

CASE REPORT

Prolonged placement of the new temporary Montanari's vena cava filter

CATERINA PRATICÒ¹, VINCENZO FODALE¹, ANNA M. D'AMICO¹,
SALVATORE LAMBERTO², & LETTERIO B. SANTAMARIA¹

¹Department of Neuroscience Psychiatric and Anesthesiological Sciences, and ²Department of Radiological Sciences, University of Messina, Policlinico Universitario "G.Martino", Messina, Italy

Abstract

Trauma patients are often at significant risk for venous thromboembolism, a multifactorial disease often manifesting clinically with pulmonary embolism, resulting in high morbidity and mortality rates. Multiple studies have reported the benefit of prophylactic positioning of inferior vena cava temporary filters, but these devices may only be placed for a relatively short time. In a 41-year-old man, admitted to the intensive care unit for multiple trauma, and at high risk for pulmonary embolism, the new definitive/temporary Montanari's vena cava filter (ALN) was positioned at the lower level of the renal veins, and maintained for ten months, much longer than is usual at the present time. The ALN filter was removed through the right jugular vein and no signs of alterations were noted in the removed device. At 1-year follow-up after the device removal, no related adverse events were seen. Since ALN filter does not require anticoagulant treatment, it was also possible to avoid administration of heparin, a high-risk treatment considering the patient's condition and the surgical treatment required.

Keywords: *Vena cava filter, trauma patient, prevention, pulmonary embolism, prolonged positioning, intensive care unit*

Trauma patients are often at significant risk for venous thromboembolism, a multifactorial disease often manifesting clinically with pulmonary embolism, resulting in high morbidity and mortality rates [1–3]. Multiple studies have reported the benefit of prophylactic positioning of inferior vena cava temporary filters, but these devices may only be placed for a relatively short time [4–7].

This report describes the 10-month placement of a new, temporary vena cava filter, much longer than is usual at the present time, in a severe trauma patient, admitted to the intensive care unit (ICU).

Case report

In July 2002, a 41-year-old man without any previous disease was involved in a railway disaster and admitted to ICU for multiple trauma and respiratory failure. A total body CT scan evidenced cerebral traumatic haemorrhage, blunt trauma to the

chest with rib fractures, multiple fractures in the upper arms and legs. In addition, an objective examination revealed a loss of muscles in the head, arms and legs.

Since the patient was classified as high risk for thromboembolism and was scheduled for repeated major orthopaedic and plastic surgery to the lower extremities, the decision to place a cava filter was taken. A definitive/temporary Montanari vena cava filter (ALN) (ALN, Implant Chirurgicaux, France) was therefore positioned at the lower level of the renal veins, in close proximity to L3 (Figure 1a), and was inserted via jugular vein instead of the placement of a definitive cava filter. On day twenty, the patient was moved from ICU to the orthopaedic department, where he underwent further surgery and then started physiotherapy. The patient continued motor rehabilitation at home for seven months, during which he did not undergo any pharmacological therapy for thromboembolism prophylaxis.

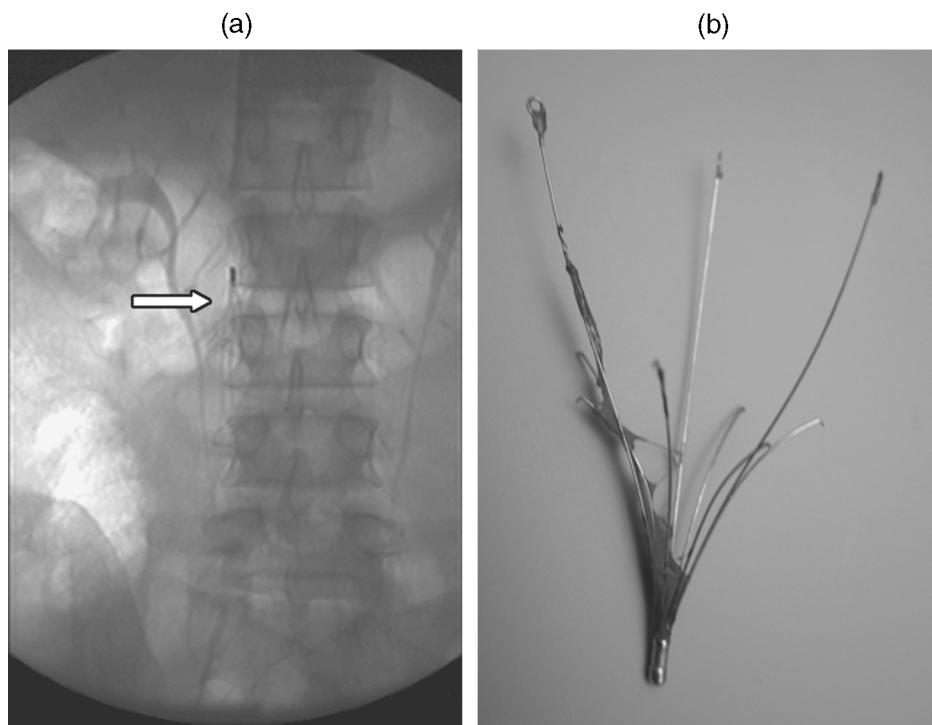


Figure 1. X-ray of the ALN positioned at the lower level of the renal veins, in close proximity to L3 (Figure 1a), and the removed device after 10 months with no signs of alteration (Figure 1b).

