Case report - Coronary

Robotic-assisted surgical myotomy in a 27-year-old man with myocardial bridging of the left anterior descending coronary artery

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Abstract

Myocardial bridging (MB) is a frequent condition usually considered benign but it may be associated with myocardial ischemia. When bridging is symptomatic, therapeutic options are numerous and in the absence of guidelines all options are conceivable. This is a case of a 27-year-old man who benefited from a new surgical approach: myotomy for MB of the left anterior descending coronary artery with the help of left robotic thoracoscopy.

Keywords: Myocardial bridging; Robotic surgery

1. Clinical summary

A 27-year-old man was admitted in an emergency department with violent retrosternal chest pain at rest. The patient reported that two days prior to admission he also had intermittent chest pain at rest during 15 min, disappearing spontaneously. His examination was unremarkable and he had no cardiovascular risk factors. The electrocardiogram showed a sinus rhythm with significant ST segment depression in the anterior leads. Blood tests were remarkable for elevated troponin I up to 7.52 ng/ml on the 1st day and 15.38 ng/ml on the 2nd day after admission (normal values: 0.00–0.25 ng/ml) and elevated myocardial bridging (MB) fraction of creatine kinase at 50 U/l (normal values: 0–25 U/l). Chest X-ray was normal and cardiac echography showed no segmental anomaly.

The patient was treated with intravenous molsidomine, clopidrogel, ASA and enoxaparin and transferred to our intensive care unit, and artificial ventilation was continued for 24 h. The patient was admitted to the department of General Surgery, Erasme Hospital, Free University of Brussels, Belgium. A month later the patient was asymptomatic and discharged for 24 h. He was returned to the ward on the first postoperative day and was discharged four days after surgery. A month later the patient was asymptomatic and had a computed tomography coronary angiogram which showed no LAD abnormality.

2. Discussion

First recognized by Reyman in 1737, MB occurs when an epicardial vessel has a limited intramyocardial segment. Although all coronary vessels can be affected, the mid LAD segment is usually implicated [1, 2]. In pathological series MB has an incidence as high as 80%, whereas angiographic studies report incidences ranging from 1.5% to 16% [2]. It has been shown that MB is associated with systolic compression and diminished coronary flow reserve, the exact clinical implication of these is not well established and while case studies report angina and infarction, conduction disturbances, ventricular tachycardia and sudden death, retrospective follow-up of symptomatic MB showed good prognosis but at the moment no definitive conclusions can be drawn [2].

The medical approach for symptomatic MB is the first line therapy using drugs, such as β-blockers and calcium channel blockers. When symptoms persist some advocate intraco-
Coronary stenting as a successful means of treatment. Haager et al. [3] studied 11 patients stented for MB, the follow-up period was two years and no major cardiac events were reported, but at seven weeks post-stenting 50% of the patients had mild to moderate or moderate to severe restenosis and 36% required target vessel revascularization. Moreover, the procedure is at risk owing to the thinner wall of the bridged artery prone to perforation requiring experimented operators.

First reported by Binet, direct surgical myotomy seems a logical approach, by eliminating the cause of compression. The high operative risks associated with open heart surgery as well as the advances in coronary stenting have limited its use, especially when no other coronary vessel abnormalities are found [4].

Less invasive surgical approaches of MB, such as beating heart surgery through sternotomy or through a less invasive incision, such as a left minithoracotomy could be an option for patients resistant to medical therapy in centers with no robotic capabilities. In centers with robotic devices, such as the Da Vinci system, we would advise treating a mechanical problem by mechanical means. Since our conversion rate in bypass for single-vessel disease is <5% in conventional beating heart totally endoscopic artery bypass (BHTECAB) we were comfortable offering the procedure to the patient whose first episode was a myocardial infarction and we had no clue of how protected he would have been with medical treatment alone. The procedure performed with the help of a robotic device initially developed for off-pump CABG [5] has no complication related to sternal splitting, permits a total removal of the myocardial bridge and even adventitial webs if needed. Adverse events of this technique can be divided into two categories: the first is related to the robot technology and port placements, the second is related to myocardial maneuvers. In our experience of more than 200 BHTECAB we had only one conversion due to technical reasons of robot malfunction. Conversion for port misplacement is also rare, in conventional VATS surgery it is reported in 3% of the cases while in BHTECAB although no large series have been reported yet, it is probably lower owing to the very conventional manner of port placement. In thin patients, the coronary vessels are easily identified on the myocardium and bridging is often obvious as it is in open-chest surgery. The stabilizer used for BHTECAB is very reliable and permits precise suture on coronary arteries on the beating heart, myocardial fibers dissection bridging an artery is even deemed easier.

3. Conclusion

Surgery of MB through a left thoracoscopic approach, robotically assisted, is feasible and safe, and it might be an elegant therapeutic option in a symptomatic patient resistant to optimal medical therapy.

References

