

Symptomatic Severe Tricuspid Insufficiency as a Late Complication of Pulmonary Balloon Valvuloplasty

Rohn V., Šlais M., Vondráček V.

Charles University in Prague, First Faculty of Medicine and General University Hospital, Second Department of Surgery – Department of Cardiovascular Surgery, Prague, Czech Republic

Received April 26, 2010; Accepted August 6, 2010.

Key words: Tricuspid valve insufficiency – Pulmonary balloon valvuloplasty – Tricuspid valve repair

Abstract: The authors describe an unusual case of a young adult patient with symptomatic tricuspid valve insufficiency as a late consequence of pulmonary valve balloon dilatation in childhood. Patient was successfully treated by tricuspid valve repair with neo-chordae implantation and a ring plasty. Two years after the operation the patient, an active sportsman, is asymptomatic with trace tricuspid regurgitation on the echo examination.

Mailing Address: Vilém Rohn, MD., PhD., Charles University in Prague, First Faculty of Medicine and General University Hospital, Second Department of Surgery – Department of Cardiovascular Surgery, U Nemocnice 2, 128 00 Prague 2, Czech Republic; Phone: +420 224 962 797; Fax: +420 224 922 695; e-mail: vilem.rohn@vfn.cz

Introduction

The most common presentation of tricuspid valve regurgitation (TR) in the adult patient is secondary to cardiac valvular pathology (mostly mitral valve disease) on the left side of the heart. Hemodynamically significant TR as a late complication of percutaneous procedures in childhood is rare.

Dilatation of pulmonary valve by percutaneous balloon valvuloplasty due to congenital stenosis is a safe and effective procedure, significantly reducing gradient across the affected valve and right ventricular systolic pressure (Kan et al., 1982; Jarrar et al., 1999).

The authors report the case of a 22-year-old man whom successful balloon valvuloplasty was performed in childhood. Due to chordal rupture he developed symptomatic tricuspid valve insufficiency which was treated by valve repair.



Figure1 – Anterior leaflet prolapse caused by ruptured chordae.



Figure 2 – Repair by chordal replacement.

Case report

A 22-year-old male patient, active sportsman, was admitted to our center with progression of fatigue and weakness during last year. He had a history of percutaneous balloon valvuloplasty of congenital pulmonary valvular stenosis during childhood with excellent result on the pulmonary valve. Since then he has been followed by cardiologist due to a murmur and initially mild tricuspid valve insufficiency which progressed in the last year. On admission to our center, on the echocardiography there was severe tricuspid insufficiency which was caused by ruptured chordae to the anterior leaflet, as well as dilated right atrium and ventricle still with good systolic function. Pulmonary artery systolic pressure was 40 mm Hg.

The patient was operated on with the use of cardiopulmonary bypass with bicaval cannulation and cold blood cardioplegia. At the operation the tricuspid valve had dilated annulus; there was a prolapse of anterior leaflet with ruptured chordae and a small cleft – most probably healed tear of the anterior leaflet (Figure 1). The valve was repaired by suture of the cleft, implantation of two pairs of PTFE artificial chordae (Gore-Tex; W. L. Gore & Assoc., Flagstaff, AZ, USA) to the anterior leaflet, and annuloplasty with the flexible Duran ring No. 31 (Duran AnCore, Medtronic Inc., Minneapolis, MN, USA) (Figure 2). Patient's postoperative course was uneventful. Two years after the operation the patient is fully asymptomatic with only trace tricuspid regurgitation on the echo.

Comment

Pulmonary valvular stenosis (PVS) is a common congenital disorder, accounting for approximately 10% of all congenital heart diseases (Akagi, 2002). Balloon valvuloplasty remains the first choice of treatment of isolated PVS since it was introduced by McCrindle and Kan in 1982 (Kan et al., 1982; McCrindle and Kan, 1991). It is less invasive, less expensive, and requires a shorter hospital stay (Peterson et al., 2003). Complications are few; beside incomplete resolution of the valve lesion or dynamic infundibular stenoses, are complications predominantly related to those of cardiac catheterization, such as cardiac perforation and tamponade, arrhythmias, and tricuspid insufficiency.

