duced by stimulation of the left or by blockade of the right stellate ganglion, does produce prolongation of the QT interval and ventricular dysrythmias.

Drugs which decrease cardiac sympathetic tone have been effective in the treatment of the LQTS. Propranolol and Dilantin successfully suppressed prolongation of the QT interval and diminished or abolished ventricular arrhythmias.\textsuperscript{5,6,11} Bretylium tosylate effectively abolished the LQTS, regardless of whether it was administered intravenously or per os.\textsuperscript{4,5} In contrast, drugs such as quinidine and procainamide, which prolong the QT interval, are hazardous and have worsened the LQTS causing near lethal ventricular arrhythmias.\textsuperscript{5,12}

Similar observations have been reported after the administration of disopyramide.\textsuperscript{13} Left stellate gangliectomy is considered in patients who have failed to respond to optimal drug therapy. A report of 20 patients who underwent this procedure is encouraging.\textsuperscript{2} Left stellectomy in combination with drug therapy sharply reduced the incidence of ventricular arrhythmias. Long term results, however, have to be evaluated.

It is apparent that the treatment of the LQTS remains a challenging problem. The observation that aprinidine completely ablated ventricular dysrythmias associated with the LQTS could be of great importance. Further clinical investigation is warranted for evaluation of its efficacy.

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IATROGENIC INTERNAL MAMMARY ARTERY-TO-INNOMINATE FISTULA

Percutaneous Nonsurgical Closure

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An internal mammary artery-to-innominate vein fistula, a rare complication of subclavian vein central venous pressure catheter insertion, was closed without surgery by percutaneous angiographic techniques. In this case and in similar cases of arteriovenous fistulas, percutaneous angiographic therapy can be both safe and effective and can lead to significant reductions in costs, hospitalization, and patient trauma.

Subclavian vein catheterization is frequently used for monitoring central venous pressure (CVP), extended administration of hyperosmolar parenteral alimentation, and rapid fluid infusion in hypovolemic patients.\textsuperscript{1} Various complications associated with insertion, long-term use, and removal of subclavian catheters have ranged from minor hematomas to perforation of major intrathoracic vascular structures.\textsuperscript{1,2} We report a case in which an internal mammary artery-to-innominate vein fistula following subclavian CVP catheter insertion was successfully treated without surgery by percutaneous angiographic catheter techniques.

CASE REPORT

A 32-year-old woman complained of a “pulse-like” noise and a sensation of pressure in her right clavicular area. Physical examination revealed a continuous bruit and palpable thrill in the right subclavicular region. Venous distension of the right arm was present; however, there was no evidence of congestive heart failure. Her history included poliomyelitis during infancy with residual bilateral lower extremity weakness and severe scoliosis. Approximately two years earlier, a CVP catheter was inserted from the right infraclavicular approach for emergency treatment of severe hypotension and urticaria, secondary to an allergic reaction from a drug taken for a lower urinary tract infection.

Selective right subclavian angiography showed an arteriovenous fistula, 1 cm long, between the right internal mammary artery and the right innominate vein (Fig 1). After a thorough discussion of the available therapeutic alternatives for closure of the fistula, the patient chose to have percutaneous transcatheter occlusion. The right internal mammary artery was catheterized selectively by the femoral artery approach, and two Gianturo coil spring occluders were inserted; one was placed a few millimeters distal to the origin of the fistula, and the second just proximal to its origin (Fig 2). Within three minutes, the bruit and thrill had disappeared. A right subclavian angiogram demonstrated proximal occlusion of the right internal mammary artery 2 cm from its origin, with no flow of contrast.

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Follow-up right subclavian angiogram after percutaneous closure of fistula: right internal mammary artery occluded with no flow of contrast material through fistula.

FiguRE 1. Control right subclavian angiogram: Arteriovenous fistula (arrow) originates from enlarged proximal portion of right internal mammary artery and empties into innominate vein opacifying superior vena cava (SVC). Size of distal right internal mammary artery normal.

material through the fistula (Fig 3). The patient was asymptomatic following the procedure and was discharged from the hospital one day later. Repeated physical examinations revealed no evidence of the thrill or bruit, and a ten-week follow-up right subclavian angiogram showed persistent occlusion of both the right internal mammary artery and the fistula.

