Case Report

http://dx.doi.org/10.3348/kjr.2011.12.6.754
pISSN 1229-6929 · eISSN 2005-8330
Korean J Radiol 2011;12(6):754-756

Korean Journal of Radiology
KJR

Evaluating a Thrombosed Azygous Vein Aneurysm Combined with Pulmonary Arterial Thromboembolism by ECG-Gated Multidetector CT: a Case Report

Ji Yeon Yang, MD[1], Dong Hun Kim, MD[2], June Hyuk Lee, MD[3], Eun Ha Suk, MD[4]

[1]Department of Radiology, Soonchunhyang University, College of Medicine, Gyeonggi-do 420-767, Korea; [2]Department of Radiology, Chosun University Hospital, Gwangju 501-717, Korea; [3]Department of Internal Medicine, Soonchunhyang University, College of Medicine, Gyeonggi-do 420-767, Korea; [4]Department of Anesthesiology and Pain Medicine, Asan Medical Center, Ulsan University College of Medicine, Seoul 138-736, Korea

Azygous vein aneurysm is a rare congenital lesion that needs to be differentiated from mediastinal mass lesions. Although almost of these anomalies are asymptomatic lesions, we experienced an interesting case in which a thrombus within an azygous vein aneurysm in a 75-year-old woman caused pulmonary thromboembolism. The patient was managed by medical treatment for one month and then the thrombus within both the azygous vein aneurysm and the pulmonary arteries completely resolved.

Index terms: *CT (computed tomography); Azygous vein; Aneurysm; Thromboembolic disease; Pulmonary embolism*

INTRODUCTION

Aneurysms of the azygous veins are rare and only approximately 42 cases have currently been reported in the medical literature (1-9). Among these cases, thrombus in an azygous vein aneurysm has been reported in five cases (1, 2). Two of these five cases were detected incidentally. The patients of three cases complained about recent chest pain and one of them showed thromboses in the azygous vein and pulmonary arteries (1). Herein, we present a case with an azygous vein aneurysm with thrombus that mimicked a mediastinal mass and it caused pulmonary thromboembolism. We can obtain important information about the right heart function by using ECG-gated CT and this can influence the care of such patients.

Received March 8, 2011; accepted after revision April 13, 2011.
Corresponding author: Dong Hun Kim, MD, Department of Radiology, Chosun University Hospital, 588 Seoseok-dong, Dong-gu, Gwangju 501-717, Korea.
• Tel: (8262) 220-3543 • Fax: (8262) 228-9061
• E-mail: dhk0827@naver.com

CASE REPORT

A 75-year-old woman was admitted to our hospital due to general weakness and to check for neurologic deficits. She had been in a bed-ridden state for the previous five months due to right hemiparesis, which was caused by cerebral infarction. She also complained about chronic cough. There was no fever or dyspnea. There was no history of recent trauma. The fibrin D-dimer measurement and other blood analyses were within the normal limits.

The chest radiograph revealed a 3.4-cm well defined right paratracheal mass that was suspected to be mediastinal mass or lymphadenopathy (Fig. 1A). Multidetector CT (MDCT) (LightSpeed VCT XTe, GE Healthcare, Milwaukee, WI) with ECG-gating and the low dose technique (12.9 mSv with adaptive statistical iterative reconstruction, ASIR) was performed for evaluating the mediastinal mass, the possible pulmonary thromboembolism and the right cardiac dysfunction as an important prognostic factor for pulmonary thromboembolism. The MDCT scan showed a 4.1 x 2.5 x 3.0 cm sized azygous vein aneurysm with a large amount of