TR as a late consequence of chordal and leaflet injury during pulmonary balloon valvuloplasty in childhood is rare. It is not well documented in the literature. It could be however progressively symptomatic and troublesome in adult age and in the extreme it can lead to right heart failure. It is therefore important to recognize the tricuspid valve injury at time of the valvuloplasty and follow the patient regularly by the echocardiography, since the decision and timing of the surgery is very important. Tricuspid valve repair at the time of mild symptoms could prevent further deterioration of right ventricular function and right heart failure (McCarthy et al., 2004; Rogers and Bolling, 2009).

The mechanism of TR in the case of chordal rupture and/or leaflet injury warrants high probability of valve reconstruction. Tricuspid valve repair is usually associated

with a low perioperative risk and offers good results with respect to hemodynamics and long-time survival (McCarthy et al., 2004; Singh et al., 2006; Tang et al., 2006).

Conclusion

A case of symptomatic severe tricuspid valve insufficiency as a late complication of pulmonary balloon valvuloplasty has been reported. Although this complication is very uncommon, it should be suspected whenever new murmur on the tricuspid valve occurs after procedure. The patient should be followed by the echocardiography on a regular basis. In case of progression of symptoms or worsening of right ventricular function and/or dilatation on the echocardiography, proper indication and timing of the operation could prevent further deterioration and right heart failure. In our case successful surgical repair of tricuspid valve was performed.

References

- Akagi, T. (2002) Pulmonic stenosis. In: *Cardiology*, eds. Crawford, M. H., Di Marco, J. P., Harcourt Publishers Ltd., Orlando.
- Jarrar, M., Betbout, F., Farhat, M. B., Maatouk, F., Gamra, H., Addad, F., Hammami, S., Ben Hamda, K. (1999) Long-term invasive and noninvasive results of percutaneous balloon pulmonary valvuloplasty in children, adolescents, and adults. *Am. Heart J.* **138**, 950–954.
- Kan, J. S., White, R. I., Mitchell, S. E., Gardner, T. J. (1982) Percutaneous balloon valvuloplasty: A new method for treating congenital pulmonary valve stenosis. *N. Engl. J. Med.* **307**, 540–542.
- McCarthy, P. M., Bhudia, S. K., Rajeswaran Haercher, K. J., Lytle, B. W., Cosgrove, D. M., Blackstone, E. H. (2004) Tricuspid valve repair: durability and risk factors for failure. *J. Thorac. Cardiovasc. Surg.* **127**, 674–685.
- McCordle, B. W., Kan, J. S. (1991) Long-term results after balloon pulmonary valvuloplasty. *Circulation* **83**, 1915–1922.
- Peterson, C., Schilthuis, J. J., Dodge-Khatami, A., Hitchcock, J. F., Meijboom, E. J., Bennink, G. B. W. E. (2003) Comparative long-term results of surgery versus balloon valvuloplasty for pulmonary valve stenosis in infants and children. *Ann. Thorac. Surg.* **76**, 1078–1083.
- Rogers, J. H., Bolling, S. F. (2009) The tricuspid valve: current perspective and evolving management of tricuspid regurgitation. *Circulation* **119(20)**, 2718–2725.
- Singh, S. K., Tang, G. H. L., Maganti, M. D., Armstrong, S., Williams, W. G., David, T. E., Borger, M. A. (2006) Midterm outcomes of tricuspid valve repair versus replacement for organic tricuspid disease. *Ann. Thorac. Surg.* **82**, 1735–1741.
- Tang, G. H. L., David, T. E., Singh, S. K., Maganti, M. D., Armstrong, S., Borger, M. A. (2006) Tricuspid valve repair with an annuloplasty ring results in improved long-term outcomes. *Circulation* **114**, I577–I581 (Suppl. I).