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Splenectomy in a Patient with Idiopathic Thrombocytopenic Purpura and Critical Thrombocytopenia of 1,000/mm³: A Case Report

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Abstract
Chronic idiopathic thrombocytopenic purpura (ITP) is an autoimmune disorder characterized by low platelet counts due to increased destruction and impaired production. A 24-year-old male from Kashmir presented with bleeding gums, nosebleeds, petechiae, and oral ulcers. Initial evaluation revealed critical thrombocytopenia (platelets: 45,000/mm³) and positive antinuclear antibodies, consistent with ITP. Despite treatment with steroids, rituximab, and IVIg, his platelet count dropped to 1,000/mm³, necessitating laparoscopic splenectomy. A multidisciplinary approach ensured preoperative stability. The surgery, marked by controlled blood loss (350–250 mL), improved platelet counts postoperatively (75,000/mm³). This case underscores the challenges of splenectomy in severe ITP and the importance of comprehensive care.

Keywords: Idiopathic thrombocytopenic purpura, Severe thrombocytopenia, Splenectomy, Multidisciplinary care, Platelet count management

Introduction:

Thrombocytopenic purpura triggered by immune system responses is an autoimmune disorder which is typified by the destruction of platelets mediated by the immune system leading to thrombocytopenia (platelet count < 100 x 10^9/L) when there are no other known causes. As per epidemiological research, incidence rates of ITP vary from 1.1-5.8 cases per 100,000 children and 1.6-3.9 cases in 100,000 adults (2). ITP can be further classified into primary (idiopathic) and secondary types that are linked with other conditions such as infections, autoimmune diseases or drug use (1-2).

In autoimmune thrombocytopenic purpura (ITP), as described in the pathophysiologic theory, this happens when there is an antibody that targets the glycoproteins in the surface of platelets leading to quicker destruction of platelets by splenic macrophages and reduces their production (4). In patients with ITP, fatigue that results from low platelet count is common. Yet often unnoticed feelings have a great impact on health related quality of life (HRQOL), including aspects of the patients' feelings and functional abilities: it causes anxiety, fear and frustration. Bleeding control is usually emphasized by physicians while neglecting these important patient reported outcomes (4). The most commonly used initial

ITP treatments are corticosteroids and intravenous immunoglobulin (IVIG) aimed at increasing platelet count quickly and controlling any bleeding that may occur (5). However, when first-line therapies are ineffective in chronic and refractory cases of ITP, they become a major therapeutic challenge.

Chronic ITP has long been treated by splenectomy as the second line therapy and is done when patients do not respond or relapse after medical therapy (6). Splenectomy has the potential to increase platelet count in the long term for most patients, but it also comes with risks especially for those who are critically thrombocytopenic.

The complexities and complications of splenectomy in a patient with chronic idiopathic thrombocytopenic purpura (ITP) presenting with severe thrombocytopenia are highlighted in this case report. The aim is to elucidate on its surgical management while stressing on a holistic perspective that encompasses clinical outcomes and HRQOL.

Case Presentation

In April 2024, a man aged twenty-four from went to see the surgeon at the hospital's surgical outpatient clinic complaining of bleeding gums and frequent nose bleeding spells. An examination revealed petechiae, facial rash, and oral ulcers. He was found to have blood pressure of 120/70 mmHg with a pulse rate of 74 beats per minute. The patient also had a fever of 101 degrees Fahrenheit (F), Glasgow Coma Scale (GCS) score was 15 out of possible 15 and he had no known comorbidities. Differential diagnoses based on his clinical history and examination are thrombotic thrombocytopenic purpura (TTP), drug induced thrombocytopenia, systemic lupus erythematosus (SLE).

Table 1: Laboratory Diagnosis

Test	**Result**	**Reference Range**
WBC	27.7	4000-10000 /uL
RBC	4.33	3.8-4.8 (10^6 /uL)
Haemoglobin	12.7	12-15 (g/dl)
Hematocrit	36.5	36-46 (%)
MCV	84.3	83-101 (fL)
MCH	29.3	27-32 (pg)
MCHC	34.8	31.5-34.5 (g/dl)
RDW-SD	41.9	39-46 (fL)
Platelets	45	150-410 (10^3/uL
Neutrophils	84.6	40-60 (%)
Lymphocytes	6.6	25-45 (%)
Serum Bilirubin	0.9	< 8.8 (mg/d)l
Serum ALT	36	10-45 (u/L)
Serum AST	24	10-45 (u/L)
Serum ALP	213	< 280 (u/L)
Serum Creatinine	1.3	0.7-1.3 (mg/dl)
Antinuclear Antibody	Positive	Negative
Anti-double-stranded DNA Antibody	Negative	< 30 IU/mL

Legend: WBC: White Blood Cells, RBC: Red Blood Cells, MCV: Mean Corpuscular Volume, MCH: Mean Corpuscular Hemoglobin, MCHC: Mean Corpuscular Hemoglobin Concentration, RDW-SD: Red Cell Distribution Width - Standard Deviation, ALT: Alanine Aminotransferase, AST: Aspartate Aminotransferase, ALP: Alkaline Phosphatase, /µL: Units per microliter, 10^6/µL: Millions per microliter, fL: Femtoliters, pg: Picograms, g/dL: Grams per deciliter, 10^3/µL: Thousands per microliter, U/L: Units per liter, mg/dL: Milligrams per deciliter, %: Percentage.

