

Patent Ductus Arteriosus: Endovascular Treatment in the Adult Patient

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The patent ductus arteriosus (PDA) is a common type of congenital heart defect and its correction is simple when performed early in life. Surgery is performed using stitches or clips. In adults, the anomaly can lead to pulmonary hypertension and ventricular dysfunction. Surgery in adults is controversial and high-risk. This report describes an alternative endovascular approach in an adult patient.

Introduction

The patent ductus arteriosus (PDA) is a relatively frequent congenital defect and its correction is simple when performed early in life. The traditional correction involves the ligation of the ductus with or without its sectioning. The presence of the anomaly in adults can lead to persistent pulmonary hypertension and ventricular dysfunction. The corrective surgery in adults is controversial. Recent reports have increasingly demonstrated the possibility of endovascular correction^{1,2}.

This report describes a PDA case in an adult patient that underwent endovascular correction using an intra-abdominal access.

Case Report

A 42-year-old female, was admitted at the Aorta Outpatient Clinic of our Institution complaining of progressive dyspnea and orthopnea. The physical examination disclosed the presence of a persistent machinery murmur along the left sternal border. The patient was then submitted to a two-dimensional echocardiogram, which demonstrated the presence of the patent ductus arteriosus and increased pulmonary artery diameter.

Key words

Ductus arteriosus, patent; aorta, thoracic; stent-graft; endoprosthesis.

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Ventricular functions were normal. The computed tomography (CT) confirmed the echocardiographic findings and the presence of calcification around the ductus arteriosus. As the patients presented an allergic reaction to the iodine contrast, the investigation was carried on with the use of nuclear magnetic resonance, which demonstrated a 5 mm diameter patent ductus arteriosus, 32 mm diameter pulmonary artery and signs that were suggestive of pulmonary hypertension (Figure 1).

The Doppler ultrasound of the femoral arteries showed small arterial diameter that was incompatible with the introduction of self-expandable endoprosthesis through femoral access. Therefore, the transabdominal access was chosen. After obtaining the patient's informed consent, the patient was submitted to general anesthesia, orotracheal intubation and routine invasive monitoring. A 7-cm oblique incision was carried out over the left iliac fossa, which allowed access to iliac arteries bifurcation. The patient was heparinized and a string-purse suture was performed at the bifurcation of the iliac arteries. A guiding catheter was positioned using Seldinger technique through the left axillary artery for the radioscopic identification of the left subclavian artery. Subsequently, under radioscopic guidance, a guide wire was positioned in the descending aorta, over which was located a pigtail catheter. An extra-stiff guiding wire was positioned through the pigtail catheter, which was later removed. A 34 mm x 90 mm self-expandable endoprosthesis with an uncovered proximal segment (free-flow) was advanced and deployer over the extra-stiff wire, with occlusion of the ductus arteriosus, but without left subclavian artery occlusion.

The postoperative evolution was uneventful. The control echocardiogram disclosed the occlusion of the ductus arteriosus with absence of flow and no endoprosthesis leaks. The patient was discharged on day 3 of the postoperative period.

The ambulatory follow-up showed significant symptom improvement and absence of murmur, as well as no need for medication. The postoperative radiographic and echocardiographic control one year after the surgery showed good coaptation of the endoprosthesis, absence of flow in the ductus arteriosus and regression of pulmonary hypertension signs (Figure 2).

Discussion

The finding of patent ductus arteriosus in adults remains a therapeutic controversy. The conventional surgical intervention

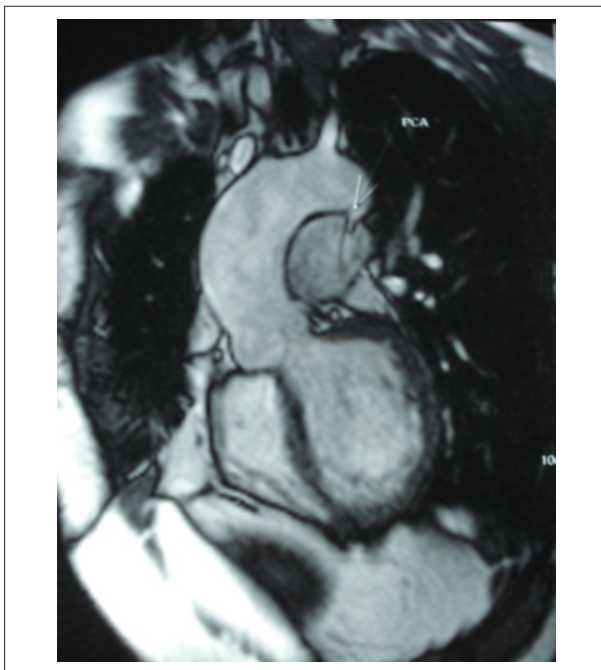


Figure 1 - Nuclear magnetic resonance showing the patent ductus arteriosus (arrow).