DISCUSSION

Traumatic arteriovenous fistulas following CVP catheterization occur relatively infrequently and only rarely involve the internal mammary artery. Subclavian artery-to-subclavian vein fistulas after subclavian CVP insertion and vertebral artery-to-vertebral vein fistulas after internal jugular vein catheterization have been reported.3-4 These lesions have been repaired surgically. One case of internal mammary artery-to-subclavian vein fistula following CVP catheter insertion, in which a portion of the catheter tubing was sheared off and remained in the fistula, presented with congestive heart failure. That patient died shortly after surgery to close the fistula.5 In a review of the literature, we discovered only one previous case of an internal mammary artery-to-innominate vein fistula. It was secondary to a stab wound with a barbecue fork to the upper chest and was closed surgically by extrapleural ligation of the proximal and distal internal mammary artery.6

The course of the internal mammary artery is posterior to the sternal end of the clavicle and the first costal cartilage. It then passes anteriorly, adjacent to the lateral edge of the innominate vein. Both these vascular structures are relatively well protected from external trauma by the bony and cartilagenous thorax. In view of the frequency of subclavian vein catheterization, however, it is somewhat surprising that associated
arteriovenous fistulas are so rarely encountered. In our patient, marked deformity of the thorax accompanying her severe scoliosis may have altered anatomic relationships, displacing these vessels laterally and thus favoring passage of the puncture needle through the internal mammary artery before its entry into the innominate vein. Review of her outside medical record, however, disclosed no mention of difficulty encountered during insertion of the CVP catheter.

Since Gianturco coil spring occluders are relatively easy to place and highly effective in occluding vessels of medium to large size, they were selected to close this arteriovenous fistula. Small particulate material such as Gelfoam or Ivalon (polyvinyl alcohol) or injectable liquid polymers (bucrylate) would pass through the fistula with resultant pulmonary embolization and, therefore, were not suitable in this situation. Detachable balloons delivered through a percutaneously inserted catheter would be equally effective as coil spring occluders in closing fistulas of this size; however, because of a significant cost differential, we chose the latter.

Initially, in the early '70s, percutaneous transfemoral vasoocclusion techniques were reserved for those patients considered too ill for conventional surgical therapy, and were used mainly in emergencies. Recently, however, in selected cases, percutaneous vasoocclusion has also been used on an elective basis as an alternative to surgery. In this age of cost-consciousness, the use of interventional angiographic vasoocclusion, where feasible, offers advantages over traditional surgical therapy through significant reductions in cost and hospitalization. Furthermore, a percutaneous procedure performed on a conscious patient as opposed to major surgery requiring general anesthesia has obvious benefits.

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Panconductional Defect in Mixed Connective Tissue Disease*

Association with Sjogren's Syndrome

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A patient in whom mixed connective tissue disease in association of Sjogren's syndrome had previously been diagnosed, experienced a syncopal attack. Electrocardiographic monitoring revealed periods of profound sinus bradycardia, sinus arrest with slow junctional escape rhythm, and first degree atrioventricular block during several episodes of dizziness. Complete right bundle branch block was a constant finding in this patient. Sino-atrial conduction time and sinus node recovery time were prolonged. Coronary heart disease was excluded by normal coronary arteriographic findings. This patient represents a rare case of cardiac involvement in mixed connective tissue disease.

Mixed connective tissue disease is a distinct rheumatic syndrome with overlapping features of scleroderma, systemic lupus erythematosus, and polymyositis. Association of Sjogren's syndrome and mixed connective tissue disease is possible, though not frequently encountered. Cardiac manifestations in mixed connective tissue disease are rare. Recently, a case of complete atrioventricular block in this disease was described. This report presents multiple cardiac conductional defects in a patient with mixed connective tissue disease in association with Sjogren's syndrome.

CASE REPORT

A 60-year-old woman had a syncopal episode on the day of admission. She had a history of frequent dizzy spells and increasing dyspnea on exertion. At the age of 50 years she had developed pain involving the wrists and hips. Since then she was repeatedly hospitalized at the rheumatology department, where mixed connective tissue disease was diagnosed on the basis of high titer of antinuclear antibody (usually higher than 1:320), polyarthralgias and polyarthritis of RA type, Raynaud's, hypergammaglobulinemia, positive rheumatoid factor, esophageal hypomotility and sclerodactyly. The patient had also pulmonary fibrosis and facial erythema with telangiectasia. In the course of the disease, several times we found positive extractable nuclear antigen, detected by the immunofluorescence method. The diagnosis was confirmed by positive anti-RNP antibodies (the double-diffusion technique with nuclear extract of calf thymus). The association with Sjogren's syndrome was confirmed by scintigram and histologic examination of a salivary gland.

On physical examination, loss of facial expression and sclerodactyly was noted. She had slight dyspnea and a regular pulse rate of 88/min. Blood pressure was 135/80

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