Immune Thrombocytopenic Purpura and Myocardial Infarction: A Dilemma of Management

Ghassan Zaid MD, Sharif Dawod MD and Uri Rosenschein MD

Department of Cardiology, Bnai-Zion Medical Center, affiliated with Rapapport Faculty of Medicine, Technion-Israel Institute of Technology, Haifa, Israel

Immune thrombocytopenic purpura is an autoimmune disease characterized by premature destruction of platelets by autoantibodies, causing thrombocytopenia and mucocutaneous bleeding [1]. The estimated incidence is 10 per 100,000 persons per year, with a female:male ratio of 3:1. The decision to treat ITP is based on platelet count and the extent of bleeding. Since severe bleeding is uncommon when the platelet count is above 30,000/μl, treatment is usually initiated when the count falls below this level [1]. Antiplatelet and anticoagulant therapy is a mainstay in the management of acute coronary syndrome, particularly in the presence of coronary intervention. Because of the bleeding risk in patients with ITP this therapy is generally contraindicated if the platelet count is below 30,000/μl [2]. Since there are no precise recommendations, this dilemma causes difficulty in managing concomitant acute coronary syndrome and ITP. Acute myocardial infarction is rare in patients with ITP. We describe a patient with ITP admitted for acute myocardial infarction and thrombocytopenia (26,000/μl).

PATIENT DESCRIPTION

A 60 year old woman was admitted with recurrent anterior chest pain at rest that began 3 days before presentation. She had a history of diabetes mellitus, hypertension, hyperlipidemia, smoking, and family history of cardiovascular disease. She was managed for ITP that was diagnosed 6 years previously. Steroid therapy was stopped 4 months before her admission because of a normal platelet count. No history of bleeding was reported. On admission, 12-lead surface electrocardiogram revealed T wave inversion in inferior leads. Blood tests showed increased troponin levels (2.5 ng/ml, normal ≤ 0.2 ng/ml), while creatinine phosphokinase levels were normal. The diagnosis at admission was non-ST elevation acute myocardial infarction; she was clinically stable and had no recurrence of chest pain during her stay in both the emergency department and the coronary care unit. Physical examination was normal with no signs of heart failure or bleeding. Echocardiography revealed basal inferior and posterior wall motion abnormality, with estimated left ventricular ejection fraction of 45%.

At presentation the platelet count was 26,000 μl, while the standard coagulation tests were normal. To prepare the patient for coronary angiography a hematologic consultation was requested and subsequently intravenous immunoglobulin and steroid treatment was started without antiplatelet or anticoagulant therapy. A few hours later she developed chest pain and transient ST-elevation in inferior leads of the ECG. Platelet count at the time of the event was 29,000 μl. Because of the spontaneous resolution of the ECG changes and chest pain after 20 minutes, conservative treatment including steroids was continued. Since the event of NSTEMI may have been caused by the rapid increase in platelet count, IVIG was stopped. After this event the patient became asymptomatic and the hospital course was uneventful. The platelet count increased gradually and reached 90,000 μl on day 4. In view of the risk of coronary intervention, which also requires antiplatelet therapy, we used diagnostic coronary computed tomography angiography before making a decision regarding percutaneous coronary intervention. CCTA revealed a dominant right coronary artery that was occluded by a large thrombus. Dual antiplatelet therapy including acetyl salicylic acid 300 mg and clopidogrel loading with 600 mg was initiated. On day 5 transfemoral coronary angiography was performed, which confirmed the presence of occlusion with Timi-0 flow in the mid segment of the right coronary artery [Figure A]. Using a thrombectomy device, red masses were aspirated and subsequently defined as fresh thrombi by pathologic analysis [Figure B]. Balloon pre-dilatation and later bare metal stent implantation in the right coronary artery were successfully performed. Final angiography revealed Timi-3 flow [Figure A]. The next day the patient was discharged on daily 100 mg acetyl salicylic acid, clopidogrel 75 mg daily for 1 month and maintenance steroid therapy. After 4 months she was completely asymptomatic.

