Splenic haematoma complicating infective endocarditis: role of preoperative splenic artery embolization

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INTRODUCTION

The incidence of splenic involvement among patients with endocarditis was reported to be ~35% [1]; however, splenic haematoma complicating infective endocarditis (IE) is rarely reported. Splenic rupture is a potential life-threatening infective complication and may preclude life-saving surgical treatment for underlying IE. An invasive procedure, especially major splenic surgery, may not be tolerated among these patients due to vulnerable cardiovascular status. While conventional approach is either conservative or surgical, endovascular embolization could be an effective and safe alternative to major splenectomy among critically ill patients. We hereby present a patient with IE complicated by splenic haematoma and progressive cardiac decompensation, who subsequently underwent successful preoperative splenic artery embolization and patient subsequently received life-saving cardiac valvular replacement surgery. The favourable outcome of our patient depicts a pivotal role of preoperative splenic artery embolization in haemodynamically compromised patients undergoing cardiac valvular surgery for IE.

CASE REPORT

A 57-year-old female presented with a 2-week history of progressive heart failure symptoms. Echocardiogram showed a slightly dilated left ventricle, trileaflet aortic valve with vegetation at the tip of the right coronary and non-coronary cusps in addition to moderate aortic regurgitation. Penicillin was commenced as blood cultures yielded non-haemolytic streptococcus, alongside with supportive treatment and blood pressure control. However, she further deteriorated in terms of her heart failure symptoms and worsened abdominal distension with splenomegaly. Transoesophageal echocardiogram confirmed multiple vegetations at the aortic valve and ascending aorta leading to severe aortic valve destruction and severe regurgitation. Left ventricular ejection fraction was ~70% with normal biventricular size and systolic function. Computed tomography (CT) of the abdomen revealed splenomegaly with a 5 cm × 4 cm subcapsular haematoma and small infarct without evidence of ring-enhancing lesion suggestive of abscess formation (Fig. 1A). No active contrast extravasation was demonstrated and both splenic artery and vein were patent.

Options of a combined cardiac and intra-abdominal operation, a staged operation (splenectomy followed by cardiac surgery) and preoperative splenic artery embolization were discussed among cardiac surgeons, gastrointestinal surgeons and interventional radiologists. In view of progressive cardiac decompensation with high operative risks, the patient subsequently underwent a preoperative splenic artery embolization. A 4-mm aneurysm was detected at the origin of the accessory splenic artery arising from the proximal segment of the main splenic artery (Fig. 1B). A perfusion defect was noted at the superior aspect of the spleen corresponding to the site of the splenic haematoma. By means of gelatin sponge pledgets (Spongostan, Ferrosan Medical Devices, Soeborg, Denmark) and fibred microcoils (Vortex and Interlock, Boston Scientific Corporation, Cork, Ireland), the distal splenic artery at the splenic hilum was embolized together with two accessory splenic arteries arising from the middle and proximal segments of the main splenic artery. There was residual flow in the proximal accessory splenic artery and complete occlusion of the main splenic artery distal to it (Fig. 2A).

After splenic artery embolization, the patient was put under cardiopulmonary bypass (CPB) with systemic heparinization to keep...
activated clotting time for more than 450 s. Upon aortic cross-clamping and myocardial protection via direct coronary cardioplegia delivery, her diseased aortic valve was resected and a size 21 Mitroflow® aortic pericardial biological valve (Sorin, USA) was implanted. She was weaned from CPB with low-dose inotropes. She stayed in intensive care unit for 1 day and was discharged to high-dependency unit on postoperative day 1. Postoperative echocardiogram showed good left ventricle ejection fraction and functioning aortic tissue valve with no pericardial effusion. The culture from the excised aortic valve yielded no growth likely secondary to successful antimicrobial treatment. Her abdomen remained soft without need for an immediate major splenectomy. After a course of intravenous antibiotics, she was discharged 6 weeks after the surgery. A CT abdomen performed 3 weeks after the operation showed that the splenic haematoma became minimally hyperdense and remained static in size with a large area of hypodense non-enhancing regions representing post-embolization infarction and irregularly enhancing parenchyma over mediastinal aspect (Fig. 2B). She remained well on subsequent follow-up at 6 months.

**DISCUSSION**

We described a case of splenic involvement of IE in a patient with progressive cardiac decompensation and valve destruction.

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**Figure 1:** (A) Contrast computed tomography of the abdomen showing 5 cm × 4 cm splenic subcapsular haematoma (white arrow). (B) Selective splenic arteriogram showing two accessory splenic arteries arising from the middle and proximal segment of the main splenic artery. Perfusion defect was noted at the superior aspect of the spleen, corresponding to the location of the splenic haematoma (area shown by the white dotted circle).

**Figure 2:** (A) Post-embolization angiogram showing the embolized distal splenic artery by gelatin sponge (white arrow) and embolized accessory splenic arteries by fibred microcoils (black arrow) and residual flow to the small portion of the inferior aspect of the spleen (white dotted arrow). (B) Postoperative contrast computed tomography of the abdomen showing that splenic haematoma became minimally hyperdense and remained static in size (white arrow) with a large area of hypodense non-enhancing regions representing post-embolization infarction (black arrow) and irregularly enhancing parenchyma over mediastinal aspect.
warranting early surgery. The annual incidence of IE among industrialized countries has been estimated to be 3–9 cases per 100,000 persons [2]. Splenic involvement in the course of IE includes splenic haematoma, infarct or abscess, splenomegaly and finally, possible rupture. Splenic rupture due to endocarditis is a life-threatening complication, especially after valve surgery with potential massive intra-abdominal haemorrhage.

Patients with IE are especially vulnerable to developing severe intra-abdominal haemorrhage, which may result from splenic rupture complicating endocarditis or as treatment complication of major splenectomy [1]. Those requiring cardiac surgeries necessitating intraoperative heparinization are at even greater risks. While antibiotic therapy may help reduce haemorrhagic complications, the outcome is not always predictable.

It has been proposed that preoperative splenic artery embolization among patients with massive splenomegaly due to underlying liver cirrhosis and haematological diseases (such as lymphoma, idiopathic thrombocytopenic purpura) reduces intraoperative blood loss and postoperative hospitalization in laparoscopic splenectomy [3]. The procedure is also highly specialized requiring trained expertise. As seen in our patient, cases with severe cardiac decompensation and high operative risks may further benefit from this less invasive procedure as opposed to major splenectomy preceding cardiac surgery.

Eng and Venkatesh reported a case of splenic artery aneurysm secondary to IE in an intravenous drug addict successfully treated with intravenous antibiotics and transcatheter embolization without the need for cardiac surgical intervention [4]. In addition, there has been evidence, suggesting that splenic artery embolization has an improved chance of splenic preservation, thereby sparing the patient from a splenectomy [5]. We believe preoperative splenic embolization minimize bleeding risk of systemic heparinization during cardiac heart valve operation and allows surgeons to decide whether to proceed to second-stage splenectomy once patient’s cardiac condition is stabilized. While available evidence is mostly anecdotal, the favourable outcome of our patient with preoperative embolization is encouraging.

**CONCLUSION**

Splenic involvement is common among patients with IE. While these patients are at high operative risks and potential splenic complications may delay life-saving cardiac surgeries, preoperative splenic artery embolization is a promising alternative to major splenectomy.

**Conflict of interest:** none declared.

**REFERENCES**


