Submitted: 08 October, 2020 Accepted: 10 November, 2020 Published: 08 March, 2021 DOI:10.22514/sv.2020.16.0112

Open Access
Signa Vitae

CASE REPORT

Giant saccular superior vena cava aneurysm: a rare clinical case

Wan-Hong Liang[1,*], Ling Zhao[1], Jin Lin[1]

[1]Department of Critical Care Medicine, Zhuhai Hospital of Integrated of Traditional Chinese Medicine and Western Medicine, Zhuhai, GuangDong, P. R. China

***Correspondence**
wydyfdwydyfd@126.com
(Wan-Hong Liang)

Abstract

Background: Superior vena cava (SVC) aneurysm is a rare clinical disease. Only around 50 cases have been reported in the medical literature. **Case presentation**: We report a 22-year-old man with SVC aneurysm with cardiac arrest as the first symptom accompanied by typical superior vena cava syndrome. **Conclusion**: We suggest that patients with giant SVC aneurysm should avoid sudden changes in posture, and that surgical treatment should be implemented urgently.

Keywords

Superior vena cava aneurysm; Cardiac arrest; Superior vena cava syndrome

1. Background

Superior vena cava (SVC) aneurysm is a rare clinical disease. Since 1949, when Abbott [1] described a patient with a SVC aneurysm for the first time, only around 50 cases have been reported in the medical literature. Many patients did not have any symptoms and were diagnosed by incidental physical examination of abnormal mass in the mediastinum. Although the potential complications of SVC aneurysms include thrombosis, pulmonary embolism, venous obstruction and rupture, most patients are considered to have a good prognosis. To our knowledge, this is the first case report of SVC aneurysm with cardiac arrest as the first symptom.

2. Case report

A 22-year-old man with sudden cardiac arrest underwent a contrast-enhanced computed tomography (CT) examination of the thorax which showed a giant SVC aneurysm. According to the description of his roommate, when the patient was ready to get up in the morning, he suddenly had dyspnea, chest and epigastric pain, cyanosis of the head and face and sweating all over the body. Then he lost consciousness and fell to the ground with convulsions, which lasted for about two minutes. His roommate called the emergency service, who transported him to the hospital. On the way to the hospital, he suddenly lost consciousness again and experienced respiratory and cardiac arrest. He was treated with cardiopulmonary resuscitation, endotracheal intubation and mechanical ventilation immediately. Fortunately, after about five minutes of cardiopulmonary resuscitation, he regained spontaneous breathing and heart rate. After arriving at the emergency department, an electrocardiogram (ECG) was urgently performed with normal findings. The patient received CT scans of his head and thorax, which showed a prominent right upper mediastinal bulge, and he was admitted to the intensive care unit (Fig. 1).

A three-dimensional (3D) reconstructed image of contrast-enhanced CT was performed and revealed a well-defined 104 mm $\times$ 63 mm $\times$ 119 mm aneurysm arising from the lateral surface of the superior vena cava (Fig. 2, Fig. 3), but no superior vena cava thrombosis or pulmonary embolism. For the connection with SVC we diagnosed a large saccular aneurism. However, the patient developed cyanosis in the anterior chest, head, face and upper limbs, accompanied by nosebleed during the process of turning the patient over to check the skin. At the same time, the patient's blood pressure dropped significantly, and fluid resuscitation and norepinephrine were required to maintain blood pressure. The medical staff immediately placed him in the supine position, the patient recovered after a few minutes, and the vasoactive drugs were gradually withdrawn. Considering that the SVC aneurysm was the main cause of respiratory and cardiac arrest, the patient was given surgical treatment according to the recommendation of cardiac surgeons. The chest cavity was opened using the median sternotomy under general anesthesia approach. A cardiopulmonary bypass was used, cannulating the ascending aorta and both the superior and inferior vena cava. The surgeon excluded the neck of the aneurysm using a vascular clamp. The mass was detached and the neck of the aneurysm was continuously sutured and strengthened with teflon felt patches. A histopathological examination was conducted and this confirmed that the mass which had been removed was a part of a venous blood vesse. After the surgical treatment, the patient's circulation was stable and there were no cardiovascular complication. The aneurysm was successfully excised (Fig. 4). There was no recurrence of cardiac arrest and superior vena cava syndrome after surgical treatment. The postoperative pathology diagnosis is consistent with SVC aneurysm. Although the patient successfully performed the operation, the patient eventually died of irreversible brain damage after respiratory and cardiac arrest.

