

ACUTE CEREBELLAR INFARCTION: MANAGEMENT & OUTCOME AN INSTITUTIONAL EXPERIENCE

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ABSTRACT

AIM: The main objective of this study is to analyze the management options and the outcome of the patients presenting with acute cerebellar infarction. **METHODS:** A total of 45 patients (male-34; female-11) admitted with acute cerebellar infarction (ischemic) in our hospital during December 2019 – December 2020, were analyzed prospectively. We analyzed the clinical presentation, radiological investigation, associated co-morbid illness and the clinical outcome following various management strategies. **RESULTS:** 30 patients were managed conservatively, out of which 25 patients survived and 5 patients expired. 8 patients were managed with ventricular drainage alone. 6 of them improved, whereas 1 patient expired. 7 patients needed sub-occipital decompressive craniectomy and removal of infarct in our study. 2 out of 7 patients survived and the rest died. Overall mortality in our series was 14.6%. **CONCLUSION:** The management criterion mainly depends on periodic clinical & radiological evaluation. Even though, the optimal timing and surgical methods remains controversial. Ventricular drainage alone can be reserved for patients with ventricular dilatation & sub-occipital decompressive craniectomy with or without EVD can be advocated for those with acute deterioration with brainstem compression.

KEYWORDS : Cerebellar infarction, GCS, CT/MRI, EVD, VP shunt, Sub-occipital craniectomy, medical management.

INTRODUCTION:

In general, cerebellar infarction occurs due to decreased perfusion, which in turn reduces oxygen delivery. Cerebellar infarction is relatively uncommon compared to cerebral infarct with an overall incidence of 1-4%⁽¹⁾. The frequently noticed causes are either due to embolic or thrombotic phenomenon. Emboli can be dislodged from heart, aorta or vertebral artery, while thrombosis occurs due to atherosclerosis, vasculopathies etc⁽¹⁾. PICA is the most commonly involved vessel in the posterior circulation stroke, with AICA & SCA positioned next to them⁽²⁾. Concurrent involvement of more than one vascular territory often causes sudden deterioration. Cerebellar infarcts are misdiagnosed frequently because of its non-localizing clinical features⁽³⁾. But, at the other end, it may even present in moribund status also. MRI/CT brain remains the gold standard in the diagnostic modalities. The controversy in the management protocol still persists even after having so many published studies and observations.

MATERIALS & METHODS:

We prospectively analyzed 45 patients with acute cerebellar infarction (ischemic) between December 2019 & December 2020. We also included the patients with cerebellar infarct extending into brainstem. Those patients, who were not willing for surgical management excluded from this study. Out of 45 patients, 34 were male & 11 were female patients and their age ranged between 21 – 75 years with an average of 30 years. They frequently presented to us with dizziness, nausea, vomiting and headache. The other less frequently noticed symptoms were ataxia & slurring of speech. 2 of them presented to us in moribund status with a GCS of 3/15. All the patients were received within 48 hours of onset of symptoms and were clinically examined and categorized according to GCS score. All patients had CT/MRI brain taken upon admission. PICA territory involvement noticed in 22 cases, of which 6 patients had bilateral cerebellar infarction. AICA occlusion seen in 13 cases. SCA territory involvement noted in 5 cases. Both AICA, PICA occlusion noted in 5 cases. Both GCS assessment & radiological imaging done serially for all the cases whenever required both in the pre-op & post-op period. 30 patients were managed conservatively with anti-edema measures such as mannitol and dexamethasone & anti-

platelet drugs. 8 patients were managed with ventricular drainage (7 had VP shunt & 1 had EVD). 2 patients had sub-occipital decompressive craniectomy, while 5 had sub-occipital decompressive craniectomy with EVD. 15 out of 45 patients had no associated co-morbid illness, whereas the rest of them had associated illnesses.

RESULTS:

Out of 30 patients managed conservatively, 25 survived and 5 expired. 2 patients with admitting GCS of 3/15 were given conservative management alone and did not survive. Other 3 patients, expired had poor GCS at admission and had associated multiple co-morbid illnesses. All with GCS >12 on admission survived with conservative management. 7 patients underwent VP shunt & 6 of them survived with good recovery, while 1 expired. 1 patient underwent EVD and improved, but during the stay, developed meningitis in the post-op period which was successfully managed with appropriate antibiotics. Sub-occipital decompressive craniectomy was done for 2 patients and they survived with mild to moderate disability. 5 patients who were treated with sub-occipital decompressive craniectomy with EVD expired. All patients who presented with low GCS/multiple co-morbid illnesses couldn't be saved even after early decompression.