NSTEMI = non-ST elevation acute myocardial infarction
IVIG = intravenous immunoglobulin
CCTA = coronary computed tomography angiography

ITP = immune thrombocytopenic purpura

COMMENT

Acute myocardial infarction is rarely experienced in patients with ITP. A few cases have been reported in the literature, with different treatment strategies; some received no therapy and others had coronary intervention. It has been shown that despite the low platelet counts in ITP, patients with this disease can still form a thrombus. Harker and Slichter [3] reported that in 12 patients with ITP the bleeding time was shorter than would have been predicted by their platelet counts [3]. The pathogenesis of thrombotic events in patients with ITP is not clear and may be attributed to different mechanisms:

- in ITP as a result of increased production of megakaryocytes in bone marrow the platelets are younger, larger and thus more active
- endothelial damage by autoantibodies appears on both platelet and coronary endothelial cells for antigenic mimicry of both [4]
- it may be related to the administration of IVIG, which leads to a rapid increase in platelet count and plasma viscosity and acute thrombotic event that usually occurs during or shortly after IVIG administration [5], which could also be the mechanism of STEMI in our case
- steroids are known to induce metabolic changes as well as a hypercoagulable state, which may play a possible role in precipitating the clinical events in this patient.

In our case, the concomitance of coronary risk factors such as hypertension, diabetes, dyslipidemia and cigarette smoking should be considered and treated. Dual antiplatelet therapy and heparin can be used with relative safety when the platelet count is more than 30,000 μl and in the absence of bleeding. Coronary angiography angioplasty can be a useful strategy in patients with acute myocardial infarction and ITP. Our

STEMI = ST elevation acute myocardial infarction

[A] Angiography of right coronary artery. Left panel: pre-intervention, showing occlusion of the mid-RCA with filling defect and Timi-0 flow. Right panel: after thrombus aspiration and bare metal stent implantation, showing open artery with Timi-3 flow.

[B] Histology of the thrombus aspirated from coronary artery using light microscopy. Left panel: Giemsa staining shows aggregates of platelets (pink color) and inflammatory cells (blue color) which confirm the early stage of fresh thrombus. Right panel: CD61 immunohistopathology staining, demonstrating the aggregates of platelets (arrow)
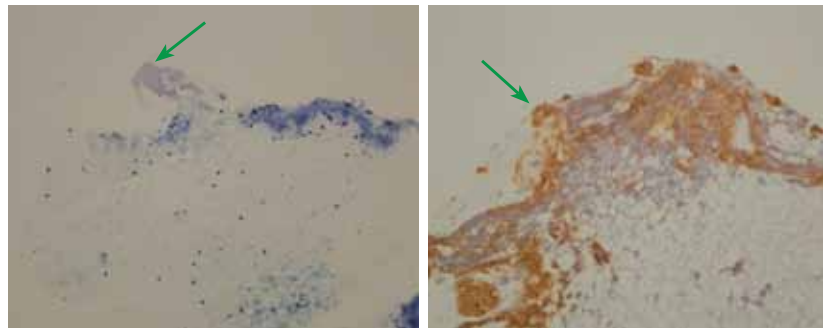
patient had NSTEMI and was stable; therefore, the invasive procedure was delayed to minimize the risk of bleeding. We did not use CCTA earlier during medical treatment, it was essential later for the decision regarding percutaneous coronary intervention. We opened the occluded artery several days later due to severe hypokinetic and not akinetic right coronary artery territory shown by echocardiography. Moreover, we chose a bare metal stent in order to administer clopidogrel for a shorter period.

Corresponding author:
Dr. G. Zaid
Dept. of Cardiology, Bnai-Zion Medical Center, Haifa 31048, Israel
Phone: (972-4) 835-9744
Fax: (972-4) 835-9749
email: dr.zaid.ghassan@gmail.com

References

1. Cines DB, Blanchette VS. Immune thrombocytopenic purpura. *N Engl J Med* 2002; 346 (13): 995-1008.

2. Antman EM. ST-elevation myocardial infarction: management. In: Bonow RO, Mann DL, Zipes DP, Libby P, eds. Heart Disease: Textbook of Cardiovascular Medicine. 7th edn. Vol 2. Philadelphia: WB Saunders, 2005: 1167-226.

3. Harker LA, Slichter SJ. The bleeding time as a screening test for evaluation of the platelet function. *N Engl J Med* 1972; 287: 155-9.

4. Fruchter O, Blich M, Jacob G. Fatal acute myocardial infarction during severe thrombocytopenia in a patient with idiopathic thrombocytopenic purpura. *Am J Med Sci* 2002; 323 (5): 279-80.

5. Paolini R, Fabris F, Cella G. Acute myocardial infarction during treatment with intravenous immunoglobulin for idiopathic thrombocytopenic purpura. *Am J Hematol* 2000; 65: 177-8.