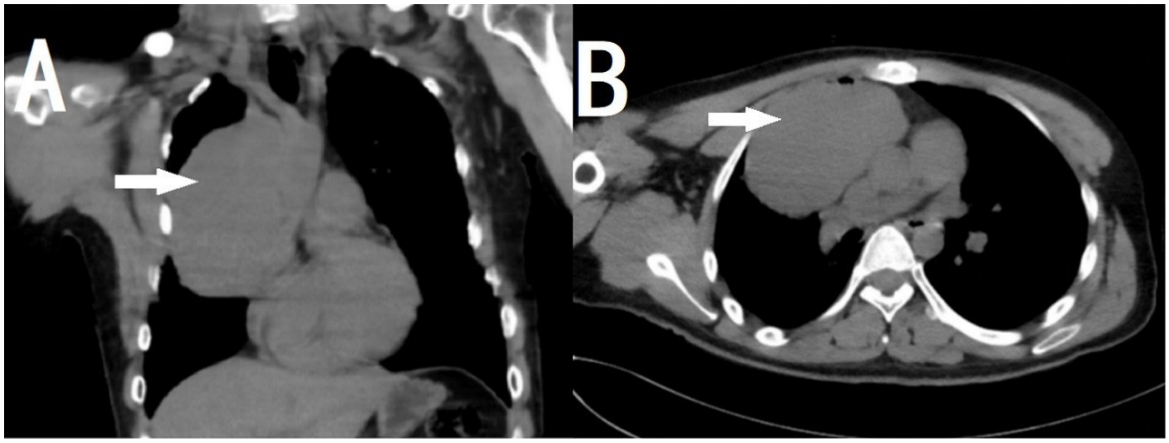

FIGURE 1. Plain CT images of coronal (A), axial (B) showing a prominent right upper ediastinal bulge (arrows).

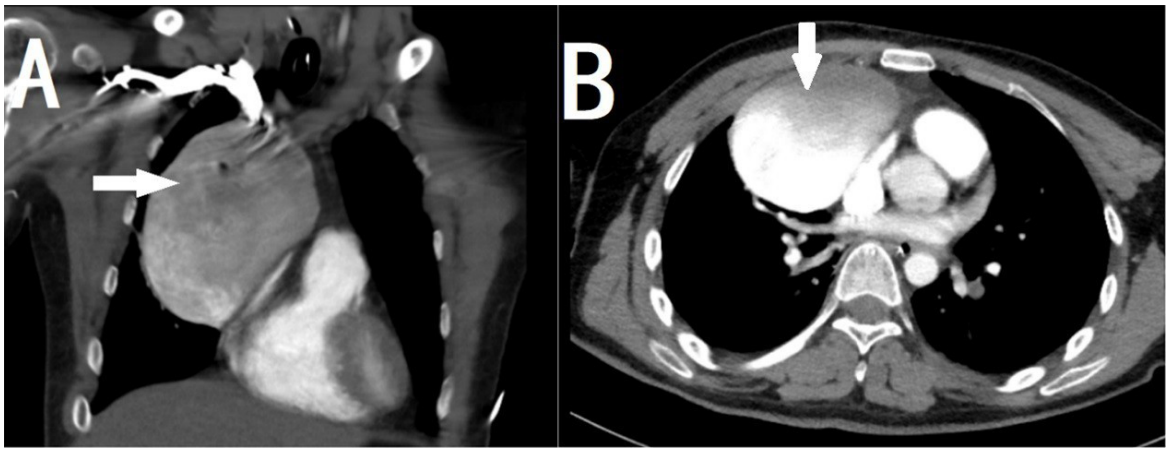

FIGURE 2. Contrast-enhanced CT (thorax) of coronal (A) and axial (B) section showing SVC aneurysm.

