Novel treatment (new drug/intervention; established drug/procedure in new situation)

Coronary artery stenting in a patient with chronic immune thrombocytopenic purpura: a clinical conundrum

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Summary

A patient with long-standing immune thrombocytopenic purpura (ITP) would logically contradict antiplatelet use due to increased bleeding risk during coronary stenting. Coronary stenting using an endothelial progenitor cells (EPC) capture stents (Genous™) was used to successfully revascularise our patient using a transradial approach. The only complication was extensive superficial ecchymosis on the patient's forearm from antiplatelet use, which resolved spontaneously. To the best of our knowledge, this is the first case report of EPC capture stents in a chronic ITP patient.

BACKGROUND

Immune thrombocytopenic purpura (ITP) is a disease characterised by premature destruction of autoantibody-coated platelets causing thrombocytopenia and posing the patient at increased risk of bleeding. However, today it is well known that more complex mechanisms are involved including impaired platelet production and T-cell-mediated effects.¹

The association of ITP with coronary artery disease is uncommon and challenging due to increased bleeding risk if myocardial revascularisation is conducted. Dual antiplatelet therapy is a mainstay in the management of patients undergoing coronary stenting but whether this is also appropriate in patients with a diagnosis of ITP is unclear. Recently developed endothelial progenitor cell (EPC) capture stents have been designed to promote rapid endothelialisation and subsequent healing. This allows for shorter duration of antiplatelet agent use.

CASE PRESENTATION

A 55-year-old Chinese gentleman presented with a week-long history of unstable angina. His risk factors for coronary artery disease included hypertension and hyperlipidaemia. His medical history revealed that he was diagnosed with chronic ITP 20 years ago, for which he has refused to take long-term steroids or the option of splenectomy. Physical examination was unremarkable with no visible petechiae.

INVESTIGATIONS

A full blood count showed a haemoglobin level of 15 g/dl, white cell count of 4.41000/ μ l and platelet count of 33000/ μ l. The prothrombin and partial thromboplastin times were within normal limits. Autoimmune screen was negative for lupus erythematosus cells, rheumatoid factor, antidouble stranded DNA and antinuclear antibody. His cardiac enzymes were not elevated.

His ECG showed sinus rhythm with deep T-wave inversion in leads V2–V5.

Prior to the patient's planned coronary intervention, he was started on aspirin 100 mg once daily, clopidogrel 75 mg once daily and prednisolone 30 mg once daily. On the third day, he was transfused with six units of platelets 1 h before the procedure.

A coronary angiogram was performed via the right radial artery. The coronary angiography showed a critical stenosis (90%) at the ostium of the left anterior descending artery (LAD) and a 75% stenosis of the proximal LAD artery (figure 1). The left circumflex and right coronary arteries were normal. The patient was given a bolus dose of heparin (50 IU/kg).

Figure 1 Illustrates coronary angiogram baseline coronary angiogram. Arrows denote location of the lesions in the left anterior descending artery.

TREATMENT

Percutaneous transluminal coronary angioplasty with stenting was performed to the ostial LAD lesion with a 3.0×15 mm Genous™ EPC stent and the mid-LAD lesion with a 2.75×18 mm Genous™ EPC stent. Poststenting, there was 0% residual stenosis in both lesions with thrombolysis in myocardial infarction three flow (figure 2). The arterial sheath was removed and compression was applied to the radial artery for the next 6 h. There was no haematoma observed at the puncture site.

OUTCOME AND FOLLOW-UP

The next day after the procedure, there was significant superficial ecchymosis in the right forearm that spread up to his right elbow (figure 3) despite his increased platelet count (69000 μ l) immediately after platelet transfusion. Both aspirin and clopidogrel were withheld. There was no evidence of compartment syndrome and the perfusion in his right hand was not affected. Aspirin and clopidogrel were restarted on the seventh day.

