

## EDITORIAL / УВОДНИК

# New developments, treatment options and possible complication in complex coronary artery disease, structural and congenital heart disease, and heart failure

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Developments of interventional techniques and devices for the treatment of coronary artery disease, structural heart diseases, including valvular and congenital heart disease, as well as heart failure, have changed the practice of modern cardiology. In this issue of the *Serbian Archives of Medicine* we present five articles on different novel techniques, devices, as well as complications of device implantation for the treatment of chronic total occlusion [1], aortic valve disease [2], patent ductus arteriosus [3], pacemaker systems upgrade [4], and finally critical analysis of the most common complications during the implantation of cardiac rhythm management devices [5].

Recanalization of chronic total occlusion remains one of the most demanding and complex interventions for the treatment of coronary artery disease. However, continuous technological developments including new dedicated guidewires enabling safer and easier recanalization, have made this challenging procedure available not only for elite centers of excellence but also for other high volume interventional laboratories with huge experience in the interventional treatment of coronary artery disease. Recanalization of chronic total occlusions has been introduced in Serbia during Belgrade BASICS interventional meeting more than 10 years ago by Japanese and other distinguished operators. Now, with this proctoring approach and large gained experience in implementation of this procedure, several our centers are successfully performing this procedure [6]. Ivanović et al. [1] presented two cases of a specific retrograde approach for the treatment of chronic total occlusion where after failed antegrade crossing of the occlusion, the occluded coronary artery was crossed from the contralateral coronary artery through collaterals. The rationale of this approach is based on the fact that the distal cup of coronary ar-

tery occlusion is thinner and more suitable for guidewire penetration in comparison with the proximal cup of the occlusion. By introduction of the retrograde approach during the last 10 years, the success of the technique improved from just above 50% to more than 90% when performed by experienced operators [7].

Most of the innovations in modern cardiology practice in the last decade come from the developments in the treatment of valvular heart disease, aortic valve stenosis in particular. In fact, transcatheter aortic valve implantation (TAVI) has swiftly moved from being a promising option in inoperable patients to the standard of care in high-risk patients, and at least an alternative treatment option in intermediate-risk patients with symptomatic aortic stenosis [8, 9]. Although it proved to be a safe procedure, unusual and life-threatening complications can occur, as shown in the article by Lazarević et al. [2]. This case report still supports the application of on-site echocardiography imaging during the procedure to search for possible causes of sudden hypotension that may lead to severe hemodynamic compromise in these fragile patients. Simultaneous echocardiography imaging might be particularly important for centers with limited experience in this procedure and technique, as are the centers in our country regarding the experience with TAVI.

On the other hand, the treatment of congenital heart disease in children and adults by interventional techniques in our country is characterized by respectable tradition, experience, and success. Here, Đukić et al. [3] present their experience from the Children's Hospital in Belgrade on the management of patent ductus arteriosus by transcatheter closure of the defect, which is considered standard procedure in most young patients after early infancy. The authors compared two devices and concluded the superiority and safety of the Amplatzer duct occluders

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over spiral shape coils, both early after intervention and in the follow-up (100% closure after one and two years).

In the last decade, we have also witnessed tremendous evolution and efficiency of devices used in patients with heart failure, including primarily cardiac resynchronization therapy (CRT) along with implantable cardioverter defibrillators. Moreover, CRT devices have been used to upgrade older pacemaker systems in cases of adverse effects of chronic right ventricular pacing that may lead to heart failure. Here, Radovanović et al. [4] present a case of a patient in whom the upgrade of the pacemaker was needed due to a newly developed heart failure. The case was further complicated by subclavian vein thrombosis on the side of the previously implanted pacemaker. Therefore, the authors decided to carry out a more complex and less-used intervention in clinical practice (but with a potential long-term benefit to reduce new venous thrombosis) to

implant one new left ventricular lead on the right side and then to transfer it subcutaneously by pre-sternal tunneling to the previous left prepectoral pocket.

Finally, the same group of authors from the Pacemaker Center of the Clinical Center of Serbia reported the rate of pneumothorax, one of the most common complications of cardiac rhythm management devices, including anti-bradycardia pacemakers, implantable cardioverter defibrillators, and CRTs, during one year [5]. Among 999 patients, the rate of pneumothorax was 1.8% (incidence from the literature data is 0.66–5% [10]), and more often found in women, older patients, subclavian vein puncture, and the use of intravenous contrast during the procedure. According to their experience and data, the authors suggested that cephalic vein cut-down is the preferred and safer technique to subclavian or axillary vein puncture with careful use of contrast venography.

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