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MINIMALLY INVASIVE AORTIC VALVE REPLACEMENT

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Several reports have been published recently detailing less invasive techniques for cardiothoracic surgical procedures designed to limit surgical trauma while decreasing costs.[1] After our initial successful experience with minimally invasive video-assisted coronary surgery[2-4] and minimally invasive video-assisted mitral valve replacement,[5] which followed the first report of video-assisted mitral valvuloplasty by Carpentier and associates,[6] we performed two cases of minimally invasive aortic valve replacement with a new technique.

Clinical summaries

PATIENT 1. A 63-year-old male patient was admitted in July 1996 with severe calcific aortic stenosis, chronic obstructive pulmonary artery disease, and New York Heart Association class IV symptoms. The patient was placed on the operative table in the 30-degree left lateral decubitus position with the right arm elevated above the head. A 6 cm incision was made in the third intercostal space (Fig. 1), and a specially adapted wound spreader (Access Platform, CardioThoracic System, Inc., Portola Valley, Calif.) was secured in place and gently opened to avoid rib fractures. The pericardium was opened on the lateral side exposing the aortic root, the right atrium, and the right superior pulmonary vein (RSPV). To improve the exposure, we supplied several stay sutures at the edges of the pericardial opening and fixed them to the skin. The right femoral artery and the right atrium were cannulated. A vent was inserted in the RSPV. After cardiopulmonary bypass (CPB) was established, the aorta was crossclamped and crystalloid cardioplegic solution was infused in the aortic root. A transverse aortotomy was performed and three stitches were placed in the commissures and pulled upward to expose the anulus. A 21 mm mechanical prosthesis was implanted with single Cardioflon sutures (Peters Laboratories, France). The aortotomy was then closed with a polypropylene running suture, and the air was evacuated through the aortic root and the RSPV vent. Perfusion time was 85 minutes and crossclamp time was 70 minutes. The patient was extubated 24 hours after the operation and discharged on postoperative day 6. The postoperative course was uneventful.

PATIENT 2. A 52-year-old male patient was admitted in July 1996 with severe aortic regurgitation and New York Heart Association class IV symptoms. The patient was positioned on the operating table as described in the first case. A 7 cm incision was made in the third intercostal space and the aforementioned wound spreader was placed. The pericardium was opened and exposed as described earlier. The aortic root and the right atrium were cannulated. A vent was inserted in the RSPV. After CPB was established, the aorta was crossclamped. A transverse aortotomy was performed and crystalloid cardioplegia was infused in the coronary ostia. Three commissural stitches were placed in the commissures and pulled upward. A 23 mm mechanical valve was implanted with single Cardioflon sutures. The aortotomy was then closed with a polypropylene running suture, and the air was evacuated through the aortic root and the RSPV vent. Perfusion time was 70 minutes and crossclamp time was 52 minutes. The patient was extubated 5 hours after the operation and discharged on postoperative day 5. The postoperative course was uneventful.

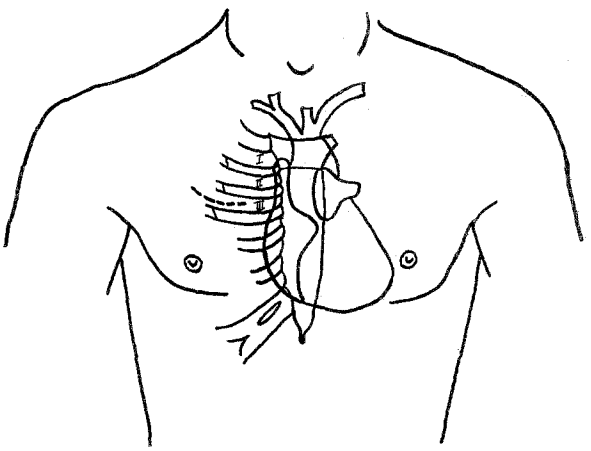

Fig. 1. The site of the incision in the right third intercostal space.

Discussion. To the present day only a few reports of minimally invasive valve operations have been published.[5-8] The method described with a small anterolateral thoracotomy in the third intercostal space and the use of a specially adapted wound spreader permits an optimal exposure of the aortic root, the aortic valve, the right atrium, and the RSPV, thus allowing appropriate access to all sites of cannulation. The use of the femoral artery as an alternative site of cannulation depends both on the anatomic characteristics of each patient (i.e., the presence of aortic calcification) and on the surgeon's preference.

Undoubtedly, the rapid and effective development of the instruments has played a major part in the growth of minimally invasive procedures in cardiac surgery. In fact, in this report the two described cases of minimally invasive aortic surgery were possible because of the technical evolu-

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tion of the specific instruments: the particular shape of the wound spreader's arms creates a visual tunnel through the intercostal space by retracting the third rib while pushing it downward, at the same time retracting the fourth rib and pulling it upward. This access produces an operative view adequate to safely perform aortic valve surgery. Therefore removal of ribs or cartilage fragments is not necessary, which results in a less traumatic and less painful approach. Minimally invasive valve surgery,[5-8] although still in its pioneering era, can open new horizons for cardiac surgery. In fact, along with the widespread and well-defined application of video-assisted technique in thoracic surgery, minimally invasive coronary and valvular procedures[1-8] are the reenergizing forefront of the future evolution of cardiac surgery and could offer concrete benefits to patients with cardiac disease.

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Aortic valve stenosis is a deadly disease that requires immediate attention. This page will teach you to recognize it and will give you an update on the best minimally invasive aortic valve replacement surgery options to treat it. The Aortic Valve Problem In A Nutshell: The normal aortic valve has three leaflets called cusps and is positioned at the exit site of the left ventricle (our main pump). The advent of sutureless aortic valves should make minimally invasive aortic valve replacements easier and quicker through less invasive approaches with reduced risk of stroke. The clinical experience with sutureless valves is increasing worldwide. In contrast to transcatheter aortic valve replacement this approach entails removal of all pathological leaflet and annular aortic valve calcification, thus facilitating the implantation of a larger expandable prosthesis. Sutureless bovine valve are constructed on a self-expandable stent, which can be inserted and released to fit in the aortic annul Minimally-invasive aortic valve replacement (MIAVR) uses a much smaller incision compared to traditional aortic valve replacement methods, which means patients recover much faster and the scar post-surgery is noticeably smaller too. MIAVR is used to treat patients with narrow or leaking valves who often complain of chest pains or shortness of breath. The technique is similar to that of keyhole surgery. Previously, surgeons used to have to split open the whole breastbone to have access to the valve and it would take several months for the wound to heal. Now patients recover more quickly, reduce Mini-thoracotomy aortic valve replacement or repair; Cardiac valvular surgery; Mini-sternotomy; Robotically-assisted aortic valve replacement; Transcatheter aortic valve replacement; TAVR. Patient Instructions. Antiplatelet drugs - P2Y12 inhibitors.Â Lamelas J. Minimally invasive, mini-thoracotomy aortic valve replacement. In: Sellke FW, Ruel M, eds. Atlas of Cardiac Surgical Techniques. Transcatheter aortic valve replacement (TAVR) is a minimally invasive procedure to replace a narrowed aortic valve that fails to open properly (aortic valve stenosis). In this procedure, doctors insert a catheter in your leg or chest and guide it to your heart. A replacement valve is inserted through the catheter and guided to your heart.