Images in cardiovascular medicine

A new permanent and retrievable vena cava filter: its removal after five months

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(Ital Heart J 2001; 2 (9): 715-716)

Received April 2, 2001; revision received August 6, 2001; accepted August 30, 2001.

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Major indications for inferior vena cava interruption are to prevent pulmonary embolism in patients with deep vein thrombosis or pulmonary embolism who either cannot be anticoagulated or suffer from a recurrent venous thromboembolic disease despite adequate anticoagulation[1]. Recently, filters for temporary, rather than permanent, use have been developed. These filters are attached to a tethering catheter or a wire for retrieval 1-6 weeks after implantation, although they can also be used as a permanent option, if necessary[2]. Use of temporary filters is a promising form of treatment for inferior vena cava interruption, although appropriate clinical studies are necessary to validate their safety and clinical benefit.

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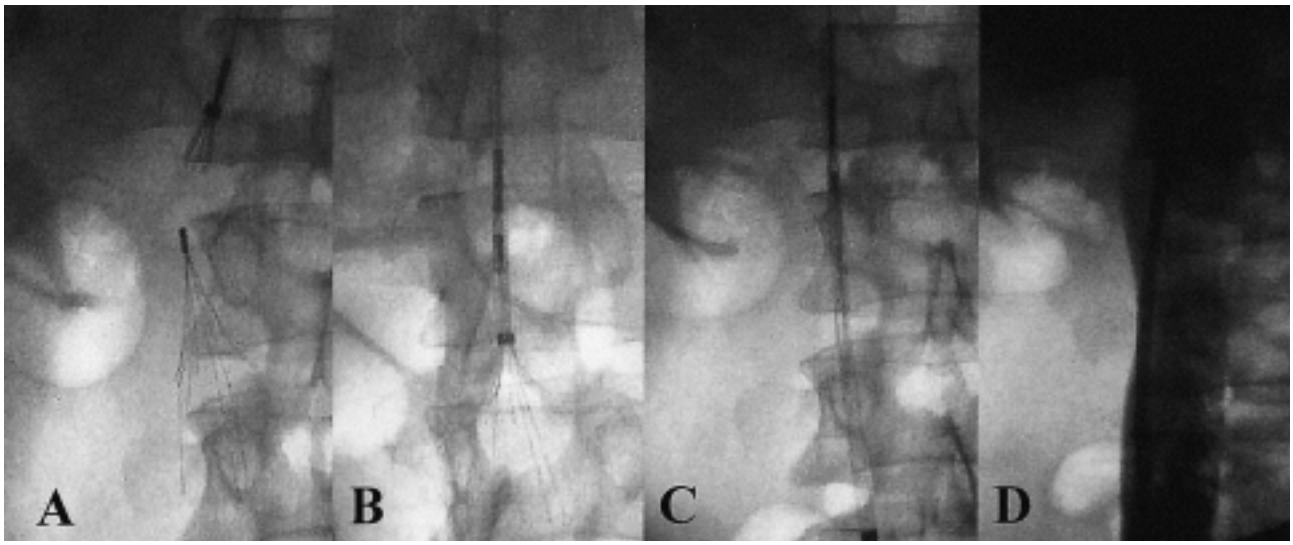

Figure 1. *Successful removal of a temporary inferior vena cava filter (ALN, Implants Chirurgicaux, Ghisonaccia, France), 5 months after its implantation in a 57-year-old man, with a recent oral anticoagulant-related intracerebral hemorrhage, referred to our center because of pulmonary embolism (Miller's index 14) caused by a mobile thrombus located in his right common and superficial femoral vein.* A: *a radio-opaque 9F retrieval sheath is inserted via the right jugular vein with an inner retrieving catheter with stainless steel pliers at its end; the distal tip of the sheath is placed just above the apex of the inferior vena cava filter, and then the retrieving catheter is introduced.* B: *after engaging the cephalic cone-shape apex, a slight tension is applied to the retrieving catheter until it is partially advanced over the filter, which at this point is just collapsed.* C: *further caudal movement of the retrieval sheath disengages the filter barbs and wires completely from the inferior vena cava wall without peeling it and allows for a rapid and atraumatic filter retrieval.* D: *after the filter is retrieved, a vena cava angiogram is performed to exclude any injury to the inferior vena cava wall.*

