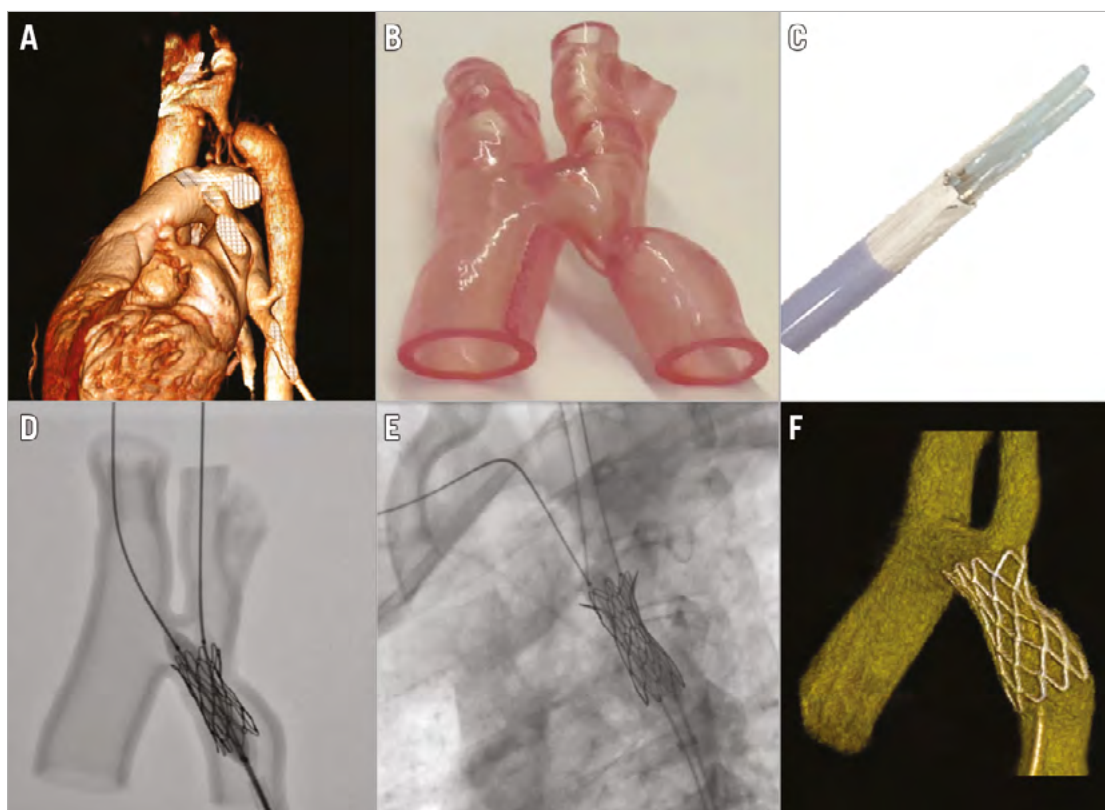


# Stenting complex aortic coarctation: simulation in a 3D printed model



Francesca Romana Pluchinotta\*, MD; Luca Giugno, MD; Mario Carminati, MD

Department of Pediatric Cardiology and Adult Congenital Heart Disease, IRCCS Policlinico San Donato, Milan, Italy



A 23-year-old lady with aortic coarctation was referred for percutaneous treatment. Cardiac CT demonstrated severe coarctation distal to the origin of the left carotid artery (LCA) with hypoplasia of the left subclavian artery (**Panel A**). The planned procedure was to implant a covered stent to reduce the risk of aortic dissection or rupture. However, using a covered stent, the risk of occluding the origin of the LCA had to be considered. An innovative approach was planned and tested in a 3D model printed in HeartPrint® Flex material (Materialise, Leuven, Belgium) (**Panel B**). A single covered CP Stent™ 39 mm (NuMED, Hopkinton, NY, USA) was mounted on, delivered over, and expanded on two separate, adjacent balloons (Cristal Balloon 10x40 mm; Balt, Montmorency, France) (**Panel C**). The two balloon wires were advanced into the right subclavian and the LCA (**Panel D**). The distal portion of the stent was expanded first to dilate the stenotic point without

compromising the flow into the LCA. Then, by withdrawing the sheath, the remaining part of the stent was expanded. Later the patient underwent catheterisation. Based on aortographic diameters, the same stent and balloon used in the simulation were chosen. Stent position was easy to work out, as it had already been tested in the 3D model (**Panel E**). After successful stent delivery, 3D rotational angiography confirmed adequate stent expansion (**Panel F**). These images show the first case of a single CP covered stent mounted on two adjacent balloons in a patient with severe coarctation very close to the LCA. The 3D model was helpful in planning the intervention, and in determining the stent length and its optimal position.

## Conflict of interest statement

The authors have no conflicts of interest to declare.

\*Corresponding author: Department of Pediatric Cardiology and Adult Congenital Heart Disease, IRCCS Policlinico San Donato, Piazza Edmondo Malan 1, 20097 San Donato Milanese (MI), Italy. E-mail: francesca.pluchinotta@grupposandonato.it