Introduction

Chronic aortocaval fistula (ACF) is a rare complication of trauma and causes major hemodynamic and structural changes.1) Previously, chronic ACF was mainly reported as a complication of ruptured abdominal aortic aneurysm (80%–90%).1–4) In the past 20 years, three cases of traumatic ACF were treated with endovascular stenting, but to our knowledge, no previous study has reported the application of endovascular aortic stenting in any patients with a 40 year ACF history.5) This report aimed to present and review the treatment of a rare case of delay presenting of traumatic ACF by using an endovascular approach and its effect on the hemodynamic problem.

Keywords: aortocaval fistula, trauma, heart failure

Case Report

A 59-year-old male came to hospital with progressive dyspnea and peripheral edema, which began 7 years before. He had a recent history of frequent hospital readmission with chest discomfort and congestive heart failure (CHF). Physical examination revealed severe tricuspid regurgitation and atrial fibrillation. Ill-defined pulsatile mass in the right paraumbilical area with continuous abdominal bruit was also detected. Both legs were swelling. His oxygen saturation was 90% at room air. Chest radiograph showed cardiomegaly with increased pulmonary blood flow and pulmonary arterial hypertension compatible with chronic long-standing left to right shunting. Volume load right ventricle, severe tricuspid regurgitation (TR) and pulmonary hypertension and patent foramen ovale (PFO) with right to left shunting was noted with echocardiogram. Left ventricular (LV) was mildly dilated with normal systolic function (LVEF 70.3%) but right ventricular (RV) systolic function was severely impaired (RV fractional area change 24.1%). Also, thrombocytopenia (92000 cells/cu.mm³) and renal insufficiency (plasma creatinine 3.2 mg/dl) were detected. He had a stab wound at right lower quadrant 41 years ago. He was taken to the operating room, where an exploratory laparotomy was performed to repair the bowel laceration.

Computed tomography (CT) scanning was performed and showed mildly atherosclerotic aorta with aortocaval...
by bedside ultrasonography. In the first week after intervention, the cardiac, renal, and thrombocytopenic problems were improved (plasma creatinine 0.7 mg/dL and platelet count 116,000 cells/cu.mm). Post operative echocardiogram showed decompression of RV with significant improvement in RV systolic function and severity of TR. With a decrease in venous pressure, PFO was spontaneously closed with normalized systemic oxygen saturation. On follow up the second week, the CT angiography showed no connection between the aorta and IVC, with slow stagnant contrast filling in false aneurysm, which represented partial thrombosis of the fistula. There was no thrombosis in the IVC aneurysm. His blood had been anti-coagulated with warfarin together with heparinization overlapping. He developed a hematoma at the right groin wound, which needed drainage Day 16 after the operation. Otherwise, he recovered uneventfully. The 6th week after the operation, the CT angiography no longer showed contrast from aorta connect to either false aneurysm or IVC (Fig. 2). His legs were not edematous.

**DISCUSSION**

Chronic ACF is rare and can give hemodynamically variable pictures, and is often misdiagnosed. In our patient with a long standing history of heart failure, it was not suspected until a continuous abdominal bruit and thrill was detected.

Chronic left to right shunt via the ACF gives rise to right ventricular volume overload, increased pulmonary...
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blood flow with subsequent pulmonary hypertension, and right sided heart failure. The clinical pictures, including chest X-ray and echocardiogram, are not much different from those of atrial septal defect, which was initially suspected in this patient. A clinical picture of high output failure similar to that of aortic regurgitation (wide pulse pressure, Water Hammer sign) was also presented. This was due to aortic runoff in ACF. The high pressure of the “arterialized” vein gave rise to various interesting findings in our patient, including (1) impaired renal function due to renal vein congestion, (2) thrombocytopenia from congestive hypersplenism, and (3) PFO and systemic desaturation as a result of high RA pressure, all of which were resolved after repair.

Endovascular therapy is an emerging field providing a variety of treatments via small skin incision with less invasiveness, decreased hospital stay, and fewer post operative complications.57 Arteriovenous fistula can be endovascular treated by occlusion of the fistula by a variety of embolic materials such as glue, coil, vascular plug, or an occluder device, depending on flow and anatomical vascular architecture.8–11) Another endovascular treatment option is stent graft placement to exclude the fistula and preserve the parent artery. This method has been applied to aortocaval fistula from ruptured aneurysm with satisfactory results.11) However, our patient, who had longstanding-ACF, also had a huge IVC aneurysm which may have become thrombosed after fistula obliteration. The primary aim for this patient was to reduce flow through the fistula as much as possible in order to stabilise hemo-

dynamic status, therefore, to provide some flow into IVC aneurysm, we decided upon endoleak. Trendelenburg position was useful for providing more venous return from the IVC aneurysm to the heart, and was observed by bedside ultrasonography, which demonstrated the changing of stagnate multilayer-like echoic blood into a more lamina flow. Anticoagulant was also given to prevent a disastrous embolism from the IVC thrombosis.

CONCLUSION

The endovascular technique provides an attractive alternative to open surgical methods for repair of chronic ACF. However, in chronic cases, complications such as severe reflex bradycardia (Nicoladoni-Branham sign) from abrupt increase in peripheral vascular resistance, after load, and excessive diuresis must be anticipated and readily addressed after ACF closure.

DISCLOSURE STATEMENT

The authors declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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