

# Vascular Diverticulum and Aneurysm: A Comment on Usage of Correct Terminology



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We recently encountered two patients in whom imaging revealed vascular outpouchings. One, a middle-aged male, had a cone-shaped outpouching arising at the junction of the aortic arch and the descending thoracic aorta suggestive of ductus diverticulum. While “aneurysm” and “diverticulum” have both been described in relation to ductus arteriosus (DA), one also encounters the confusing term “aneurysm of the ductus diverticulum”. Another patient being evaluated for pulsatile tinnitus had a soft tissue projecting into mastoid air cells through a defect in the sigmoid plate of temporal bone and an outpouching of sigmoid sinus corresponding to the same location. This entity has been variously described in literature as “venous sinus diverticulum” and “venous sinus aneurysm”.

## DIVERTICULUM VERSUS ANEURYSM

According to Merriam Webster dictionary, the term aneurysm is derived from Greek *aneurynēin* “to dilate” or “to stretch”. Aneurysms have been defined as focal or diffuse dilatation of an artery by more than 50% of its normal diameter.<sup>[1]</sup> They have less commonly been described in the heart and venous system. The term diverticulum is derived from Latin

word *deverticulum* “a bypath” or from *devertere* “to turn”. Although term “diverticulum” is used commonly in the context of hollow viscera, it is not uncommon to see its usage in vascular system, examples being Kommerell and ductus diverticulum.

Ductus diverticulum, a benign incidental finding, is a cone-shaped bump at the site of aortic attachment of the ligamentum arteriosum. It is an embryological remnant of the infundibular portion of the DA.<sup>[2]</sup> On the other hand, aneurysm of DA is not always benign.

Regarding the sigmoid sinus outpouching, one hypothesis states that it occurs due to stenosis in the transverse sinus which leads to high-velocity jet impacting on the wall of the sinus. However, the low pressure within the venous system is unlikely to erode intact petrous temporal bone. Another more plausible hypothesis states that it represents enlarged remnant of the embryonic petrosquamosal sinus.<sup>[3]</sup> Hence, diverticulum is a more appropriate term to describe this pathology as it more closely represents a “bypath”.

Diverticula and aneurysms have also been described in the heart. Ventricular diverticula have been described as outpouchings which contain endocardium, myocardium, and pericardium, display normal contraction and are narrow necked in contrast to aneurysms which are lined by fibrous walls, exhibit paradoxical motion, and are wide necked. While diverticula are congenital in origin, aneurysms can be either congenital or acquired.<sup>[4]</sup>

From these examples, we can observe that etiopathogenesis can provide clues to naming vascular outpouchings. The term diverticulum may be more appropriately used when a vascular outpouching represents a persistent remnant of an embryological structure. The term aneurysm can be used to refer to an outpouching or dilatation which occurred due to vessel wall weakening. This differentiation would be important as a dilated weakened vessel (i.e., an aneurysm) would be expected to be at greater risk of further dilatation or rupture than an embryological remnant (i.e., a diverticulum) which has normal wall structure.

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