ORIGINAL RESEARCH PAPER

Radiodiagnosis

CT EVALUATION OF SEQUELAE OF HEAD INJURY

KEY WORDS:

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ABSTRACT

CT is a rapid non invasive safe and highly accurate for evaluation of patients with head trauma. In addition to its value as an acute diagnostic aid sequential CT scanning is useful in evaluating longer term post traumatic deficits that require differential management decision. Therapeutic program and rehabilitation goals can be realistically applied.

The present study was an evaluation of the CT findings in 75 selected cases of cranial trauma sequelae. An attempt was also made to correlate the radiological findings with the clinical presentation of the head injured patients remote from the time of injury. The cases were evaluated clinically with special respect to neurologic, psychiatric and mental function status. They were subjected to CT examination of the brain. Majority of these patients presented with sequelae within the first year since the time of injury.

Clinical symptomatology was varied with headache, the most frequent symptom (21%) followed by hemiplegia (11.6%) and seizures (10.8%). Abnormal behavior and impaired memory were net (8.5% each). 9 cases (6.97%) each of language speech disorders and impaired intelligence were seen.

The CT findings encountered during the study were focal encaphalomalacia / gliosis (34%). Chronic subdural collection (14%), Hydrocephalus (12%), Porencephaly (8.2%) and normal scan (7%). Infarcts, Abscesses and growing fracture were also noted.

INTRODUCTION

Cranial trauma with brain injury has become increasingly common in the past decades particularly in urban area. *Brock* had stated in his classic textbook on head trauma that the appalling number of accidents in modern life make the subject of injury as important as that of any pandemic scourge. The features of head injury are so varied that while some patients who initially appear to be severely injured and in deep coma may go on to complete recovery while others with initial mild injury may develop delayed complications resulting in death or life long disability.

The sequelae of cranial trauma mostly depend on the nature of the original injury. They may affect:

1. The cranium or brain covering such as growing or depressed fractures, leptomeningial cysts and chronic subdural collections.
2. Cerebrum – these include infections (empyema, abscess, and meningitis), hydrocephalus, infarction, and porencephaly, focal or generalized atrophy.

MATERIALS & METHODS

The study was carried out at the department of Radio diagnosis and Imaging, Command Hospital, Southern Command, Pune in the period Aug 1994 to May 1996.

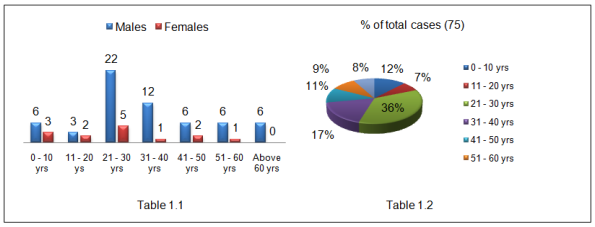
The material for the study was drawn from the entitled defence personnel, civilians & their families taking health cover from the hospital. This also includes the referred cases from peripheral defence hospitals for neurological assessments. 75 cases were selected out of such patients for the present study.

The patients were of different age groups ranging from 3yrs to 90 yrs out of which 14 females and 9 children were there. The rest were adult males.

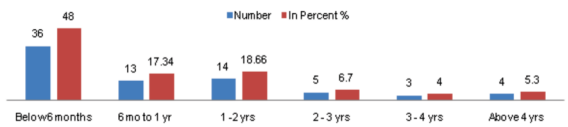
The cases thus selected were subjected to detailed clinical/ neurological examination and CT evaluation. The main symptoms asked were headache, seizures, impaired memory, neurological deficit, skull fracture and any other symptoms patient mentioned.

OBSERVATIONS AND RESULTS

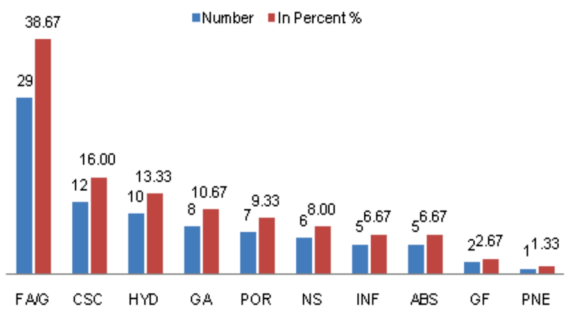
1. Age and Sex incidence



2. Distribution of time interval since head injury

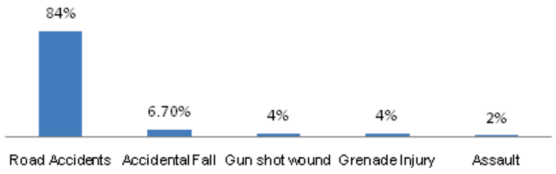


3. Distribution of CT findings in Head Injury Sequelae patients

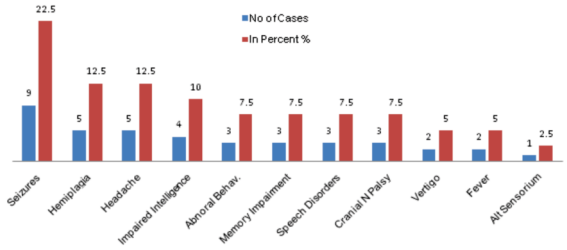


FA/G	Focal Atrophy / Gliosis
CSC	Chr Subdural Collections
HYD	Hydrocephalus
GA	Generalized Atrophy
POR	Porencephaly
NS	Normal Scan
INF	Infarct
ABS	Abscess
GF	Growing Fracture
PNE	Pneumoencephalocele

