Temporary vena cava filter placement for pulmonary embolism

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Current clinical trials are under way to determine the safety and efficacy of temporary inferior vena cava filters for use in patients who need but have contraindications to anticoagulation medications for a short time (<10 days). To date, no data on these types of filters have been published. The authors describe a 20-year-old male trauma patient in whom a pulmonary embolism developed early in his hospital course and who was appropriately placed on anticoagulation therapy. Surgical intervention, however, was necessary to repair complex facial fractures sustained in a motorcycle collision. A filtering infusion catheter was placed until anticoagulation therapy could be resumed. The patient tolerated the surgery without further embolism and has recovered without difficulty.

(Key words: pulmonary embolism, pulmonary embolism prophylaxis, temporary vena cava filter, trauma)

Temporary inferior vena cava filters (IVCFs) are currently under study and will likely replace many of the present permanent IVCFs for a majority of circumstances. The risk or presence of pulmonary embolism requires the use of therapeutic anticoagulation. On occasion, anticoagulation must be delayed temporarily for various reasons, including intracranial bleeding, solid organ injury, and the need for surgery. In addition, extremity fractures may preclude the use of compression devices.

Placement of IVCFs has been shown to reduce the incidence of pulmonary embolism and offer a viable option for prophylaxis in patients who cannot undergo intravenous anticoagulation. However, physicians are often hesitant to place a permanent vena cava filter in patients whose need for anticoagulation may be only short term. The potential for long-term complications is small but is believed to increase with time. Therefore, other alternatives have been sought.

Temporary IVCF placement can be an alternative to permanent filter placement when other anticoagulation means cannot be used for a short time. However, current ongoing, prospective studies are necessary for further documentation of the efficacy and safety of temporary IVCFs.

We describe development of a pulmonary embolism shortly after admission in a young trauma patient who required surgery to repair complex facial fractures sustained in a motorcycle collision. Cessation of anticoagulation therapy was required for the surgery and for 72 hours postoperatively. A temporary filter was chosen to be the alternative to placing a permanent filter to avoid possible long-term risks.

Report of case

A 20-year-old man involved in a motorcycle collision sustained a femur fracture, complex facial fractures, and multiple lacerations. The patient underwent operative repair of his femur fracture immediately. No ocular injuries were sustained; however, repair of the multiple facial fractures by the plastic surgery team would be necessary. On postoperative day 2 following femur fixation, acute dyspnea and tachycardia developed. An intermediate-probability ventilation perfusion (VQ) lung scan followed by a pulmonary arteriogram demonstrated a pulmonary embolism. The patient was immediately started on intravenous heparin therapy. Surgical repair of the facial fractures was delayed for 6 days until the patient was hemodynamically stable from his other injuries. To perform internal fixation of the fractures, anticoagulation must be held on the day of surgery for 72 hours. A Protect Infusion Catheter (Bard Radiology, Covington, Ga) with an expandable filtration net was placed to avoid placing a permanent IVCF.

The device was positioned under fluoroscopic guidance via a percutaneous internal jugular approach on hospital day 8 (Figure 1). The catheter was passed into position over a wire via the right internal jugular vein. The central portion of the catheter was retracted to allow the filter-like arms to open, engage to the wall of the inferior vena cava, and block any blood clots (potential emboli).

Once the device was deployed and in position, its tail was anchored by suture or bandage to the patient’s neck. The following morning, heparin therapy was held, and the patient underwent internal fixation for the complex facial fractures. No complications were encountered. Heparin and warfarin sodium therapy were initiated 48 hours postoperatively. On postoperative day 4, the patient was ambulating and eating without difficulty. A second cavagram was done through the infusion catheter (Figures 2 and 3). No clots were noted in the filter, and it was subsequently removed. The patient has continued to recover appropriately and is currently doing well at follow-up.
Discussion

Although limited data regarding temporary IVCFs are available, our report depicts successful use of a filtering infusion catheter. Use of a temporary filter avoids the possible risks of long-term migration of a permanent filter or vena cava obstruction, especially in the younger patient population. The catheter was placed in a fashion similar to that for the permanent filters, yet was used as a central line in addition to a filtering device. It is recommended that most temporary IVCFs be left in place for approximately 10 days. Longer placement increases the patient’s risk for catheter-related infection. Patients with contraindications to prolonged (>10 days) anticoagulation therapy should have a permanent filter placed.4

The performance of the temporary IVCF has been reported to be superior to that of the permanent filters for trapping clots.5 Potential clots trapped in the filter must be evaluated before removing the device, or a fatal embolism could result. Venography must therefore be done again to view any clot present. In one study, 40% of patients having temporary IVCF placement had clot present.6 Once the clot is identified, it must be lysed with a thrombolytic agent before the catheter can be removed or a permanent IVCF placed above the clot.

Comment

We have found the temporary IVCF to be a useful alternative to placing a permanent IVCF in patients in whom anticoagulation therapy must be delayed for a short time (<10 days). Placing the temporary filter involves similar risks to placing a permanent filter without the possible long-term risks. However, the limited use and documentation of these types of filters requires further prospective studies be done.

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References