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Pulmonary AVM and Stroke: Case Report from Istishari Arab Hospital

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ABSTRACT

***Background*: Pulmonary arteriovenous malformation (PAVM) is an abnormal communication between pulmonary artery and pulmonary vein which leads to multiple manifestations that range from hypoxia to neurological manifestation such as stroke due paradoxical emboli in young patients. Chest radiography and CT-enhanced studies help in diagnosis with pulmonary angiography which is considered the gold standard study for diagnosis. Management was done with embolization of the feeding artery or arteries.**

***Case*: A 31 year old female with no previous history of medical illness, presented with sudden onset left sided weakness and was diagnosed as a case of right sided ischemic stroke. After reviewing her case by multidisciplinary team and multiple imaging studies, pulmonary angiography showed that the patient had large right lower lung lobe PAVM in addition to another right middle lung lobe and left lower lung lobe smaller PAVM. After that, patient underwent embolization of with no complications.**

***Conclusion*: PAVM, although it is rare, should be considered in differential diagnosis as the cause of neurological manifestation as ischemic stroke in young patients by paradoxical emboli. Embolization of the feeding artery or arteries is the main treatment of PAVM.**

Keywords: Computed tomography, pulmonary arteriovenous malformation.

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I. Introduction

Pulmonary arteriovenous malformation is an abnormal communication between pulmonary artery and pulmonary vein without capillary communication, which results in an intrapulmonary right-to-left shunt [1], [2]. Generally, pulmonary arteriovenous malformations are rare in clinical felid, but they are important in because they may be associated with life-threatening conditions such as brain abscess, ischemic stroke and lung haemorrhage [3]. Pathologic consequences of pulmonary arteriovenous malformation depend on right-to-left shunt degree. These patients can be asymptomatic in most of cases, but they may become symptomatic by increasing the degree of deoxygenated blood mixing with oxygenated blood through the PAVM and this causes hypoxemia, fatigue, dyspnea, and cyanosis [2]. Hypoxemia and orthodeoxia are some of the more common clinical presentations. Paradoxical embolism due to isolated pulmonary arteriovenous malformation (AVM) is usually uncommon cause of ischemic stroke, but it still one of the causes of ischemic stroke especially in patients who have not yet been diagnosed with their malformation [4]. The estimated risk of stroke secondary to PAVMs is as high as 2.6% to 25.0% [5]. Chest radiography and contrast enhanced computed tomography are essential initial diagnostic tools for diagnosis of AVM, but pulmonary angiography is the gold standard method for diagnosis of AVM [6]. Embolization is the mainstream treatment for pulmonary arteriovenous malformations, in which balloon or coil embolization devices (or both combined) are used to block the feeding artery or arteries to the malformation [7].

II. Case Report

In this case study, we will review a case which was admitted to Istishari Arab Hospital at Ramallah city. Our patient is 31 years old female, with good health status and free past medical and surgical histories. Patient was in her usual state of health until two months prior to her presentation, when she suddenly developed left sided weakness involving both upper and lower limbs, dysarthria, and mouth deviation. Urgent CT-scan was done and it showed that there was no hemorrhage. Brain MRI, was done, which showed signs of ischemic changes in the right MCA territory. The patient was diagnosed as a case of ischemic, and was started treatment with anti-coagulants and physiotherapy, with gradual improvement in her condition. After that, multiple investigations and imaging studies were done, in order to determine the cause of ischemic stroke as patient is young in age with no obvious preceding factor. Doppler ultrasound of carotid vessels was done and it was free with no stenosis in either side. Echocardiography also was done, which showed

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EF about 50 % with no thrombus in left atrial appendage. MRA showed occlusion of right middle cerebral artery by embolus. Multidisciplinary team, including radiology, pulmonary, hematology, cardiology, and neurology specialists reviewed her condition and investigations. After return back to detailed history of her family, we found positive history of vascular malformation. So that, the decision was to search for distal vascular anomaly, as the source of the distal embolus. As part of the systemic review for vascular abnormalities, pulmonary angiography was done which showed right lower lung lobe large PAVM with smaller another right middle lung lobe and left lower lung lobe smaller PAVM (Fig.1, 2 and 3). The final diagnosis was that the patient is a case of ischemic stroke due to paradoxical embolus due to PAVM, mostly due the larger one in right lower lung lobe. After that, patient underwent embolization of the large right lower lung lobe PAVM by interventional radiology team (Fig 4). Embolization using coils was done with no complication, and patient was followed up in the hospital for two days and then discharged home with good health. After that patient condition was improved with no episode to ischemic stroke. After about two years patient was returned back to hospital and underwent embolization of the right middle lung lobe and left lower lung lobe small PAVMs.

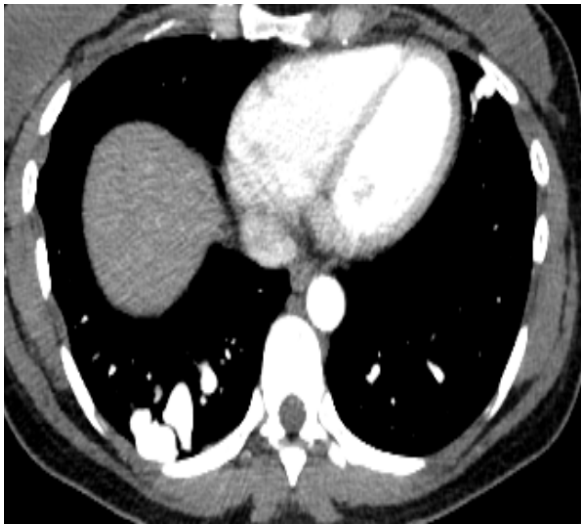

Fig. 1. Right lower lung lobe huge PAVM on pulmonary angiography.

