CASE REPORTS

ISCHEMIC VENTRICULAR SEPTAL RUPTURE WITH PATENT CORONARY BYPASS GRAFTS DUE TO OCCLUDED SEPTAL BRANCH, A CASE REPORT

Mohammad El Diasty[1*], Rubab Fatima[2], Angel L. Fernandez[3], Igo Ribeiro[1]

[1] Division of Cardiac Surgery. Queen's University, Kingston, ON, Canada
[2] School of Medicine. Queen's University, Kingston, ON, Canada
[3] Department of Cardiac Surgery. University Hospital, Santiago de Compostela, Spain

* Corresponding author: doctoreldiasty@yahoo.com

Abstract

Background: *Ischemic ventricular septal rupture (VSR) is a lethal complication that occurs either after spontaneous or iatrogenic occlusion of one of the major epicardial coronary vessels. To the best of our knowledge, this is the first reported case of a VSD after a septal branch occlusion in a patient with patent coronary artery grafts to both the left anterior descending and posterior descending arteries.*

Methods: *We present a rare case of anterior ischemic VSR due to the occlusion of a major septal branch. The patient had previous coronary artery bypass grafts and his left internal mammary artery conduit to the anterior descending artery was patent. The culprit lesion that resulted in the development of the VSR was the occlusion of a major septal branch.*

Discussion: *The presence of collateral circulation in chronic coronary occlusive disease may provide a protective effect against the development of transmural myocardial necrosis which may reduce the risk of septal rupture. This case highlights the fact that patent coronary artery grafts may not protect from future ischemic VSR.*

Conclusion: *Major septal branches with significant disease should be assessed for percutaneous options if technically feasible as dictated by the Heart Team.*

CASE REPORT

A 71-year-old male presented to our emergency department with sudden worsening anginal chest pain on the background of mild chest discomfort for the previous few days. He had a long history of coronary artery disease with a stent to proximal left anterior descending artery in 2013 and subsequent coronary artery bypass grafting with Left Internal Mammary Artery to Left Anterior Descending and Left Radial Artery to the Posterior Descending Artery in 2016. His past medical history also includes non-insulin-dependent type 2 diabetes mellitus, dyslipidaemia, arterial hypertension, and severe chronic obstructive pulmonary disease.

Upon presentation, his electrocardiogram showed new right bundle branch block associated with Troponin T of 28000ng/L (range 0-30ng/L). On examination, he had a harsh systolic murmur over the lower sternal area. While awaiting an urgent coronary angiography, he suddenly developed complete heart block and cardiac arrest. He was resuscitated and was started on mechanical ventilation and inotropic support. Temporary endo-venous pacing wires and intra-aortic balloon pump were also inserted. Bedside Trans-thoracic echocardiography confirmed the presence of anterior VSR. Urgent coronary angiography was performed, and it showed patent coronary artery bypass grafts and an occlusion of a major septal branch that was previously patent in his old coronary angiogram (figure 1).

The patient continued to deteriorate clinically with

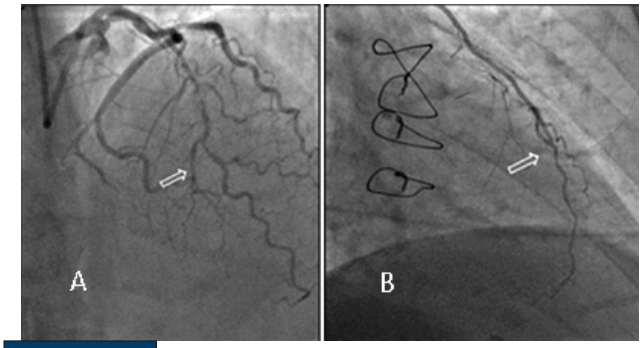

Figure 1 *A: Old Coronary angiogram (prior to the coronary artery bypass grafting) that shows patent large septal branch (arrow). B: Recent coronary angiogram that shows patent LIMA to LAD graft and the completely occluded septal branch (arrow).*