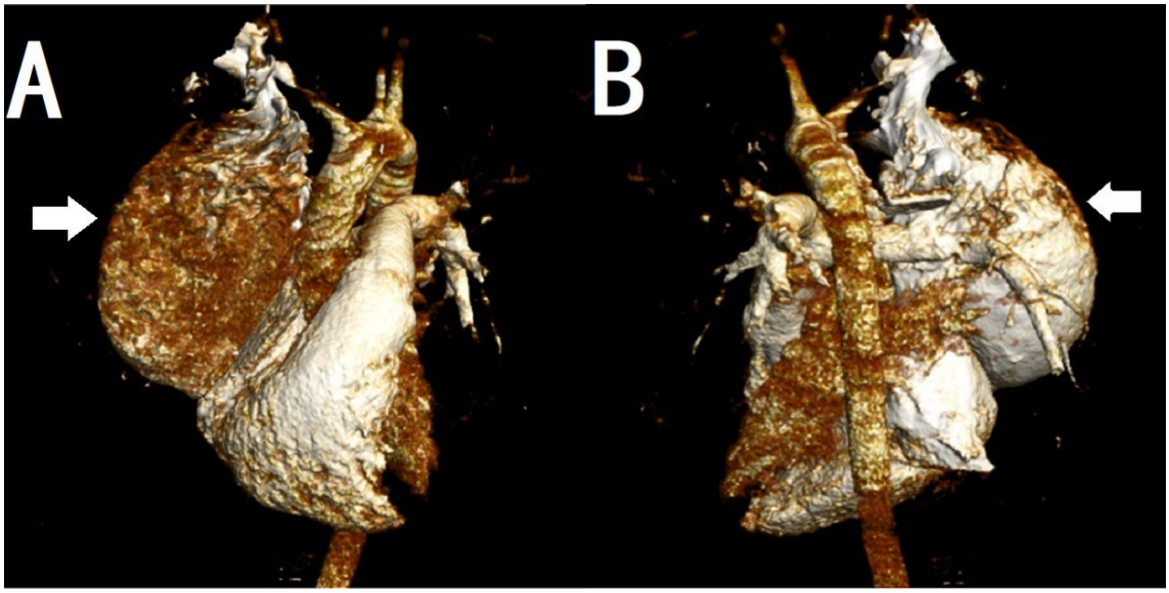

FIGURE 3. 3D reconstructed image of CT (thorax) in angiographic protocol demonstrating SVC aneurysm.

3. Discussion

SVC aneurysms can be divided into fusiform or saccular morphology. Most are fusiform. The exact mechanism of the formation of these aneurysms has not been elucidated, but suggested theories include congenital abnormalities, inflammation, infection, mechanical injury and pathological defects in the adventitia of the longitudinal muscle wall of the superior vena cava [2, 3]. Fusiform superior vena cava aneurysms tend to receive conservative treatment, For saccular aneurysms, prophylactic surgical resection or percutaneous intervention

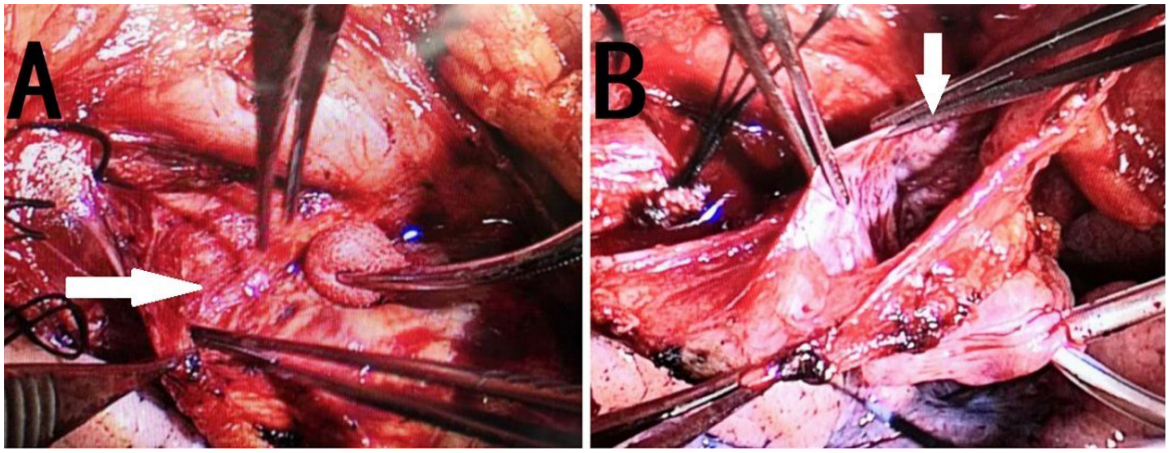

FIGURE 4. The surgical view of the superior vena cava aneurysm before (A) and after (B) surgery.

