

Supernumerary Cervical Vertebrae - A Clinical Case Report

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Abstract

Background: The number of cervical vertebrae is constant in humans and most mammals have seven cervical vertebrae. Change in number of cervical vertebrae is associated with major congenital defects, stillbirths and paediatric cancers with a resulting high level of early mortality lethality. This report emphasizes that supernumerary cervical vertebrae can exist as an isolated anomaly.

Case Report: A 30 year old male civil servant was referred to the spine surgery unit with neck pain of 2 weeks duration. The pain radiated to the medial aspect of the left upper limb down to the fingers and is aggravated by bending the neck forwards. There was no history of weakness or numbness in the arms and hands, or swelling or in the arm with activity, no weakness of hand grip, hand dexterity intact, and no gait problems. He had no history of trauma to the cervical spine, no deformity of the spine or any neurological deficits. There was no musculoskeletal deformities or any abnormalities noted in

organ system. X-rays of the cervical spine (Fig 1) showed 10 cervical vertebrae with mild degenerative changes at C4, C5. X-rays of the other aspects of the spine showed no other abnormalities. He was managed conservatively with analgesics, muscle relaxant and physiotherapy. At 6-month follow up visit patient was pain free.

Conclusion: Supernumerary cervical vertebrae though extremely rare can occur as an isolated vertebral anomaly in an otherwise healthy individual and can be associated with neck pain.

Key words: Neck Pain, Supernumerary Cervical vertebrae, Isolated Vertebral Anomaly,

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Introduction

Supernumerary cervical vertebrae is very rare in adult humans and all mammals have seven cervical vertebrae regardless of neck length except for sloths and manatees.¹ Gallis et al showed that while about 7.5% of all human conceptions had an abnormal number of vertebrae, it was strongly selected against such that almost all of these persons die before the age of reproduction.

During human development, the vertebral bodies are formed from the 4th week as a result of migration of cells from the sclerotome regions of the somites in the ventromedial, ventrolateral, and dorsal direction.²

Consequently any error in this genetic programmed migration of these somites could be associated with multiple congenital abnormalities such as stillbirths and pediatric cancers leading to either intrauterine or early extrauterine death.³ These at most cases are incompatible with life as the developing embryo dies from other lethal lesions affecting other organ systems.

Spondylocostal dystosis is a congenital disorder with multiple vertebrae and numerical and structural rib abnormalities resulting in cervico thoracic asymmetry, short stature and neck.⁴ However isolated cases of supranumerary cervical vertebrae without any other

associated congenital anomalies is quite rare which is of interest in this case report.

Case Report

A 30 year old male civil servant was referred to the spine surgery unit with neck pain of 2 weeks duration. The pain radiated into the left upper limb down to the fingers and is aggravated by bending the neck forwards. He had no history of trauma to the cervical spine, there was no history of weakness or numbness in the arms and hands, or swelling or in the arm with activity, no weakness of hand grip, hand dexterity intact, and no gait problems. He had no deformity of the spine or any neurological deficits. There was no musculoskeletal deformities or any abnormalities noted in the organ system. Ranges of motion of the neck were all satisfactory (Fig.2). X-rays of the cervical spine (Fig 1) showed 10 cervical vertebrae with mild degenerative changes at C4,C5. X-rays of the other aspects of the spine showed no other abnormalities. He was managed conservatively with short term use of soft neck collar, analgesics and physiotherapy. At 6-month follow up visit, the patient was pain free.

Discussion

Cervical vertebrae number exhibit very low variation in humans with most people having seven cervical vertebrae. Supranumerary vertebrae are extremely rare in the cervical spine though it may not be unusual in the thoracic or lumbar vertebrae.⁵ The number of cervical vertebrae is determined during the early organogenesis

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stage of fetal development⁶. It is a critical stage of embryo development and should be conserved as any insult to the genetic make up could lead to death. This morbidity and mortality associated with mutation during organogenesis does not exist at any other time in development⁵.



Figure 1: Lateral cervical radiograph showing 10 cervical vertebrae

Sander and Raff postulated that this strong conservation is necessary because of the high interactivity between the modules at this stage.^{7,8} This high interactivity implies

that any mutation will have widespread pleiotropic effects that become amplified as development proceeds. Gallis et al suggested that during organogenesis the high interactivity and low modularity of the patterning of the anterior-posterior axis in the cervical paraxial mesoderm seems to be the reason for the selective early -deaths of humans with change in number of cervical vertebrae.¹ Mutations that change the number of cervical vertebrae almost always appear to have many untoward pleiotropic effects that cause mortality in fetuses and infants¹. Hence the very rare nature of this anomaly.

There have been very few reports of supernumerary cervical vertebrae presumably as a result of this strong selection against changed number of cervical vertebrae. Barclay-Smith in 1911 noted an eighth cervical vertebrae amongst other vertebral anomalies in a young female skeleton from excavations at Sakkara in Egypt at a site that dates to 500 - 600BC.⁹ Van As and Naidoo reported the case of an 1 year old with eight cervical vertebrae, thirteen thoracic vertebrae and polythelia with no neurological deficits and hence requiring no interventions.¹⁰ We are not aware of any reports of supranumerary cervical vertebrae without any other vertebral anomalies or of any report of more than one extra cervical vertebrae. The index patient was an adult with three extra cervical vertebrae and no other clinically demonstrable vertebral or musculoskeletal anomalies. In cases where cervical ribs are associated, management is of the features of thoracic outlet syndrome.¹¹



FIG.2. VARIOUS MOVEMENTS

Steigenga et al proposed that variations of highly conserved traits like number of cervical vertebrae may be an indicator of medical risks given the extreme selection against this trait in utero.^{1,2} We therefore find it interesting that the index patient has had no other medical problems however we intend to continue following up the patient .

Conclusion

Supernumerary cervical vertebrae though extremely rare can occur as an isolated vertebral anomaly in an otherwise healthy individual and can be associated with neck pain.

Clinical Message

The above case report is to highlight the existence of supernumerary cervical vertebrae presenting as an isolated vertebral anomaly in an otherwise healthy individual.

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