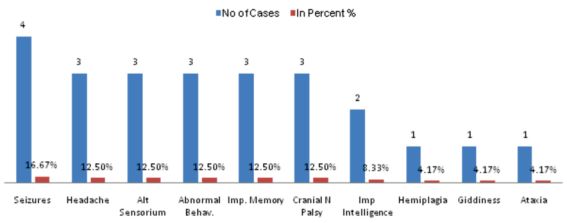
4. Distribution of mode of Injury



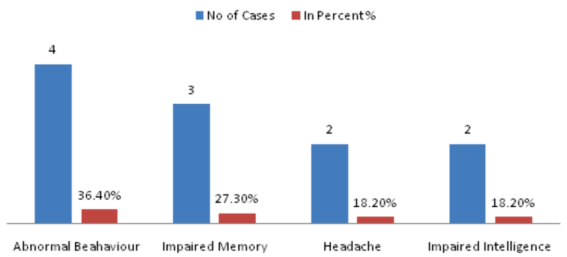
5.Distribution of Clinical Features in patients with Gliosis



6.Distribution of Clinical Features in patients showing Hydrocephalus



7.Distribution of Clinical Features in patients with Generalized Atrophy



DISCUSSION

Because it is rapid non invasive safe and highly accurate it has come to be the neuro-radiologic test of choice for evaluating patient's with head trauma for acute lesions as well as sequelae. CT has proved to be extremely cost effective reducing skull radiography, cerebral angiography and exploratory surgery.

From Table 1.1 and 1.2 it is evident that maximum number of cases belong to the age group 21 – 30 yrs (36%). 20 – 40 yrs which is generally the most active period of adult life made up more than half of the cases (54%), Children of 0 – 10 yrs formed a significant third group (12%) probably due to their playful outdoor life making them prone to accidents or falls.

Levin et al in 1979 studied 27 patients after closed head injuries for long term neuro-psychological outcome and found that maximum cases with sequelae were in the age group of 19 – 45 yrs.

Shoek et al in 1979found 68% of patients studied after recent severe head injury to be younger than 20 yrs.

In our study 81% were males indicating both the bias of the case selection from defense personnel and also the general difference in the lifestyle of two sexes; males being more associated with outdoors, female dependants of defense personnel are housewives and thus less prone to head trauma. Though our study was on a selected group however the study of *Shoek* also showed males to be 5 times more common than females.

84% of injuries in our series resulted from road accidents.This is only to be expected considering the ever increasing number of vehicles on our roads today. This is similar to the study by *Shoek* et al in which road accidents took 80% of the share.

Most common CT finding seen in patients with post traumatic sequelae in our studies isGliosis (38.67%). In the series by *Lanksch (*1979*)*, 38.8% cases showed the CT abnormality in 314 cases of post traumatic sequelae studied. Post traumatic gliosis was explained by *Lanksch et al* to be the result of direct effects of trauma as well as secondary consequences.

Barry N French et al studied 196 patients with head injury with follow up CT and found 13 to develop sub dural hematoma within 20 – 46 days of injury. In our present series we found out that 12 cases (16%) presented with CT finding of chronic sub dural collection.

10 of 75 cases included in our series showed hydrocephalous (13.33%) as a CT finding of head injury. Hydrocephalus is recognized late sequelae of cranio-cerebral injury. *Lanksch et al* found it in 81% of post traumatic sequelae they studied. *Merino de Villasante* found it in 4%, 29% has been reported by *Kishore et al*. the above findings are consistent with our work.

Our study shows that patient showing generalized atrophy most often presented with abnormal behavior and impaired memory. *Robertson et al* encountered numerous instances of mild increase in ventricular size with prominent sulci in patients with impairment of mental function suggesting post traumatic cerebral atrophy.

CT finding of Porencephaly was most often associated with abnormal behavior and impaired mental function (31%). In study by *Lanksch et al*, 32% of tissue defects showed personality changes which is very comparable to the figures in our study

CONCLUSION

1. Majority of patients (54%) in our study fall in age group of 20 – 40 yrs with male predominance (M:F = 61:14). 65% of our patents presented with sequelae within 1 yr of head injury.
2. Vehicular accidents are the commonest mode of injury (84%) as seen in our study.
3. Commonest CT finding was found to be Gliosis (38.67%) as a result of post traumatic sequelae followed by chronic sub dural collection (16%), Hydrocephalus (13.33%) and generalized atrophy (10.67%), rest of the CT findings were not significant irt to sequelae of head injuries.
4. There was a definite trend in our study between clinical presentation and CT finding. Presence of Gliosis on CT showed high correlation with seizures (22%) followed by hemiplegia and headache (12.5% each). Chronic sub dural collections were seen most often associated with hemiplegia (26%) and headache (22%) in our study.

Although our study was small its results are comparable to other similar works reported in the world literature. It brings out the role of CT as a safe rapid and simple diagnostic modality of detection of morphologic lesions of the brain in patients presenting with head injury sequelae. Although the subject has attracted attention of many workers more work in the field with incorporation of MR and PET would help better diagnosis, management and rehabilitation of head injury

sequelae patients and improve their quality of life.

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