



## Post-auricular lump: CT diagnosis

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### Answer: Paracondylar process-epitransverse process complex

On the computed tomography (CT) scan, there was a well-defined bony protuberance just lateral to the left occipital condyle, in keeping with a paracondylar process. It extended inferiorly to articulate with a separate 1.4-cm osseous fragment, which in turn articulated with a protuberance from the left transverse process of the atlas (epitransverse process; Fig. 1 for diagrammatic representation). The findings corresponded to the clinically palpable lump with no other osseous or soft-tissue mass lesion identified.

The craniovertebral junction is an anatomically complex region with a variety of developmental anomalies that may arise from incomplete assimilation of the proatlas somite into the occiput [1–3]. The paracondylar process (PCP) is one such rare entity. It arises adjacent to the occipital condyle and is directed toward the ipsilateral C1 transverse process [3]. It may be present as a small hump (paracondylar tuberculum), a free-ended process or may articulate with the C1 transverse process [3]. If the

process detaches and assimilates to the C1 transverse process instead, an epitransverse process is formed [3]. Our patient has an unusual variation where both paracondylar and epitransverse processes coexist [4]. In addition, to our knowledge, a multi-segmented appearance of two separate pseudo-articulations with the occipital bone and C1 transverse process has not been previously reported.

The reported prevalence of the PCP varies from 0.077 to 4% depending on the population studied and it can be unilateral or bilateral [1, 3, 5–7]. The PCP is usually asymptomatic, but may rarely present with headache, neck ache, and even restricted head movement, including osseous torticollis [3, 6–8], especially if large or articulating with the C1 transverse process [9]. It may also present as an osseous lump (as in our patient) [2] or more frequently as an incidental imaging finding [10]. Compression of the adjacent vertebral artery and C1 nerve root may hypothetically lead to symptoms, but this has not been documented in previous case reports [2, 4].

The PCP is difficult to identify on radiographs owing to superimposed structures [3], but is well-delineated on multiplanar CT, which also allows differentiation from other entities such as the calcified stylohyoid ligament, which is thinner and directed medially [6, 9, 10]. It also facilitates detection of other cervical spine anomalies, which often coexist [7].

When symptomatic, conservative treatment usually suffices, although there are reports of symptomatic relief with surgical resection [7, 8].

The radiologist may often be the first to detect the presence of a PCP, which is frequently incidental or clinically unsuspected. Awareness of this rare variant will allow confident radiological diagnosis and prompt reassurance regarding its benign nature.

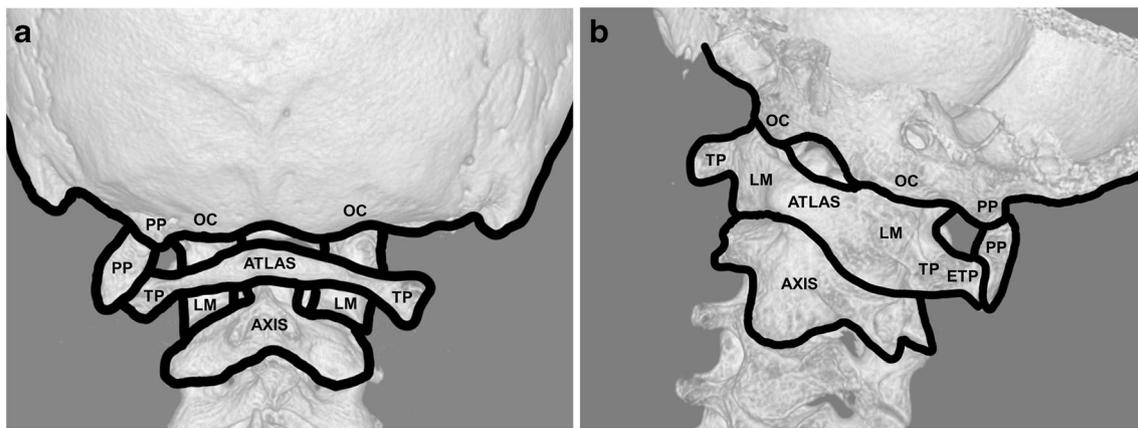
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The case presentation can be found at <https://doi.org/10.1007/s00256-018-3070-x>

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**Fig. 1** Illustrated diagram of the craniocervical junction in **a** the posterior projection and **b** the left anterior oblique projection. *ETP* epitransverse process, *LM* lateral mass, *OC* occipital condyle, *PP* paracondylar process, *TP* transverse process

### Compliance with ethical standards

**Conflicts of interest** The authors declare that they have no conflicts of interest.

### References

- Mangal A, Choudhry R, Tuli A, Singh P, Kaur Narula M, Khera V. Imaging and morphology of the paracondylar process in a dry adult human skull: a case report. *Surg Radiol Anat.* 2004;26(4):334–7.
- Stathis G, Economopoulos N, Mavraganis D, Kelekis N, Alexopoulou E. Paracondylar process, a rare normal variant: the value of MRI in the diagnosis. *Surg Radiol Anat.* 2012;34(3):281–4.
- Prescher A, Brors D, Adam G. Anatomic and radiologic appearance of several variants of the craniocervical junction. *Skull Base Surg.* 1996;6(2):83–94.
- Isidro A, Burdeus JM, Loscos S, Bara J, Bosch J, Gallart A. Surgical treatment for an uncommon headache: a gap of 4800 years. *Cephalalgia.* 2017;37(11):1098–101.
- Taitz C. Bony observations of some morphological variations and anomalies of the craniocervical region. *Clin Anat.* 2000;13(5): 354–60.
- Bertini G, Celenza M, Orsi R, Porrati PL, Rolandi G. Osseous anomalies of the craniocervical junction: a case report. *Ital J Orthop Traumatol.* 1991;17(1):135–9.
- De Graauw N, Carpay HA, Slooff WB. The paracondylar process: an unusual and treatable cause of posttraumatic headache. *Spine.* 2008;33(9):E283–6.
- Shah MJ, Kaminsky J, Vougioukas VI. Surgical removal of a symptomatic paracondylar process. *J Neurosurg Spine.* 2009;10(5):474–5.
- Guebert G, Yochum T, Rowe L. Congenital anomalies and normal skeletal variants. In Yochum TR, Rowe LJ. *Essentials of skeletal radiology.* Baltimore, MD: Williams and Wilkins; 1987. p. 95-168.
- Narayanan R, Shankar B, Paruthikunnan SM, Kulkarni CD. Paracondylar process of the occipital bone of the skull: a rare congenital anatomical variant. *BMJ Case Rep.* 2014; <https://doi.org/10.1136/bcr-2014-205315>.