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POSTERIOR FIXATION OF ATLANTOAXIAL DISLOCATION ANALYTICAL STUDY

Neurosurgery

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KEYWORDS

AIM OF THE STUDY

To compare the usefulness of various surgical methods of stabilization for atlanto axial instability

a. To Realign the spine.
b. To prevent loss of function of undamaged, neurological tissue.
c. To improve neurological status.
d. To obtain and maintain spinal stability.
e. To obtain early functional recovery.

MATERIALS

Materials of this study comes from the accident service unit of the Govt. Rajaji Hospital and the Neurology and Neurosurgery out patient department. 18 cases of Atlanto Axial instability were operated upon. The predominant cause of the lesion was trauma. They were eleven in number. Eight cases were diagnosed in the acute phase. Three cases turned up three to six months after the injury. 4 cases were congenital subluxation. One case was of infective orgin Tuberculosis in nature. Degenerative dislocation was one case only.

Age (Yrs.)	Number	Percentage (%)
Less than 10	8	44.4
11-20	1	5.6
21-30	4	22.2
31-40	2	11.1
More than 41	3	16.7

TABLE II
Age Distrubution

TABLE II
No. Of Cases – Sex

Sex	No. of cases	Percentage(%)
Male	14	77.8
Female	4	22.2

Majority of the cases were below 10 years of age. The next high incidence was in the third decade. Males were predominant in this series. 14 cases were males, 4 were females.

44.5% of the cases had other associated lesions. Fracture of the posterior arch of the Atlas,. Fracture spinous process of C2, Fracture of odontoid, Fracture body of C% vertebra were one each. Next to the trauma cases congenital lesions had other associated lesions. They accounted for 60% of the congenital lesion (3 out of 5). Os odontoideum, one, fused C3, C4 vertibrae one and basal invagination one were the lesions. The one case of degenerative dislocation had severe degenerative spondylosis in the lower cervical vertebrae also.

TABLE III
Distribution Of Pathology

Age (Years)	No. of cases	Congenital		Traumatic		Infective		Degenerative	
		Case	%	Case	%	Case	%	Case	%
Less than	10	8	3	37.5	4	50	1	12.5	-
11-20	1	-	-	1	100	-	-	-	-
21-30	4	1	25	3	75	-	-	-	-
31-40	2	-	50	1	50	-	-	-	-
More than	40	3	-	-	2	66	-	-	33

TABLE IV
No. Of Cases With Associated Lesion

Cause	No. of cases	Associated lesion			
		No. of cases	%	Types of lesion	No. of pases
Congenital	5	3	60	1.Basal Invagination	1
				2.Fused vertebra	1
				3.Osodontoideum	1
Traumatic	11	4	37	1.Fracture of posterior Arch	1
				2.Fracture of spinous process of C2	1
				3.Fracture odontoid	1
				4.C5 body fracture	1
Infective	1	-	-	-	-
Degenerative		1	100	Spondylotic degeneration of lower cervical spine	1

44% of the cases had neurological deficit in the form of longtract st 8, upper limb weakness and cranial nerve palsy. Again trauma was the predominant cause in this group. 5 out of 11 cases (44.5%) of traumatic Atlanto Axial dislocation had neurological deficit. 40% of congenital Atlanto Axial dislocation (2 out of 5) had neurological deficit. The one case with basilar invagination had cranial nerve palsy.

TABLE V
Pre Operative Neuroligical Deficit

Cause	Total No.	Neurological Deficit No.	Percentage
Congenital	5	2	40
Traumatic	11	5	45-5
Infective	1	-	0
Degenerative	1	1	100

METHODOLOGY

All cases of traumatic Atlantoaxial dislocation were put in skull traction with 2.5 kg of weight., Children had half of this weight. The reduction was checked by translateral x-rays. If the reduction was not achieved weight was increased by 0.5 kg in stepwise manner and maximum of 5 kgs was never crossed in adults and 2.5 kgs in children. All cases of traumatic origin had satisfactory reduction by this method. The traction was maintained till the surgery, In cases of congenital, infective and degenerative dislocation also the same method was adopted.

Patients were operated in the prone posture. Through the midline incision, the basiocciput, Atlas, lamina and spinous process of Axis and C3 vertebrae were exposed.