Computed tomography scan confirmed correct positioning of the ALN.

In May 2003, after 10 months, the patient was able to walk without help and did not require further surgical treatment. The ALN filter was therefore removed through the right jugular vein following an infiltration of local anesthetic, and no signs of alterations were noted in the removed device (Figure 1b). We did not observe any complications related to infection or migration. One month after the removal, the patient underwent a further CT scan and cava venography, both excluding long term complications related to the ALN positioning. At 1-year follow-up after the device removal, no related adverse events were seen.

Discussion

In severe trauma patients, the reported incidence of deep venous thrombosis ranges from 20 to 90%, with an incidence of pulmonary embolism between 2.3 and 22% [8]. Therefore, in the trauma patient population venous thromboembolic disease remains a difficult problem in terms of management and therapy. Contraindications to or complications of anticoagulant treatment are not uncommon in surgical or intensive care units [7]. These are worrying but temporary situations and represent a classic indication for partial interruption of the inferior vena

cava [7]. Temporary filters are an attractive option in this context, as long as they are safe and stable, can be left in place long enough to permit normalization of the thrombosis and anticoagulation problems and can then be removed in all circumstances, whether or not they have trapped a thrombus while in place [7]. The insertion of an inferior vena cava filter prophylactically reduces pulmonary embolism in patients at increased risk [4,5]. The decision to implant vena cava filters, either temporary or permanent, is difficult, especially in young patients [9], but the techniques for placement of inferior vena cava filters have undergone continued evolution from open surgical exposure of the venous insertion site to percutaneous insertion in most cases today [10]. Nevertheless, temporary cava filter positioning has commonly been suggested for a provisional period of time only. Long duration of temporary caval filter positioning in critical thromboembolic situations was recently proposed for up to six weeks [7].

In our patient, admitted to the intensive care unit for multiple trauma and at high risk for pulmonary thromboembolism, an ALN was positioned and maintained for ten months, much longer than is usually proposed. Compared to other temporary caval filters, the peculiar characteristics of the ALN appear to be: magnetic resonance compatibility, more struts, 40 degree angle, easy insertion via

femoral, brachial or jugular vein, better biocompatibility, and therefore the possibility of a prolonged positioning in the vena cava.

The interest of this case report is that the ALN was safely placed for 10 months, much longer than any reported case today for this type of temporary device (weeks). Since the positioning of a cava filter for prolonged time may be required to prevent pulmonary embolism in trauma or critically ill patients, pregnant women or in other high-risk patients, these subjects may be safely approached with the ALN also for prolonged periods. Moreover, since the ALN filter does not require an anticoagulant treatment, it was also possible to avoid administration of heparin, a high risk treatment considering the patient's cerebral condition and for required surgical treatment.

References

- [1] Gathof BS, Picker SM, Rojo J. Epidemiology, etiology and diagnosis of venous thrombosis. *Eur J Med Res* 2004;9:95–103.
- [2] Kurtoglu M, Guloglu R, Alimoglu O, et al. The late outcomes of vena cava filters in the prevention of pulmonary embolism. *Ulus Travma Derg* 2003;9:114–9.
- [3] Anderson FA Jr, Spencer FA. Risk factors for venous thromboembolism. *Circulation* 2003;107(Suppl. 1):I6–9.
- [4] Sing RF, Cicci CK, Smith CH, Messick WJ. Bedside insertion of inferior vena cava filters in the intensive care unit. *J Trauma* 1999;47:1104–7.
- [5] Sharpe RP, Gupta R, Gracias VH, et al. Incidence and natural history of below-knee deep venous thrombosis in high-risk trauma patients. *J Trauma* 2002;53:1048–1052.
- [6] Carlin AM, Tyburski JG, Wilson RF, Steffes C. Prophylactic and therapeutic inferior vena cava filters to prevent pulmonary emboli in trauma patients. *Arch Surg* 2002; 137:521–5.
- [7] Bovyn G, Catroux B, Lenot B, et al. Value of a long duration temporary caval filter in critical thrombo-embolic situations. *Ann Fr Anesth Reanim* 2003;22:809–14.
- [8] Hak DJ. Prevention of venous thromboembolism in trauma and long bone fractures. *Curr Opin Pulm Med* 2001;7:338–43.
- [9] Kutlu R, Alkan A, Sigirci A, et al. Temporary and permanent inferior vena cava filter combination in a young patient: to implant or not to implant? *Cardiovasc Intervent Radiol* 2003;26:492–5.
- [10] Benjamin ME, Sandager GP, Cohn EJ Jr, et al. Duplex ultrasound insertion of inferior vena cava filters in multi-trauma patients. *Am J Surg* 1999;178:92–7.