

Superior Vena Cava Obstruction Bypass—An Alternative Technique Using Bovine Pericardial Conduit: A Case Report

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ABSTRACT

An alternative technique of superior vena cava obstruction bypass using bovine pericardial conduit is described. The patient in this case had recurrent bilateral thrombophlebitis and thrombosed saphenous veins. Most of the surgical techniques reported in the literature so far have described the use of polyethylene terephthalate (Dacron) graft, polytetrafluoroethylene graft, autologous pericardial patch, and spiral vein graft. The use of synthetic grafts has been plagued with high rates of thrombosis. The pathology, clinical presentation, surgical technique, and outcome are discussed.

INTRODUCTION

Since William Hunter reported the first case of superior vena cava obstruction (SVCO) in 1757, there has been a growing number of SVCO cases reported worldwide, and the etiologies, pathogenesis, diagnoses, and treatment options are varied. Radiographic imaging, particularly computed tomography scanning and venography, are helpful in diagnosing the condition before management is attempted (Figure). Most malignant cases of SVCO are treated with chemotherapy, radiotherapy, or palliation. The benign cases are usually treated more aggressively. There have been many literature reports of the use of SVC stents, surgical decompression, thrombectomy, SVC replacement, SVC patching, and SVC bypass [Abner 1993]. We describe here a technique of SVC bypass using bovine pericardial conduit.

CASE REPORT

A 47-year-old male Sudanese student was admitted with clinical features of SVC obstruction that he described had been going on for 3 months. The patient had been treated for malaria and bilharziasis 5 years before and denied having any cerebral or laryngeal symptoms. The results of routine blood

tests, including serum protein C, protein S, and antithrombin III levels, were normal. Computed tomography scanning of the thorax showed a calcified thrombus occurring within the whole length of the SVC and causing obstruction, together with dilated collaterals. There was no evidence of intrathoracic neoplasm or lymphadenopathy. Anticoagulant therapy was started immediately to prevent extension of the thrombus, and the patient was referred for early surgery. The patient had recurrent bilateral thrombophlebitis and thrombosed saphenous veins.

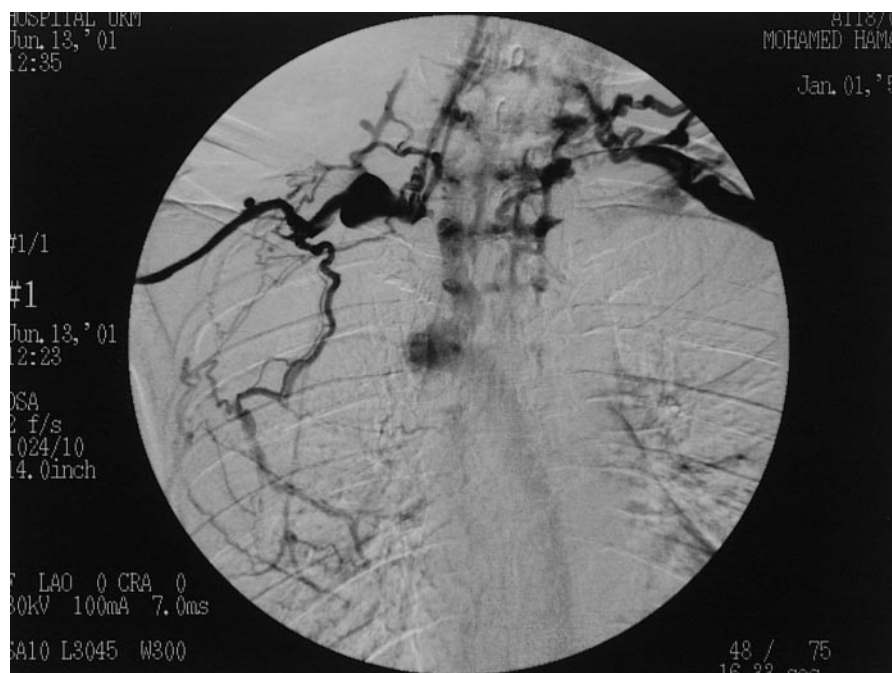
At operation, the SVC was approached via a median sternotomy incision. The SVC was calcified, fibrosed, and densely adherent to the lateral wall of the ascending aorta, which was also calcified. The innominate veins were patent. The thymus was removed to create a space for the conduit. The inferior vena cava diameter was approximately equal to a size 14 Hegar dilator. A bovine pericardial patch (Baxter Healthcare, Irvine, CA, USA) wrapped around the size 14 Hegar dilator was used to construct the pericardial conduit. The longitudinal edges of the pericardial patch were sutured together with continuous 5-0 polypropylene (Prolene; Ethicon, Somerville NJ, USA) suture. The tube graft was sutured with continuous 5-0 Prolene suture to the left innominate vein and to the right atrial appendage. The fibrotic pericaval tissue blending into the SVC and aortic wall was biopsied. Histopathologic examination of the pericaval tissue specimen showed features of chronic inflammation only. Following the bypass operation, the patient was treated with warfarin orally for 8 weeks, and this treatment was followed with aspirin 150 mg daily for life. The 6-month follow-up of this patient confirmed that he was clinically well with no recurrence of SVC obstruction.

