

Aortic valve replacement with right thoracotomy in a patient with sternal metastasis from renal carcinoma

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Abstract. We present a clinical case of severe aortic stenosis in a 73 years old patient symptomatic for dyspnoea class NYHA III-IV. At the physical examination the patient presented a single sternal metastasis of renal carcinoma involving the sternum. Oncological stability prompted us to perform aortic valve replacement. In order to avoid median sternotomy and its complications due to the presence of sternal metastasis we successfully performed aortic valve replacement through a right minithoracotomy. (www.actabiomedica.it)

Key words: Aortic valve replacement, minithoracotomy, sternal metastasis

Introduction

In the scientific literature few cases of aortic valve replacement or cardiac interventions in patients affected by sternal metastases from malignant neoplasia are reported. We found only two cases (1-2): in the first one the presence of sternal metastasis allowed aortic valve replacement with median sternotomy, while in the second one the diagnosis of sternal metastases was made only after a massive and unexplicable haemorrhage after performing median sternotomy. We present our experience of a patient affected by sternal metastasis of renal carcinoma, operated on for aortic valve replacement.

Case Report

In April 2005, a 73 year-old male, displaying symptoms of dyspnoea class NYHA III-IV, angina and syncope, was referred to our Unit for severe calcific aortic stenosis. The patient, affected by severe asthmatic Chronic Obstructive Pulmonary Disease (COPD), had previously undergone total right nephrectomy, due to renal ADK in 2000. At that time

the stage of neoplasia was T1N0M0, but 3 years after the operation a large sternal metastasis was diagnosed.

At the time of admittance to our Unit, the patient was under the care of the local oncological day-hospital because of the above mentioned sternal metastasis of renal adenocarcinoma. Oncological pathology was defined stable by clinicians and well responsive to interferon therapy. The preoperative oncological staging performed by Positron Emission Tomography (PET) documented one localization of metastasis, at the sternum level (Figg. 1, 2).

On admission, transthoracic echocardiography confirmed the presence of a severe calcific aortic stenosis with a Left Ventricular Ejection Fraction (LVEF) only smoothly depressed (47%). Coronary angiography excluded significant associated coronary artery disease.

Given the stability of the metastasis, we decided to perform the aortic valve replacement through a right minithoracotomy (3) with the aim of avoiding sternal incision, the removal of the tumoral mass and the consequent technical demanding procedure of chest wall reconstruction.

We made a 10 cm incision in 4th right intercostal space obtaining an exposure of the right atrium, the

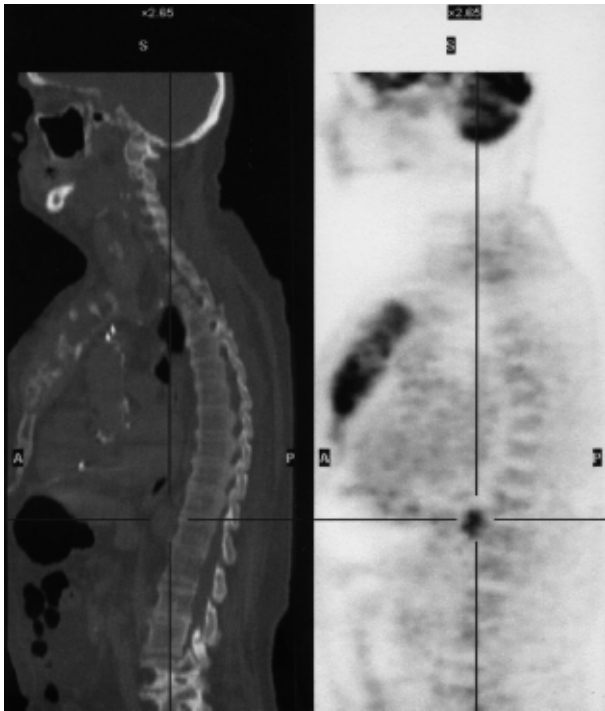


Figure 1. Preoperative PET - Sagittal view showing the complete sternal involvement due to the presence of the metastasis

aorta and the right pulmonary veins. Extracorporeal circulation was performed by femoro-femoral cannulation using a two stage cannula for the venous site (4)

and carried out at mild surgical hypothermia at 30°C. The vent was placed in right superior pulmonary vein. After the aortic cross clamping, cardioplegia was delivered using a crystalloid solution (Custodiol at 4°C) directly inoculated in the ascending aorta. The aortic valve was exposed with an oblique partial aortotomy and removed with a complete annulus decalcification. We implanted a 23 mm St Jude Epic bioprosthesis (Saint Jude Medical, Saint Paul, Min, USA). The extracorporeal time was 110 min. and the aortic cross clamping time 80 min.