in this age range involves significant operative risk and many times requires the help of extracorporeal circulation and the interposition of synthetic grafts³.

The mortality rates of this disease, when untreated, can reach 20% at 30 years of age, increasing 4% per year⁴.

Untreated individuals can present pulmonary artery hypertension, risk of dissection of the pulmonary artery, endocarditis, Eisenmenger's syndrome, ventricular dysfunction and sudden death⁴.

Considering the complications and increased surgical risk, the endovascular treatment has arisen as a therapeutic option, through the elimination of the aortic orifice of the ductus arteriosus^{1,2,5,6}.

The most common approach is the placement of coils in an embolization attempt or the use of Amplatzer devices. However, these present several limitations, such as the presence of residual shunts, embolization of coils into the pulmonary tree or peripheral arterial system, presence of large-diameter ductus arteriosus and ductus rupture².

This case report demonstrates the possibility of performing and endovascular intervention, even in the presence of small-caliber femoral arteries. The procedure showed to be safe and simple.

The limitations of the method include: possibility of left subclavian artery occlusion, even with the use of uncoated endoprosthesis, transabdominal approach in patients with small-caliber femoral arteries or those with advanced atherosclerotic disease.

Conclusion

The endovascular treatment of the patent ductus arteriosus can become the first-choice alternative for adult patients, mainly when one considers the development of devices with a more favorable profile and increased aortic maneuverability.

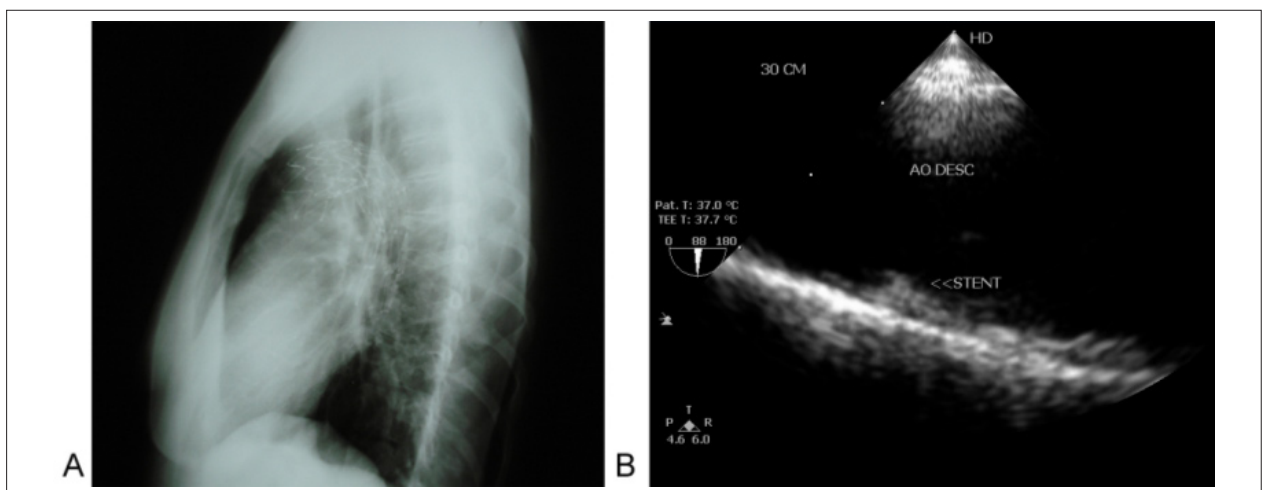


Figure 2 - A. Chest x-ray showing the positioning and expansion of the endoprosthesis. B. Transesophageal echocardiogram showing good coaptation of the endoprosthesis and elimination of the ductus arteriosus.

Case Report

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