

## REFERENCES

1. Kansy A, Tobota Z, Maruszewski P, Maruszewski B. Analysis of 14,843 neonatal congenital heart surgical procedures in the European Association for Cardiothoracic Surgery Congenital Database. *Ann Thorac Surg.* 2010;89:1255–9.
2. Zhao ZQ, Puskas JD, Xu D, Wang NP, Mosunjac M, Guyton RA, et al. Improvement in cardiac function with small intestine extracellular matrix is associated with recruitment of C-kit cells, myofibroblasts, and macrophages after myocardial infarction. *J Am Coll Cardiol.* 2010;55:1250–61.
3. Robinson KA, Li J, Mathison M, Redkar A, Cui J, Chronos NA, et al. Extracellular matrix scaffold for cardiac repair. *Circulation.* 2005;112 Suppl 9:1135–43.
4. Zaidi AH, Nathan M, Emani S, Baird C, Del Nido PJ, Gauvreau K, et al. Preliminary experience with porcine intestinal submucosa (CorMatrix) for valve reconstruction in congenital heart disease: Histologic evaluation of explanted valves. *J Thorac Cardiovasc Surg.* 2014;148:2216–25.

<http://dx.doi.org/10.1016/j.rec.2016.03.020>

## Minimally Invasive Approach for Valvular Surgery and Atrial Septal Defect



### Abordaje mínimamente invasivo en cirugía valvular y del septo interauricular

#### To the Editor,

Over the last 20 years, cardiac surgery has evolved toward less invasive procedures, with the aim of reducing the surgical insult to the body and achieving early patient recovery. Currently, the standard surgical approach for the treatment of mitral disease remains full median sternotomy; however, minimally invasive techniques have become established as a safe and effective alternative used routinely in specialized centers, associated with excellent short-term and long-term outcomes and lower morbidity.<sup>1,2</sup> The right anterior minithoracotomy is the most common minimally invasive approach for mitral valve surgery. This technique allows treatment of the tricuspid valve, atrial defects, and atrial fibrillation at the same time.<sup>3</sup>

We present our initial experience and results with this minimally invasive approach. Between January 2012 and December 2015, 40 patients underwent intervention in our hospital. There was a predominance of men (62.5%), and the mean age was 58.5 years (range, 22–81 years). All patients had a right anterior minithoracotomy (incisions of 6 cm to 8 cm) plus 3 accessory ports < 5 mm, according to the surgical requirements (for Chitwood clamp, atrial retractor, and vent). All patients were connected to extracorporeal circulation by peripheral cannulation of the femoral vessels (artery and vein): a single 2-stage venous catheter was positioned in the superior vena cava in the first 12 patients, with subsequent cannulation of the right jugular vein in the remaining patients. A CO<sub>2</sub> laser was used in all operations. Beating heart surgery was performed, without ischemia in 4 patients, and with moderate hypothermia in 8 patients who were in ventricular fibrillation. The remaining patients proceeded to transthoracic

aortic cross-clamping with a Chitwood clamp, with antegrade cardioplegia through the aortic root via the ministernotomy. The mean time on extracorporeal circulation was 140 ± 38 minutes and the mean ischemia time was 98 ± 27 minutes. The Table shows the types of operation performed in these patients; notably, around half the operations were mitral valve repairs.

In our series, there have been no recorded deaths, either in-hospital or in the longer-term. At follow-up, all the repaired mitral valves were competent and free from regurgitation and reoperation. The most significant postoperative complications were as follows: 1 case of air embolism with mild transient neurological deficit (delirium and psychomotor agitation) with complete recovery at the time of hospital discharge; 1 case of failed mitral valve repair, with reintervention via minithoracotomy during the same admission to perform a new valvular repair; 1 patient with prolonged mechanical ventilation due to adult respiratory distress syndrome with complete recovery at the time

**Table**

Type of Surgery Performed Via Right Anterior Minithoracotomy

Type of surgery	Patients, n
Mitral valve surgery	32
Mitral valve replacement	13
Mitral valve repair	19
Annuloplasty	19
Neochordae implantation	6
Central Alfieri	1
Commissural closure	4
Posterior leaflet resection	11
Tricuspid valve replacement	4
Ostium secundum ASD closure	5

ASD, atrial septal defect.



**Figure.** Appearance of surgical wounds in a patient who underwent right anterior minithoracotomy for mitral valve repair, 2 weeks after surgery.

of hospital discharge; and 1 conversion to full median sternotomy due to bleeding after the procedure was finished, caused by damage to the pulmonary artery after release of the aortic clamp. The remaining patients' hospital stays were < 5 days, with no postoperative pain and recovery of normal activities in 2 weeks (Figure). Therefore, regarding morbidity and mortality, the results of our series are comparable to those of other published studies.<sup>1,4</sup>

According to the literature, compared with those with conventional treatments, patients who undergo surgery with minimally invasive approaches have fewer arrhythmias, less bleeding and need for transfusion, shorter stays in intensive care and in hospital, earlier extubation, less postoperative pain, and an earlier recovery of functional status and daily activities, with greater patient satisfaction and a better aesthetic result.<sup>1,2</sup> Despite the lower morbidity, these techniques are not performed routinely in all hospitals, as they are more technically demanding for the surgeons, have longer operating times (ischemia time and extracorporeal circulation time), and are accompanied by the corresponding learning curves and need for dedicated, costly materials.<sup>3,4</sup> In the future development of cardiac surgery, minimally invasive surgery has an essential role in responding to the demands of both patients and cardiologists; it is comparable to interventional procedures<sup>5</sup> and an excellent technique for the surgical approach in patients with previous cardiac surgery.<sup>1,2,6</sup> Therefore, in various hospitals, minimally invasive surgery appears to be an increasingly popular technique as an alternative to conventional surgery. Prospective, randomized studies are needed to allow a better evaluation of the clinical outcomes and cost-efficiency of this technique.