The postoperative course was characterized by surgical revision of the thoracotomy at the third hour after surgery because of significant bleeding from the sternal neoplastic mass, damaged during costal divarication. The patient required prolonged mechanical ventilation due to the resurgence of his asthmatic COPD. Intensive Care Unit (ICU) stay lasted 5 days and the hospital stay was 12 days. Pre-discharge echocardiography demonstrated an optimal performance of the bioprosthesis with preserved left ventricular function. At sixth month follow up the patient was alive, asymptomatic and the echocardiographic examination confirmed the good performance of the bioprosthesis. Neoplastic pathology was documented as stable by a CT scan performed two months after surgery.

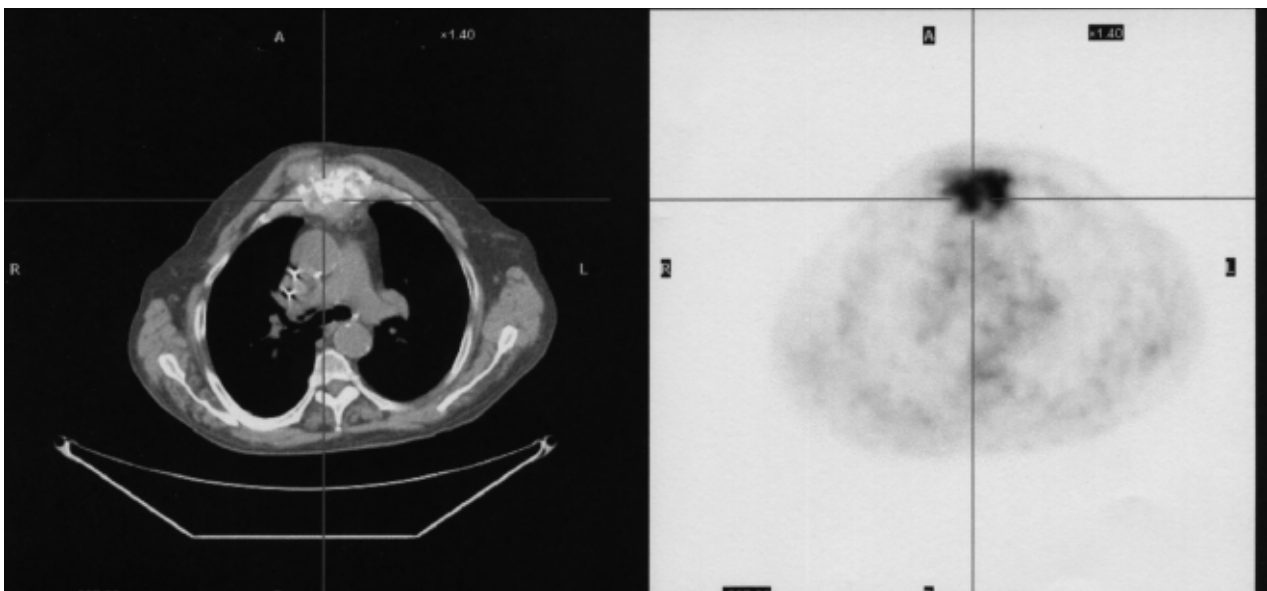


Figure 2. Preoperative PET - Transverse slide of the preoperative PET showing the involvement of soft tissues anterior to the sternum

Discussion

In the presence of sternal primary or secondary neoplasm, sternotomy may cause various problems such as intraoperative haemorrhage and instability of sternal osteosynthesis. Moreover, the resection and the reconstruction of the anterior chest wall in the case of secondary neoplasias is subject to weighted by unsatisfactory results, as reported in several studies (5).

In this case, postoperative haemorrhage occurred despite the use of thoracotomy and it was due to costal divarication which caused a laceration of the sternal mass. We began surgery with a 10 cm incision, but the occurrence of bleeding forced us to enlarge the incision (up to 15 cm) to gain a better exposure of the operating field. Probably a lateral incision further from the sternal mass, combined with a costal resection not touching the side of the mass would have been a safer approach and would not have disturbed the metastasis.

Minimally invasive aortic valve replacement was a good option for our patient, allowed aortic valve replacement without the need for a technically demanding procedure like anterior chest wall reconstruction. In fact, this invasive procedure carries a significant risk of morbidity, especially in patients affected by severe COPD. Minimally invasive aortic valve replacement was also possible because the metastatic pathology was well controlled by medical therapy and it was performed only after a complete preoperative clinical stadiation excluding other sites of neoplasm metastases and a favorable opinion of the consultant oncologist on the medium-term prognosis of the patient. As reported in literature (7), patients with renal adenocarcinoma and solitary metastasis have good life expectancy if they are treated with pharmacological therapy, radiotherapy or both. Femoro-femoral cannulation allowed us to perform ascending aorta manipulation, aortic cross clamping and valve replacement in a limited operative field (4-6), without difficulties. On the other hand, in 2005 the technique of implanting an aortic bioprosthesis using an endovascular approach had not yet been developed.

In conclusion, our experience shows that aortic valve replacement using right thoracotomy is a safe procedure and gives excellent results with low morbidity. In the near future, percutaneous approach to aortic valve pathology will require further studies in order to better define its role in the management of such high-risk patients.

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