A 35-year-old woman was admitted to the hospital following an automobile accident with multiple trauma chiefly involving fractures of long bones in both lower extremities. There was no shock and the patient tolerated orthopedic surgery and exploratory laparotomy well. The week following admission, she developed sudden onset of shortness of breath accompanied by right-sided chest pain. The patient was afebrile and the blood pressure was stable. Physical examination was remarkable for rapid, shallow breaths and a heart rate of 120 beats/minute with gallop rhythm. Arterial blood gas determination revealed a decrease in PaCO₂ with widened alveolar-arterial oxygen gradient; the electrocardiogram showed sinus tachycardia. The chest radiograph (Fig 1) was clear and the patient was started on intravenous heparin for suspected pulmonary embolism. A central venous catheter was placed via the right internal jugular vein for administering medication and fluid shortly before the chest x-ray film was taken. Six hours later, she was somewhat improved, but the chest x-ray examination revealed complete consolidation of the right upper lobe (Fig 2).

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Diagnosis: Misplacement of central venous catheter with intrapulmonary infusion of fluid

Because of multiple fractures and immobility, the patient was at great risk for thromboembolic disease; her clinical presentation was very suggestive of acute pulmonary embolism. The homogenous consolidation in the right upper lobe would be an unusual presentation for pulmonary embolism and temporally occurred within a six-hour period following placement of a central venous catheter through the right internal jugular vein. Aspiration of the internal jugular line produced no blood and the catheter was withdrawn 2 cm before blood could be aspirated freely. A total of 200 ml of D_{5}W containing heparin had been infused through the line. Anticoagulation was continued for suspected pulmonary embolism, but she received no additional therapy. The chest radiograph two days later shows nearly complete clearing of the right upper lobe (Fig 3).

Central venous catheterization has become a very common procedure both for monitoring central venous pressure (CVP) and as an access line for administering intravenous fluids and medication, as in this patient. The growth of parenteral nutrition has led to even wider use of catheters used for long periods of time. Most catheters are now inserted via the internal jugular or subclavian veins and are soft and flexible with a blunt tip.

Complications of central venous catheterization have been reported many times and include pneumothorax, hemothorax, hydrothorax, hydromediastinum, subcutaneous emphysema, brachial plexus injury, hematoma, subclavian artery puncture, arteriovenous fistula formation, cardiac tamponade, air embolization, catheter embolization, arrhythmias, thrombophlebitis, and infection. Langston found only 62 percent of 300 central venous lines to be correctly located and noted that no incorrect position could be detected clinically. Because of the varied path the catheter can take, it is universally recommended that CVP catheter position be confirmed by x-ray examination. The decrease in the use of stiff, lengthy catheters inserted via the vein in the arm has probably decreased some of the more serious problems such as cardiac tamponade.

In this patient, the catheter location was confirmed radiographically and felt to lie in the superior vena cava. It is likely that the catheter perforated the azygous vein and was planted in the proximal right upper lobe. A repeat chest roentgenogram was obtained because the patient was being seen in consultation, but otherwise another x-ray film might not have been taken for another day or two and it is likely that the right upper lobe consolidation would have been recognized as pneumonia rather than intravenous fluid.

Central venous catheterization can have many complications, even in the hands of skilled physicians. It is important to confirm radiographically the location of all catheters and to rearrange any catheter that appears coiled or improperly located. Thought must be given to catheter misplacement when seeing a sudden consolidation of lung so that "glucococcal" pneumonia is correctly treated.

REFERENCES