Fig. 2. Right middle lung lobe PAVM on pulmonary angiography.

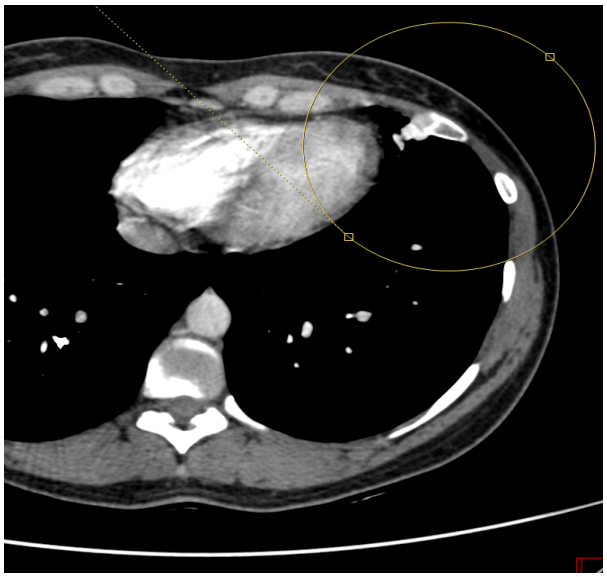

Fig. 3. Left lower lung lobe PAVM on pulmonary angiography.

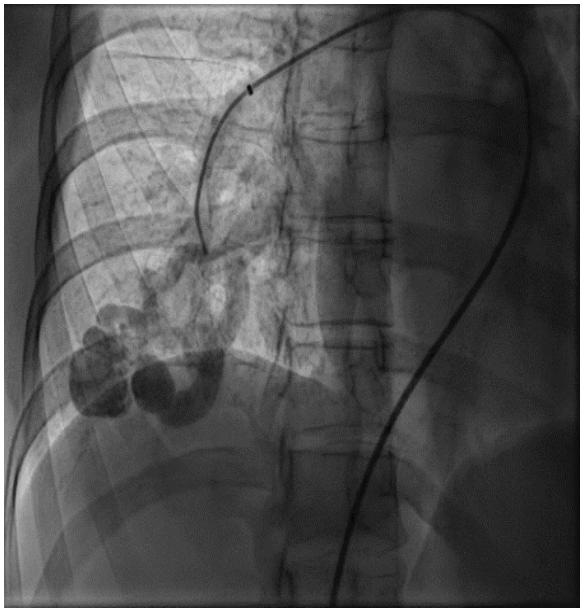

Fig. 4. Embolization of right lower lung lobe huge PAVM.

III. Discussion

Pulmonary AVM, although is rare, is still one of the causes of paradoxical emboli and so ischemic stroke in young patients especially in patients with hereditary haemorrhagic telangiectasia. In Sellon and Bertram case reports, both presenting cases of stroke due to pulmonary AVM, showing that pulmonary AVM is an important and treatable cause of stroke in young adults and should be considered in the context of other causes of right-to-left shunt and it should be considered in young patients with stroke [8], [9]. In our study, young patient with no previous history of medical illness presented with ischemic stroke due to undiagnosed pulmonary AVM. This means the importance of searching for vascular malformation especially AVM in young patients presented with neurological manifestation as stroke Pulmonary arteriovenous malformation can cause serious neurologic complications (such as stroke, cerebral abscess), pulmonary haemorrhage and hypoxaemia [7]. In Moussouttas study, a retrospective study of pulmonary AVM patients, which showed a strong association between single pulmonary

AVM and various neurologic complications, in addition to increase the risk for neurological symptoms in patients with multiple PAVM due to increased risk for paradoxical embolization with a greater number of malformations [10]. In our case study, patient had large AVM that leaded to paradoxical emboli resulting in right sided ischemic stroke. The mainstay of management of pulmonary AVM is dependent on endovascular embolization of the feeding artery by interventional radiology. This can alleviate the symptoms and prevent these complications that related to it with much improvement and in this technique in the last years [1]. In our case study, after diagnosis of pulmonary AVM by pulmonary angiography, patient was treated by embolization of the right lower lung lobe large AVM with no complication and with good prognosis on follow-up. In Trerotola study, which shows us the challenges related to pulmonary AVM embolization and the advances in that technique in last years, it accepts that embolization is the gold standard treatment of pulmonary AVM. It also shows the importance of embolization for pulmonary AVM management and its advantages [11].

IV. Conclusion

Pulmonary AVM, although it is rare, should be considered in differential diagnosis as the cause of neurological manifestation as ischemic stroke in young patients by paradoxical emboli. Embolization of the feeding artery or arteries is the main standard treatment of pulmonary AVM.

Conflict of Interest

Authors declare that they do not have any conflict of interest.

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