International Journal of Surgery Case Reports 95 (2022) 107142

Contents lists available at ScienceDirect

International Journal of Surgery Case Reports

journal homepage: www.elsevier.com/locate/ijscr

Case report

Giant lipoma in superior vena cava: A case report and literature review

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ARTICLE INFO

Keywords:
Lipoma
Superior vena cava
Intravascular tumour

ABSTRACT

Introduction: Intravascular lipomas are rare occurrences, especially in major vessels. This tumour is composed of adipocytes in a fibrous capsule that has a slow growth rate and usually shows no symptoms. There were only eight reports in the literature regarding intravascular lipoma located in the superior vena cava.

Case presentation: A 54-year-old man had episodes of supraventricular tachycardia and atrial flutter for over a year. Preoperative radiological findings showed a giant mass that arose from the superior vena cava to the right atrium and a biopsy catheter showed that there were no signs of malignancy. The patient then underwent surgery through median sternotomy and the mass was extirpated on the highest part of the stalk that could be reached. The patient was stable and remained to show no symptoms or evidence of residual mass or stalk in 2 years follow-up.

Conclusion: The surgical approach in excising lipoma in SVC should be considered wisely with the support of adequate preoperative diagnosis. Since lipoma is a very slow-growing tumour, extensive manipulation that could increase surgical technique difficulty or postoperative morbidity and mortality is not necessary.

1. Introduction

Primary benign tumours that originate from the intravascular wall are considered a rare occurrence. Among all of them, lipomas were found to be extremely rare, especially the ones that occur in superior vena cava (SVC) [1]. Currently there were only 30 literatures found on PubMed by using search terms “intravascular lipoma”, “superior vena cava lipoma” and “intravenous lipoma”. There were only eight cases found regarding intravascular lipoma located in the SVC [2].

Intravascular lipomas are composed of adipocytes in a fibrous capsule that have a slow growth rate. It usually shows no symptoms that it commonly diagnosed after an incidental finding [3]. Even though this tumour only caused obstructive symptoms when it has a large size, many had believed that it better be surgically removed due to its probability of causing turbulent blood flow and subsequently thrombotic complication in the venous portal system [4]. The aim of this article is to raise awareness of the possibility of giant lipoma in the presence of other diagnosis with similar findings.

2. Case presentation

A 54-year-old man had episodes of near syncope, supraventricular tachycardia and atrial flutter for over a year. The patient was an ex-smoker with a history of hypertension, dyslipidaemia, and a family history of sudden cardiac death. The physical examination results were unremarkable. Transthoracic echocardiography (TTE) examination shows a large mass at right atrium (RA) with the size 4,7 × 3,6 cm, occupying more than half of RA chambers. The left ventricle is normal in size and function, with an ejection fraction of 73%. Other findings in TTE were normal. A computed tomography scan (CT) showed an elongated lesion with low density that arose from SVC to RA (Fig. 1A). Magnetic resonance imaging (MRI) examination confirmed a big encapsulated mass that arose from SVC to RA with the size of 12 × 4 × 4 cm (Fig. 1B). The mass was confirmed as a fat-rich content and diagnosed as lipoma. Given the size and patient's age, malignancy could not be excluded. Therefore the patient underwent biopsy by catheterization and the results showed that there were no signs of malignancy. The patient was prepared for extirpation and underwent catheterization. It was found that the left main artery had 20–30% stenosis on the distal,

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https://doi.org/10.1016/j.ijscr.2022.107142
Received 15 March 2022; Received in revised form 27 April 2022; Accepted 30 April 2022
Available online 6 May 2022

left anterior descending artery had 40–50% stenosis on the middle, left circumflex artery had 60–70% stenosis on the distal, and right coronary artery had 50% discrete stenosis on the proximal. The patient was diagnosed with a moderate 3-vessel disease of the coronary artery, and it was decided to be treated conservatively.

The median sternotomy approach was chosen and we found that SVC was 2 times bigger than the aorta. Under TEE the mass was found to be occupied by the SVC, then we decided to cannulate the internal jugular vein and IVC. Under a total bypass with a cardiopulmonary bypass machine, RA was opened and we found a yellowish mass inside the RA that originates from SVC. The mass has a stalk that originates from the cranial of SVC. The mass was yellowish with the size of 15 × 5 × 4 cm, had a lobulated surface, mobile, and had a rubbery consistency (Fig. 2). We pulled the mass and extirpated it on the highest part of the stalk that could be reached. RA was closed and cardiopulmonary bypass was quickly discontinued without any problem, and the surgery was done smoothly. The patient was stable with normal sinus rhythm on ECG post-surgery and was discharged four days after.

