

Results of Posterior Occipito-Cervical Decompression and Fusion in Case of Basilar Invagination : A Case Series.



Medical Science

KEYWORDS : Basilar invagination, decompression and fusion, pedicle screws, occipitocervical plate

Dr. RUCHIR PATEL	4th year orthopedics resident, Department of orthopedics,
Dr. ANIL SOLANKI	4th year orthopedics resident, Department of orthopedics, B.J. Medical College, Ahmedabad.
Dr. HARDIK R. SUTHAR	4th year orthopedics resident, Department of orthopedics, B.J. Medical College, Ahmedabad.
Dr. ANKIT PATEL	4th year orthopedics resident, Department of orthopedics, B.J. Medical College, Ahmedabad.
Dr. APOORVA ACHARYA	M.S.Orthopaedic, Associate professor GCS Medical college & research institute

ABSTRACT

Craniovertebral junction anomalies are vary in severity from gross failure of development, incompatible with life, discovered by chance of no practical significance. Traumatic dislocation or fracture increased in frequency due to RTA or increased outdoor activity. 20 patients of various age group diagnosed case of basilar invagination were taken for study purpose. Operated by decompression & fixed with occipito cervical plate or loop and fusion with autogenous bone graft. Regular 2 month follow up examination were done and all were assessed using Ranawat, Nurick and mJOA score and various radiological lines. Good to excellent results can be achieved by surgical treatment in properly selected patients with good surgical technique and long term follow up examination.

Introduction:

The term "CRANIOVERTEBRAL JUNCTION" includes bony and neuro-vascular structure from base of occiput to 2nd cervical vertebrae {AXIS}. The subject of craniovertebral junction anomalies is under discussion and evaluation for over a century. A number of classical reviews have attempted to clarify a variety of complex associated issues. Despite the volumes of publications on the subject, it appears that the last word has not yet been said. Craniovertebral anomalies are more frequently found in the Indian subcontinent than anywhere else in the world. Basilar invagination is the most common craniovertebral junction anomaly. Basilar invagination implies that the floor of the skull is indented by the upper cervical spine, & hence the tip of odontoid is more cephalad protruding into the foramen magnum which causes the compression of medulla and brainstem. [figure 1]. There are **two** types of basilar invagination: primary invagination, which is congenital or developmental and more common, and secondary invagination, which is acquired mostly due to trauma. Primary invagination can be associated with occipito atlantal fusion, hypoplasia of the atlas, a bifid posterior arch of the atlas, odontoid anomalies. In basilar invagination, all three parts of the occipital bone (basiocciput, exoccipital & squamous occipital bone) are deformed. It is associated with signs and symptoms like short neck (78%), torticollis (68%), s/s of associated ACM (cerebellar & vestibular disturbances) & syringomyelia (25 to 35%), motor & sensory disturbances (85%), lower cranial nerves involvement, occipital headache & pain in the nape of neck (greater occipital nerve compression or irritation), s/s of raised intracranial pressure (Hydrocephalus) due to posterior encroachment which causes blockage of aqueduct of Sylvius, compression of cerebellum & vestibular apparatus leading to vertical or lateral nystagmus (65%) (not due to direct pressure from post rim of FM but rather due to a thickened band of dura), vertebral artery insufficiency signs and symptoms.



Figure : 1

Materials and methods:

Our study is short term prospective study. Study period extends from July 2012 to May 2015.

Total 20 patients {male+female} of various age group {8 year to 65 year} with diagnosed cases of basilar invagination were taken for study purpose.

INCLUSION CRITERIA:

- All the patients having symptoms related to spinal cord compression
- Neurological deficit or weakness
- MRI showing compression of cord at CV junction
- (And off course) patient willing for this high risk surgery

EXCLUSION CRITERIA:

- Medically unfit patient
- Patients not giving operative consent
- Age limitation-early age upto 5 year they can be managed by Minerva cast
- very old age when operative benefit could not be expected.

11 of them were examined in details both clinically and radiologically [x rays, CT scan, CT angiography, MRI] pre operatively

All 20 patients were operated by various surgical techniques after explaining high operative risk:

A- using standard midline approach , posterior occipitocervical decompression with fixation using standard plate with screws or loop with wires [figure 2]

-Fusion done using tricortical bonegraft taken from posterior superior iliac spine.



Figure 2
Immediate post operative neurological evaluation done in all patients.

Regular 2 months follow up examination done both clinically and radiologically for

- neurological improvement or worsening according to RANAWAT, mJOA or NURICK grading system
- using Mcrae, Chamberlain , Ranawat index for radiological study
- incision related complication like infection, discharge
- implant related complication like loosening or breakage
- check the status of bone graft fusion.

Results and Discussion:

Clinical outcome

17 patients showed improvement in their symptoms or gait with improved mJOA score, RANAWAT’s neurological class and NURICK’S functional scale. 2 patients did not show any signs of improvement. 1 patient who had severe basilar invagination with os odontoideum with kyphotic deformity expired on 3rd postoperative day due to respiratory insufficiency.

1 patient had wound related complication with opening of stitches and exposed implant which required excision of exposed implant and wound recovered by secondary healing. [figure 3]



Figure 3
On long term follow up 1 patient had loosening of implant from occiput bone on X-ray but she had no any clinical symptoms. Rest of patients had no long term complication.

Radiologically

Using Mcrae, chamberlain line and Ranawat index, all 19 patients had reduction of dens below foramen magnum.

Bone graft fused in all 19 patients between 6 to 8 months.

So all over mortality rate of our study was 5%.

Conclusion:

Basilar invagination anomalies are commonly occurring but rarely diagnosed anomalies. Developmental and congenital anomalies are more common than traumatic events. As per our prospective study excellent to good short term results can be achieved with acceptable safety but it needs further long term follow up in larger series to confirm good long term results. Good results depend on proper patient selection, good surgical skill, proper use of implants and post operative care.

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