Korean Journal of Radiology
KJR

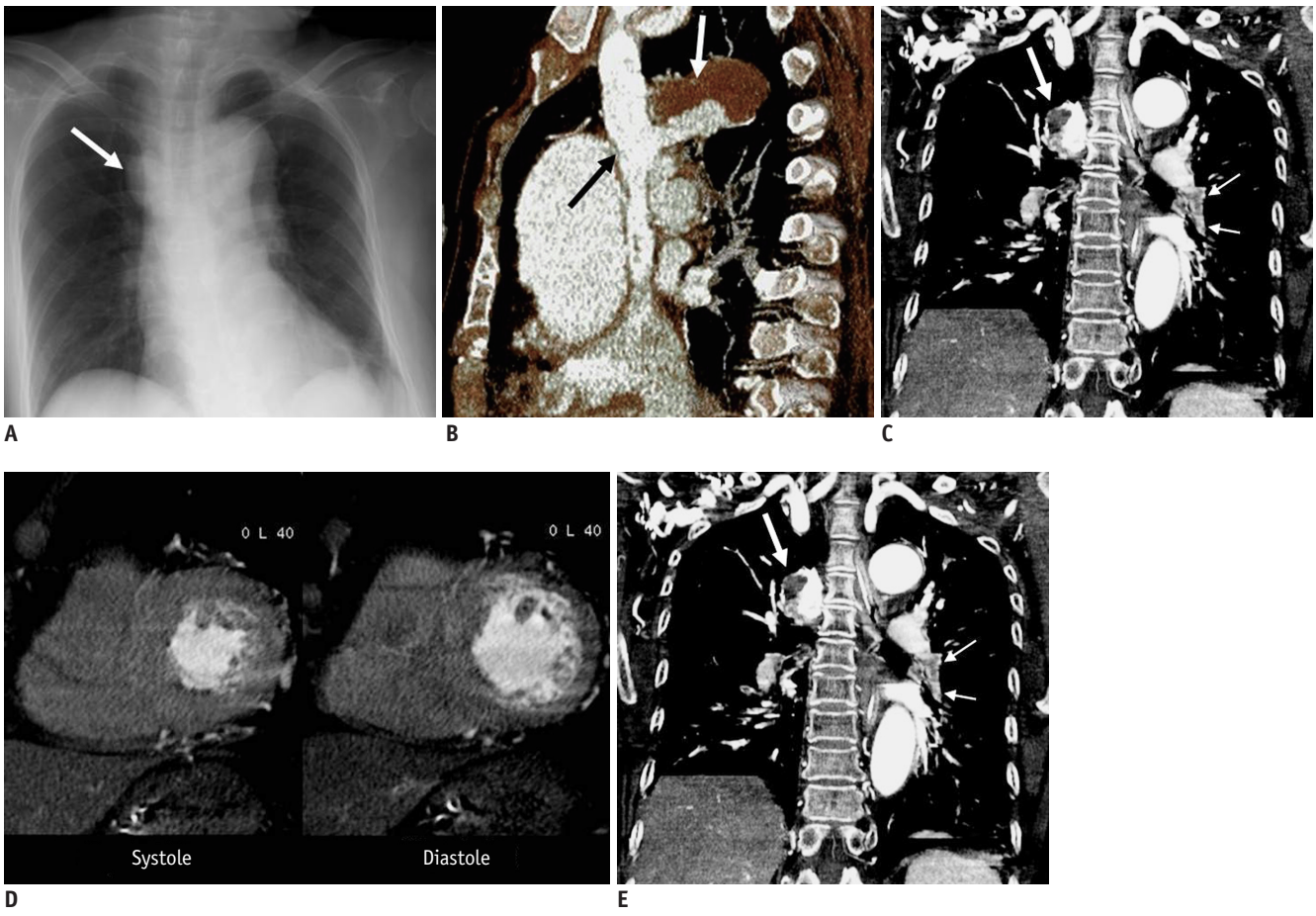

Fig. 1. 75-year-old woman with azygous vein aneurysm and pulmonary thromboembolism.
A. Chest plain radiograph shows well defined right paratracheal mass opacity (arrow). **B.** Oblique sagittal image of volume rendering reconstruction showed aneurysmal dilatation of azygous vein with thrombus (white arrow). Black arrow indicates inferior vena cava. **C.** Tilted coronal maximal intensity projection image of thorax shows thrombus within segmental branch of left lower pulmonary artery (small arrows) and azygous vein aneurysm (large arrow). **D.** Multiplanar reformatted short axis images at end-systolic phase (left image) and end-diastolic phase (right image) demonstrate normal shapes of both ventricles. Right ventricle/left ventricle diameter ratios are 0.81 at end-systolic phase and 0.75 at end-diastolic phase, respectively. **E.** Follow-up maximal intensity projection image after anticoagulation treatment for one month shows resolved thrombus within segmental branch of left lower pulmonary artery as compared with that of **C.** There is subsegmental atelectasis in left lower lung field.

thrombus (Fig. 1B) and there were contrast filling defects in the segmental branches of the pulmonary arteries (Fig. 1C). There was no abnormality in the distal azygous vein and no pulmonary infarction. Indirect CT venography of both lower extremities (4.8 mSv) showed no definite deep vein thromboses (not shown). Also, ECG-gated MDCT showed the preserved right heart function and morphology (Fig. 1D).

The patient was treated with heparin for four days and then she was given warfarin. The warfarin and an international normalized ratio of about 2.0 were maintained for two months.

Follow-up MDCT with ECG-gating after one month of medication was performed. The thrombus within the azygous vein aneurysm had completely resolved (Fig. 1E). The size of the azygous vein aneurysm (3.5 x 2.2 x 2.0 cm) was slightly decreased, compared with that seen on the previous MDCT scan. She discharged after improvement of her cough and general condition.

DISCUSSION

Aneurysms of arteries are common, but an azygous vein aneurysm is a rare condition. This anomaly can be detected on chest radiograph as simulating a paratracheal mass without symptoms. In our case, the azygous vein aneurysm was detected as an abnormal right paratracheal mass on a chest radiograph, and thrombus within the aneurysm caused pulmonary thromboembolism. A few cases of partial and total thromboses of azygous vein aneurysms have been reported in the medical literature (1, 2). The possible

causes for thrombus formation include sluggish flow and inflammation. Theoretically, the intraluminal thrombus may flow and lodge into the pulmonary arteries, causing pulmonary thromboembolism, such as occurred in our case (3).

