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Commentary to the article: "Pulmonary artery aneurysm mimicking pulmonary artery dissection detected by multimodality imaging"

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We would like to comment on the recently published case report describing diagnostic difficulties in pulmonary artery aneurysm (PAA) [1].

However interesting, the discussion was focused on what is in fact an uncommon idiopathic PAA and lacks insight into two groups of patients in which such dilatation is much more

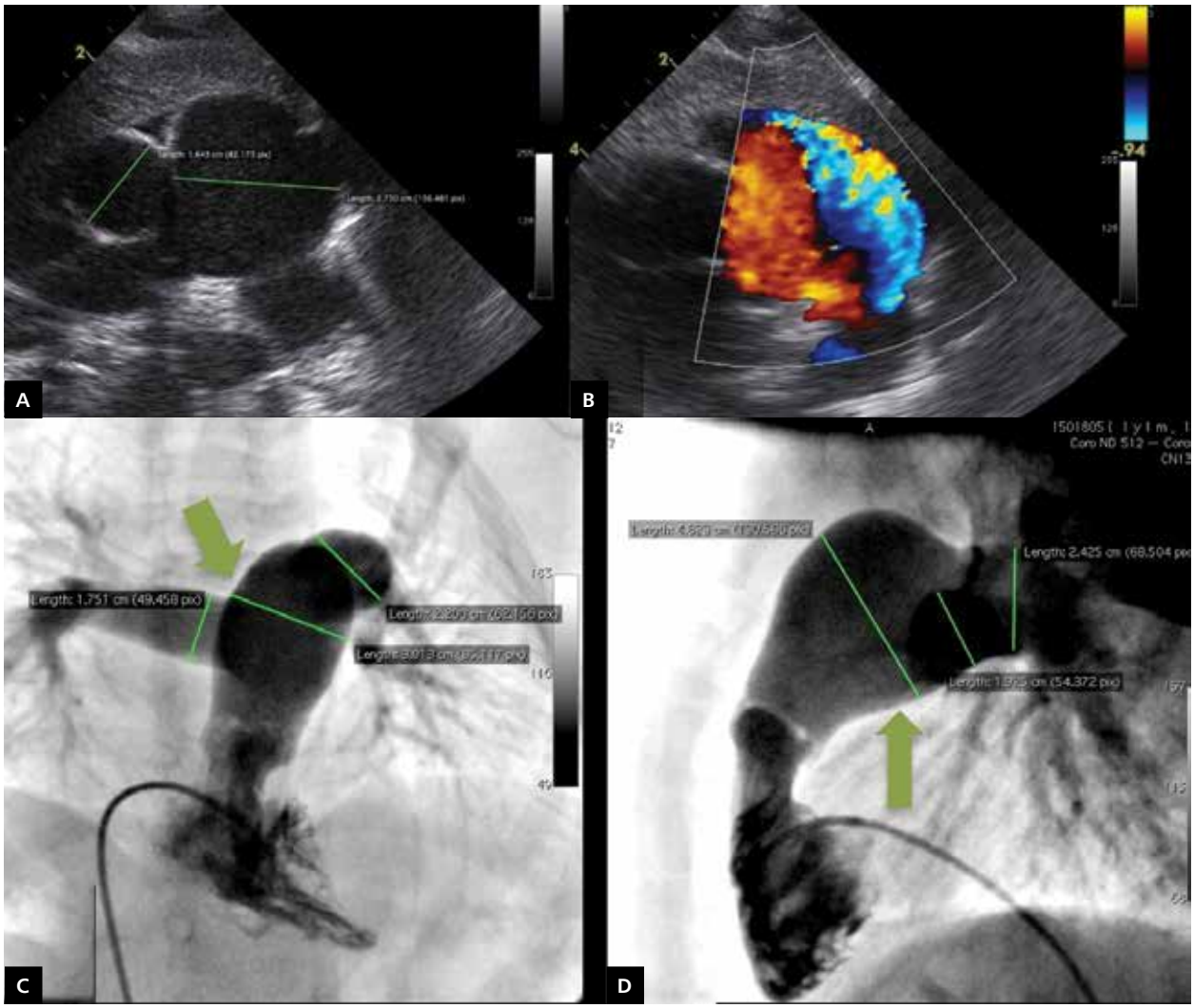

Figure 1. 13 m.o. child with pulmonary stenosis and pulmonary artery aneurysm (PAA): two-dimensional transthoracic echocardiography (TTE) short axis view showing the aneurysm of main pulmonary artery (2.7 cm compared to aortic diameter of 1.6 cm) and dilated pulmonary branches — left to a greater extent (**A**); colour Doppler study showing flow separation and secondary flow resulting in vortex flow pattern (**B**). Same patient: utilisation of angiography to reveal asymmetric nature of PAA; the frontal view underestimates the dilatation as the lateral diameter (arrow) is 3.0 cm (**C**) compared to the maximum dimension (arrow) of 4.6 cm as seen on the lateral view showing that the bulging is mainly towards the front and top (**D**). As seen also the standard TTE view, despite good echocardiographic window, grossly underestimates the true degree of aneurysmal dilatation due to its geometry

commonly seen. These two groups are children featuring a better echocardiographic window in the area of interest, and the continuously growing group of patients with congenital heart diseases — both pre and post surgical or interventional treatment (Fig. 1).

PAA may accompany pulmonary stenosis as poststenotic dilatation seen already in neonatal age and sometimes persisting into adulthood despite good treatment outcome and growth of the patient [2, 3].

In tetralogy of Fallot, the PAA may develop postsurgically especially if the transannular pericardial patch technique is used. The latter exemplifies iatrogenic cause of PAA. Since the patch extends into a pulmonary valve, its dilatation may lead to progressive pulmonary insufficiency and reoperation.