The ecchymosis resolved spontaneously and he was discharged on dual antiplatelets for 1 month. Prednisolone was stopped after 1 week. His platelet count was 48000 μ l and 35000 μ l on days 3 and 7, respectively, postplatelet transfusion. The patient was last reviewed 12 months later and he has continued to remain asymptomatic cardiac-wise.

DISCUSSION

Chronic ITP is a syndrome characterised by persistent thrombocytopaenia caused by a circulating antiplatelet factor that results in platelet destruction by reticuloendothelial system.¹ The incidence of newly diagnosed isolated ITP is 1.6–3.9/100 000 per year. Patients with ITP can present with unstable angina or myocardial infarction despite their low platelet count, which suggests intact platelet function. Recently, it has been reported that there is an increased thrombotic risk in patients with a

diagnosis of ITP compared with the general population and to patients with acquired thrombocytopenia.²

There are several potential measures to urgently increase a patient's baseline platelet count prior to a surgical procedure. These include pretreatment corticosteroids, intravenous immunoglobulin (IVIg) and platelet transfusion possibly in combination with IVIg and emergency splenectomy.³ Coronary artery bypass grafting in ITP without splenectomy has been performed successfully with IVIg pretreatment to increase the platelet count.⁴ Platelet transfusion alone is usually ineffective in long-term treatment of ITP patients; however, platelet transfusion with or without IVIg can be helpful as an immediate measure, as it has been reported to increase post-transfusion platelet count and/or rapidly reduce bleeding.^{5 6} Controversy persists as to the threshold platelet level at which to transfuse the non-bleeding patient undergoing invasive procedure as well as the optimal dose of platelets to use. There is a general consensus, however, that between a platelet level of 10 and 50000 μ l, there is increased bleeding risk during haemostasis challenge.⁷ Hence, in the light of our patient's baseline platelet count of 33000 μ l, we decided that he should undergo platelet transfusion to achieve adequate haemostasis when the arterial sheath was removed after the procedure. Indeed, despite this pre-emptive measure, our patient developed extensive superficial ecchymosis albeit no significant haematoma.

As our patient has a single vessel disease with localised coronary lesions, percutaneous revascularisation was the preferred mode of revascularisation. Drug-eluting stents are commonly used in the treatment of coronary lesions and have been shown to be safe with lower incidence of restenosis.⁸ However, using drug-eluting stents would still require our patient to be on dual-antiplatelets therapy for at least a year, exposing him to a higher bleeding risk. Moretti *et al*⁹ reported a case in which coronary stenting with drug-eluting stents was done successfully with dual antiplatelet agents for 6 months without any stent thrombosis. However, the severity of thrombocytopenia was mild with a platelet count of 110000 μ l at baseline compared with our patient. As such, we chose an EPCs capture stent (Genous™) that is coated with murine anti-CD34 monoclonal antibodies that bind with a specific surface antigen of EPCs circulating in the blood. Because of this characteristic, EPCs are attracted to the stent surface resulting in prompt formation of a layer of endothelium. It has been shown in both in a human ex vivo shunt model and an animal model, that the EPC capture stent accelerates stent endothelialisation.^{10 11} The theoretical advantage of the EPC capture stent is to prevent stent thrombosis

Figure 2 Illustrates immediate poststenting angiographic result.

Figure 3 Illustrates widespread ecchymosis of the patient right forearm.

with a shorter duration of antiplatelets treatment required. Furthermore, EPCs capture stent has been used in high-risk patients including patients with ST-segment elevation acute myocardial infarction (STEMI). Lee *et al* has shown that the GenousTM stent was safe and effective in STEMI with a stent thrombosis rate of 0.9% and total mortality of 5.8%. More importantly, with 1 month of dual antiplatelet therapy there was no increase in the number of late stent thrombosis cases.¹²

Initially, we intended our patient to receive continuous dual-antiplatelet therapy for 1 month only. However, the extensive bruising in the patient's forearm necessitated us to stop the antiplatelet agents only after 3 days, with aspirin and clopidogrel restarted a week later when the ecchymosis was resolving. The patient did not develop any undue cardiac events conceivably due to the rapid healing mediated by the EPC capture stent.