DISCUSSION

There are many reports in the literature regarding the use of spiral vein grafts as the bypass conduit for SVC obstruction [Doty 1999]. A spiral vein graft definitely takes a longer time to construct, and the procedure involves an additional leg incision and surgical morbidity. For patients who experience bilateral saphenous vein diseases such as thrombophlebitis, thrombosis, varicosities, and so forth, we believe that bovine pericardial conduit can be used as an alternative conduit. Bovine pericardial grafts have been widely used in cardiovascular surgery, particularly in pedi-

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A preoperative venogram.

atric cardiac surgery, and have had acceptable long-term results. Besides, bovine pericardial conduit is easy to reconstruct, and there is no additional leg wound morbidity. The use of warfarin for 8 weeks and aspirin 150 mg thereafter is advocated, although further studies need to be done to confirm the efficacy of this treatment. Patients with chronic atrial fibrillation or hypercoagulable states may need long-term warfarin therapy.

CONCLUSION

The use of bovine pericardial conduit for the SVC obstruction bypass operation is a good alternative for patients with bilateral saphenous vein disease.

REFERENCES

- Abner A. 1993. Approach to the patient who presents with superior vena cava obstruction. *Chest* 103(suppl 4):394S-7S.
- Doty JR, Flores JH, Doty DB. 1999. Superior vena cava obstruction. *Ann Thorac Surg* 67:1111-6.

REVIEW AND COMMENTARY

1. Editorial Board Member PB44 writes:

- Would the authors comment on the generalized thrombotic state, thrombophlebitis, and so on?
- Is there any objective evidence of patency, ie, Doppler echocardiograms, computed tomography scans?

- Why all the calcification in the mediastinum? Has tuberculosis been a contributing factor?

Authors' Response by Mohd Fikri Abdullah, MD:

- The patient has had previous thrombophlebitis, and both saphenous veins were thrombosed. His protein C, protein S, and antithrombin III levels were normal.
- The postoperative Doppler echocardiography assessment showed good patency of the conduit.
- The results of the Mantoux test were negative. Multiple tissue biopsies sent for analysis were reported to be negative for tuberculosis.

2. Editorial Board Member SC389 writes:

The authors need to provide the following: (1) preoperative hard data, eg, computed tomography scans, magnetic resonance images, or venograms showing the lesions; (2) intraoperative photos and/or drawings to demonstrate the procedure; and (3) postoperative hard data, eg, computed tomography scans, magnetic resonance images, or venograms showing the absence of recurrence of SVC obstruction.

Authors' Response by Mohd Fikri Abdullah, MD:

I have included a photo of the preoperative venogram as well as a movie of the procedure. I have also been informed that the patient has returned to Sudan and is not available. I had been planning to perform postoperative venography at least 2 years after the procedure, but unfortunately we cannot contact the patient.