PBF showed RBCs that had decreased density, exhibiting a normocytic normochromic pattern with few microcytic hypochromic cells and occasional macrocytes. Marked thrombocytopenia

was observed. During his stay in the hospital, he was treated with steroids, which increased his platelet count to 80,000/mm³ before he was discharged and put on hematology follow-up. A dose of 375 mg/m2 of rituximab together with steroids were also administered.

In June 2024, the patient sought admission again for similar symptoms; this time round however his platelet count dropped down to 5,000/mm³. IV Ig was administered but there was no improvement in platelet levels leading to an eventual decision for laparoscopic splenectomy. Over this period, he continued taking regular treatment as prescribed by a hematologist. One week prior to surgery; his platelet count reached critically low levels of 2,000/mm³ although there were no signs of spontaneous bleeding. To combat this he received one unit of single-donor apheresis platelets.

A multidisciplinary pre-operative approach had been used that included the surgical team, clinical hematologist and anesthesia team. On the surgical day his platelet count was further dropped to 1,000/mm³. He was given 200 ml of single-donor apheresis platelets 1.5 hours prior to surgery along with intravenous antibiotics 30 minutes before. His arrival in the operating room (OR) was marked by connecting him to a multi-channel monitor. The pre-operative vitals showed a heart rate of 80 bpm, blood pressure of 125/85 mmHg and oxygen saturation (SpO2) of 98%. A 20G IV cannula was already in place and another secured. Before induction the patient received 200 ml of single-donor apheresis platelets and also intravenous dexamethasone 10 mg, hydrocortisone 100 mg as well as methylprednisolone 1 g. A 16F Foley's catheter was inserted without any complications.

In the course of surgery, the surgeon isolated and ligated splenic artery and vein to control bleeding before detaching and removing the spleen from its attachments. The surgical field was examined for bleeding or any remaining splenic tissue but bleeding persisted from its site. The operation took three hours during which time all patients' vital signs were kept normal. The incision may be closed with either sutures or staples; afterward the patient was taken to a recovery area for monitoring.

350-250 ml blood loss was estimated. Thus, 3 liters of crystalloids and 1 unit of packed red blood cells (PRBCs) were given. The patient's urine output was 1,000 ml without any signs of hematuria recorded. On repeat CBC after ligation of splenic vessels platelet count was 45,000/mm³ and hemoglobin (Hb) was 11.1 g/dl. Throughout the procedure, the patient remained hemodynamically stable. At the end of the surgery, he received ondansetron intravenously as an antiemetic at a dose of 8 mg. He was then shifted to ICU for further monitoring purposes. Postoperative CBC results indicated an improvement in the patient's laboratory values after splenectomy operation had been conducted on it. However, it remained elevated than preoperative levels suggesting a reduction in inflammatory response or infection; white blood cell (WBC) count dropped down significantly from its previous record a day ago. The red blood cell (RBC) count remained stable and within normal ranges; thus no significant blood loss or anemia observed post-surgery according to these parameters: hemoglobin levels were constant which suggests that this patient is not anemic at present moment . Mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH), and mean corpuscular hemoglobin concentration (MCHC) have all stayed within their respective norms indicating that there have been little changes among indices related to red cell population size and its state respectively over this period of time". The most striking thing about (normal)cytoplasmic fragments is their insignificant amount and therefore their relative importance remains undetermined. However, increase in platelet counts was statistically significant demonstrating positive response towards surgical intervention and postoperative care (Table 2).