when considering the high risk of surgery had been reported to prevent rupture, thrombosis or venous obstruction [4, 5]. This case is distinct from previously reported cases. In the past, most reported cases were asymptomatic, occasionally showing chest pain, shortness of breath and other symptoms [6]. But in this case, the young man, who had no underlying disease, developed cardiac arrest as the first symptom, suggesting that superior vena cava aneurysms may lead to sudden cardiac death. When the patient's posture was changed, there was a typical manifestation of superior vena cava syndrome accompanied by severe hemodynamic disorders. Three patients with SVC aneurysm have been reported to have died of pulmonary embolism [7–9]. However, in this case, neither image findings nor clinical manifestations supported the diagnosis of pulmonary embolism. According to the results of examination after admission, myocardial infarction and myocarditis were excluded as well. Therefore, we concluded that superior vena cava aneurysms may be the direct cause of respiratory and cardiac arrest. We infer that the possible mechanism has the following two aspects. On the one hand, when the patient's posture changes, the giant SVC aneurysm may swing along with it, displacing the mediastinum violently, resulting in a sharp deterioration of hemodynamics. On the other hand, the giant SVC aneurysm may compress the atrium and ventricle during postural changes, resulting in a sharp decrease in cardiac output and severe hemodynamic instability. According to the characteristics of this case, we suggest that patients with giant SVC aneurysm should avoid sudden changes in posture, and that surgical treatment should be implemented urgently.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Ethical approval was given by the medical ethics committee of Zhuhai Hospital of Integrated Traditional Chinese Medicine and Western Medicine with the following reference number: 202010003.

ACKNOWLEDGEMENTS

Authors thank the patient's parents for allowing them to report the case.

CONFLICT OF INTEREST

All authors declare that they have no conflict of interest.

REFERENCES

[1] Abbott OA. Congenital aneurysm of superior vena cava; report of one case with operative correction. Annals of Surgery. 1950; 131: 259-263.
[2] Patel A, Cobb R, Rivera V, Simpson S. Untreated superior vena cava aneurysm: radiological significance and review of the literature. Radiology Case Reports. 2016; 2016: 6960757.
[3] Janczak D, Skiba J, Gemel M, Mak M, Ziomek A, Malinowski M, *et al*. Giant saccular superior vena cava aneurysm-a rare and difficult clinical case. Journal of Thoracic Disease. 2016; 8: E247-E249.
[4] Jacobson AM, Ailiani RG, Paramesh V. A rare case of superior vena cava saccular aneurysm. CASE. 2019; 3: 246-249.
[5] Jargiello T, Durakiewicz M, Sojka M, Czekajska-Chehab E, Szczerbo-Trojanowska M. Saccular aneurysm of superior vena cava treated with percutaneous, transcatheter thrombin injection. CardioVascular and Interventional Radiology. 2014; 37: 529-532.
[6] Zhang HY, Lian WS, Chai DZ. Large asymptomatic superior vena cava aneurysm. Journal of Vascular Surgery: Venous and Lymphatic Disorders. 2019; 7: 591.
[7] Oh SG, Kim KH, Seon HJ, Yoon HJ, Ahn Y, Jeong MH, *et al*. Unusual cause of acute right ventricular dysfunction: rapid progression of superior vena cava aneurysm complicated by thrombosis and pulmonary thromboembolism. Journal of Korean Medical Science. 2011; 26: 690-693.
[8] Ream CR, Giardina A. Congenital superior vena cava aneurysm with complications caused by infectious mononucleosis. Chest. 1972; 62: 755-757.
[9] Nakamura Y, Nakano K, Nakatani H, Fukuda T, Honda K, Homma N. Surgical exclusion of a thrombosed azygos vein aneurysm causing pulmonary embolism. Korean Journal of Thoracic and Cardiovascular Surgery. 2007; 133: 834-835.

How to cite this article: Wan-Hong Liang, Ling Zhao, Jin Lin. Giant saccular superior vena cava aneurysm: a rare clinical case. Signa Vitae. 2021;17(2):228-230. doi:10.22514/sv.2020.16.0112.