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## CME LECTURES

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### STABILIZATION AND TRANSPORT OF HEAD INJURED

Manjula Kularatne\*

Consultant Anaesthetist, Teaching Hospital Colombo South

\*Corresponding author: E-mail: [manjulakularatne@hotmail.com](mailto:manjulakularatne@hotmail.com)

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Some of the head injured patients may have to be transferred to specialized neurosurgical centers for either investigations or for management. This could get complicated by the presence of other injuries which could be life threatening and may need to be sorted out before transfer such as haemopneumothorax, liver rupture, spleen damage.

World wide interest and attention had been given to transfer of patients with acute brain injury over the recent past and hence lead to the improved survival of these patients. The main concerns would be to prevent secondary brain damage and early transfer to the appropriate center to get the required treatment.

It is identified that hypotension, hypoxia, hyperthermia, raised intracranial pressure due to any reason are associated with very high mortality and are independent predictors of poor outcome<sup>1</sup>. Main pathophysiological problem would be the loss of autoregulation of the cerebral circulation and therefore the flow becomes pressure dependent. Hypoxia will lead to the activation of cell death cascade and release of excitatory neurotransmitters such as aspartate and glutamate and cause uninhibited neuronal cell death<sup>2</sup>.

Goal is to prevent secondary brain damage and start with A,B,C of resuscitation. Hypoxia should be treated by attending to the airway and attending to breathing. Normocapnia or slight hypocapnia will maintain adequate cerebral blood flow. Patients with GCS less than 8 needs the airway control by intubating. Intubation has to be done by using sedatives with muscle relaxants to prevent rise of ICP.

PaO<sub>2</sub> is best kept at or above 90 mm Hg and hypotension needs treatment with 0.9 % saline and

expected cerebral perfusion pressure is above 60mmHg. Meticulous fluid balance is required to prevent cerebral oedema. GCS should be re - checked if the patient is not given sedatives. Neurological evaluation with pupillary examination has to be done after initial resuscitation.

Standard pharmacological management include use of mannitol, anti-convulsant therapy if indicated (phenytoin or phenobarbitone) and the control of blood sugar (6-8 mmol). Strict glycaemic control is no longer recommended<sup>3</sup>. Hypertonic saline has been introduced as a substitute to mannitol in the recent past with promising results<sup>4</sup>.

Correction of electrolytes is also important to prevent secondary brain damage. Moderate hypothermia to 34<sup>0</sup>-35<sup>0</sup> centigrade is associated with good prognosis<sup>5</sup>.

Necessity for the transfer should be identified in time and various indications are listed in different guidelines<sup>6</sup>.

- persisting coma (GCS score 8/15 or less) after initial resuscitation
- confusion which persists for more than 4 hours
- deterioration in level of consciousness after admission (a sustained drop of one point on the motor or verbal subscales, or two points on the eye opening subscale of the GCS)
- progressive focal neurological signs
- a seizure without full recovery
- depressed skull fracture
- definite or suspected penetrating injury
- a CSF leak or other sign of a basal fracture

Patients may be transferred for investigations such as CT or MRI as well. These patients may be

transferred back to the transferring hospital if the investigations are normal.

### **SUMMARY AND RECOMMENDATIONS for the safe transfer of patients with acute brain injury (7)**

- High quality transfer of patients with brain injury improves outcome.
- There should be designated consultants in the referring hospitals and the neuroscience units with overall responsibility for the transfer of patients with brain injuries.
- Local guidelines on the transfer of patients with brain injuries should be drawn up between the referring hospital, the neurosciences unit and the local ambulance service. These should be consistent with established national guidelines. Details of the transfer of responsibility for patient care should also be agreed.
- While it is understood that transfer is often urgent, thorough resuscitation and stabilisation of the patient must be completed before transfer to avoid complications during the journey.
- All patients with a Glasgow Coma Scale (GCS) less than or equal to 8 requiring transfer to a neurosciences unit should be intubated and ventilated
- Patients with brain injuries should be accompanied by a doctor with appropriate training and experience in the transfer of patients with acute brain injury. They must have a dedicated and adequately trained assistant. Arrangements for medical indemnity and personal accident insurance should be in place.
- The standard of monitoring during transport should adhere to recommended standards.
- The transfer team must be provided with a means of communication - a mobile telephone is suitable.
- Education, training and audit are crucial to improving standards of transfer.
- Proper documentation is also crucial.

In the case of transferring of head injured, stabilization is the most important factor which gives rise to good outcome. Recommended safe

time period is about four hours from the time of admission to transfer to the specialized centre.

We, Sri Lankans face with many dilemmas in the case of transferring any critically ill patient. Most of the hospitals do not have properly trained staff to accompany critically ill patients. There are no adequately equipped ambulances or standard monitoring facilities. It is time for us to get standard national guidelines and to audit the situation to have a better outcome.

### **References**

1. Data from trauma coma data bank 2006.
2. Werner C, Engelhard K-Pahophysiology of traumatic brain injury: BJA 99 (1)4-9 2007
3. Helmy A, Vizechipi :Traumatic brain injury Intensive care management BJA 99 (1)32- 42 2007
4. Moppeti I.K et al : Traumatic brain injury, Early management - BJA July 2007; 18-31
5. Fukuda et al :Cerebral protection BJA July 99 1017 2007
6. National Clearinghouse Guidelines 2006
7. Guidelines by the Association of Anaesthetists of Great Briton & Ireland 2006