Azygous vein enlargements occur in patients with congestive cardiac failure, portal hypertension, inferior vena cava obstruction and anomalies of the inferior vena cava. Trauma was also reported to cause pseudoaneurysm formation of the azygous vein (4). However, the accurate etiology of our case is unknown. It may have been a congenital lesion from the remnants of the embryonic subcardinal vein, the right posterior cardinal vein or the primitive subclavian vein (5).

An azygous vein aneurysm shows various findings on various imaging modalities. Chest radiograph of an azygous vein aneurysm can be interpreted as an abnormal mediastinal density or lymphadenopathy. The size of an azygous vein aneurysm can change due to respiratory movement, standing or performing a Valsalva maneuver (6). MRI shows the absence of flow void due to the slow flow of a venous aneurysm. We should not misunderstand this finding as a non vascular structure (7). A dynamic CT scan of an azygous vein aneurysm shows mild enhancement in the early arterial phase and then delayed enhancement. Dynamic CT and the three dimensional reconstruction images were important for diagnosing thrombosis and its communication with the superior vena cava (8). In our case, an ECG-gated MDCT scan was used for evaluating the morphology of the azygous vein aneurysm, the possibility of pulmonary thromboembolism and the function of the right heart. Right ventricular dysfunction is related with a poor prognosis in patient with acute pulmonary embolism. It is known that the measuring the right ventricle/left ventricle diameter ratio from the end-diastolic phase using ECG-gated CT was more specific than non-gated CT (10). We detected the azygous vein aneurysm with pulmonary thromboembolism. We were able to obtain important information of the preserved right heart function, which predicted a good prognosis.

Although there is no agreement upon the treatment strategy for patients with azygous vein aneurysms, surgical resection is indicated for the patients who have a risk of rupture and pulmonary embolism (6). A floating thrombus within the lumen raises the probability of recurrent pulmonary embolism and propagation of thrombus, which presents as either acute or chronic pulmonary hypertension (9). Chiu et al. (5) reported that conservative management with follow-up CT scans might be a reasonable approach for asymptomatic patients with non-thrombosed azygous vein aneurysms because ruptures have not been reported. Our case had an azygous vein aneurysm with thrombus and pulmonary thromboembolism, and she presented with chronic coughing. The ECG-gated MDCT scan gave us other important information that the right heart function and size were nearly normal. So, we treated this patient conservatively.

We present here a case of azygous vein aneurysm with thrombus and this caused pulmonary thromboembolism, which was assessed by ECG-gated MDCT. The ECG-gated MDCT scan is very useful for evaluating the morphologic change of an azygous vein aneurysm and the right heart function in a patient with pulmonary thromboembolism.

REFERENCES

1. Nakamura Y, Nakano K, Nakatani H, Fukuda T, Honda K, Homma N. Surgical exclusion of a thrombosed azygos vein aneurysm causing pulmonary embolism. *J Thorac Cardiovasc Surg* 2007;133:834-835
2. Ishikura H, Kimura S, Fukumura Y, Ohtani T. Resection of an azygos vein aneurysm with thrombosis. *Gen Thorac Cardiovasc Surg* 2010;58:209-211
3. Mehta M, Towers M. Computed tomography appearance of idiopathic aneurysm of the azygos vein. *Can Assoc Radiol J* 1996;47:288-290
4. Jain A, Blebea JS. Post-traumatic pseudoaneurysm of the azygous vein in a patient with azygous continuation. *J Comput Assist Tomogr* 1994;18:647-648
5. Chiu SS, Lau S, Kam CK. Azygous vein aneurysm: CT scan follow-up. *J Thorac Imaging* 2006;21:66-68
6. Podbielski FJ, Sam AD 2nd, Halldorsson AO, Iasha-Sznajder J, Vigneswaran WT. Giant azygos vein varix. *Ann Thorac Surg* 1997;63:1167-1169
7. Watanabe A, Kusajima K, Aisaka N, Sugawara H, Tsunematsu K. Idiopathic saccular azygos vein aneurysm. *Ann Thorac Surg* 1998;65:1459-1461
8. Kurihara Y, Nakajima Y, Ishikawa T. Case report: saccular aneurysm of the azygos vein simulating a paratracheal tumour. *Clin Radiol* 1993;48:427-428
9. Gnanamuthu BR, Tharion J. Azygos vein aneurysm--a case for elective resection. *Heart Lung Circ* 2008;17:62-64
10. Lu MT, Cai T, Ersoy H, Whitmore AG, Levit NA, Goldhaber SZ, et al. Comparison of ECG-gated versus non-gated CT ventricular measurements in thirty patients with acute pulmonary embolism. *Int J Cardiovasc Imaging* 2009;25:101-107