Ossification of the posterior longitudinal ligament associated with formed arcuate foramina on atlas – evaluation using CT angiography

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INTRODUCTION

The significance of this case is to present two conditions that can have similar or identical clinical manifestations. To the best of our knowledge, the association of these conditions and their joint influence on described clinical manifestations have not been reported earlier.
CT angiography showed eccentric reduction of the lumen of left vertebral artery in V3 segment, where the artery passes the arcuate foramen. MR imaging did not show compression of spinal cord. The MR follow-up was indicated.

DISCUSSION

Ossification of the longitudinal ligament presents progressive heterotopic ossification of still unclear pathogenesis. OPLL can present as an isolated condition, but can also be associated with certain conditions, most often with Diffuse idiopathic skeletal hyperostosis [DISH, Morbus Forestier], Ossification of the yellow ligaments [OYL] and Ankylosing spondylitis [M. Strümpell-Bechterew]. The cause of this condition is still not clearly defined, although some studies pointed the association of defective collagen gen and regulating bone metabolism genes with this condition. Also, in these patients, glucose intolerance was often found. OPLL usually presents in the 5th and 6th decade, more often in male patients [2:1] with the incidence of 0.12% in North America, and the incidence varying in Japan, where first described, from 1.9 to 4.3%. The condition is most often asymptomatic and progressive, most often it is found in cervical [75% of cases], thoracic [15%] and less often in lumbar spine [10%]. Symptoms are unspecific, and the conditions remains undiagnosed for a long time. The diagnosis is usually established in the late stage, when myelopathy occurs [presented with pain, numbness and paresis]. Sometimes, clinically silent myelopathy, without pain and paresis, can develop.

Arcuate foramina on atlas [foramen arcuale atlantis-Kimmerle] are a trait of human atlas vertebra, causing vertebral artery to pass through another foramen, after leaving cervical transversal foramina, before entering the skull. Incidence in the population is about 8%, with fe-
The significance of these foramina on atlas is possible external pressure on V3 segment of vertebral artery and reduction of its lumen. Repeating trauma while rotating the head can cause lesion on the artery wall and sequent reduction of the blood flow.

Initial diagnostic method is radiography of cervical spine in two projections, which can show both changes. In OPLL, continuous or segmental linear ossifications just behind the vertebral bodies are shown. Continuous type is classified as a lesion extending over several vertebral bodies including discal anulus. Segmental type, however, represents one or several separate lesions behind the vertebral bodies, skipping the disci. Arcuate foramina are detected as bone spiculi, arching vertebral artery sulci, backward from the posterior ends of the superior articular processes.

Minuscious evaluation of OPLL demands CT and CT angiography of blood vessels of the neck and scull basis. CT exam provides information on extent of changes and relation to the dura, as well as on the width of the spinal canal and intervertebral foramina which expected axial sections width in the cervical spine should be 4-6 mm², morphology of vertebral arteries and possibility of the spinal cord compression. The highest sensitivity in evaluation of the spinal cord compression is provided by MR imaging.

The therapy of both conditions is surgical and reserved for the cases with manifest myelopathy with OPLL, while asymptomatic cases receive radiological follow-up examinations. Surgical treatment of bone spiculi in arcuate foramina is reserved for the cases with manifest vertebro-basilar insufficiency without any other possible cause. Postoperative improvement is shown in long-term follow-up in the majority of patients.

Differential diagnosis with OPLL includes the presence of calcified herniated intervertebral discus, calcified meningioma or calcified epidural haemathoma, while in arcuate foramina, calcification of atlanto-occipital ligaments must be taken into account.

Our case showed that routine MD CT exam using slices thinner than 1mm, created possibility of early morphological and differential diagnosis of these rare and atypical osteoarticular conditions.

SAŽETAK

OSSIFIKACIJA POSTERIORNOG LONGITUDINALNOG LIGAMENTA UDRUŽENA SA FORMIRANIM ARKUALNIM FORAMENIMA NA ATLASU – EVALUACIJA CT ANGIOGRAFIJOM

Uvod: Osifikacija posteriornog longitudinalnog ligamenta (OPLL) predstavlja progresivnu heterotopnu osifikaciju nejasnog uzroka. Cilj ovog prikaza je nalaz udružene OPLL i arkualnih foramena koji nije opisan u literaturi.

Materijal: Radiografskim, CT angiografskim i MR pregledom vratne kieme i baze lobanje pregledana je bolesnica stara 32 godine sa atipiènim tegobama tipa glavobolje u potiljaènom delu, vratu i ramenima i povremenim vrtoglavica tokom više posednjih godina.

Rezultati: Nadjena je udružena pojava OPLL i na prvom vratnom pršljenu obostrano formirani arkualni foramena, levo kompletni sa redukcijom lumena leve vertebralne arterije, a desno nekompletni.

Zakljuèak: Znaèaj ovog sluèaja ogleda se u visoko senzitivnoj dijagnostici radiološkim modalitetima do sada neopisane pojave dva patološka supstrata koja mogu imati slièene ili iste klinièke manifestacije u stadijumu bolesti koji ima smisao rane dijagnostike i daljeg radiološko-morfološkog praæenja.

Kljuène reèi: Osifikacija posteriornog longitudinalnog ligamenta, formirani arkualni foramena, CT angiografija, stenoza intervertebralnih foramena

FIGURE 4: THE EXTENSION OF OSSIFICATION OF THE POSTERIOR LONGITUDINAL LIGAMENT INTO INTERVERTEBRAL FORAMINA; AXIAL SECTIONS AT THE LEVELS OF C2-C3 FORAMEN [A], C3-C4 FORAMEN [B], LEFT SIDE FORAMINA DIAMETER REDUCTION BY OSSIFICATED DURAL RECESSES [ARROWS] -SAGITTAL PLANE [C]
REFERENCES


3. A. Krishnamurthy et al. Arcuate foramen of atlas: incidence, phylogenetic and clinical significance, Department of Anatomy, center for Basic Science, Kasturba Medical College, Bejai, Mangalore, Karnataka, India, in Romanian Jurnal of Morphology and Embriology 2007; 48:263-266


