Vertebral artery aneurysm rupture: An autopsy case

Nursel Türkmen[1], Bülent Eren[2], Recep Fedakar[1]

[1] Uludağ University Medical Faculty, Forensic Medicine Department, Council of Forensic Medicine, Bursa Morgue Department
[2] Council of Forensic Medicine of Turkey Bursa Morgue Department

SUMMARY
Vertebral artery aneurysm rupture is a rare cause of sudden death. The presented case was 31-year-old woman who was found dead in her bedroom. Family members stated that she had history of one year duration childhood epilepsy treatment. Autopsy investigation revealed 5 mm in diameter aneurysm, ruptured in 1 mm area, localized on the trunk of the right vertebral artery. We described an autopsy case of sudden unexpected death due to ruptured vertebral artery aneurysm.

Keywords: vertebral artery – aneurysm – death – autopsy.

Ruptura aneurysmatu arteriae vertebralis - popis případu

SOUHRN
Náhlé úmrtí v důsledku ruptury aneurysmatu vertebrální arterie je v literatuře uváděno jako vzácné. Popisovaný případ se týká ženy stáří 31 let, která byla nalezena mrtvá ve své ložnici. Rodinní příslušníci udávali anamnesticky jeden rok trvající léčení epilepsie v dětství. Při pitvě bylo nalezeno aneurysma v průměru 5 mm s rupturou v rozsahu 1 mm lokalizované na pravé vertebrální arterii.

Klíčová slova: vertebrální arterie – aneurysma – smrt – pitva.

Soud Lek 2013; 58(4): 55–56

Vertebral artery aneurysm is not common pathology (1,2). Radiological investigations for explaining the origin of subarachnoid hemorrhage and MR examination indicating localization of aneurysm were presented as valuable investigative methods (3). Early identification of ruptured vertebral aneurysm and immediate surgical intervention was reported to be life-saving procedure (1,2). Neurosurgical arterial clamping techniques were indicated to be useful procedures in unilateral aneurysms (4). We aimed to discuss vertebral artery aneurysm rupture as a rare cause of sudden death from medicolegal aspect of view.

CASE REPORT

A 31-year-old woman was found dead in her bedroom. The cause of death was unknown; a forensic autopsy was performed after local prosecutors investigation. According to family members statements she had history of one year duration epilepsy treatment during childhood period. Beside her husband claimed that she had been medically evaluated for headache complaints, in public hospital one week ago, where was administered medical treatment, and it was explained that on radiological investigation there were no sign of subarachnoid hemorrhage on cranial computed tomograms. The body was 165 cm in height and 65 kg in weight. The forensic autopsy external examination revealed no severe trauma, there was only 6x3 cm bruise on the dorsum of the right hand. In the postmortem autopsy investigation brain was 1350 gr in weight, excessive distension of meningeal veins, prominent and widespread subarachnoid hemorrhage on the basal part of the brain, around the brain stem, and cerebellar hemispheres were detected. Ongoing dissection revealed 5 mm in diameter aneurysm, rup-

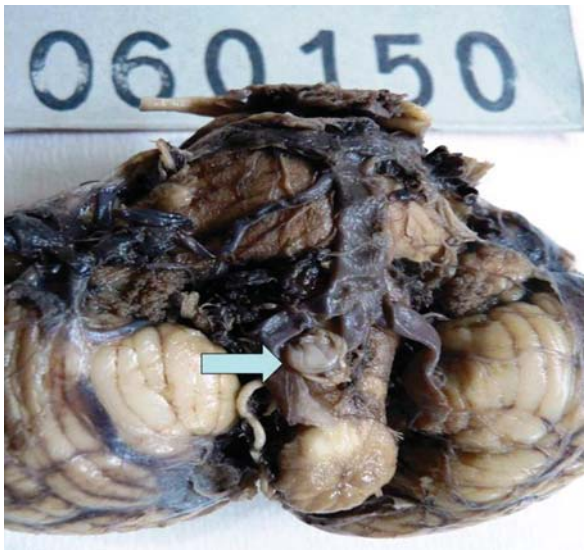

Figure 1. Macroscopic apperance of vertebral artery aneurysm (arrow).

