

Case Report

Sixth cervical vertebra with bilateral double foramen transversarium and non-bifid spine: a rare case

Gyan Prakash Mishra^{1*}, Sangeeta Kumari², Shobha Bhatnagar¹, Brijendra Singh³

¹Department of Anatomy, Career Institute of Medical Sciences and Hospitals, Ghaila, Lucknow-226020, U.P, India

²Department of Forensic Medicine & Toxicology, Mayo Institute of Medical Sciences, Barabanki, U.P., India

³Department of Anatomy, AIIMS, Jodhpur-342005, Rajasthan, India

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*Correspondence:

Dr. Gyan Prakash Mishra,

E-mail: gyanprakash.mishra88@gmail.com

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ABSTRACT

Anatomical knowledge of variations is of utmost clinical importance to all of us as they may be one of the reasons as etiological as well as of surgical importance. Vertebral region also presents many variations. Foramen transversarium are typical feature of cervical vertebrae and give way to neurovascular bundle, like vertebral artery, vertebral veins and sympathetic plexus around them throughout. Foramen transversarium and spine or spinous process of cervical vertebrae are important to all of medical specialists as well as for surgeons specially the surgeons dealing with head & neck surgeries. Knowledge of anatomical/surgical variations is very important for neurosurgeons and radiologists for reporting and planning for surgeries as this type of variation if ignored may be a cause for fatal or undesirable outcome of the surgical procedure or may lead to a different planning/approach at the time or during the surgical procedure. In the present case we observed very uncommon finding of bilateral double foramen transversarium as well as a nonbifid spinous process in sixth cervical vertebra which is extremely rare. Right and left both main foramen transversarium were bilateral symmetrical and rounded in shape. Right accessory foramen transversarium was complete while left was incomplete. Finding of present study is important in neurosurgery for posterior approaches of the cervical vertebrae and also useful for radiological studies to avoid erroneous counting of cervical spines in clinical observations as surface landmark.

Keywords: Foramen transversarium, Spinous process, Cervical vertebrae, Accessory, Variations

INTRODUCTION

The presence of foramen transversarium in transverse process is characteristic feature of the cervical vertebrae. Variations in number, size and shape of foramen transversarium correlate with the variations in course and vascular pattern of vertebral vessel. Anatomy and morphology of foramen transversarium is useful to the operating spine surgeons and radiologist in the interpretation of radiographic films and computed tomogram scans.¹ Spinous process is present in all cervical vertebrae except C1. Bifid spinous process is feature of typical cervical vertebra and they are C3-C6

vertebrae. Spinous process is absent in C1 and in C7 spinous process becomes non-bifid and is longest spine called as vertebra prominens and used as bony landmark in counting vertebral levels on clinical/radiological observations. The presence of non-bifid spinous process of the third, fourth and sixth cervical vertebra is an extremely rare variation and these findings may be of clinical interest to radiologists, neurologists, orthopaedic surgeons, anthropologists and forensic personnel.² The anterior tubercle of the sixth cervical vertebra is known as the carotid tubercle which separates the carotid artery from the vertebral artery.

CASE REPORT

During the osteology demonstration of cervical vertebrae for the undergraduate medical students at the career institute of medical sciences and hospitals, Lucknow (UP). We noticed bilateral double foramen transversarium in sixth cervical vertebra (Figure 1). One was main and other was accessory foramen transversarium. Right and left both main foramen transversarium were bilateral symmetrical and rounded in shape. Right accessory foramen transversarium was complete while left was incomplete. Carotid Tubercle was seen on each transverse process which is known feature of sixth cervical vertebra. In present case we also observed nonbifid spinous process (Figure 1) and length of spinous process was 15 mm.

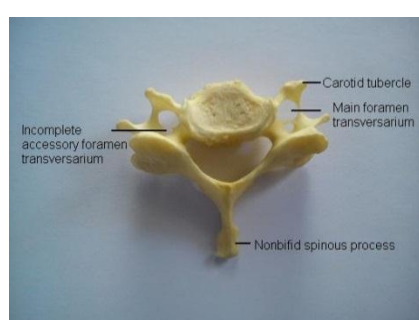


Figure 1: Showing bilateral double foramen transversarium with nonbifid spinous process in sixth cervical vertebra.

DISCUSSION

Variations of foramen transversarium and spinous process have been noticed by other authors too. One study reported 2 cases (1.5%) of double foramen transversarium in 132 human cervical vertebrae.³ Another study of 363 specimens reported double foramen transversarium in 5 (1.4%) vertebrae.⁴ A study observed the double foramen transversarium in 4.76% of the cases.⁵ Double foramen transversaria could mean or indicate duplicate vertebral arteries.⁶ A study reported 19 (12.6 %) vertebrae having bilateral double transverse foramina out of 150 cervical vertebrae.⁷ A study of 140 cervical vertebrae reported bilateral double foramen transversaria in 2 vertebrae (1.42%).⁸ In present case we found bilateral double foramen transversarium in sixth cervical vertebra. A study of 359 Americans of African (black) and European (white) reported that at C2 most individuals (91%) had bifid spinous process, but significant differences between race/sex subgroups were found at C3-C6, whereby the whites showed a higher frequency of bifidity than blacks and males a higher frequency of bifidity than females.⁹ A bifid spine is a feature of the third to sixth cervical vertebrae.¹⁰ Study of a male cadaver third, fourth and sixth cervical vertebrae appeared to be normal except that spinous process were not bifid.² In present study we observed bilateral double

foramen transversarium with nonbifid spinous process in sixth cervical vertebra. Above variations which are observed in a single case together is a rarity. Such finding has not been reported previously by other authors. These variations may be certainly helpful for planning during neurosurgery for posterior approaches of the cervical vertebrae and to avoid post-operative complications. These variations are also of importance and helpful for radiologist, anthropologist and anatomist.

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