the use of low-dose hydroxyurea in patients with very severe thrombocytosis can reduce the platelet count and the

associated risk of developing thrombosis to safe levels.<sup>6</sup> In cases of emergencies including stroke due of primary thrombocythemia, plateletpheresis is done to immediately lower the platelet count.

#### 4. Conclusion

Patients with post splenectomy reactive thrombocytosis can have serious anaesthetic implications and although they usually undergo complication free surgeries if no other pro thrombotic risk factors are present, it is still prudent to implement basic peri operative thromboprophylaxis measures in all surgical patients with post splenectomy reactive thrombocytosis.

#### 5. Source of Funding

None.

#### 6. Conflict of Interest

None.

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