Superior Vena Cava Syndrome due to a Retained Central Venous Pressure Catheter*

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A 70-year-old man had the superior vena cava syndrome. At thoracotomy a retained central venous pressure line was found to be the cause of venous thrombosis at the outlet of the superior vena cava into the right atrium. A retained central venous pressure catheter and catheter-induced venous thrombosis should be added to the list of causes of the benign form of the superior vena cava syndrome.

Obstruction of the superior vena cava usually implies the presence of malignant disease and requires ur-
revealed a mean right atrial pressure of 11 mm Hg, a right ventricular pressure of 35/0-8 mm Hg, and a pulmonary arterial pressure of 30/16 mm Hg (mean, 20 mm Hg). No difficulties were experienced while entering the right atrium.

At thoracotomy, no abnormalities were found in the mediastinum or in the area surrounding the superior vena cava. The superior vena cava was then incised, and a blood clot surrounding a polyethylene central venous pressure line was found at the entrance of the vessel into the right atrium. The central venous pressure line was found to be extending from the right antecubital fossa. The catheter lacked a radiopaque line, which apparently accounted for its lack of visualization during the catheterization. Following the surgery the patient made an unremarkable recovery.

**DISCUSSION**

There are a number of causes of the benign form of the superior vena cava syndrome. In a recent series of cases of benign superior vena cava syndrome, 12 out of 16 cases were due to mediastinal granuloma, two were due to retrosternal thyroid, and one each was due to aortic aneurysm and congestive heart failure. These patients were younger and had a slower onset and progression than those with the malignant form of the superior vena cava syndrome. The other reported causes of the benign form include benign mediastinal tumor, traumatic hematoma, mediastinal emphysema, pneumothorax, atrial myxoma, mitral stenosis, pericarditis, sarcoidosis, vasculitis, and thrombosis associated with polycythemia. The formation of a thrombus around a venous catheter should also be included in the differential diagnosis of the benign form of the superior vena cava syndrome.

It has long been recognized that indwelling catheters can lead to venous thrombosis, particularly on a long-term basis. The incidence of thrombosis due to indwelling femoral catheters in patients being treated for burns was 13 percent (18/135) according to Moncrief. Warden et al. reported the incidence of venous thrombosis due to indwelling catheters to be 16.5 percent in subclavian veins and 7.9 percent in the superior vena cava in a study of autopsies of patients with burns. None of the thromboses of the superior vena cava was totally occlusive, and there were no clinical manifestations, except in those cases where the thrombi were infected.

In a prospective study of the incidence of thrombosis following central venous cannulation, Ahmed and Payne found occlusion of the subclavian and internal jugular veins in four out of 63 patients with indwelling central venous catheters, as demonstrated by venographic studies.

The superior vena cava syndrome due to central catheters has been reported rarely. Wertheimer et al. reported a case of the superior vena cava syndrome and complete occlusion of the right innominate vein 1½ years after the insertion of a transvenous cardiac pacemaker through the right internal jugular vein. The symptoms improved after conservative therapy consisting of withdrawal of the catheter, oral administration of anticoagulant drugs, and diuresis. Nottage reported a case of the superior vena cava syndrome occurring two hours following placement of a right internal jugular venous catheter during resuscitation in a patient with a mass in the right apex. The superior vena cava syndrome resolved after the removal of the catheter.

Our patient had an unrelated complaint; however, the physical examination revealed prominent veins in the neck and chest wall that were typical of obstruction of the superior vena cava. The computerized axial tomographic scan was suggestive of obstruction of the superior vena cava. The superior venacavogram confirmed the presence of obstruction. Right cardiac catheterization did not yield any diagnostic clues. It was only after the superior vena cava was incised during thoracotomy that it was realized that the patient had a complete occlusion of the superior vena cava due to an indwelling central venous pressure line. He had developed extensive collateral circulation in the azygos and hemiazygos veins.

The number of various invasive procedures using central venous catheters has increased dramatically in recent years. The recognition of their potential for causing the superior vena cava syndrome should lead to earlier diagnosis and therapy.

**References**