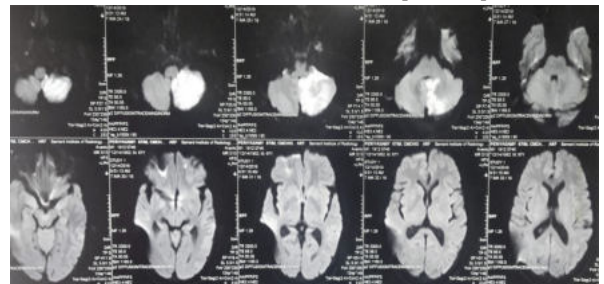
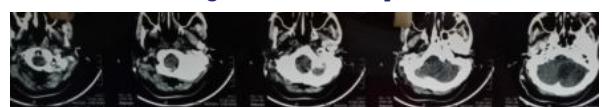


Figure 1. MRI Brain (Diffusion weighted image) showing acute left cerebellar infarct (PICA+AICA) without mass effect. Patient managed conservatively



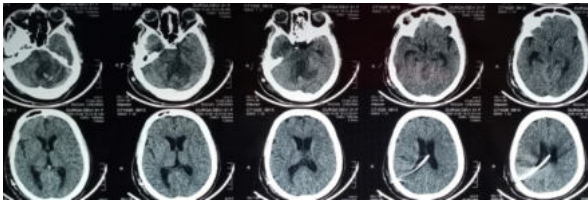


Figure 2. CT Brain showing Left cerebellar infarct (PICA) with hydrocephalus. Patient treated with VP shunt.

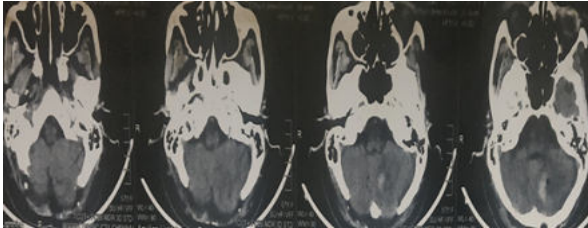


Figure 3. CT Brain showing sub occipital craniectomy status. Infarct with hemorrhagic transformation noted in left PICA & SCA territory.

DISCUSSION:

Even though, the cerebellar infarction accounts for 1-4% of all strokes, the mortality or morbidity rate associated with it remains very high (23%) compared to 12.5% arising due to supratentorial cerebral stroke. Some may present with localizing signs such as ataxia, nystagmus, dysarthria⁽⁴⁾. But often, they tend to present with non-localizing symptoms such as dizziness, nausea, vomiting & headache. This makes them not amenable for early diagnosis often. Radiological diagnosis mainly depends on CT/MRI brain. Even though, CT brain has had low resolution due to the hampering effect of surrounding temporal & occipital bone⁽⁵⁾, it remains the first modality of diagnostic imaging due to easy availability. Concurrent cardiac evaluation is mandatory in terms of management of cerebellar infarction.

The management protocol of cerebellar stroke remains a controversy compared to supratentorial stroke due to various reasons:

- a) Delayed diagnosis due to initial non-localizing symptoms,
- b) Delayed presentation resulting from increased tolerance of infra-tentorial structures to hypoxia & ischemia due to high white matter percentage and enormous collateral blood flow⁽⁶⁾. So they tend to present mostly outside the window period, making them not an ideal candidate for thrombolysis.
- c) Cerebellar edema following infarction usually develops within 3-4 days of onset, but some had deterioration even after the tenth day of their admission⁽⁷⁾. Hence, making a treatment protocol according to the time of onset of symptoms remains a tough choice.
- d) Difficulties in the identification of the exact cause of sudden deterioration whether due to brainstem compression or due to hydrocephalus.

However, we treated our cases according to the clinico-radiological status and by identifying the causes of deterioration clinically. We administered conservative management for those patients with cerebellar infarction without mass effect and with GCS > 12⁽⁸⁾. Conservative management includes anti-edema (osmotherapy, steroids), anti-platelet drugs and concurrently treating their co-morbid illness. All of them were hospitalized for a minimum period of 10 days. Ventricular drainage⁽⁹⁾ attempted for those who had significant ventricular dilatation without having tight posterior fossa. EVD was done for one patient. Though he improved clinically, he required prolonged hospital stay due to meningitis. Those who underwent VP shunt had good clinical improvement and the risk of developing meningitis in the post-

op period was not encountered. We did not try ventricular drainage in case of tight posterior fossa, in fear of upward herniation⁽¹⁰⁾ (although it is least reported). We reserved sub-occipital decompressive craniectomy with or without EVD for those cases with tight posterior fossa (obliterated basal cistern)⁽¹¹⁾. Complications encountered in our study were meningitis, wound infection, pseudomeningocele formation, pulmonary complications and DVT & this did not affect the overall outcome.

CONCLUSION:

Age, brainstem involvement, GCS on admission⁽⁷⁾, associated multiple co-morbid illnesses determine the clinical outcome of the patients with cerebellar infarction. From our observation, it is evident that there is no role for prophylactic decompressive craniectomy.

ABBREVIATIONS USED:

PICA – Posterior inferior cerebellar artery
 AICA – Anterior inferior cerebellar artery
 SCA – Superior cerebellar artery
 CT – Computed Tomography
 MRI – Magnetic Resonance Imaging
 GCS – Glasgow coma scale
 EVD – External ventricular drainage
 VP shunt – Ventriculoperitoneal shunt

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