

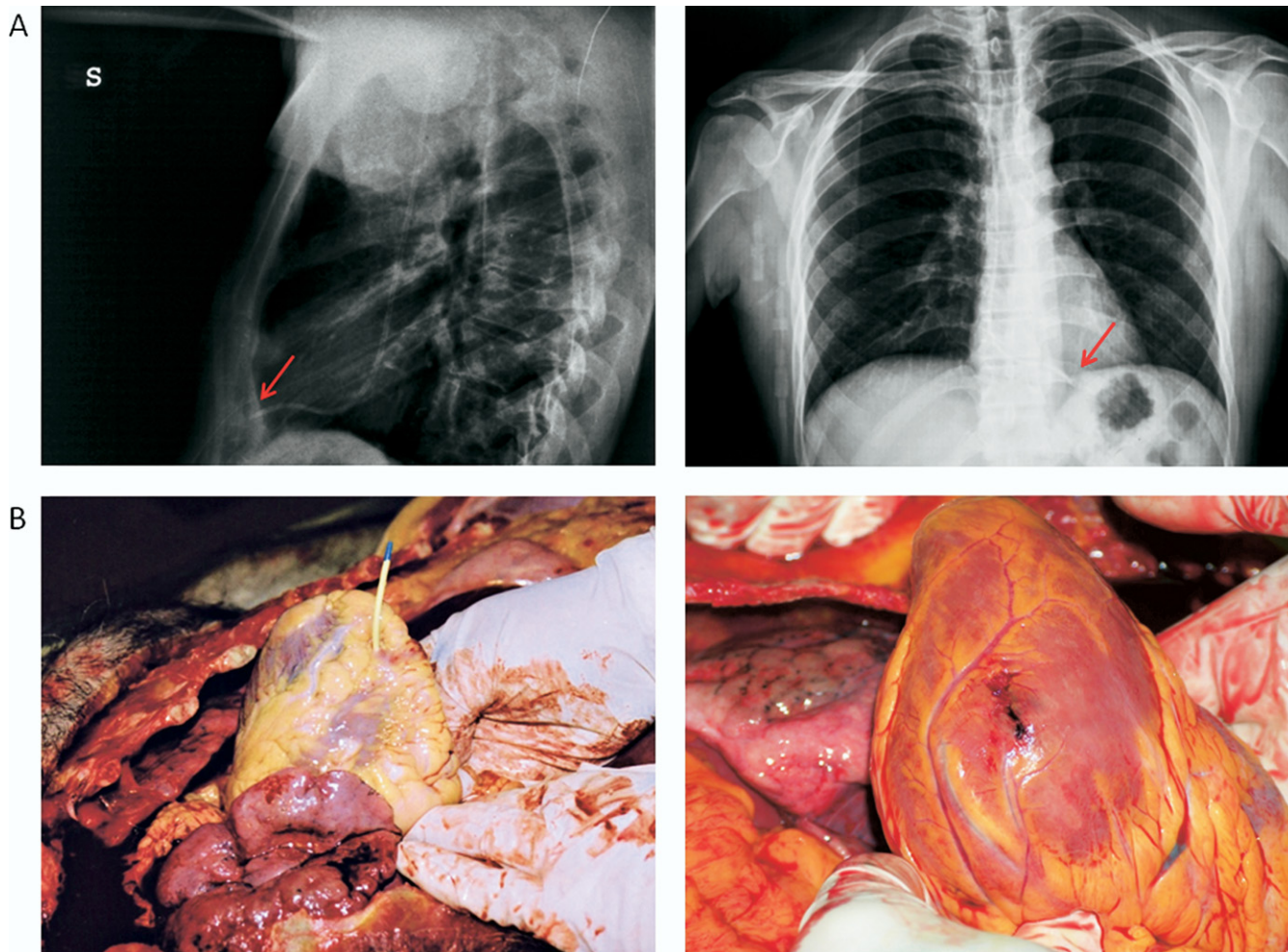
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**Figure.** A, Chest radiograph that shows the positioning of the catheter. Used with permission of Biagio Lettieri, MD, Department of Anesthesiology and Emergency, Second University of Naples, Naples, Italy. B, Autopsy shows the catheter extending for about 4 cm. Used with permission of Paola Capodanno, MD, Department of Anaesthesiology and Emergency, Second University of Naples, Naples, Italy.

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A 41-year-old man with a history of distal ulcerative colitis was admitted to a public hospital in southern Italy with persistent bloody diarrhea. A right internal jugular central venous catheter was placed for management of parenteral nutrition. During placement of the catheter, the guidewire was advanced approximately 30 cm. Despite a gradual improvement of gastrointestinal symptoms, the patient died 2 weeks later from a ventricular fibrillation cardiac arrest.

*For the diagnosis and teaching points, see page 771.*

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## IMAGES IN EMERGENCY MEDICINE

(continued from p. 764)

### DIAGNOSIS:

*Guidewire ensnarement.* Guidewire entrapment in inferior vena cava filter is a known complication, usually occurring during blind central venous access. Secondary complications include inferior vena cava filter breakage or dislodgment, guidewire fracture, and inability to remove the wire from the filter.

The 2 commonly used guidewires are straight and J-tip guidewires. Studies show that J-tip guidewires engaged all major filter types, whereas certain filters are more susceptible to entrapment. Straight guidewires did not engage any of the filters.<sup>1</sup> The mechanism is likely hooking of the filter with the curved wires.<sup>2</sup>

The advancement of interventional radiology has permitted the development of several techniques for removing entrapped guidewires.<sup>3</sup> Our patient's guidewire was retrieved under fluoroscopy through the right common femoral artery (Figure 2). During the original, blind attempts at withdrawing the guidewire, our patient's inferior vena cava filter migrated into the superior vena cava. Because the inferior vena cava filter was firmly fixed in its new location, it was left in place (Figure 1).

Some preventive measures include awareness of an inferior vena cava filter before insertion of a central venous catheter, use of a straight guidewire when the patient has an inferior vena cava filter, and introduction of the guidewire only up to 20 cm (depth of the superior vena cava). This distance can be estimated by placing the guidewire over the chest from the insertion site to the angle of the manubrium.<sup>3,4</sup>

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## IMAGES IN EMERGENCY MEDICINE

(continued from p. 765)

### DIAGNOSIS:

*Improper placement of the central venous catheter.* Radiographs demonstrate the improper placement of the central venous catheter, which abuts the right ventricular wall (Figure, Panel A, red arrows). Autopsy demonstrated ventricular perforation with 4 cm of the catheter tip lying outside the myocardium (Figure, Panel B). Histologic analysis showed a chronic fibrotic and inflammatory reaction. This reaction suggests that the incorrect positioning of the catheter may have caused the progressive cardiac perforation, perhaps because of endocardial damage from repeated contacts of the catheter tip with the myocardial wall. To avoid this type of complication, advancement of the guidewire should be limited to approximately 15 cm before threading of the catheter.<sup>1-3</sup>

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