Bypassing the obstructed superior vena cava with a subcutaneous long saphenous vein graft

A patient with superior vena cava syndrome secondary to a small cell carcinoma of the lung was recently encountered. Diuretic therapy, radiotherapy, and chemotherapy failed to provide relief of symptoms. Consequently, we constructed a bypass graft with a long segment of the left saphenous vein. The vein was drawn through a subcutaneous tunnel over the abdomen and chest to be attached to the left external jugular vein. The resultant decompression of the superior vena cava provided almost immediate relief of symptoms. This simple bypass procedure allows decompression of the superior vena cava with minimal risk of morbidity or death and provides excellent palliation of a most disabling condition.


Superior vena cava obstruction, an extremely disabling syndrome, has become more prevalent in recent years.¹⁻⁴ Malignant intrathoracic tumors are responsible for 75 to 90 per cent of cases.² Fibrosing mediastinitis has also been cited as a significant factor.⁵ At present, patients with this condition are treated with diuretic therapy, radiotherapy, and chemotherapy. If these measures fail or the patient does not develop significant collateral circulation to produce relief, direct surgical intervention has been advocated. These surgical procedures¹, ⁴, ⁶ have ranged from resection of the involved segment of the superior vena cava to various bypass procedures. This treatment requires thoracotomy and carries with it a high morbidity, mortality, and failure rate.⁷

In 1961, Schramel and Olinde⁸ reported a simple bypass technique in which the superficial saphenous vein was used. The purpose of this paper is to describe a similar case with a modification of this procedure.

Case history

The patient, a 56-year-old man, presented with a 3 day history of swelling of the left arm. He had smoked heavily for a period of 40 years but had had no significant past illnesses.

Examination on admission demonstrated bilateral jugular venous distention, minimal suffusion of the face, and no tearing but marked pitting edema of the left arm. Roentgenograms confirmed a mediastinal mass which, on biopsy, proved to be a small cell carcinoma of the lung. In the hospital, his condition progressively deteriorated despite diuretic therapy. He experienced a marked increase in swelling of the face, marked tearing, and a chest pain described as a retrosternal pressure. The progression of his disease is well demonstrated in Fig. 1. Two weeks after admission, he was subjected to deep cobalt therapy (3,000 R) with minimal improvement, as

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This treatment was subsequently augmented with a course of cyclophosphamide with no response. Aside from the symptoms associated with vena cava obstruction, the patient continued to maintain an excellent appetite and was quite active.

Four weeks after admission, he underwent the surgical procedure presented in Fig. 2. The long saphenous vein from the left leg was dissected down to a level just below the knee; tributaries were carefully tied off, although the main tributaries near the insertion of the saphenous into the femoral vein were preserved. The vessel was then swung up in a subcutaneous tunnel over the abdomen and chest. Because the length of the vein was not felt to be sufficient, a short segment was removed from the right superficial saphenous vein. This was interposed between the left saphenous vein and the left external jugular vein and was anastomosed to the left external jugular vein. Care was taken to ensure that the valve system in the interposed segment was maintained in the direction of expected flow (Fig. 2).

Almost immediately after the operation, the patient was afforded considerable relief of his distressing symptoms. Within 1 week, the major portion of the facial and arm edema had disappeared, as demonstrated in Fig. 3. Venography, carried out in the eighth postoperative week, showed a patent graft with excellent flow from the external jugular vein to the deep iliofemoral system (Fig. 4).
Fig. 4. Venograms of bypass graft show function 8 weeks postoperatively.

The patient continued to remain free of symptoms of superior vena caval obstruction and was discharged from the hospital. He was readmitted 4 months later with systemic progression of his disease. The patient died from metastatic generalized cancer. At autopsy, the venous bypass was patent and presumably had functioned until death.

Discussion

In the majority of cases, the initial treatment of superior vena caval obstruction still remains diuretic therapy, radiotherapy, and chemotherapy. A significant number of patients who survive for a prolonged period will develop sufficient collaterals to relieve their symptoms.

In those patients with continued disability in spite of the above treatment, surgical bypass should be considered. The procedure described in our patient allows superior vena caval decompression with minimal risk of morbidity or death.

We were concerned that thrombosis would be a problem. However, the gravitational effects as well as an above-normal pressure system from the obstruction may have reduced this complication. No anticoagulants were used except for low-molecular-weight dextran during the immediate postoperative period.

Summary

Superior vena caval obstruction produces a very disabling symptom complex which may not respond to radiotherapy or chemotherapy.

Most surgical procedures carry a high risk of morbidity and death. In this report, we presented a simple technique which provided significant palliation, although it did not prolong life.

REFERENCES