✉ ***Correspondence address:***
Dr. Bülent Eren
Council of Forensic Medicine of Turkey
Bursa Morgue Department
Heykel, Osmangazi 16010, Bursa, Turkey
tel.:+90 224 222 03 47, fax:+90 225 51 70
e-mail: drbulenteren@gmail.com

tured in 1 mm area, and localized on the trunk of the right vertebral artery (Fig. 1). Histopathological analyses revealed congestion and hypoxic changes in the brain. In microscopic examination of vertebral aneurysm, fibrotic aneurysmal wall and organized thrombi in the lumen were found. Elastica van Gieson staining was performed and fragmentation of the intimal elastic lamina in the aneurysmal wall was detected in microscopic investigation. In the macroscopic and microscopic examination of internal organs, there was detected only mild lung oedema. Systematical toxicological analysis of blood, internal organs and urine was performed, only 241 ng/ml benzodiazepine was detected in the urine of the descesaed. Death was reported as sudden death due to vertebral artery aneurysm rupture and subarachnoid hemorrhage.

DISCUSSION

Vertebral artery aneurysm is a rarely detected pathology (1,2). In the medical literature autopsy series revealed that aneurysm ruptures resulting in subarachnoid hemorrhage which occur together or separately with arterial hematoma and intraluminal arterial bleeding with occlusions leading to the fatal brain stem infarction (1). In the review article on intracranial vertebral artery dissection Caplan et al. (5) stated that intracranial vertebral artery dissection cause four overlapping syndromes; I group younger patients with brainstem infarcts due to subintimal dissection extending into the basilar artery, usually single fatal events; II group like presented case, subarachnoid hemorrhage due to subadventitial or transmural arterial dissection; III group aneurysms cause mass effect on the brainstem and lower cranial nerves; and IV group chronic dissections due to connective tissue defects, bilateral aneurysms, repeated stroke attacks, and subarachnoidal hemorrhage. Yamada et al (6), claimed that the pathophysiology of vertebral artery aneurysm ruptures are associated with lamina elastica degeneration, on the other hand Endo et al (2) presented 20 autopsied cases of the vertebrobasilar artery with a dissection and also reviewed the literature to investigate the pathological characteristics and pathogenesis of this lesion. They stated that location and pathological features of the aneurysms were different in each of the presented cases, subadventitial haemorrhage associated with the subarachnoidal hemorrhage, multiple noncontiguous intramural hemorrhages, and new vessels in and around the arterial wall were specific findings in the series and all autopsied cases with a dissection between the media and adventitia with a rupture site in the thin adventitia. However, in the medical literature the pathogenesis is still not properly expalined (1,2,3), hypertension and congenital degenerative changes were focused on (1). Early identification of ruptured vertebral aneurysm and immediate surgical intervention was reported to be life-saving procedure (1,2). Procedural morbidity and mortality rates were reported to be the highest in ruptured aneurysms and the lowest in unruptured aneurysms, direct clipping was reported as an effective alternative approach in the treatment of dissecting aneurysms of the vertebral artery in which blood flow in the main artery is to be preserved (4). Vertebral artery aneurysm ruptures are rare among other brain aneurysms, clinical symptoms are not representative in all of the cases, especially initial diagnostic radiological investigations for early detection are of great importance; the MR examination is useful and should not be forgotten. The post-mortem examination and dissections of the aneurysm must be performed carefully to uncover and illuminate the pathogenesis of the disease.

REFERENCES

1. **Sasaki O, Ogawa H, Koike T, Koizumi T, Tanaka R.** A Clinicopathological study of intracranial dissecting aneurysms of the vertebral artery. *J Neurosurg* 1991; 75: 874-882.
2. **Endo S, Nishijima M, Nomura H, Takaku A, Okada E.** A pathological study of intracranial posterior circulation dissecting aneurysms with subarachnoid hemorrhage: report of three cases and review of the literature autopsied. *Neurosurgery* 1993; 33: 732-738.
3. **Murakami M, Takahashi N, Matsumura N, Umezawa K, Midorikawa H, Nishijima M.** Artery dissection presenting with simultaneous subarachnoid hemorrhage and Vertebrobasilar brain stem infarction: case report. *Surg Neurol* 2003; 59: 18-22.
4. **Sano H, Kato Y, Okuma I, et al.** Classification and treatment of vertebral dissecting aneurysm. *Surg Neurol* 1997; 48: 598-605.
5. **Caplan LR, Baquis GD, Pessin MS, et al.** Dissection of the intracranial vertebral artery *Neurology* 1988; 38: 868-877.
6. **Yamada M, Miyasaka Y, Yagishita S, Fujii K.** Dissecting aneurysm of the intracranial vertebral artery associated with proximal focal degeneration of the elastica: a comparative pathological study of the vertebral artery in patients with and without aneurysms. *Surg Neurol* 2003; 60: 431-437.