The observed bidirectional or vortex flow pattern is a common phenomenon in cases of PAA. It must be differentiated from reverse flow in the pulmonary artery (PA) in cases of significant pulmonary insufficiency or patent ductus arteriosus. The former is diastolic and throughout the whole diameter of the vessel, whereas the latter is diastolic (or systolic-diastolic) and travels from the vicinity of the left PA along the left lateral wall of the PA. In contrast, the vortex flow pattern in PAA is systolic, simultaneous and parallel to the forward flow. It has been studied mathematically and modelled *in vitro* [4]. The so-called 'secondary flow' appears in a situation when a relatively narrow jet is injected into a wide vessel. In the discussed situation, it is especially prominent due to the eccentric nature of the primary flow — the forward jet directed into the PA roof. It is accompanied by a flow separation and prominent secondary flow in the inner area of PAA. The primary flow direction into the bulge of PAA is considered one of the reasons for the progressive nature of the dilatation, despite supposedly low PA pressures.

The PAA dissection has been described in very few case reports to date, and has had outcomes ranging from successful emergency surgery to sudden cardiac death [5]. There is no consensus as to whether to perform preventive surgery and at what stage of dilatation. Since PA is considered a low pressure vessel (with the exception of cases of pulmonary hypertension) and the risk of rupture is minimal, it seems justified that most cases are managed conservatively. A diagnosis of PAA rupture requires a high index of suspicion and multimodality imaging as transthoracic echocardiography, transoesophageal echocardiography, and angiography may be false negatives [5].

Conflict of interest: *none declared*

References

1. Unlu M, Demirkol S, Balta S et al. Pulmonary artery aneurysm mimicking pulmonary artery dissection detected by multimodality imaging. Kardiol Pol, 2013; 71: 1180–1182.
2. Van Buchem FSP. Dilatation of the pulmonary artery in pulmonary stenosis. Circulation, 1956; 13: 719.
3. Makaryus AN, Catanzaro J, Boxt L. Pulmonary artery aneurysm evaluated by 64-detector CT 254 in a patient with repaired tetralogy of Fallot. Tex Heart Inst J, 2007; 34: 254–255.
4. Sung HW, Hsu TL, Hsu CH, Hsu JC. Pulmonary artery hemodynamics with varying degrees of valvular stenosis: an in vitro study. J Biomech, 1998; 31: 1153–1161.
5. Lopez-Candales A, Kleiger RE, Aleman-Gomez J et al. Pulmonary artery aneurysm: review and case report. Clin Cardiol, 1995; 18: 738–740.

Robert Sabiniewicz, Jarosław Meyer-Szary
Department of Paediatric Cardiology
and Congenital Heart Diseases,
Medical University of Gdansk, Poland