

Retrieval of a Migrated Coronary Stent by Cardiopulmonary Bypass

R Sequeira de Almeida, J Dantas Lima Jr.

Citation

R Sequeira de Almeida, J Dantas Lima Jr.. *Retrieval of a Migrated Coronary Stent by Cardiopulmonary Bypass*. The Internet Journal of Anesthesiology. 1998 Volume 3 Number 2.

Abstract

INTRODUCTION

Coronary stents are devices capable of reducing the rate of restenosis after percutaneous transluminal coronary angioplasty (PTCA), and salvaging a failed PTCA, which means successfully managing a threatened closure after an unsuccessful balloon angioplasty. The basic principal is to avoid complications by pressing the intimal and medial flaps of the coronary artery against the vessel wall. This mechanism reduces the risk of thrombus formation and thus reduces the risk of acute closure and emergency bypass surgery ¹. Although a series of benefits may be pointed out, there are some complications with this procedure such as femoral artery bleeding and/or formation of a pseudoaneurysms, stent malposition, migration and thrombosis ². We report a clinical case of unsuccessful balloon expandable stent deployment with the risk of endangering the normal circumflex artery and of systemic embolization; the patient had also a femoral artery pseudoaneurysm and extensive hematoma due to aggressive anticoagulation therapy.

MATERIAL AND METHOD

A 49-year-old man was admitted to the hospital for elective angioplasty of the left anterior descending artery (LAD) (2.8mm caliber). The stenotic lesion was localized on the proximal third of the LAD and compromised 85% of the artery's diameter (TIMI ₃). After initial balloon dilatation, it was decided to insert a stent to reduce the risk of restenosis. A balloon-expandable stent, AngioStent™ (E-Z-EM, Inc, Queensbury, NY), 15mm in length, already mounted on a 3mm/20mm balloon, was unsuccessfully deployed at the site of the lesion due to the fact that it was not completely expanded. All attempts to reposition the stent failed and the stent became dislodge from the balloon. The stent migrated during balloon removal. The expanded distal part migrated

to the left main coronary artery (LMCA) and the non-expanded part to the aorta were it was left floating in the aortic lumen. The patient was hemodynamically stable and any attempts to retrieve the stent without surgery were considered dangerous due to the fact that they could compromise the LMCA's intima and occlude the normal circumflex artery. The patient was fully heparinized, and the case discussed with the patient and his family. Four later he agreed to coronary bypass surgery. The operation was performed using a membrane oxygenator, a roller pump and mild to moderate systemic hypothermia (32°C). After the heart was arrested with antegrade cold potassium cardioplegia, a transverse aortotomy was performed and the ostium of the LMCA identified. The stent was partially visualized and removed with forceps. The aortic valve was examined and a calcified stenotic commissure between the left and the right coronary cusps was found. A commissurotomy was performed and the lump of calcium excised. A saphenous vein was used for grafting the LAD lesion (TIMI 3). The post operative course was uneventful, except for an episode of atrial tachycardia managed with amiodarone and electric cardioversion. The patient was discharged routinely on the 7th postoperative day requiring only aspirin and amiodarone.

COMMENTS

Although the increased use of balloon expandable stents is a valuable contribution for diminishing the restenosis rate after PTCA ³, a number of papers reporting several severe complications have been published. The complications can be related to the site of percutaneous insertion (15% of all cases, 50% of which need surgical treatment ^{3,4}) or the site of the coronary stent deployment, such as subacute stent thrombosis (3-5% in elective and 10-20% in emergency cases ⁴). In our case two complications were described: a

peripheral one, a pseudoaneurysm, and a coronary one, an unsuccessful deployment of a balloon extended stent. The use of stents for lesions located in the proximal third of the LAD is a routine procedure. We also decided to use a stent in order to reduce the risk of restenosis. This type of stent is advanced across the lesion without a protective sheath. After placing the stent in the correct position, the balloon was expanded and unsuccessfully deployed, due to the fact that it wasn't completely expanded. When the deflated balloon was pulled back and the stent was dislodged from its original position. One part remained in the LMCA and the unexpanded part ended floating inside the aortic lumen. It was decided not to try any type of maneuvers with guide-wires or another balloon in order to retrieve the stent because it may lead to a lesion in the circumflex artery or to the LMCA. As the patient did not accept an emergency bypass surgery and was angina free and hemodynamically stable, full heparinization was initiated. This procedure gave time for a favorable decision by the patient. An elective coronary artery bypass surgery was accepted; an aortotomy was performed and the partially expanded stent easily retrieved from the LMCA. A stenotic and calcified aortic valve was found and a valvuloplasty performed. The decision to work on this valve was related to the patients age. The major decision to graft only the LAD with a saphenous vein and not an arterial conduit was made regarding the fact that the lesion was already dilated impending the use of a radial artery, and that the patient had an important pulmonary obstructive airway disease, being therefore unsuitable for the use of an internal mammary artery. The only possibility was the use of a vein graft. The decision to only graft the LAD was made on the assumption that the LMCA was not traumatized when the stent was retrieved. The peripheral vascular complication was simultaneously surgically treated

by direct suture. The atrial tachycardia was not attributed to an ischemic lesion, due to the fact that there were no changes in the patients electrocardiogram. The patient was discharged on aspirin and amiodarone and was angina free one month after being discharged. A new coronary angiography was performed after 18 months of follow-up. It showed a total obstruction of the initial part of the LAD and a previous by-pass to the same artery.

References

1. Liu MW, Voorhees WD 3rd, Agrawal S, Dean LS, Roubin GS. Stratification of the risk of thrombosis after intracoronary stenting for threatened or acute closure complicating coronary balloon angioplasty: a Cook registry study. *Am Heart J* 1995; 130(1):8-13
2. Moscucci M, Mansour KA, Kent KC, et al. Peripheral vascular complications of directional coronary atherectomy and stenting: predictors, management, and outcome. *Am J Cardiol* 1994;74(5):448-53.
3. Mintz-GS, Popma-JJ, Hong-MK, et al. Intravascular ultrasound to discern device-specific effects and mechanisms of restenosis. *Am-J-Cardiol.* 1996; 78:18-22.
4. Hearn JÁ, King SB 3d, Douglas JS Jr, Carlin SF, Lembo NJ, Ghazzal ZM. Clinical and angiographic outcomes after coronary artery stenting for acute or threatened closure after percutaneous transluminal coronary angioplasty. Initial results with a balloon-expandable, stainless steel design. *Circulation* 1993; 88:2086-96.
5. Goyal V, Pinto RJ, Mukherjee K, Trivedi A, Sharma S, Bhattacharya S. Alteration in pulmonary mechanics after coronary artery bypass surgery: comparison using internal mammary artery and saphenous vein grafts. *Indian Heart J* 1994; 46(6):345-8.

Author Information

Rui Manuel Sequeira de Almeida, M.D., M.Sc., LuísCastro Bastos, M.D.

Division of Cardiovascular Surgery, Instituto de Moléstias Cardiovasculares de Cascavel, R. Maranhão 945, Cascavel

José Dantas Lima Jr., M.D., Amaury César Jorge, M.D

Division of Cardiovascular Surgery, Instituto de Moléstias Cardiovasculares de Cascavel, R. Maranhão 945, Cascavel