Case report - Vascular thoracic

Superior vena caval aneurysm

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Abstract

Venous aneurysms arising from the mediastinal systemic veins are rare. There are only 27 reported cases of such aneurysms. Majority arise from the superior vena cava. We are reporting a saccular aneurysm of superior vena cava in a 58-year-old male. The chest radiogram suggested superior mediastinal mass and the computed tomogram was suggestive of aortic arch aneurysm. Aortography and venography confirmed the diagnosis as saccular aneurysm arising from the superior vena cava. A 7 cm saccular aneurysm arising from the distal half of superior vena cava was resected through median sternotomy. The surgery was done to prevent pulmonary thrombo-embolism.

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1. Introduction

Intra thoracic vascular lesions account for almost 10% of mediastinal masses. Majority of these are aneurysms arising from aorta and its branches [1]. Aneurysms arising from mediastinal systemic veins are very rare, with only 27 cases reported in the literature. Of these, majority are fusiform aneurysms arising from superior vena cava. Saccular aneurysms of superior vena cava are even rarer with only five cases reported in the literature (Table 1).

2. Case report

A 58-year-old man was evaluated for deep seated pain in the right infra clavicular area of 1 year duration. He was a chronic smoker. He was normotensive and all the peripheral pulses were palpable. Physical examination did not reveal any abnormality. A chest radiography taken in erect posture showed homogenous round opacity in the right paratracheal region. Our clinical impression was right paratracheal mass, possibly lymphoma of mediastinal lymph nodes. A computer tomogram of chest was done. It suggested presence of aneurysm arising from ascending aorta with extension to innominate artery (Fig. 1A). Serological tests for syphilis were negative.

Coronary angiogram, performed as a part of preoperative evaluation showed normal coronary anatomy. Ascending aortic injection revealed normal ascending aorta and arch vessels. A late filling saccular structure was identified adjacent to the ascending aorta. A venogram was done through the right basilic vein which revealed a saccular aneurysm arising from the superior vena cava (Fig. 1B). The dye was remaining in the sac, even after a time interval of 5 min, indicating severe stasis.

Resection of aneurysm was planned through median sternotomy, under cardio-pulmonary bypass (CPB). After pericardial marsupialization, a 7 cm aneurysm arising from the lateral wall of the superior vena cava was identified. The mouth of the aneurysm was 1.5 cm wide and was situated below the joining of azygous vein. The sac was very thin and lax. The neck of the sac was excluded with a partial occlusion clamp and divided. The sac was dissected from the pericardium and the right pleura. The neck of the sac was closed with 5-0 polypropylene continuous suture. The sac did not contain any clot. The procedure could be completed without use of CPB. The sac was lined with single layer of endothelial cells covering a dense layer of fibrous and smooth...
muscle. The adventitial layer had connective tissue with few capillaries. The postoperative period was uneventful and he was discharged on anti-platelet drugs. At 3 months follow up, he was free of symptoms.

3. Discussion

Superior vena caval aneurysms are one of the rarest causes of mediastinal masses. The diagnosis of this lesion is often missed because of its rarity. The first case was reported by Abbot in 1950 [2], a fusiform aneurysm of superior vena cava was diagnosed by venogram. The saccular variety was first reported by Lawrence and Burford [3] in 1956. The diagnosis was made by exploratory thoracotomy. Exploratory thoracotomy and venogram were the two methods employed for diagnosing these lesions in early reports. The advent of computer tomogram promised to make the diagnosis easier, but these lesions can still be overlooked primarily because of lack of awareness about this condition (Fig. 1A). Venous aneurysms of the mediastinal territory have been occasionally studied by computed tomography, magnetic resonance and aortography, to rule out aortic aneurysm [4,5]. Computer tomogram usually demonstrates a contrast enhancing lesion adjacent to the ascending aorta. The enhancement approaches but is less than that of aorta [5]. Some times the lesion shows calcification and may be mistaken for part of thymic gland [4]. A positional variation of size of the mass in chest radiography is diagnostic of venous aneurysms in mediastinum [5], but this test is not often done because of failure to appreciate this possibility. Hence venogram may still be needed for diagnosing this lesion [5]. Near fatal pulmonary embolism was reported in one case following venogram due to dislodgement of thrombus [6]. A completely thrombosed saccular aneurysm can lead to deceptive findings in computerized tomogram and may lead to thoracotomy for diagnosis [7].

