HAVE CRANIO-VERTEBRAL JUNCTION ANOMALIES BEEN OVERLOOKED AS A CAUSE OF VERTEBRO-BASILAR INSUFFICIENCY?

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Are CVJ anomalies causing VBI?

BACKGROUND

- association of VBI with CVJ anomalies is severely underestimated
- x-rays of the Cx spine are done in only 30% of pts with VBI & only 11% pts have proper flex^n/ ext^n x-rays done

posterior circulation ischemia has a higher morbidity and mortality

Fifty percent of these patients who are managed conservatively progress to develop infarction
Diagnosing even a percentage of the patients with VBI as having CVJ anomalies may have major therapeutic & prognostic implications.
Aims and Objectives:

- Using 99Tc ECD brain SPECT to document the presence of posterior circulation cerebral ischemia in patients with CVJ anomalies and correlate with symptoms of VBI.
Are CVI anomalies causing VBI?

- PROSPECTIVE STUDY DONE OVER A SIX MONTH PERIOD
STUDY DESIGN

19 PATIENTS WITH FIXED AAD

Clinical assessment & Brain SPECT on admission

CONTROL GROUP
(7 PTS)

TOO + PF

Rpt SPECT at 4 weeks

VBI GROUP
(12 PTS)

TOO + PF

Rpt SPECT at 4 weeks

Are CVJ anomalies causing VBI?


VBI GROUP

- Pts with features suggestive of VBI (Drop attacks, episodic vertigo, visual disturbances and dysarthria)

CONTROL GROUP

- patients without symptoms of VBI
Operative procedure

- combined TOO and Occipito-cervical fusion from occiput to C3, using contoured loop and sublaminar wiring with bone graft placement.

- Both procedures were carried out consecutively in a single sitting.
Patients with reducible AAD, requiring only occipito-cervical fusion were excluded from the study to maintain uniformity.

Postoperatively the neck was immobilized using a philadelphia collar for a period of three months.
SPECT scanning was done using 99Tcm-ECD on a dual headed GE 'Varicam' scanner.

- The final data was displayed on a 10 grade color scale and semi quantitative analysis performed.
Regional cerebellar perfusion <10% of contralateral lobe, or in case of bilateral involvement, less than 20% of basal ganglia
Are CVJ anomalies causing VBI?

Observations

Radiology

- AAD 19
- BI 15
- Occipitalisation of atlas 14
- Kippel-feil anomaly 9
- Cerebellar infarcts 2

(Both in VBI group)
OBSERVATIONS (VBI Group)

Clinical features

- Vertigo and drop attacks: 10
- Incoordination: 8
- Visual symptoms: 4
RESULTS
(Preoperative SPECT)

- Decreased cerebellar perfusion in 75% (n=9) of the patients in the VBI group compared to 14% (n=1) in the control group (p=0.019, fischer exact, 2 tailed).
Are CVJ anomalies causing VBI?
RESULTS

- Following surgery, five patients (55%) in the symptomatic group and none in the control group had improvement in cerebellar perfusion.

- All five patients showing improvement on SPECT also had improvement in their symptoms of VBI following surgery.
Two pts in VBI group developed meningitis in the postoperative period & had a further decrease in cerebellar perfusion on the follow up SPECT scan.

Another 2 pts in VBI group had cerebellar infarcts on MRI & did not show improvement in cerebellar hypoperfusion following surgery.
Are CVJ anomalies causing VBI?

Pathogenesis VBI in CVJ Anomalies

- Chronic low grade micro-trauma
- Rptd flex/extn of vessel
- Intimal damage
- Thrombosis
- Embolisation
Clinical rarity of posterior circulation infarcts in CVJ anomalies could be due to:

- Duplication of VA and the adequacy of the circulation of Willis

- Patients symptomatic for VBI are not routinely evaluated for CVJ anomalies which remain undiagnosed
In patients with CVJ anomalies currently used imaging modalities such as cervical spine x-rays and CT scans are not adequate to evaluate for vertebro-basilar ischemia.
Ours is the only study of its kind documenting hypoperfusion in posterior circulation territory in patients with CVJ anomalies. This hypoperfusion may represent a state of chronic VBI, expected in such patients & MAY BE REVERSIBLE following surgery.
CONCLUSIONS

- Our study shows that rigid immobilisation (provided by occipito-cervical fusion in our patients) by itself may confer protection from VBI and direct repair of VA may not be necessary
We strongly recommend that in patients of VBI, a high index of suspicion should be kept for CVJ anomalies and x-rays of the cervical spine with flexion-extension views be done on all patients.