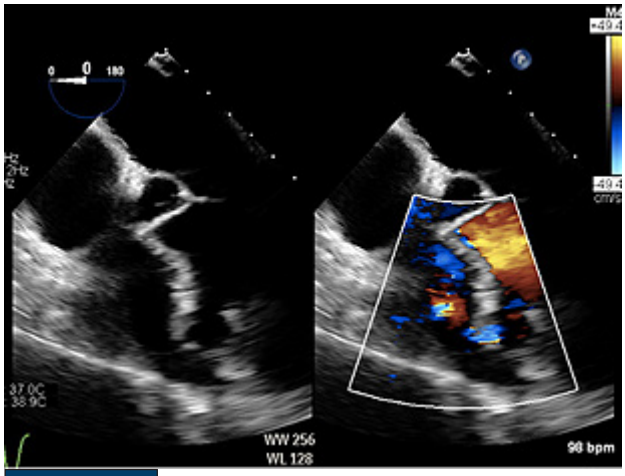

Figure 2 *Trans-esophageal echocardiogram (apical five chambers) that shows the ischemic VSR with left to right shunt.*

escalating inotropic and vasopressor requirements. The option of percutaneous closure of the defect was disregarded due to the ongoing deterioration of the patient's clinical condition and it was felt an emergency redo sternotomy and surgical repair would be the patient's best option. Intraoperative trans-esophageal echocardiography confirmed the presence of mid-septal non-restrictive VSR with left to right shunt (figure 2). After a technically challenging procedure, the VSR was successfully repaired but unfortunately the patient developed intractable bilateral pulmonary haemorrhage. Given the futility of this condition, it was decided not to start any form of mechanical circulatory support and the patient was declared deceased.

DISCUSSION

Ischemic VSR is a very infrequent but a life-threatening complication of acute myocardial infarction. Its incidence has been significantly reduced with the widespread application of early percutaneous transcatheter coronary reperfusion[1]. Septal rupture results from transmural myocardial necrosis and it is usually attributed to the acute occlusion of one of the major epicardial coronary arteries. In rare occasions, ischemic VSR was reported after occlusion of major septal branches due to spontaneous thrombosis[2,3] or after coronary stenting[4,5].

The presence of collateral circulation in chronic coronary occlusive disease may provide a protective effect against the development of transmural myocardial necrosis which may reduce the risk of septal rupture[6]. In this clinical case, despite the potential development of coronary collateral circulation and the presence of patent coronary bypass grafts to the left anterior descending and posterior descending arteries, the acute occlusion of septal branch resulted in transmural infarction and interventricular septal rupture. To the best of our knowledge, it is the first time in literature to report a case of VSR in patients with patent coronary bypass grafts.

CONCLUSIONS

The Heart Team should not overlook isolated major septal branch lesions as their occlusion might result in serious interventricular septum ischemia despite the complete myocardial revascularization to the left anterior descending and/or the posterior descending territories.

REFERENCES

1. Figueras J, Alcalde O, Barrabes JA, et al. changes in hospital mortality rates in 425 patients with acute ST-elevation myocardial infarction and cardiac rupture over a 30-year period. Circulation. 2008: 118: 2783-2789.
2. Zhong X, Zhou G, Huan Z, Wang X, Wang L, Yang J. Small septal vessel occlusion results in big damage: ventricular septal dissection and rupture. Eur Heart J 2018; 39: 2506-2507.
3. Kaneko S, Isoda S, Matsuki Y, Yamazaki I, Masuda M. Post-infarction ventricular septal defect due to an isolated septal myocardial infarct. J Card Surg. 2017; 32:487-488.
4. Fujii N, Tsuchihashi K, Nishida J, Funayama N, Takagi S, Miura T. Delayed ventricular septal perforation caused by minimal branches occlusion during coronary artery stenting Cardiovasc Interv Ther. 2013; 28:383-387.
5. Yoshizaki T, Ishida M, Takagi T, et al. A case of ventricular septal rupture associated with major septal branch occlusion after percutaneous coronary intervention. J Cardiol Cases. 2014; 10: 140-143.
6. Skehan JD, Carey C, Norrell MS, Belder M, Balcon R, Mill PG. Patterns of coronary artery disease in post-infarction ventricular septal rupture. Br Heart J. 1989; 62: 268-272.