Aneurysms arising from superior vena cava are usually primary. Histo-pathological examination in three of the four aneurysms did not reveal any defect, as in our case. One had deficiency in the longitudinal muscle layer of the adventitia [8]. They are also associated with cystic hygroma. In one report, out of 15 cases of mediastinal cystic hygroma, five had associated fusiform dilatation of superior vena cava. This can be explained by the close embryonic relationship between lymphatic vessels and veins [9].

In superior vena caval aneurysms, only three complications have been reported, two episodes of pulmonary embolism and one developed contained rupture. Fatal pulmonary embolism while manipulating the sac was reported.

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Age</th>
<th>Sex</th>
<th>Method of diagnosis</th>
<th>Treatment</th>
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<tr>
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<td>1958</td>
<td>52</td>
<td>F</td>
<td>Right thoracotomy</td>
<td>Excision and ligation of stalk</td>
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<td>1977</td>
<td>27</td>
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<td>Modry et al.</td>
<td>1980</td>
<td>54</td>
<td>F</td>
<td>Venogram</td>
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<td>38</td>
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<td>Not known</td>
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<tr>
<td>Pasic et al.</td>
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<td>18</td>
<td>F</td>
<td>Venogram</td>
<td>Excision under CPB</td>
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Fig. 1. (A) Computed tomography scan showing contrast filled mass adjacent to the ascending aorta. This was reported as aneurysm of ascending aorta. Retrospectively the saccular aneurysm of superior vena cava (SVC) was diagnosed. A clear fat plane separates the mass from the aorta and the mass seems to arise from the SVC. The diagnostic difficulty was due to lack of awareness of such a condition. (B) The venogram demonstrating the saccular aneurysm of superior vena cava.
by Ream and Giardiana [10] in a 20 year-old woman with infectious mononucleosis and thrombo-phlebitis of a fusiform aneurysm. Emergency pulmonary embolectomy was required in one case [6] following venogram. The contained rupture reported was in an aneurysm of left superior vena cava and required no surgical requirement [9]. The long term prognosis seems to be good even without surgery, hence many authors argue for conservative management in these lesions [6,8,9].

Even though the first diagnosed case underwent wrapping of the fusiform aneurysm [2], the general consensus is that fusiform variety can be managed conservatively in view of the low risk of complications. The saccular aneurysms need to be managed surgically in view of the risk for thrombus formation and pulmonary embolism. Pasic et al. [4] advocates the use of cardio-pulmonary bypass for management of saccular aneurysm, to prevent pulmonary thrombo-embolism and minimize intra operative hemorrhage. But CPB is required for management of complex saccular aneurysms like those with calcification, thrombus formation and venous obstruction. Venous cannulation for the conduct of CPB can be difficult. Pasic [4] used innominate vein cannulation and the bleeding from the right subclavian vein was controlled by a balloon catheter. The bleeding from right jugular vein was controlled by a pump sucker. If the control of innominate vein is difficult, then total circulatory arrest may be required for tackling such difficult aneurysms. The simpler variety can be easily tackled through median sternotomy without CPB. The neck of the sac can be controlled with partial occlusion clamp, with minimum manipulation of the sac. Three saccular aneurysms of superior vena cava and one of left innominate vein were successfully treated with excision without cardio-pulmonary bypass [8]. In case of difficulty in controlling the neck of the sac or if the sac contains clot, or the sac is calcified and adherent, the aneurysm should be tackled under cardio-pulmonary bypass.

References