Pathology examination shows mature white adipose cells with no-centrally located nuclei dominated this mass, thin fibrous septa in some parts, and a few blood vessels. These histologic findings confirmed the mass as a lipoma. The patient underwent cardiac rehabilitation after being discharged and remains to show no symptoms in 2 years follow-up. There is also no evidence of residual mass or stalk on the SVC on Cardiac MRI with four chamber and right ventricle two chamber stack 10 slices, slice thickness 6 mm that was performed extended to the cervical region on 2 years follow-up (Fig. 3).

3. Discussion and conclusions

Lipomas are benign tumours that rarely occur intraluminal in major vessels, which are most prevalent in people between 40 and 60 years. It usually shows no symptoms, but when present it usually shows obstructive symptoms of cardiovascular like congestive ness and edema [5,6]. We only found eight cases of SVC lipoma from a literature search in PubMed (Table 1). Four cases described that patients showed obstructive symptoms. In our case, the patient shows symptoms of periodical arrhythmia which has never been described in other cases even though the one that extended to the right atrium like ours. We assumed that the symptom was due to its position in RA and its gigantic size, therefore we decided not to do any invasive intervention to it. It was confirmed that the arrhythmia disappeared after the resection.

None of those eight cases underwent biopsy before the intervention. There were only a few articles about intravascular lipoma and there was no literature that shows the incidence of intravascular lipoma or liposarcoma. Despite it, there were data about the incidence of lipoma and liposarcoma originated from the heart that shows the rarity of the case (lipoma 0.07%–8.4%; liposarcoma 0.19%–0.5%) [7]. Nevertheless the rarity of malignancy incidence in the cardiovascular tumour, we still cannot exclude the possibility of malignancy, in this case, due to its size (the biggest lipoma ever been reported in SVC) and the age of the patient. Studies have shown cardiac MRI to be the gold standard diagnostic imaging modality for cardiac lipoma, but it has limited sensitivity that could only distinguish 69% of cases in the setting of well-differentiated liposarcoma [8]. Given that malignant tumour originated from cardiovascular required different consideration in treatment options, therefore we still encourage to do the biopsy before intervention to better weigh the risks and benefit of the surgical treatment.

In our case, the cardiac CT and cardiac MRI didn't specify the origin of the lipoma's stalk. Given the uncertainty of the tumour origin, we decided to not perform any extensive manipulation due to its probability of increasing surgical technique difficulty and postoperative morbidity or mortality. Two years later, the patient remains to show no symptoms, and Cardiac MRI also shows no evidence of recurrence of the tumour or the stalk. This evidence certifies that it is not necessary to do any extensive manipulation or other surgical approaches to reach the origin of the stalk since lipoma is a very slow-growing tumour. We suggest a thorough diagnostic approach before the procedure to define the whole tumour's precise location. Extension of cardiac MRI to the cervical region or venography should be considered in other similar cases.

The surgical approach in excising lipoma in SVC should be considered wisely with the support of adequate preoperative diagnosis. Extensive manipulation that could increase surgical technique difficulty or postoperative morbidity and mortality is not necessary since lipoma is a very slow-growing tumour.

Abbreviations

SVC	Superior vena cava
TTE	Transthoracic echocardiography
RA	Right atrium
CT	Computed tomography
MRI	Magnetic resonance imaging
TEE	Transesophageal echocardiography
IVC	Inferior vena cava
ECG	Electrocardiogram

This article has been reported in line with the SCARE 2020 criteria.