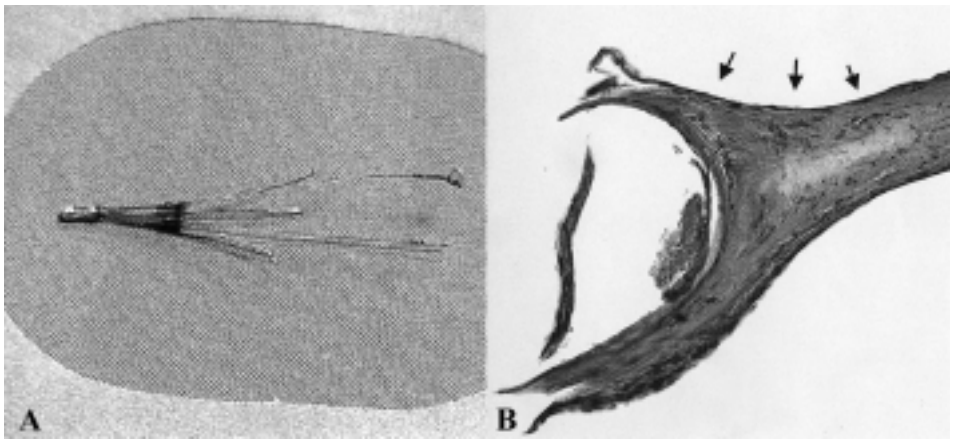

Figure 2. A: *gross inspection of the removed device showed no alterations of the stainless steel struts, due to corrosion or fatigue, whereas a small trapped embolus was visible in the central part of the proximal filter.* B: *microscopic examination, at the site of the filter wire in contact with the caval wall, showed localized thin neointima hyperplasia and small fibrin deposits, with few adherent erythrocytes and thrombocytes, and without any signs of acute inflammation or foreign body rejection.*

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To the Editor. We read with great interest the case report "Double-outlet right ventricle with intact ventricular septum" by Vairo et. al.[1] published in the *Italian Heart Journal*. In this paper Vairo gave us the benefit of his experience on this interesting case as when he was part of our team, at the Giovanni XXIII Pediatric Hospital of Bari, at the time we treated the said patient.

The purpose of the present letter is to give a complete picture of the patient's history. For this reason, we would like to report the further developments in the child's follow-up[2]. Nine months after the child was discharged home she was re-admitted to our unit and submitted to elective cardiac catheterization that demonstrated a wide open atrial septostomy with no pressure gradient between the atria. The left ventricular volume was severely reduced but the left ventricle did not appear hypoplastic. This was probably due to massive mitral valve incompetence that masked, by means of significant dilation, a chamber with a low ventricular mass. Thereafter the patient was scheduled for surgery and single-ventricle treatment according to the modified Glenn procedure was planned. Having established a cardiopulmonary bypass, the right Blalock-Taussig shunt was sectioned and a bidirectional cavo-pulmonary anastomosis performed. A trivial forward flow through the pulmonary outflow tract was left as an additional source of pulmonary blood flow. In addition, having sutured the medial edges of the mitral valve, a patch of bovine pericardium was placed in the supra-annular position. This latter maneuver was performed with the aim of excluding the morphological left ventricle from the systemic circulation. The postoperative course was uneventful and the child was discharged home 18 days following admission.

Patient evaluation performed in the outpatient clinic 42 months later confirmed that growth was normal. No complications were observed and the child did not necessitate any medications. Her transcutaneous oxygen saturation was in the 90 s on room air. Transthoracic echocardiography showed a satisfactory contractility of the systemic right ventricle and a total exclusion of the left ventricle which did not impair the right ventricular function (Fig. 1). A Fontan operation may be required within 5 years of age.

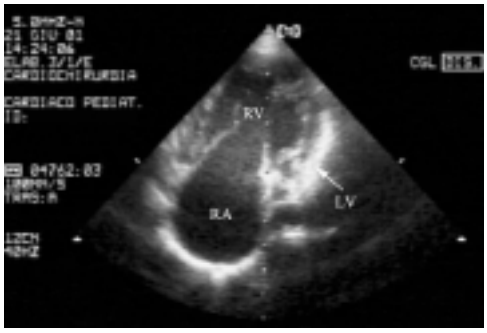

Figure 1. *Four-chamber view showing total exclusion of the left ventricle (LV) from the systemic circulation. RA = right atrium; RV = right ventricle.*

The interest of this case is due to the fact that, following a full literature review, we did not find any previous report of a patient with double-outlet right ventricle and no ventricular septal defect[1-5] who is still alive and in good health at an intermediate postoperative follow-up.

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