Atraumatic Removal of a Polyethylene Catheter from the Superior Vena Cava*

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A case is reported in which a polyethylene catheter introduced via a metal needle through the left subclavian vein was sheared and lodged in the superior vena cava. The use of a Dormia ureteric stone catcher catheter proved to be an easy and efficient way to retrieve the fragmented catheter, thereby avoiding a thoracotomy. It is hoped that the alarmingly high incidence of this complication will stimulate manufacturers to avoid entirely the use of a metal needle for insertion of polyethylene catheters.

Percutaneous insertion of polyethylene catheters in order to administer fluids and monitor the central venous pressure is common practice. A peripheral arm vein or the subclavian or external jugular veins are commonly used. These catheters can be readily inserted through a metal needle and although safety guidelines1,2 have been provided to prevent the shearing of the plastic catheter by the metal needle or its embolization if sheared, the incidence of these complications is more frequent than desired. This report was prompted by the occurrence of three such cases in a period of two weeks at our hospital. Two of the patients were in a terminal stage of illness and although the fragmented catheters were visualized radiographically, no attempt was made to remove them. Both patients expired within hours of causes unrelated to this complication. The third case forms the basis for this report.

Case Report

A 70-year-old white man entered our coronary care unit for treatment of acute inferior myocardial infarction. The patient had been a heavy smoker for the last 50 years and had a history of marked ethanol ingestion. On physical examination, he had evidence of chronic lung disease and an enlarged but not tender liver was palpated. On the third hospital day the patient became confused and the onset of delirium tremens was noted. Treatment was instituted accordingly. Later on that day he developed supraventricular tachycardia controlled by electrical cardioversion. The next day the patient appeared dehydrated and a polyethylene catheter† was inserted percutaneously through the left subclavian vein for administering fluids and monitoring of central venous pressure. The following morning

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References


Acknowledgment: The authors are grateful to Drs. D. J. Brecourt and T. D. Sorgen, Albuquerque Indian Sanatorium, for referral of this patient.

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Chest, Vol. 57, No. 4, April 1970
the nurses noted that the site of entrance of the catheter into the subclavian vein was wet and, on inspection of the area, it was discovered that the distal portion of the catheter had been sheared by the metal needle. A chest x-ray film (Fig 1) confirmed the presence of the radiopaque catheter, approximately six inches in length running from the left innominate vein to the lower part of the superior vena cava. Because of the serious complications that can occur when foreign objects are left in the cardiac chambers,3-5 namely; thrombosis, sepsis with septic emboli, perforation and hemorrhagic cardiaum, psychoneurosis, etc., it was decided to attempt the extraction of the fragmented catheter with the help of a Dormia ureteric stone catcher catheter.† A cutdown was done under local anesthesia and the left basilic vein was isolated. The Dormia catheter was advanced under fluoroscopic control into the right atrium where the wire basket was opened (Fig 2). When pulled back slowly it was noted that the wires of the wire had slipped around the polyethylene catheter and as its proximal end was approached, the wire basket was closed and the polyethylene catheter removed with ease while a 35mm movie was being made. The patient had an uneventful recovery and was discharged from the hospital three weeks later.

**Discussion**

In 1954, Turner and Sommers6 described the first case of embolization to the right heart chambers by a polyethylene catheter. Other cases7-9 were reported in subsequent years and in some of them removal was successfully achieved by surgical means.

In 1963, Taylor and Rutherford10 called attention to this complication, reporting the first case where the polyethylene catheter was sheared by a metal needle. Reports since have become frequent11,12 and presumably a great number of cases go unreported.

Instructions to prevent this complication by the proper use of a plastic protector are described on each package. However, it must be stressed that these catheters are used to a great extent in emergency situations by house officers in training. Both of these factors favor a high incidence of complications. When an arm vein is used to insert the catheter, the chances of the plastic tubing reaching the heart chambers are less. Now that the subclavian vein is used with increased frequency, we are faced with a different situation. Once these catheters are sheared, they can readily move to the superior vena cava or the right heart chambers which makes their retrieval imperative, but also more difficult.

Hopefully in the near future medical supply companies will provide disposable sets that will include a plastic cannula through which the plastic catheter would be inserted, avoiding the risk of catheter shearing by the metal needle. Until such time, however, an attempt to remove the catheter from the cardiac chambers using one of the atraumatic methods previously described in the literature,2,13-15 can be accomplished without the need for thoracotomy. In the case described, the use of the Dormia ureteric stone catcher catheter proved

to be an easy and safe method to be employed for this purpose.

References


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Partial Pericardial Defect with Constrictive Pericarditis*

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A patient with a partial pericardial defect and herniation of the left atrial appendage had associated constrictive pericarditis. Possible explanations for the constriction were spread of infection from the pleural cavity, impaired pericardial cushioning leading to fibrosis, and a fibrotic disorder induced by methysergide.

In most patients with congenital defects of the pericardium, the deficiency has been left-sided and complete. In a smaller number of patients, the left-sided defect has been partial and associated with herniation of the left atrial appendage into the left pleural space. As recently reviewed by Rogge and associates, symptoms in such patients are variable and consist of chest pain, syncope, and on rare occasion, sudden death from herniation of the left ventricle through the defect. In the present case, the first of its type, the presence of constrictive pericarditis was believed to be etiologically related to the observed partial pericardial defect, which was demonstrated at thoracotomy.

Case Report

A 67-year-old white woman was well until 1960, when she first complained of chest pain. This pain was sharp, localized to the left precordium and shoulder, and lasted for variable periods. There were no obvious precipitating factors. Results of selective coronary arteriography were normal, and subsequent work-up revealed a small diaphragmatic hernia. Antacid therapy was initiated without significant relief, and she continued to complain of chest pain.

In February, 1967, she first noted peripheral edema and mild dyspnea with exertion. In September, 1967, after a period of increased activity, she became symptomatically worse with progressive edema, dyspnea, and paroxysmal nocturnal dyspnea. She was hospitalized two months later, at which time there was evidence of right pleural effusion. Thoracentesis was performed, and results of diagnostic studies were normal. The patient failed to respond to diuretic therapy, and four additional thoracenteses were required during the next four weeks. Because of the persistence of symptoms, the patient was referred to the Mayo Clinic for further care.

The patient had a long history of headaches. Methysergide therapy, 2 mg twice a day, was started in 1964, with complete relief of this symptom. The use of this medication had been continued to the present admission. There was no history of tuberculosis, pulmonary infection, chest trauma, or extensive radiation.

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