Atlantic-axial Injury
Joseph Junewick, MD FACR
09/30/2009

History
6 year old restrained rear seated passenger involved in a motor vehicle accident with front-end damage complaining of suboccipital pain. No cervical spine tenderness or neurological deficit.

Diagnosis
Atlanto-axial Injury

Discussion
The atlantodental interval is largely maintained the transverse atlantal ligament which extends along the posterior aspect of the dens from one lateral mass of C1 to the other. Ligaments of lesser importance include the alar, apical, and cruciform.

Injury of the transverse atlantal ligament is rare, usually associated with a Jefferson fracture or C1 lateral mass fracture, resulting in "rotary dissociation". The mechanism of injury is unclear but likely related to a combination of several forces (rotation, flexion, lateral tilt and axial loading).

Fracture of the anterior arch of C1 is related to hyperextension of the spine with avulsion by the longus colli muscles.

This type of injury is painful and occasionally associated with fixed torticollis but not necessarily with neurologic deficit.

Findings
CT-Axial and sagittal and coronal reformatted images demonstrate widened predental space (anterior atlantodental interval) with rotary subluxation of C1 and C2 (note the asymmetry of the lateral masses of C1 relative to C2) and avulsion fracture of the anterior tubercle of C1.

MR-Performed 2 days after initial injury. Sagittal T1, FSE2 and IR and axial FSE2 images of the cervical spine demonstrate precervical and suboccipital edema, synovial fluid in the predental joint, posterior translation of the dens, and disruption of the apico-clival ligament with hemorrhage.

Reference
Disclaimer
This teaching site is partially funded by an educational grant from GE Healthcare and Advanced Radiology Services, PC. The material on this site is independently controlled by Advanced Radiology Services, PC, and GE Healthcare and Spectrum Health have no influence over the content of this site.

Content Download Agreement
The cases and images on this website are owned by Spectrum Health. Permission is granted (for nonprofit educational purposes) to download and print materials to distribute for the purpose of facilitating the education of health professionals. The authors retain all rights to the material and users are requested to acknowledge the source of the material.

Site Disclaimer
This site is developed to reach healthcare professionals and medical students. Nothing this site should be considered medical advice.
Only your own doctor can help you make decisions about your medical care. If you have a specific medical question or are seeking medical care, please contact your physician.
The information in this website is provided for general medical education purposes only and is not meant to substitute for the independent medical judgment of a physician relative to diagnostic and treatment options of a specific medical condition.
The viewpoints expressed in these cases are those of the authors. They do not represent an endorsement. In no event will Advanced Radiology Associates, PC, Spectrum Health Hospitals (Helen Devos Children’s Hospital) or GE Healthcare be liable for any decision made or action taken in reliance upon the information provided through this website.