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Neurosurgery of “os odontoideum” associated with craniocervical junction instability in childhood. Comparison between sublaminar wires and lateral masses screws with titanium rods

Massimiliano Visocchi, Gianluca Trevisi, Gianpiero Tamburrini, Luca Massimi, Concezio Di Rocco, Massimo Caldarelli

Institute of Neurosurgery, Catholic University of Rome, Italy

The aim of the study was to evaluate the effectiveness, pitfalls and failures of instrumentation and fusion with titanium wires and rods by comparing with screws hardwires in patients harbouring “os odontoideum” with craniocervical junction (CVJ) instability.

We operated 14 children (mean age 9.85 years) with genetic (Down’s syndrome, cases), metabolic (mucopolisaccarydoses type IV, i.e. Morquio Syndrome) and developmental (isolated “os odontoideum”) diseases. Each patient underwent preoperative radiological evaluation by means of X-Rays, CT scan and MRI of the craniocervical region showing C1 – C2 shift more of 4.5 mm with cervicomedullary compression. Os odontoideum was quite always associated with complex CVJ malformations (85.72%) and or genetic syndromes. 100% of the patients showed instability.

Group 1: In 7 patients occipito-cervical instrumentation with a titanium U-shaped wired rod was performed in all but one patient harbouring odontoideum in whom “C1 C2 Sonntag wiring stabilization and fusion” technique was performed. Autologous bone fusion graft was used in all but one patient (os odontoideum) in whom heterologous demineralised bone matrix was used.

Group 2: In other 7 patients occipitocervical lateral masses screws were implanted along with U-shaped rods. Postoperatively, all the Group 1 patients underwent “hard” (Halo Vest) and soft (Philadelphia) external orthosis; all the Group 2 patients underwent “soft” external orthosis for enough time as suggested by X-Rays, CT and MRI scans examinations. Complete bone fusion and stable neural decompression were achieved in 6 months for Group 1 and 3 months for Group 2. Frankel and Di Lorenzo’s clinical scales were used to assess the outcome at the beginning of the study at intermediate and maximum follow-up which ranged from 180 to 28 months. At maximum follow up, there was either clinical improvement or stabilization recorded in all the patients. Failure of the bone fusion requiring a second successful operation occurred in only one patient in Group 1 (Down syndrome) at 8 months follow up; in this case a cerebrospinal fistula and wound infection occurred associated with secondary pseudoarthrosis. According to our experience, in Os Odontoideum patients the screwing technique is strongly preferred to the wiring due to the less complication rate and the shorter postoperative immobilization.