Table 2:Postoperative Laboratory Results

Test	Results	Reference Range
WBC	22.5	4000-10000 /uL
RBC	4.38	3.8-4.8 (10^6 /uL)

Haemoglobin	12.6	12-15 (g/dl)
Hematocrit	36.9	36-46 (%)
MCV	84.2	83-101 (fL)
MCH	28.8	27-32 (pg)
MCHC	34.1	31.5-34.5 (g/dl)
RDW-SD	43.3	39-46 (fL)
Platelets	75	150-410 (10^3/uL
Neutrophils	79.7	40-60 (%)
Lymphocytes	11.8	25-45 (%)

Legend: WBC: White Blood Cells, RBC: Red Blood Cells, MCV: Mean Corpuscular Volume, MCH: Mean Corpuscular Hemoglobin, MCHC: Mean Corpuscular Hemoglobin Concentration, RDW-SD: Red Cell Distribution Width - Standard Deviation, /µL: Units per microliter, 10^6/µL: Millions per microliter, fL: Femtoliters, pg: Picograms, g/dL: Grams per deciliter, 10^3/µL: Thousands per microliter, U/L: Units per liter, mg/dL: Milligrams per deciliter, %: Percentage.

Discussion

Immune thrombocytopenic purpura (ITP) is a disorder that is characterized by an abnormally low platelet count caused by immune-mediated destruction. A case of a 24-year-old man who presented with ITP reveals several important facets of diagnosis and management, especially in patients not responding to conventional treatments like steroids and intravenous immunoglobulin (IVIg). The patient' s initial clinical picture consisted of bleeding gums and nose while he had always a low platelet count suggestive of severe ITP. In spite of vigorous medical treatment including usage of high-dose steroids and IVIg, the condition never improved much prompting the need for surgical intervention.

Splenectomy is highly regarded as an option for ITP Patients who have failed medication treatment. This patient had their platelets increase after initially being put on steroids but they then deteriorated fast enough to earn them a position on the priority list for a laparoscopic splenectomy. According to multiple studies, about 60% of adult ITP patients will stay remitted after having their spleen removed, especially if they didn't respond to first line therapy (7). The rationale behind this surgical procedure is that it removes the main place where platelets are destroyed and antibodies produced thus diminishing the autoimmune attack against these cells (8).

However splenectomy still has its challenges since moving forward with it especially on severe thrombocytopenia might prove difficult. In this context; we employed a multidisciplinary approach involving surgical teams, hematologists and anesthetists so as to minimize perioperative risks such as bleeding or infections. This procedure was necessary before surgery as he was given platelet transfusions and corticosteroids so as to optimize his condition (9). Studies indicate that compared to random donor platelets, single-donor apheresis platelets are associated with better outcomes in patients who are severely thrombocytopenic during preoperative setting.

Post operative courses demonstrated considerable rise in platelet counts vis-a-vis successful splenectomy among them depending on what they found out about their study conducted a few years back (10). Nevertheless, it is important to state here that splenectomy cannot be viewed as a definitive treatment for ITP since some patients have relapsed or might still need more treatment. Logically mentioned elevated white blood cells and neutrophils may suggest an inflammation response or reaction from surgical operation(11).

The clinical picture presented by this patient including petechiae, a facial rash and oral ulcers called for a broad differential diagnosis. Initially, conditions such as thrombotic thrombocytopenic purpura (TTP), drug-induced thrombocytopenia, systemic lupus erythematosus (SLE) were considered because of their similar clinical features that overlapped. This therefore illustrates that thorough diagnostic evaluation is essential in patients who come with thrombocytopenia and systemic symptoms because misdiagnosis may lead to inappropriate management (12).

Long-term follow up after splenectomy in ITP patients is very important. While there is high initial success rate for surgery, patients remain at

risk for infections especially from encapsulated organisms due to splenic dysfunction (13).To reduce this risk preoperatively or as soon as possible after splenectomy, vaccination against pneumococcus and meningococcus and Haemophilus influenzae type b are recommended (14).

May be in conjunction with steroids in the treatment course of this patient and has been used in refractory ITP cases. Antibody production against platelets may be reduced with rituximab, an immunosuppressant, but its role in ITP management remains unclear and requires more research (15).

Lastly, the complications associated with managing ITP in young patients suffering from severe and refractory diseases are well demonstrated by this case. Thus, splenectomy was chosen as it improved the patient's platelet count significantly and also enhanced their overall clinical condition. In order to improve ITP care, further investigation into new therapies and long-term results of splenectomy is necessary (16).

Conclusion

Illustrative of the complexities involved in administering treatment for patients suffering from immune thrombocytopenic purpura (ITP), this case report details a patient who failed to respond to conventional approaches. Although steroids led to initial improvements, the patient later relapsed and had critical thrombocytopenia, requiring splenectomy with an incredibly low platelet count. This was successfully done using a multidisciplinary team that included careful preoperative optimization and surgical management. However, while splenectomy with extremely low platelets is useful in some duty cases, it highlights the need for individualized interventions and careful monitoring during ITP management to mitigate relapse risk and other associated complications.

Consent for Publication:

A written informed consent was obtained from the patient for the publication of this case report and any accompanying images. The patient was fully informed of the nature of the publication, the potential use of their medical information for educational purposes, and the steps taken to maintain their privacy and confidentiality.

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