C1–2 lateral mass screws

see also C1 pedicle screw placement.

C1 lateral mass screw placement with polyaxial mini screws and C2 pedicle screw placement with rod fixation. Originated by Goel and Laheri in 1994 and promulgated in 2001 by Harms and Melcher.

Advantages over C1–2 transarticular facet screws

1. the more superior and medial trajectory should reduce the risk of vertebral artery injury.

2. may be used in the presence of C1–2 subluxation

3. may be usable in certain cases of aberrant vertebral artery course

4. in selected cases, this can be used for temporary fixation without fusion (since joint spaces remain intact) and the hardware may be removed after an appropriate time to reclaim motion in the C1–2 articulation.

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1. position: prone, pin headholder

2. anesthesia: awake fiberoptic or nasotracheal intubation

3. equipment: C-arm or O-arm image guidance

4. implants:

a) mini-polyaxial screws (smooth shank screws needed for C1)

b) cable required for interspinous graft (optional, but recommended)

c) have rep bring in occipital plates and instrumentation in case of inability to place C1 screws therefore enabling occipital-cervical fusion as a bail-out option

5. consent (in lay terms for the patient – not all-inclusive):

a) procedure: surgery to place screws &rods from the back of the neck to stabilize, and usually to fuse the top 2 bones of the neck

b) alternatives: nonsurgical management in a collar, in some cases screws may be temporary and no fusion would be done

c) complications: screw breakage/pullout, failure to fuse which might require addition surgery, loss of some neck bending motion is expected (≈ 20%is typical)

NB: if fusion is to accompany screw placement (i.e. permanent screw placement), strong consideration should be given to supplemental interspinous fusion, if not contraindicated to prevent fatigue breakage of C1 screws.

Applied anatomy: there is no true neural foramen at C1–2, the C2 nerve root lies on the posterior surface of the capsule of the C1–2 articular joint.

Pre-op assessment

It is mandatory to know the position of the VA on both sides (and in particular, the location of both foramina transversarium of C1), and the following bony information (requires thin-cut CTscan):ç

1. cranio-caudal thickness (height) of the posterior arch of C1 (in case the arch needs to be drilled to facilitate screw placement)

2. to determine screw length: distance from the planned entry point (see below) to the planned exit target (midposition of the anterior part of the superior C1 VB)

3. to estimate medio-lateral angle for screws.