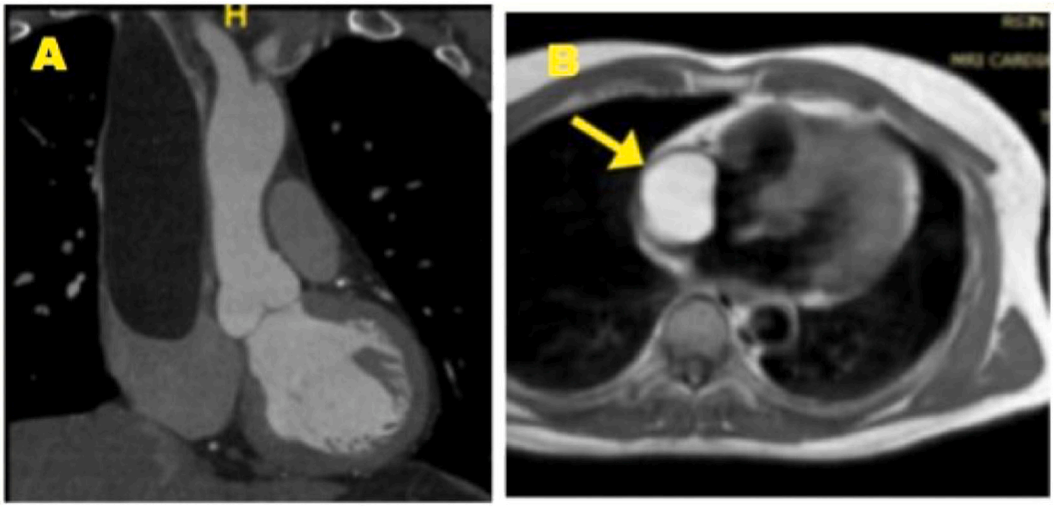

Fig. 1. Preoperative radiology. (A) CT scan coronal plane; (B) cardiac MRI T1-weighted image axial plane.

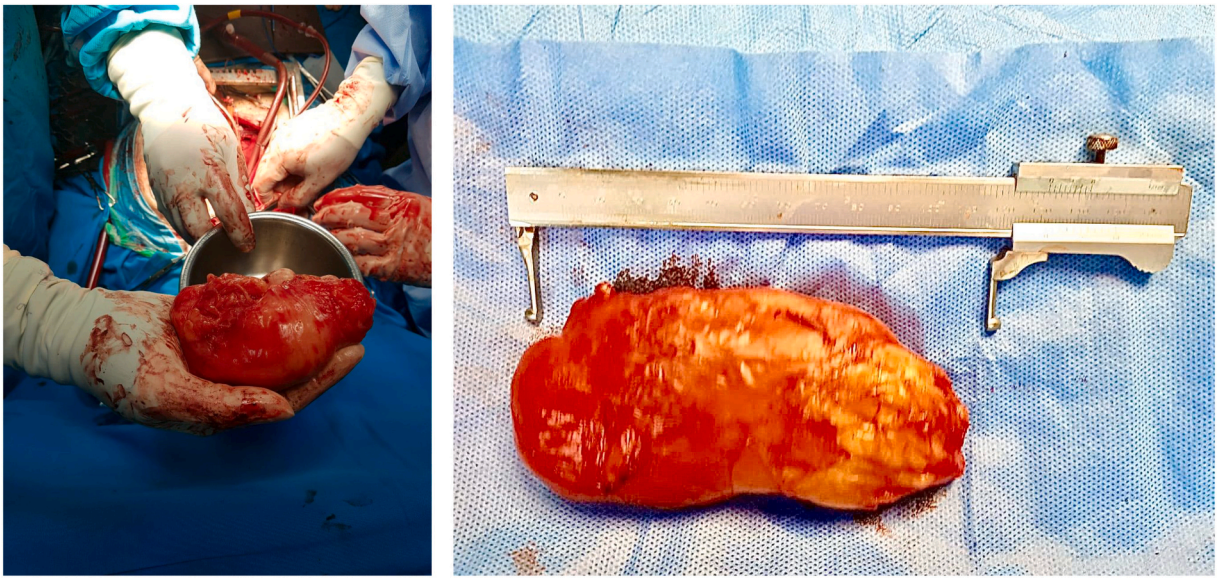

Fig. 2. Giant lipoma after surgically resected.

