Saphenous vein graft aneurysm – Unusual cause of hemoptysis: A case report and review of literature

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ABSTRACT

Hemoptysis due to saphenous venous graft (SVG) aneurysm is an extremely rare condition and published literature has described the role of conservative management, surgical resection, and covered stent. Here, we report a successful placement of a covered stent for SVG aneurysm in a 56-year-old male who presented with hemoptysis. He was a known diabetic and had undergone a coronary artery bypass grafting 5 years ago. Computed tomography (CT) chest and fiberoptic bronchoscopy performed in another local hospital had revealed blood in the left lingula with spillover into the left lung parenchyma. Hence, he had received empirical anti-tuberculosis medication for 2 months without any improvement. He was referred to our hospital for further management of hemoptysis. Multidetector CT (MDCT) angiography of the chest covering coronaries performed at our hospital revealed SVG aneurysm that was managed with covered stent placement.

KEY WORDS: coronary artery bypass graft, multidetector CT, saphenous vein graft aneurysm
with contrast showed infiltrates in the left lingula. Subsequent fiberoptic bronchoscopy revealed blood in the left lingula with no endobronchial lesion. Microbiological work up on BAL fluid for infectious etiology including tuberculosis was negative. He received empirical anti-tuberculosis medication for 2 months without any clinical improvement.

He presented to our tertiary care hospital for further management of his persistent hemoptysis. He denied any history of fever, night sweats, and weight loss or skin rash. Physical examination showed stable blood pressure with a palpable peripheral pulse. Blood investigations revealed low hemoglobin of 9.7 g/dl, total counts of 7600 cells/mm, platelet count of 3.15 lakh/mm3, PT-INR 0.98 and APTT of 35 seconds (within normal range). Serological markers for connective tissue disease and troponin level were within the normal range.

Electrocardiogram did not reveal any new ischemic changes. Chest x-ray showed left hilar prominence. Multi-detector computed tomography (MDCT) chest angiography covering coronaries, with ECG gating, showed aneurysm in SVG abutting left lingular bronchus [Figure 1]. The aneurysmal sac was confirmed on catheter coronary angiography and it measured 23 × 23 mm [Figure 2].

A review of fiberoptic bronchoscopy report performed at the previous hospital corroborated the radiological finding of aneurysm eroding lingular bronchus. He underwent successful placement of a covered stent (3.5 mm × 26 mm, Graftmaster, Abbott Vascular, USA). The intervention was performed accessing the right femoral artery by seldinger technique. The SVG was cannulated by a 7F right judkins catheter and the covered stent was carried over a 0.014” whisper wire in the SVG which led to the cessation of hemoptysis [Figure 3]. Anti-tuberculosis medication was discontinued immediately after stent implantation. At his 3 months follow-up, he is clinically stable with no further episodes of hemoptysis.

**Discussion**

Hemoptysis is the expectoration of blood from tracheobronchial tree with severity ranging from blood-streaked sputum to massive hemoptysis. The etiology of hemoptysis is quite vast as it is primarily categorized into parenchymal, airway or vascular diseases. Chest x-ray, MDCT chest angiography, digital subtraction angiography and bronchoscopy are the primary method for establishing the diagnosis and site of bleeding.[3]

The rupture of a SVG aneurysm causing hemoptysis is an unusual complication after CABG. Chest pain/Angina, shortness of breath and myocardial infarction are more common presentation of SVG aneurysm. Although SVG aneurysm is a rare phenomenon with an incidence of 0.07%, it carries reported mortality of 13.9%. [4] SVG can have early (<12 months) or late presentation. While the early presentation is attributed to infection of the implanted graft, intrinsic weakness of the venous wall, technical preparation of the graft, possible causes of late presentation are atherosclerotic degeneration, graft endothelial dysfunction, and changes in medial smooth muscle cell orientation in the vicinity of valve sites. The venous graft aneurysms tend to rupture, thrombose or embolize. [5,6] Most SVG aneurysms are managed either with the placement of covered stent, coil embolization or surgical resection of the aneurysm. [7,8] Table 1 shows the related published literature on hemoptysis in SVG aneurysm and its management.

In our case, a careful review of the MDCT chest angiography revealed SVG aneurysm that was eroding left lingula airway. The multidisciplinary team decided to proceed with the deployment of covered stent instead of the coil as during active hemoptysis coil embolization does not provide an active seal of fistula aneurysm leading to the cessation of hemoptysis.
Table 1: Published literature on hemoptysis in SVG aneurysm and its management

| Study                  | Age (years) | Gender | Post CABG time interval (Years) | Hemoptysis severity | Management       | Outcome |
|------------------------|-------------|--------|---------------------------------|---------------------|------------------|---------|
| Present case           | 56          | Male   | 5                               | Mild                | Covered stent    | Alive   |
| Ohnishi et al., 2018   | 89          | Male   | 24                              | Mild                | Conservative     | Alive   |
| Jehangir et al., 2018  | 55          | Male   | 6 months                        | 2 episodes          | Covered Stent    | Alive   |
| Guruz et al., 2016     | 78          | Male   | 6                               | Not mentioned       | Vascular plug    | Alive   |
| Klair et al. 2014      | 64          | Female | 22                              | Massive             | Conservative     | Dead    |
| Khalpey et al., 2012   | 83          | Male   | 30                              | Massive             | Covered stent    | Dead    |
| Jiménez-Jáimez et al., 2011 | 74       | Male   | 12                              | Massive             | Surgical Resection | Not Mentioned |
| Mylonas et al., 2010   | 85          | Male   | 10                              | Not mentioned       | Vascular plug    | Alive   |
| Tonelli et al., 2008   | 81          | Male   | 16                              | Massive             | Vascular plug    | Alive   |
| Ivert et al. 2006      | 56          | Male   | 6                               | Unclassified        | Surgical Resection | Alive   |
| Nishimura, et al., 2005| 67          | Male   | 17                              | Mild                | Surgical Resection | Alive   |

Figure 3: Three-dimensional MDCT images showing the SVG aneurysm (white arrow) along the in course of the graft to OM (broken arrow) (a and b). Post-procedure images (c and d) show a stent in the graft (white arrow) with resolution of the aneurysm

In conclusion, the rupture of an SVG aneurysm causing hemoptysis is an infrequent complication after CABG, which can present as massive hemoptysis occasionally. It is of utmost importance that the treating physician should be aware of such an unusual cause of hemoptysis, so that the right diagnosis and timely intervention can be taken. Misdiagnosis or delayed diagnosis can have severe consequences leading to significant morbidity and mortality. With this case report and review of the relevant literature, we hope to improve the etiological diagnosis and management of hemoptysis across medical fraternity.

Declaration of patient consent
The authors certify that appropriate patient consent was obtained.

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Conflicts of interest
There are no conflicts of interest.

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