Gemma Sánchez-Espín,\* Juan J. Otero, Emiliano A. Rodríguez, María J. Mataró, Carlos Porras, and José M. Melero

Unidad de Gestión Clínica del Corazón y Patología Cardiovascular, Servicio de Cirugía Cardíaca, Hospital Universitario Virgen de la Victoria, Málaga, Spain

\*Corresponding author:

E-mail address: [gemmase@hotmail.com](mailto:gemmase@hotmail.com) (G. Sánchez-Espín).

Available online 2 June 2016

## REFERENCES

1. Modi P, Hassan A, Chitwood Jr WR. Minimally invasive mitral valve surgery: a systematic review and meta-analysis. *Eur J Cardiothorac Surg*. 2008;34:943–52.
2. Schmitto JD, Mokashi SA, Cohn LH. Minimally invasive valve surgery. *J Am Coll Cardiol*. 2010;56:455–62.
3. Glauber M, Miceli A. State of the art for approaching the mitral valve: sternotomy, minimally invasive or total endoscopic robotic? *Eur J Cardiothorac Surg*. 2015;48:639–41.
4. Mariscalco G, Musumeci F. The minithoracotomy approach: a safe and effective alternative for heart valve surgery. *Ann Thorac Surg*. 2014;97:356–64.
5. Carrasco-Chinchilla F, Arzamendi D, Romero M, Gimeno de Carlos F, Horacio Alonso-Briales J, Li CH, et al. Experiencia inicial del tratamiento percutáneo de la regurgitación mitral con dispositivo MitraClip® en España. *Rev Esp Cardiol*. 2014;67:1007–12.
6. Vallabhajosyula P, Wallen T, Pulsipher A, Pitkin E, Solomoto LP, Musthaq S, et al. Minimally invasive port access approach for reoperations on the mitral valve. *Ann Thorac Surg*. 2015;100:68–73.

<http://dx.doi.org/10.1016/j.rec.2016.03.019>

## One-year Non-persistence With Contemporary Antiplatelet Therapy in Acute Coronary Syndrome Patients Undergoing Percutaneous Coronary Intervention



*Falta de persistencia con el tratamiento antiplaquetario contemporáneo al año en pacientes con síndrome coronario agudo sometidos a intervención coronaria percutánea*

### To the Editor,

In patients with acute coronary syndrome (ACS) undergoing percutaneous coronary intervention (PCI), nonpersistence with antiplatelet therapy prescribed at discharge may lead to worse outcomes.<sup>1</sup> Apart from treatment cessation, nonpersistence may take the form of switching from one agent to another, which is common in everyday clinical practice.<sup>2</sup> We present insights from the GReek AntiPlatelet rEgistry (GRAPE) on 1-year nonpersistence with treatment prescribed at discharge.

GRAPE is a prospective, observational, multicenter, cohort study involving consecutive, moderate-to-high risk ACS patients undergoing PCI. Initial P2Y<sub>12</sub> receptor antagonist selection along with the subsequent in-hospital and postdischarge antiplatelet agent administration were left to the discretion of the treating clinician. Follow-up was performed at 1, 6, and 12 months by telephone interview or personal contact. Persistence with P2Y<sub>12</sub> receptor antagonists was defined as conforming to the recommendation of continuing the same P2Y<sub>12</sub> receptor antagonist as that prescribed at discharge. Switching was defined as changing to a different P2Y<sub>12</sub> receptor antagonist than that prescribed at

discharge, and cessation as not receiving any P2Y<sub>12</sub> receptor antagonist.

To assess potential predictive factors for cessation and switching, we used logistic regression modelling and adjusted for type of P2Y<sub>12</sub> receptor antagonist, oral anticoagulant, male sex, age (in decades), body mass index (per 5 Kg/m<sup>2</sup>), diabetes mellitus, hypertension, smoking, reason for admission, prior bleeding, creatinine clearance (calculated by the Cockcroft-Gault formula) < 60 mL/min, and PCI without stenting or with only bare metal stent use. The model was tested for discriminative power by the C-statistic. Informed consent was obtained from each patient and the protocol was approved by each institution's human research committee. GRAPE has been registered at clinical trials (NCT01774955).

At 1 year, 101 (5%) patients were lost to follow-up, while data on P2Y<sub>12</sub> receptor antagonist medication at 1 year were analyzable in 2005 patients. The nonpersistence rate was 24.2% (485 of 2005), with 55.5% (269 of 485) of nonpersistent patients having switched to a different P2Y<sub>12</sub> receptor antagonist, while 44.5% (216 of 485) had discontinued the P2Y<sub>12</sub> receptor antagonist. The nonpersistence rate was higher for prasugrel (21.5%) and ticagrelor (37.3%) than for clopidogrel (13.3%),  $P < .001$  for both, and was higher for ticagrelor than for prasugrel,  $P < .001$ . Differences were mainly driven by the higher rate of switching among patients discharged under novel P2Y<sub>12</sub> receptor antagonists (2.5%, 13.2%, and 25.0% for clopidogrel, prasugrel, and ticagrelor, respectively), while the cessation rate did not differ among groups (10.9%, 8.3%, and 12.3% for clopidogrel, prasugrel, and ticagrelor, respectively). Out of 269 patients in the switching group, 191 (71.0%) switched from a