Basilar invagination treatment

Patients with minimal symptoms can be treated with non-operative modalities such as physical therapy, non-steroidal anti-inflammatory medication, or a cervical collar.

Surgery

see Atlantoaxial stabilization.

Surgical treatment is reserved for patients with symptoms refractory to non-operative management, neurological deficit, or severe spinal cord compression. Surgery usually involves the removal of bone that is causing the compression and stabilization using spinal instrumentation.

Distraction of the C1-C2 joint and maintenance thereof by introduction of spacers into the articular cavity can successfully and durably reduce basilar invagination (BI). Thus, with the adjunct of instrumented fusion and decompression, BI-induced myelopathy can be efficiently treated with a one-stage posterior approach. This intervention is technically challenging.

Atlantoaxial instability with and without basilar invagination poses a considerable challenge in management regarding reduction, surgical approach, decompression, instrumentation choice, and extent of fusion. A variety of strategies have been described to reduce and stabilize cranial settling with basilar invagination. Modern instrumentation options included:

Extension to the occiput, C1-C2 transarticular fixation, and C1 lateral mass-C2 pars among others. Since not all cases of cranial settling are the same, their treatment strategies also differ. Factors such as local vascular anatomy, amount of subluxation, need for distraction, and shape of occipital condyles will dictate level and type of instrumentation.

Joint-distraction and intra-operative manipulation surgeries to correct basilar invagination (BI) and atlantoaxial dislocation (AAD) are becoming standard procedures.

Sagittal joint inclination and craniocervical tilt significantly correlated with both BI and AAD (P < .01). Coronal joint inclination correlated with BI (P = .2). The mean sagittal joint inclination value in control subjects was 87.15 ± 5.65° and in patients with BI and AAD was 127.1 ± 22.05°. The mean craniocervical tilt value in controls was 60.2 ± 9.2° and in patients with BI and AAD was 84.0 ± 15.1°. The mean coronal joint inclination value in control subjects was 110.3 ± 4.23° and in patients with BI and AAD was 121.15 ± 14.6°.

It is a important role of joint orientation and its correlation with the severity of BI and AAD and has described new joint indexes.
Transoral approach

see Transoral approach for Basilar invagination

Case series

Sinha et al., managed 27 children by rigid variety of occiput/C1-C2-C3 internal fixation of various craniovertebral junction pathologies. All patients were subjected to thin cuts of computed tomography with 3D reconstruction for selecting appropriate rigid construct. Eight children had occiput-C2, 3 had occiput-C2-C3, and 16 had C1-C2 hardware constuct. One patient of C1-C2-plate fixation had section of C2 nerve root ganglia. Basilar invagination with atlantoaxial dislocation was reduced by new distraction/compression techniques.

Improvement in clinical features and correction of deformity with solid hardware construct were seen in all patients. Follow-up period ranged from 5-72 months. One patient was lost to follow-up, and one case died of compression of vertebral artery at C1 lateral mass. Patients of myelopathy had recovery rate of 90.9%. Hardware failure was seen in one patient, and wound infection was observed in two cases.

Rigid variety of occiput/C1-C2 internal fixation is a safe and effective method in the management of variety of craniovertebral pathologies in pediatric population. This new technique of reduction of basilar invagination with atlantoaxial dislocation from posterior approach may alleviate the need of high morbity associated with surgical procedure like transoral odontoidectomy in younger patients.