Trans articular fixation was done in 10 cases (55.5%).

TABLE VI
Types Of Surgery

TYPES	No. of cases	Percentages
1. Occipito cervical fusion	2	11.1%
2. Trans articular screw fixation	10	55.5%
3. C1 C2 lateral mass fixation	1	5.6%
4. Posterior stabilisation after decompression with grafting and wiring	5	27.8%

iliac crest graft. Snuggly fitting in between Atlas and Axis.

In two cases (11.1%). Both of which were traumatic in origin only posterior wiring was done and no graft was used.

In 5 patients where the preoperative neurological status warrented posterior decompression and in one case where there was C2 spinous process fracture occipito cervical fusion from occiput to C3 was done using split fibular grafts placed one on each side and tied with wires to the articular facets/In one patient who had foramen magnum decompression C1 and C2 lateral mass fixation done Post operatively no traction was used. Patients were nursed in supine posture. On the third day they were allowed to situp with sorbo rubber collar. After suture removal patients were discharge according to the neurological status with advise to use collar continuously. One patient with infective etiology alone was discharged with POP jacket. Patients were reviewed once in 15 days in first month once in a month for next 3 months and once in 3 months for the next one year.

They were examined clinically for the neurological status and radiologically for the stability.

RESULTS

The success rate of the stability achieved varied according to the surgical technique used. Of the 2 cases where fixation with wiring without grafting was done. One achieved stability while other was unstable in flexion. Though not to the same extent as before surgery.

80% of the cases where grafting was used along with wiring with or without decompression achieved stability.

Improvement in neurological deficit occurred in both the cases of the congenital Atlanto Axial dislocation which had neurological deficit before. The same happened in case of degenerative Atlantoaxial dislocation. In case of traumatic dislocation only 60% (3 out of 5) which had neurological deficit before surgery improved.

Worsening of the neurological status occurred in both the cases where fixation was done by wire alone. In the decompression and fixation with grafting group 2 out of 5 (40%) worsened. One case which had hartshill fixation also warsened.

TABLE VII
Post Operative Stability

Type of surgery	Total No.	Stable		Unstable	
		No.	%	No.	%
Occipito cervical fusion	2	1	50	1	50
Trans articular screw fixation	10	8	80	2	20
Posterior stabilisation after decompression with grafting and wiring	5	4	80	1	20
C1 C2 lateral mass fixation	1	1	100	-	-

TABLE VIII
Improvement In Neurological Status

Causes	No. of cases with deficit	No. of cases improved	Percentage
Congenital	2	2	100
Traumatic	5	3	60
Degenerative	1	1	100

INFERENCE

1. Atlantoaxial dislocation most commonly can present without neurological deficit (55.6%).A high degree of suspicion is necessary to diagnose the lesion.
2. Grafting increase the post operative stability achieve.
3. Improvement in neurological status depends predominantly on the stability achieved and the pathological cause of the deficit.
4. Highest incidence of worsening of neurological deficit is with wire fixation alone without grafting.
5. Posterior decompression when done. Does not produce increased incidence of unstability after wiring with grafting.

DISCUSSION

The criteria used to designate whether stability was achieve post operatively was by radiological examination in flexion and extension, to access whether the space between odontoid and arch of atlas remained same or increased. This is the method adopted by various authors in this condition. By this in two cases of wiring alone without grafting only one achieved stability i.e. 50& and the other case was less unstable than before surgery

In case of degenerative and congenital dislocation improvement in neurological deficit was directly related to the neurological status before surgery. Adequacy of decompression, and also the stability achieved. In traumatic cases the lesser incidence of improvement in neurological deficit is because of the insult that occurred during the injury, the high incidence of difficulty in achieving stability because of the extent of associated lesions lower down

The high incidence of neurological deterioration in decompression and wiring with the grafting (40%) can be attributed to the pathology of the lesion because stability was achieved in the same percentage as that the group without decompression.

CONCLUSION

Posterior FIXATION for atlanto axial dislocation with various technique like c1 c2 latera mass fixation, occipito cervical fusion and trans articular fixation ACHIEVE good and all are equally effective.

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