Ring around the dens: Ossification of the transverse atlantal ligament in ankylosing spondylitis

A 35-year-old male patient presented with the complaints of neck pain and stiffness. He had restriction of neck movements in all directions dating back to several years and was a known patient of ankylosing spondylitis (AS) with no neurological deficits. A plain radiograph of the cervical spine showed fusion of the cervical vertebrae with continuous ossified anterior longitudinal ligament [Figure 1]. Magnetic resonance imaging of the cervical spine showed a hypointense mass behind the dens with no thecal sac or cord compression [Figure 2a]. A computed tomography scan of the cervical spine showed ossification of the transverse atlantal ligament forming a ring around the dens [Figure 2b].

Complete ossification of the transverse ligament of the atlas forming a ring around the dens has been noted in a fossil specimen of a prehistoric type of rhinoceros,[1] but is uncommonly described in humans. Patchy calcification of the transverse ligament (but not complete ossification in its entirety) has been noted in the cases of atlantoaxial dislocation and in mineral depositions in the ligament in disorders of calcium metabolism[2] and in fluorosis.[3] Partial ossification of this ligament has also been described in association with hypoplasia of the posterior arch of the atlas.[4,5] However, we found only one report in the literature that reports ossification of the transverse ligament, in a patient with AS.[2]

Zhang et al.[2] have stated that while calcification begins at the center of the ligament, ossification begins from the sides and stated that the presence of “consecutive dense strings” elsewhere in the spine (as noted in the anterior longitudinal ligament in our case) always signifies ossification. The pathogenesis of ossification is probably akin to that occurring in other ligamentous structures in AS.

Although this finding was discovered incidentally, it raises several questions. Will the ossification progress or remain restricted to the transverse ligament alone and if it did and caused cervicomedullary junction compression, what would be the ideal surgical approach? We feel that anterior decompression (transorally) with posterior stabilization though technically demanding may be the only option in such a case. Second, would disease-modifying agents (biologics) such as tumor necrosis factor blockers or interleukin 7 inhibitors be useful in preventing progression? There is no literature to suggest if they are or are not beneficial though side effects such as reactivation of latent tuberculosis are well documented. In such a case, is there a role of prophylactic fusion of the atlantoaxial joint to prevent further progression akin to what has been described in high cervical ossified posterior longitudinal ligament? And if so, what would be the radiological criteria to demonstrate instability in a spine that appears fused by the disease itself? We found no clear-cut answers to these questions and as in our patient, the cerebrospinal fluid column in front and behind the cervical cord was not compromised and our patient had no features of myelopathy, we did not intervene surgically and the patient is being observed for appearance of deficits.
Declaration of patient consent
The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest
There are no conflicts of interest.

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