

## Head Injury in the Elderly

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Neurotrauma is a grave concern of the trauma surgeon confronted with an elderly patient who has sustained an injury. Age is a significant factor in predicting outcome from severe head injury, and elderly (above 65 years of age) constitute a second peak for incidence for both men and women<sup>1</sup>. Without doubt, neurotrauma is the commonest cause of life-threatening neurological disorder in the elderly. Although favourable outcome from such injuries is not very high among any age group, vegetative state or death is twice as likely for those beyond 55 years of age as for those between 35 to 45 years of age<sup>2</sup>. Because of the associated illnesses, that restrict the physical activity and maintenance of erect posture and balance, elderly are more prone to falls and pedestrian accidents causing head injuries. It is not only the mode of injury that is different from the young, the response to the injury too is different, and has to be remembered by the attending primary care physician and the neurosurgeon. Old documents should be made available, and contact with family physician for details of previous illnesses must be made.

### COMMON MODE OF HEAD INJURY

**Falls:** Falls constitute the commonest mode of injury in the elderly. Preexisting mental illness, cerebrovascular disease, cardiovascular disease, otogenic vertigo, painful conditions of the lower limbs, etc. are common causes responsible inability maintain erect posture and attenuated reflexes leading to falls.

**Motor Vehicle Injury:** Elderly may be affected as passengers in a motor vehicle. Uncommonly, they may be on a two-wheeler or on a bicycle.

**Assault:** Elderly, especially those staying alone are often targets of assault with blunt objects.

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### PATHOLOGY

Skull fractures may be linear or stellate. Extradural hematoma is less often seen in the elderly due to dura being intimately adherent to the inner table of the skull. More often, the patient sustains acute subdural hematoma or intracerebral hematoma, with cerebral contusion. Chronic subdural hematoma may follow an apparently trivial fall or jerk to the head.

### METABOLIC RESPONSE

The stress response leads to increased oxygen consumption and activation of leukocyte produced inflammatory mediators, requiring significant physiological reserve. In the elderly, there is less of such reserve, and they are unable to compensate for the increased respiratory and cardiovascular demands, and are unable to balance the physiological demands imposed by injury and with those inherent in resuscitation and treatment. Aggressive fluid management can be harmful and monitoring of central venous pressure is mandatory while resuscitating the elderly.

### APPROACH TO THE ELDERLY PATIENT WITH HEAD INJURY

**Evacuation:** Elderly patients use more resources than the young patients matched for severity of head injury<sup>3</sup>. Direct transfer to a specialized trauma centre is likely to result in a shorter stay, and sequential interhospital transfer should be bypassed. Delay in transfer should be only for ensuring a patent airway. Injuries can be aggravated during initial management, due to many of the same factors which originally predisposed them to injury. Limited homeostatic reserve makes it imperative that they should be protected from excessive exposure which could rapidly lead to hypothermia. Thin and fragile skin may avulse due to shearing forces, while moving or repositioning the patient. While immobilisation is essential in skeletal or extensive soft-tissue injury, it may lead to cutaneous ulceration, venous thrombosis, ankylosis and pulmonary thromboembolism. Pain-induced catecholamine response can be poorly tolerated, hence mobilization should be minimum, and undertaken after adequate analgesia or splintage.

### Airway and respiratory care

Airway must be protected, and topical anesthesia of hypopharynx should be done to reduce vagal stimulation during intubation. Traumatic intubation should be avoided, and a rigid larynx can be negotiated by a fiber-optic laryngoscope. Rib cage can be fragile, or have limited compliance due to chronic obstructive airway disease. Resuscitation can lead to rib fractures and pneumothorax. High respiratory quotient due to carbon dioxide accumulation (due to glucose infusion) may make weaning from ventilator difficult.

### Neurological Evaluation

While there is correlation of survival with initial Glasgow Coma Scale (GCS), evaluation of the elderly is difficult due to any preexisting mental illness, stroke, or neuropathy of any etiology. Funduscopy and pupillary changes are rendered ineffective due to corneal opacity, cataract surgery. The baseline should be compared to the pre-injury neurological status as described by relatives or mentioned in the documents.

### Imaging

All elderly patients with head injury should undergo computed tomography (CT) of the head, plain radiography of cervical spine and chest and subsequent magnetic resonance imaging (MRI) of the cervical spine. Number of CT abnormalities encountered correlate inversely with survival and seem to overshadow the effect of age<sup>4</sup>. In one series of 195 elderly patients with severe head injuries, patients remaining comatose for at least 72 hours after injury died within six months and that patients with intracranial pressure more than 20 mm Hg had a higher mortality at both 72 hours and six months after injury<sup>5</sup>. This study suggests that consideration be given to the level of consciousness and increased intracranial pressure while counseling the family of the patient about the prognosis. Elderly patients with spondylotic cervical spines are at risk of spinal cord injury due to stretching and compressing the cord by thickened ligaments and spondylotic bars at the time of impact to the neck. Cord shows intrinsic hyperintensity and gross compression.

### Fluid Management and Nutrition

These are problematic areas in the elderly (as in very small children). Management of volume stakes within narrow perimeters must balance the risk of hypovolemia against that of congestive cardiac failure. Impaired renal function may be present and serum creatinine can be low in elderly with impaired protein metabolism. Malnutrition is common

especially with a history of alcoholism. Implementation of early enteral alimentation by nasogastric/oral/gastrostomy feeding is important and use of total parenteral nutrition in the elderly especially with preexisting renal, hepatic or cardiac disease is fraught with danger.

### Sepsis

Elderly are known to have impairment of various immunologic mechanism. Febrile and leukocytic responses are attenuated and there is reduction in IgM, Inteferon  $\alpha$  and Interferon  $\beta$ <sup>1</sup>. Neurophil chemotaxis, phagocytosis is impaired. These factors predispose a head-injured elderly patient to infection and sepsis. Mental status change is a sign of early sepsis and should not be missed.

### Resumption of activity

High priority should be given to early mobilization. Atherosclerotic states can lead to thrombosis due to low flow states. There is improvement in pulmonary function, and avoidance of complications like thromboembolism by mobilisation. Factors preventing early mobilization are fear of falling, reluctance, pain, tethering due to intravenous lines, monitoring catheters and urinary catheters.

## SPECIFIC LESIONS

### Chronic Subdural Hematoma

Chronic SDH may have a protean onset and presentation. There is often a trivial injury or a fall, that has been forgotten. Patient is brought with history of recent onset of abnormal behaviour, or cessation of speech, altered sensorium, hemiparesis. CT may show hematoma with recent bleed, midline shift and even transtentorial herniation. Evacuation with a single burr hole usually suffices. However, the subdural space should be tapped after 72 hours to evacuate any residual accumulation. Recovery is usually fast.

### Intracerebral hematoma

ICH may be coup or contré-coup injury. Hematoma larger than 20 ml should be evacuated especially if accompanied by low GCS.

### Cervical cord injury

The injury is considered here since the mechanism thereof is same as that of head injury. Patient is usually rendered quadriplegic, and MRI shows intramedullary hemorrhage and compression of the cord. Decompressive laminectomy is done; however, neurological recovery is poor and patient remains in poor Frankel grade.

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