A Giant Vertebral Aneurysm Presented with Cough and Dyspnea and Mistreated Over a Year: An Extraordinary Case Report and Review of the Literature

Yigit Can SENOL, MD1*, Ayberk KARAMAN, MD2, Bige SAYIN, MD2, İlkay AKMANGIT2 and Ergun DAGLIOGLU, MD1

1Department of Neurosurgery, Ankara Bilkent City Hospital, Ankara, Turkey
2Department of Interventional Radiology, Ankara Bilkent City Hospital, Ankara, Turkey

*Corresponding author: Yigit Can SENOL, Department of Neurosurgery, Ankara City Hospital, Neurology and Orthopedics MH3 4th Floor, 06800, Cankaya/Ankara/Turkey, Tel: +90-539-702-4602; +90-312-552-6000

Abstract
We report an exceptional case of vertebral artery aneurysm presented with dyspnea and cough symptoms which is misdiagnosed with bronchiectasis. Literature showed that cough can be an exceptional symptom of vertebral aneurysms.

Vertebral aneurysms presented with cough are rare and might be confused with other lung diseases such as pneumonia, chronic obstructive lung disease (COPD) or bronchiectasis.

Introduction: Giant intracranial aneurysms are rare entities defined by a diameter of at least 25 mm, accounting for 5% of all cases of intracranial aneurysm. These aneurysms can treat with endovascular; flow diverters, stents, primary coiling and combined treatments and vascular procedures such as clipping, or bypass surgeries. In the present case report, because of the main symptoms of cough and dyspnea, aneurysm diagnoses are delayed and the patient had a treatment of bronchiectasis over a year.

Conclusion: Cough and dyspnea can be the only symptoms of the aneurysms. Vertebral aneurysm should be in the differential diagnoses of coughs that doesn’t alleviate.

Keywords
Vertebral artery aneurysm, Endovascular treatment, Cough, Dyspnea

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Giant intracranial aneurysms are rare entities defined by a diameter of at least 25 mm, accounting for 5% of all cases of intracranial aneurysm [1]. As their nature of rarity giant aneurysms are less seen in posterior circulation and associated with high mortality and morbidity [2]. Due to small size of posterior fossa, posterior circulation aneurysms can present with cranial nerve palsies, hydrocephalus, motor impairment therefore substantial mass effect. Because of the mass effect, infrequently vertebral artery aneurysm can confer with cough and dyspnea due to vagal nerve deterioration [3]. Although, anterior circulation aneurysm can confer with cough and dyspnea due to vagal nerve deterioration. In the present case report, because of the main symptoms of cough and dyspnea, aneurysm diagnoses are delayed and the patient had a treatment of bronchiectasis over a year.

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History and Examination

The patient was a 47-year-old female admitted to Ankara Bilkent City Hospital (Ankara, Turkey) in June 2018, who had been experiencing symptoms of cough, dyspnea and hoarseness for 1 year. Her cough was treated with several antibiotics and diagnosed with bronchiectasis but there was no improvement of her complaints. In June 2019 because of the progression of her dyspnea, admitted to our hospital’s emergency service. Her tachypnea got worse and saturation fell down. At last, the patient has elective intubation in the E.R. On the elective intubation, E.R doctor noticed that the patient’s left vocal cord was paralyzed and an emergent head and cervical computer tomography angiography performed. Ct scans revealed a large vertebrobasilar aneurysm and obvious compression of the brainstem (Figure 1). Patient transferred to a neurosurgery intensive care unit and started antibiotic of teicoplanin with the loading dose of 400 mg 2 × 1 and continued 400 mg 1 × 1.

Physical examination was performed before intubation by the E.R. doctor and showed an obvious right-slant tongue extension, right sided walking with Medical Research Council [6] grade 5- muscle strength in the right-limb and negative bilateral finger-to-nose and heel-to-knee tibia tests with normoactive reflexes. After admission to the ICU, the patient underwent digital subtraction angiography (DSA) at Ankara Bilkent City Hospital. A giant spherical aneurysm right vertebral V4 segment aneurysm with a maximum diameter of 30 mm was identified (Figure 2).

Treatment Strategy

Informed consent was provided by the patient and her relatives prior to endovascular therapy. A treatment plan was formulated after angiography. First, a microcatheter (headway 17) was placed through the right vertebral artery and the Pipeline was completely released through the right VA. Subsequently, the aneurysm was relatively tightly embolized with coils. Clopidogrel was administered with a loading dose of 300

*Figure 1:* Ct scans revealed a large vertebrobasilar aneurysm and obvious compression of the brainstem.

*Figure 2:* A giant spherical aneurysm right vertebral V4 segment aneurysm with a maximum diameter of 30 mm was identified.
mg and continued with 75 mg per day. The Clopidogrel resistance test was evaluated with 72% on day 4. At 5 days following hospitalization, the giant aneurysm of the V4 segment was embolized with Pipeline 5 × 35 mm flow diverter device. Stagnation of blood in the aneurysm was seen in control angiograms.

For 2 days following the endovascular treatment, the patient was listless and complained of a headache worse than those that had occurred during the pre-embolization period. Physical examination revealed no new positive signs. Postoperative the patient transferred to the neuro-ICU and on post-operative day 2 her vitals were improved and extubated. Antibiotics were stopped on the day 10 of the admission. The patient was transferred to the Neurosurgery inpatient service at the day of 12 of her admission.

**Follow-up**

After 2 months of the operation, the patient had increased white phlegm and her choking cough was continuing. Furthermore, the patient’s right limb muscle strength was improved compared with that pre-embolization and the patient has Medical Research Council grade 5 muscle strength in the right-limb. Three months after embolization, re-examination of the head MRI and MRA revealed that the aneurysm was completely occluded [Raymond-Roy classification, Class I [7]]; although, the brainstem was still compressed when comparing with the pre-embolization MRI (Figure 3). At 12 months after surgery, her phlegm was markedly improved and discontinued with the medical drugs. Cough and hoarseness disappeared. Re-examination of DSA revealed no aneurysm recurrence [Raymond-Roy classification, Class I [7]] and no stenosis in the parent artery on MRI (Figure 4) and computer tomography angiography (Figure 5). The modified Rankin scale score [8] of the patient is 1 point.

**Discussion**

Flow diverters are a more widely accepted tool for aneurysm treatment within the last decade.

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**Figure 3:** At 12 months after surgery, her phlegm was markedly improved and discontinued with the medical drugs.

**Figure 4:** No stenosis in the parent artery on MRI.
Conflict of Interest Statement

None of the authors have a proprietary interest in this study or any conflicts of interest to disclose.

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Author Contributions

The authors confirm contribution to the paper as follows: study conception and design: Ergun Daglioglu and Ilkay Akmangit; data collection: Yigit Can Senol and Ayberk Karaman. Draft manuscript preparation: Bige Sayın. All authors reviewed the results and approved the final version of the manuscript.

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