

CASE REPORT

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Exsanguination by Subclavian-esophageal Fistula Associated with a Left Subclavian Aneurysm*

ABSTRACT: Aortic aneurysms are a common autopsy finding, but aneurysms confined exclusively to the subclavian arteries are rare. When found, they are typically associated with trauma, surgery, or aberrant vessel distribution. Subclavian-esophageal fistula formation is also rare, with the vast majority being related to aberrant vessel distribution or esophageal foreign bodies. Dicle et al. first reported a subclavian-esophageal fistula associated with a non-aberrant subclavian artery aneurysm in 1999 (1). The following case would mark the second report of that phenomenon, and the first in the setting of a forensic autopsy.

KEYWORDS: forensic science, forensic pathology, subclavian aneurysm, subclavian-esophageal fistula

The decedent, an 88-year-old white male, lived at home with his 86-year-old wife who suffered from severe Alzheimer's disease. The two had been married for nearly 70 years. His past medical history was only significant for hypertension. Police records indicated five calls to the residence in the recent past, responding to reports of a "proowler" in the yard or within the residence. On each occasion, it was determined that the wife had not recognized her husband and called 911. On this particular occasion, she left her residence and told her neighbor that she had seen the prowler again and "hit" him. When the police arrived, the decedent was found face down and unresponsive inside the front door of the residence. He was noted at the scene to have small lacerations of the hands and wrists, but no other injuries were noted at that time. Resuscitative efforts were initiated by EMS, and the decedent was transported to the nearest emergency room. On arrival, resuscitation was still in progress, but continued efforts were unsuccessful and he was pronounced dead.

Scene Investigation

Scene investigation revealed blood on the front door and on fragments of broken green glass lying on the porch outside of the front door and within the residence. The wife told officers at the scene that she had tried to hit the "proowler" with a glass candy bowl, and that he had blocked it with his hands. Questioning the neighbors revealed that a similar incident had occurred one week prior, but the incident had not been reported. At that time the wife had confronted the husband within the house with a kitchen knife, but he was apparently uninjured and the authorities were not notified.

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Autopsy

External examination confirmed superficial lacerations of the hands and wrists. Also noted were scattered, healing superficial linear wounds of the left chest, presumed to be related to the previous unreported knife incident. Examination of the face and scalp revealed a thin linear superficial abrasion of the left cheek.

Cardiovascular examination revealed moderate to severe atherosclerotic disease of the aorta and its main branches, as well as mild narrowing of the coronary arteries by atherosclerotic plaques. There was marked sclerosis of the vertebral, basilar, and internal carotid arteries. Examination of the heart showed a single focus of myocardial fibrosis in the posterior wall of the left ventricle that suggested a small remote infarct. The most notable finding was a round intimal defect (4 cm in diameter) in the medial aspect of the base of the left subclavian artery that communicated with a 7 cm saccular aneurysm (Fig. 1), which was surrounded by a thin layer of adventitia and periaortic tissue. The aneurysm contained a large thrombus, and abutted the postero-lateral aspect of the esophagus. The proximal portion of the left subclavian artery was also noted to be slightly dilated.

Examination of the esophagus demonstrated a 4 × 3 cm area of eroded mucosa located 10 cm inferior to the epiglottis (Fig. 2). The center of this lesion contained a full thickness defect that communicated with the subclavian aneurysm, forming a subclavian-esophageal fistula. Greater than 1000 mL of partially clotted blood was discovered within the stomach, suggesting exsanguination into the gastrointestinal tract.

Other findings included kidneys with a markedly granular surface and scattered cortical cysts. Examination of the central nervous system showed mild diffuse cortical atrophy, but was otherwise unremarkable.

Histology

Histologic examination of the subclavian-esophageal fistula showed ulceration of the mucosa with extensive acute and chronic



FIG. 1—Close-up view of the left subclavian aneurysm (scale in inches).



FIG. 2—Same specimen, posterior view, demonstrating the attached esophagus with mucosal erosion and site of communication (scale in inches).

inflammation and fibrosis of the submucosa and muscularis propria. The intact esophageal mucosa showed marked inflammation and mild reactive atypia, but there was no evidence of dysplasia or malignancy. There was also no evidence of viral cytopathic effect, bacterial colonization, or fungal elements. Sections of the subclavian aneurysm showed a thin layer of adventitia surrounding an organized thrombus. The kidneys showed mild chronic interstitial nephritis and moderate arteriolar nephrosclerosis. The myocardium demonstrated hypertrophic cardiomyocytes with patchy fibrosis of the posterior left ventricular wall.

Discussion

Aortic aneurysms as a complication of severe cardiovascular disease are commonly seen at autopsy, but isolated subclavian aneurysms are very rare. These types of aneurysms are typically seen in association with trauma, vascular surgery, or aberrant subclavian distribution (1–5). There have been only a handful of cases related to atraumatic, non-aberrant subclavian arteries. The most extensive review of subclavian aneurysms was by Dougherty et al., which went back 100 years to compile the 70 cases reported (2). The main causes, in order of incidence, were atherosclerosis (60%), infection (syphilis 15%, tuberculosis 10%), and cystic medial necrosis and Marfan's syndrome (10%) (2). These cases tend to involve the right subclavian artery, showed a male predominance, and were bilateral in approximately 12% of the cases (1,2). Patients tend to be asymptomatic, but symptoms may include supraclavicular mass, Horner syndrome, tracheal compression, cough, hemoptysis, and dysphagia (2).

In general, fistula formation between the gastrointestinal tract and cardiovascular system usually involves the aorta and can be due to surgery, neoplasm, foreign bodies, and radiotherapy (1–3). Of the cases reported, the majority of subclavian-esophageal fistulae present as a complication of aberrant subclavian artery distribution. The few reported cases of subclavian-esophageal fistula associated with normal subclavian vessel distribution tend to occur as a result of an esophageal foreign body (1,4,5). In the presented case, the arch vessels were appropriately positioned, a history of previous trauma or surgery was not elicited, no foreign bodies were discovered, and an esophageal neoplasm was excluded. This suggests that this case was exclusively related to the decedent's cardiovascular disease. Dicle et al. (1) first reported subclavian-esophageal fistula formation in a non-aberrant vessel with no evidence of foreign body association. To date, this phenomenon has not been reported in association with a forensic autopsy.

Although fatalities related to subclavian aneurysms would typically be labeled as natural deaths, the manner of death in this case could be debated. Cases of sudden death related to myocardial infarcts have been labeled homicides if precipitated by an acute stressful or emotional event such as robbery or burglary (6). If we were to assume that in this case, the decedent's aneurysm finally ruptured (completing the fistulous communication between the esophagus and subclavian artery) due to an acute stressful event (the assault), then this case could be considered a rare case of homicide by exsanguination via subclavian-esophageal fistula.

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