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Pulsatile Tinnitus Due to a Sigmoid Sinus Diverticulum and/or Dehiscence

In 2009, a 52-year-old man presented with a two-year history of intermittent right-sided pulse-synchronous tinnitus. He noted that the tinnitus worsened when his blood pressure was elevated. Otologic exam was unremarkable with no obvious middle ear fluid or mass. There was no neck bruit and the tinnitus diminished on manual compression of the ipsilateral internal jugular vein. In keeping with the recommendations for clinical imaging at that time, a non-contrast CT of the temporal bone was performed. This was to evaluate for conditions such as: a middle ear glomus, an aberrant internal carotid artery, a jugular bulb variant (e.g. a high-riding jugular bulb), otosclerosis, superior semicircular canal dehiscence syndrome, a persistent stapedial artery, or a hemangioma of the temporal bone.¹ No evidence of these conditions was found. An MRI of the brain, with MR angiography and venography of the intracranial vasculature also performed to evaluate for conditions such as: idiopathic intracranial hypertension, a dural arteriovenous fistula, an arteriovenous malformation, vascular loop syndrome and dural sinus stenosis or thrombosis.² All of these conditions were excluded. As no definite pathology was identified, no firm treatment recommendations were initially made.

In 2011, Eisenman reported on a series of 13 patients with pulsatile tinnitus due to a sigmoid sinus diverticulum and/or dehiscence who were successfully treated surgically via an extraluminal transmastoid approach.³ This was the first relatively large series published in the otologic literature. This publication likewise reported on the subtle radiologic signs that signify the presence of a sigmoid sinus diverticulum and/or dehiscence such as an irregularity of the normal semicircular contour of the bony sinus wall, focal thinning of the calvarial cortex overlying the adjacent sinus wall, absence of the normal thin layer of cortical bone overlying the sinus and the “air-on-sinus” sign where mastoid air cells directly contact the sinus wall without overlying bone.³

In light of this new information, the patient’s imaging studies were re-evaluated and evidence of a right-sided sigmoid sinus diverticulum and/or dehiscence was identified. The images below show the findings on an axial slice of the patient’s temporal bone CT study.

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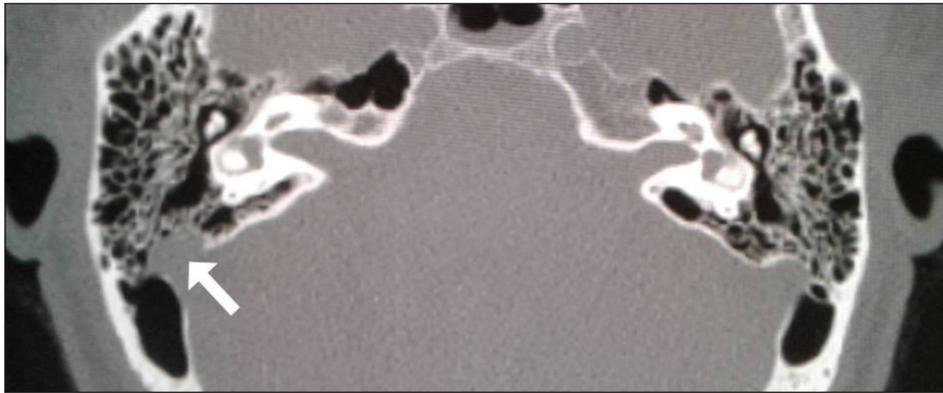


Figure 1. Axial CT image of the temporal bone at the level of the horizontal semicircular canals : absence of the normal thin layer of cortical bone overlying the right sigmoid sinus (white arrow) compared to the left sigmoid sinus

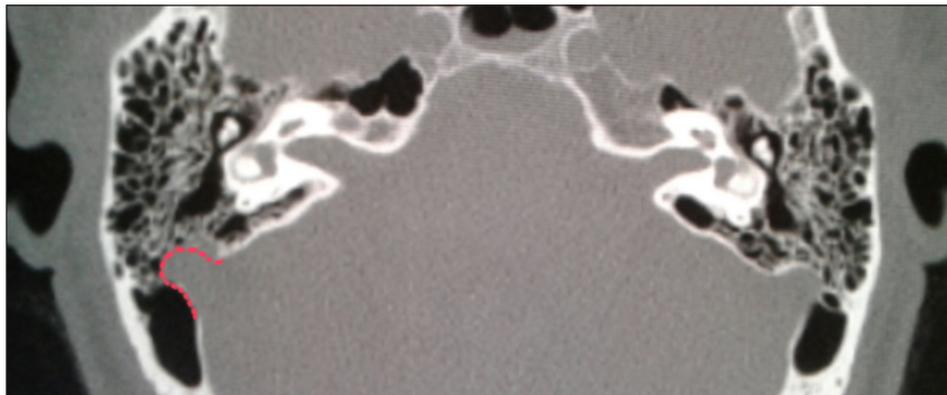


Figure 2. Axial CT of the temporal bones: the location of the sigmoid sinus outlined with the red dotted line, illustrating the irregularity in the normal semicircular contour of the bony sinus wall. A portion of the sigmoid sinus can be seen extending beyond the seeming border of the sigmoid sinus.



Figure 3. Magnified view of Figure 1 showing the "air-on-sinus" sign, where the mastoid air cell directly contacts the sinus wall, without any overlying bone (white arrow)

How significant is this condition ? Sigmoid sinus diverticulum and/or dehiscence is being increasingly recognized as a common cause of pulsatile tinnitus. In fact, a recent study by Schoeff *et al.* found its prevalence to be 23% in patients with pulsatile tinnitus.⁴ As such, the identification of this condition is highly relevant particularly because effective surgical management is available for its alleviation.

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