Transradial approach in coronary interventions has been shown to reduce the incidence of vascular complications. Despite this, our patient developed extensive superficial ecchymosis that fortunately did not progress to a full-blown haematoma.

In patients with ITP, the use of EPC capture stent for coronary artery revascularisation is a novel approach and may be a safer option compared with other stents.

Learning points

- ▶ Coronary artery revascularisation can be successfully performed in patients with chronic immune thrombocytopenic purpura (ITP).
- ▶ Platelet transfusion can be considered alongside corticosteroid and intravenous immunoglobulin use in order to rapidly raise baseline platelet count of ITP patients preoperatively.
- ▶ Transradial approach in coronary intervention can reduce vascular complications.
- ▶ Consider the use of EPC capture stent for coronary intervention in patients requiring shorter duration of antiplatelet therapy.

Competing interests None.

Patient consent Obtained.

REFERENCES

1. Cines DB, Blanchette VS. Immune thrombocytopenic purpura. *N Engl J Med* 2002;**346**:995–1008.
2. Sarpatwari A, Bennett D, Logie JW, *et al*. Thromboembolic events among adult patients with primary immune thrombocytopenia in the United Kingdom General Practice Research Database. *Haematologica* 2010;**95**:1167–75.
3. Provan D, Stasi R, Newland AC, *et al*. International consensus report on the investigation and management of primary immune thrombocytopenia. *Blood* 2010;**115**:168–86.
4. Thompson D, Cohen AJ, Edwards FH, *et al*. Coronary artery bypass grafting in idiopathic thrombocytopenia without splenectomy. *Ann Thorac Surg* 1989;**48**:721–2.
5. Carr JM, Kruskal MS, Kaye JA, *et al*. Efficacy of platelet transfusions in immune thrombocytopenia. *Am J Med* 1986;**80**:1051–4.
6. Spahr JE, Rodgers GM. Treatment of immune-mediated thrombocytopenia purpura with concurrent intravenous immunoglobulin and platelet transfusion: a retrospective review of 40 patients. *Am J Hematol* 2008;**83**:122–5.
7. Norfolk DR, Ancliffe PJ, Contreras M, *et al*. Consensus conference on platelet transfusion, Royal College of Physicians of Edinburgh, 27–28 November 1997. Synopsis of background papers. *Br J Haematol* 1998;**101**:609–17.
8. Lee J, Park D, Kim Y, *et al*. Incidence, predictors, treatment and long-term prognosis of patients with restenosis after drug-eluting stent implantation for unprotected left main coronary artery disease. *J Am Coll Cardiol* 2011;**57**:1349–58.
9. Moretti C, Teresa Lucciola M, Morena L, *et al*. Idiopathic thrombocytopenia purpura and percutaneous coronary stenting: a dangerous duo? *Int J Cardiol* 2008;**130**:96–7.
10. Larsen K, Cheung C, Tempel D, *et al*. Capture of circulatory endothelial progenitor cells and accelerated re-endothelialization of a bio-engineered stent in human ex vivo shunt and rabbit denudation model. *Eur Heart J* 2012;**33**:120–8.
11. Van Beusekom H, Ertas G, Sorop O, *et al*. The GenousTM endothelial progenitor cell capture stent accelerates stent re-endothelialization but does not affect intimal hyperplasia in porcine coronary arteries. *Catheter Cardiovasc Interv* 2012;**79**:231–42.
12. Lee YP, Tay E, Lee CH, *et al*. Endothelial progenitor cells capture implantation in patients with ST-segment elevation acute myocardial infarction: one year follow-up. *Eurointervention* 2010;**5**:698–702.

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