

Follow-up on results of three-dimensional printed model aided unusual intervention on aneurysm of aortic arch lesser curvature

Robert Sabiniewicz¹, Jarosław Meyer-Szary¹,
Lidia Woźniak-Mielczarek¹, Dominika Sabiniewicz²

¹Department of Pediatric Cardiology and Congenital Heart Diseases,
Medical University of Gdansk, Poland

²nd Department of Radiology, Medical University of Gdansk, Poland

A recent article “Feasibility of in-house rapid prototyping of cardiovascular three-dimensional models for planning and training non-standard interventional procedures” [1] presented the usefulness of three-dimensional (3D) printed models in planning unusual procedures in atypical structural heart defects. In particular, the model was used to plan the procedure of closing an aneurysm on the lesser curvature of the aortic arch in a patient after previous surgery for aortic coarctation (Fig. 1A). Thanks to the prepared model, the type and size of the closing implant were selected, optimal vascular access path was chosen, and technique of the procedure was practiced. This allowed for shortening the time of procedure, perform it without complications, and with a good direct result. This proves the usefulness of personalized printouts of 3D models described in the literature in planning unusual or complicated interventions [1–3].

Herein, is presented follow-up details and treatment results of a previously presented case. Post 6 months the patient did not present any symptoms or complain of discomfort. A follow-up computed tomography scan showed a good long-term outcome. The aneurysm orifice was closed with an ADO implant remaining in the correct

position (Fig. 1B). There was no narrowing or flow disorder in the aortic arch and no inflow to the aneurysm that was completely closed. The procedure of closing the aneurysm prevented its further enlargement or increasing pressure on surrounding structures most importantly the left pulmonary artery. Presented 3D reconstructions compare the baseline situation and the remote outcome of the procedure.

Conflict of interest: None declared

References

1. Meyer-Szary J, Woźniak-Mielczarek L, Sabiniewicz D, et al. Feasibility of in-house rapid prototyping of cardiovascular three-dimensional models for planning and training non-standard interventional procedures. *Cardiol J.* 2019; 26(6): 790–792, doi: [10.5603/CJ.2019.0115](https://doi.org/10.5603/CJ.2019.0115), indexed in Pubmed: [31970736](https://pubmed.ncbi.nlm.nih.gov/31970736/).
2. Luo H, Meyer-Szary J, Wang Z, et al. Three-dimensional printing in cardiology: Current applications and future challenges. *Cardiol J.* 2017; 24(4): 436–444, doi: [10.5603/CJ.a2017.0056](https://doi.org/10.5603/CJ.a2017.0056), indexed in Pubmed: [28541602](https://pubmed.ncbi.nlm.nih.gov/28541602/).
3. Sabiniewicz R, Meyer-Szary J, Potaż P, et al. Melody valve implantation pre-procedural planning using custom-made 3D printed model of the region of interest. *Adv Intercv Cardiol.* 2018; 14(2): 210–211, doi: [10.5114/aic.2018.76419](https://doi.org/10.5114/aic.2018.76419), indexed in Pubmed: [30008780](https://pubmed.ncbi.nlm.nih.gov/30008780/).

Address for correspondence: Jarosław Meyer-Szary, MD, PhD, Assistant teacher, Department of Pediatric Cardiology and Congenital Heart Diseases, Medical University of Gdansk, ul. M. Skłodowskiej-Curie 3a, 80–210 Gdańsk, Poland, tel: +48 58 349 2882, fax: +48 58 349 2890, e-mail: jmeyerszary@gumed.edu.pl

Received: 2.04.2020

Accepted: 5.05.2020

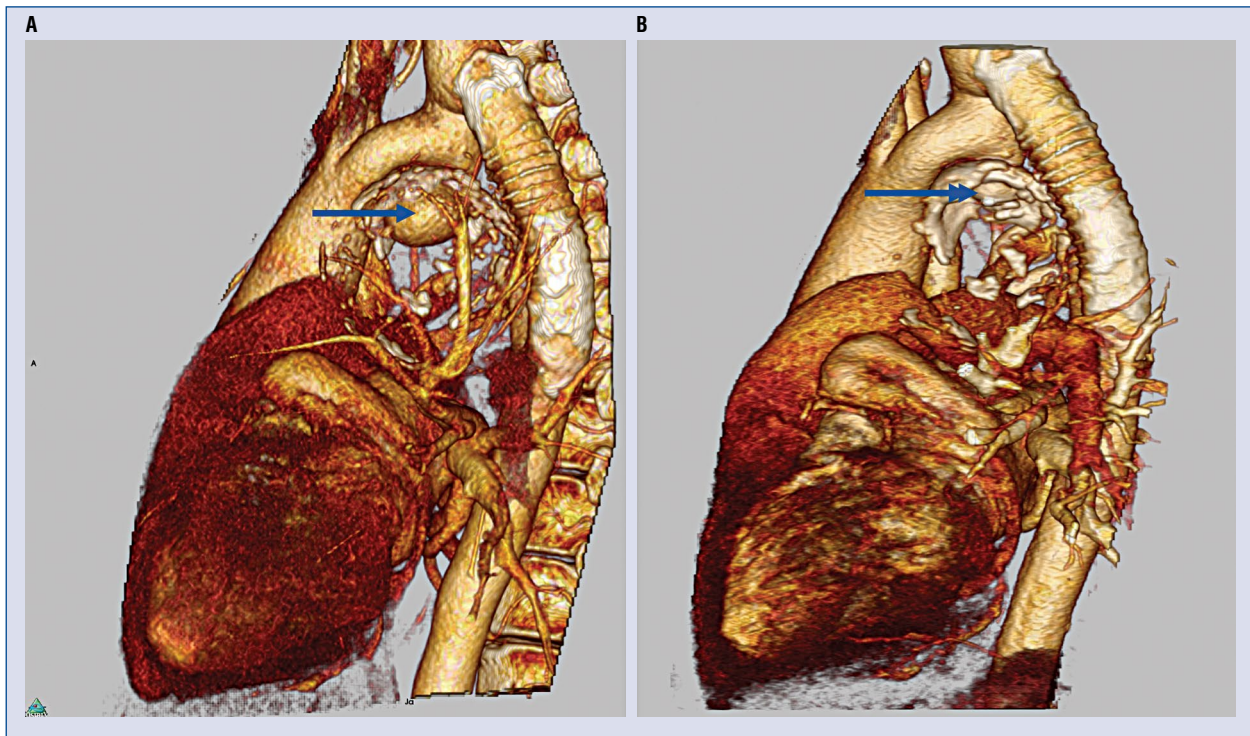


Figure 1. Computed tomography volume rendering reconstruction showing the anatomy before the procedure (A) and after (B). The arrows show the aneurysm on the lesser curvature of the aortic arch and the ADO implanted to close it. Detailed description in the text.