Occiput stabilisation in the treatment of Atlanto-Axial dislocation with Basilar Invagination:
Lesson learnt with an interesting case

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Disclosure

• We have no Disclosures

• [We or others in our families have no relevant financial relationship with any commercial interest]
Introduction

• Atlanto axial dislocation (AAD) and basilar invagination (B I) are complex cranio-vertebral anomalies.

• They present with features of Cervico-medullary junction compression and deformities like torticollis.

• These anomalies require surgery for correction of the cervico-medullary compression and achieving cranio-vertebral re-alignment and stabilization
Methodology

We present one such case which was initially treated with atlanto-axial fusion but subsequently needed Occipital stabilization as well

- A 14 year old male presented with left sided limb weakness for 2 months
- On examination he had spastic left hemiparesis with a weak hand grip
- Imaging findings revealed irreducible atlanto-occipital dislocation and basilar invagination with severe cervico-medullary junction (CMJ) compression and myelomalacia.
Results

- He underwent foramen magnum decompression and excision of the posterior arch of C1 followed by distraction of the atlantoaxial joint (using the available bone chips) and atlantoaxial re-alignment and fusion using polyaxial screws and rods system.

Fig. 1 MRI Showing marked CMJ compression

Fig. 2 CT showing Fixed AAD with BI
Results

- He improved in the left sided limb power and was discharged with a Philadelphia collar.
- Imaging studies showed reduction of the atlanto-axial dislocation and basilar invagination. (Fig. 3)
- He was well for 2 months following which he deteriorated in the left sided limb power.
- Repeat imaging showed upward migration of dens with a rotational dislocation as well.

Fig 4a & 4b  CT images of the displaced L sided screw and re dislocation

Fig. 5 shows CMJ compression and BI
Results

- The patient was put on skeletal traction and re-explored.
- The occiput was included in the construct using a plate to fix the occiput and axis on the affected side.
- There was correction of the AAD and reduction of the BI and of the angle between the clivus and the spine with immediate clinical improvement.

Fig. 6 a b & c showing CT images of the construct with reduction of BI and the angle between the clivus and cervical
Results

**Fig. 7** Cutting the Joint Capsule to allow manipulation of the irreducible AAD (First Surgery)

**Fig. 8** C1 C2 fusion using poly axial screws and rod; The C1 C2 joint space is opened and bone chips inserted to provide the distraction and reduction (First surgery)

**Fig. 9** Occiput included in the construct for reduction and correction of the angle between the clivus and cervical spine (Second surgery)
Discussion

Various method of surgical treatment are advocated for irreducible atlanto axial dislocation with basilar invagination, namely
Transoral odontoidectomy
Foramen magnum decompression.
Atlanto-axial lateral mass fixation
Occipitocervical distraction and fixation.

- Standard treatment modality is individualised as per neurological status of the patient, imaging findings and pathology involved
- Some patient may require multimodality treatment

As in our case which needed to include the occiput into the construct.
He is well on 6 months follow up
Conclusion

• A simple technique, like inclusion of the occiput into the construct, may provide the needed stability to hold the distracted C1 C2 joint in the reduced position
• It may also help in reducing the angle between and clivus and the cervical spine
• It may alleviate the possible failure that may occur with atlantoaxial fusion alone, especially in cases with associated basilar invagination