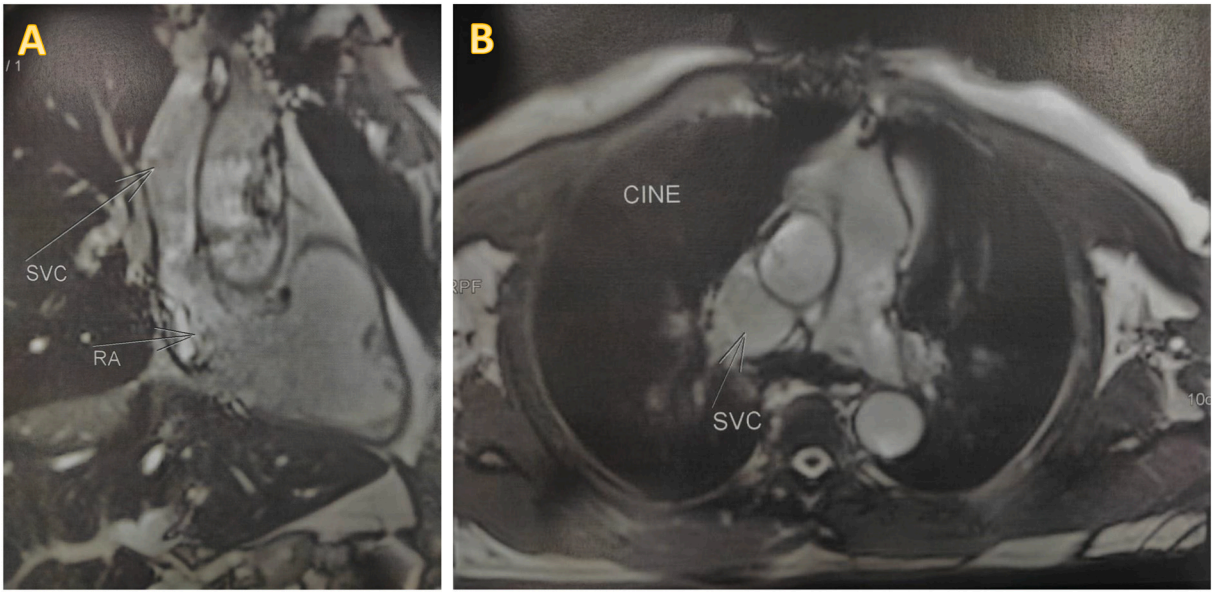

Fig. 3. 2 year post operative cardiac MRI (cMRI). (A) Cine cMRI coronal plane; (B) Cine cMRI axial plane.

Consent for publication

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Provenance and peer review

Not commissioned, externally peer-reviewed.

Ethical approval

Not applicable.

Funding

There was no funding for this case report.

Guarantor

Tri Wisesa Soetisna.

Research registration number

Not applicable.

Table 1
Previously reported case of giant lipoma in superior vena cava

Author (year)	Gender/ age	Clinical presentation	Prediagnostic modalities	Tumour size	Surgical approach
Vinnicombe S (1994) [9]	F, 42 y.o.	Fatigue, edema face and right hand	CT scan: rounded mass of fat compressing proximal right brachiocephalic vein and SVC Venogram: large lobulated filling defect up to 3.5 cm diameter in SVC	10 × 5 × 5 cm	Not well described
Thorogood SV (1996) [10]	M, 73 y. o.	Asymptomatic	CT scan: mass of fat density in SVC and the right braciocephalic vein	Not specified	No surgical intervention
Mordant P. (2010) [11]	F, 55 y.o.	Asymptomatic	CT scan: intraluminal nonenhancing tumour occluding the distal right subclavian vein, the right brachiocephalic vein, and the SVC up to the right atrium Venogram: total occlusion of the right subclavian and brachiocephalic veins and of the SVC to the level of the azygos vein MRI: fatty intravascular lesion	9 × 6 cm	Median sternotomy with right transclavicular cervicotomy. Transverse venotomy in SVC. En bloc resection, end-to-end anastomosis left innominate vein - SVC
Bravi MC (2011) [4]	M, 63 y. o.	Abdominal, right shoulder, and lumbar pain	CT scan: superior vena caval (SVC) filling defect with a subtotal occlusion that extended into the right atrium. MRI: uniform signal drop on fat-suppressed sequences	Not specified	Not well described
Tanyeli O (2015) [1]	M, 48 y. o.	Right arm edema and paresthesia	CT scan and MRI: fat density within SVC	5 × 2 cm	Mini J sternotomy, venotomy
Concatto NH (2015) [12]	M, 58 y. o.	Asymptomatic	CT scan: a hypodense elongated lesion with fat density within the superior vena cava MRI: confirmed the fatty nature of the lesion	11 × 3 cm	Not well described
Wahab A (2017) [13]	F, 70 y.o.	Asymptomatic	TEE: 2.6 × 1.6 × 1.6 cm partially obstructing round, echogenic mass at SVC and RA junction	2–3 cm	No surgical intervention
Sundaram N (2020) [2]	M, 58 y. o.	Asymptomatic	CT scan: intraluminal 5 cm mass in the right innominate vein extending into SVC Venous duplex: large pedunculated 5 cm hyperechoic mass at the junction of the right internal jugular and subclavian veins	5 cm	Median sternotomy with right cervical extension, venotomy in SVC, counter incision in right mid-jugular vein
Soetisna TW. et al* (2021) a	M, 54 y. o.	Episodes of SVT and atrial flutter	CT scan: elongated lesion with low density from SVC to RA MRI: big capsulated mass from SVC to RA (fat-rich content)	15 × 5 × 4 cm	Conventional median sternotomy

* as reported in this case report

CRediT authorship contribution statement

Tri Wisesa Soetisna: conceptualised, wrote the paper and reviewed the literature. Lisca Namretta: wrote the manuscript and edited the paper. Bagus Ronidipta: reviewed the literature. Elen Elen: validated the data and reviewed the paper. Sunu Budhi Raharjo: reviewed and edited the paper. Amin Tjubandi: supervised, reviewed the literature and edited the paper.

Declaration of competing interest

The authors declare that they have no competing interests.

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