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ROLE OF ROUTINE FOLLOW-UP CT BRAIN AT 24HRS AND 48HRS IN CLINICALLY STABLE MILD HEAD INJURY PATIENTS – IS IT COST EFFECTIVE?

Neurosurgery

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ABSTRACT

Aim: To study the importance of routine follow-up CT Brain at 24hrs and 48hrs in clinically stable mild head injury patients in picking up silent increase in size of hematomas and its influence in altering the management protocol and its cost effectiveness.

Materials and methods: This is a prospective type of study including 235 patients with mild head injuries admitted in a tertiary care centre near chennai. CT brain was done at the time of admission and the nature of injury recorded. Routine follow-up CT Brain taken at 24hrs and 48hrs after the time of head injury irrespective of the time of initial CT Brain. The patients were clinically monitored for any signs of increased ICP or neurologic deterioration and the radiological progression assessed.

Observation: Increase in size of hematomas & fresh hematomas are observed in 9% of patients studied, which altered the treatment protocol. Routine CT scans picks up progression of hematomas even before patient deteriorates.

Conclusion: Though the role of routine follow-up CT brain in mild head injury patients without any clinical deterioration is still contentious, it should be considered wherever possible. Routine CT scan may not be cost effective but for those families for whom it has altered the management & saved their loved ones it matters most .

KEYWORDS

head injury, routine CT, delayed hematomas

AIM:

To study the importance of routine follow-up CT Brain at 24hrs and 48hrs in clinically stable mild head injury patients in picking up silent increase in size of hematomas and its influence in altering the management protocol and its cost effectiveness.

MATERIALS AND METHODS:

- This is a prospective type of study including 235 patients with mild head injuries admitted in a tertiary care centre near chennai. CT brain was done at the time of admission and the nature of injury recorded. Routine follow-up CT Brain taken at 24hrs and 48hrs after the time of head injury irrespective of the time of initial CT Brain. The patients were clinically monitored for any signs of increased ICP or neurologic deterioration.
- All the patients included in the study didn't deteriorate clinically during the study period and there were no signs of raised ICP.
- 48hrs CT Brain was deferred for patients who were operated based on 24 hrs CT Brain findings.

INCLUSION CRITERIA:

- All Adult head injury patients with GCS 9 & above admitted during the study period were included.

EXCLUSION CRITERIA:

- Patients with bleeding diathesis and other medical problems
- Surgically treated patients
- Pediatric patients
- Patients who showed clinical evidence of deterioration during the study period were excluded.

INDICATIONS FOR SURGERY DURING THE STUDY PERIOD INCLUDES:

The recommendations of Brain trauma foundation[1] were followed for surgical management of patients

- Acute SDH of > 15mm thickness
- EDH of >25cc volume
- ICH of >30cc volume
- Posterior fossa lesions > 10cc volume
- Any lesion with midline shift of >5mm.
- Posterior fossa lesions with compression and shift of fourth ventricle.

OBSERVATIONS:

The follow up CT brain were compared with initial CT brain with Quantitative measurements and the additional changes were recorded as follows

- Increase in size of hemorrhages
- Fresh haemorrhages
- Resolution of haemorrhages

ADDITIONAL CHANGES IN REPEAT CT BRAIN:

- Of the 235 patients studied, 22 patients showed additional changes in follow-up CT Brain(chart 1) amounting to 9.3 % of total patients studied.

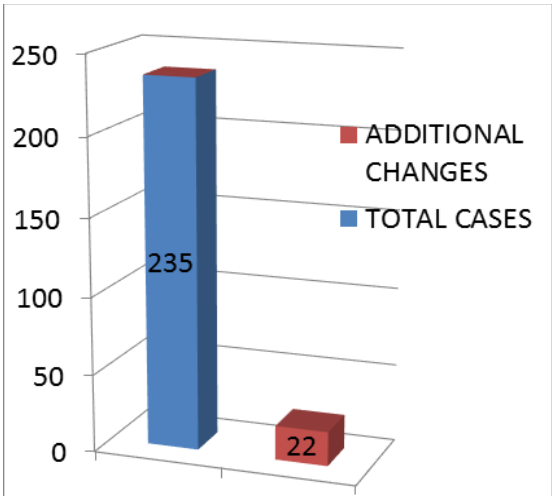


Chart1: showing additional changes in the cases studied

Of these 22 patients who showed additional changes in repeat CT brain,

- 14 patients showed increase in size of existing lesions, 8 patients showed fresh lesions
- 54 patients showed some evidences of resolution.
- Whereas, 159 patients showed no change in CT brain, depicted in (chart 2).

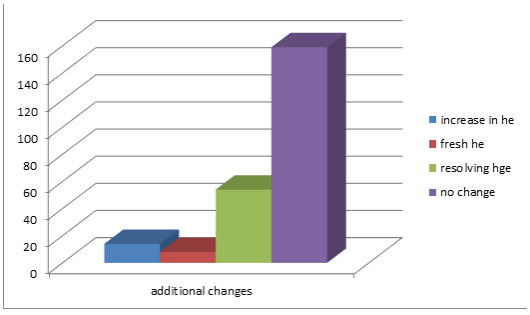
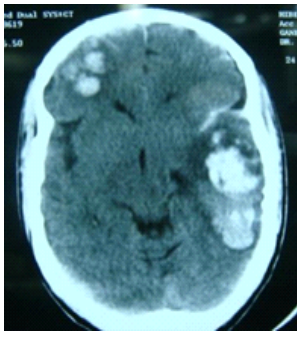


Chart2: showing the frequency of changes in follow up scans

INCREASE IN SIZE OF HAEMORRHAGE:

- In the group of 14 patients showing increase in size of existing hemorrhage(fig 1a,1b), the signs of mass effect, extent of brain edema, volume of hemorrhage, signs of raised ICT assessed.



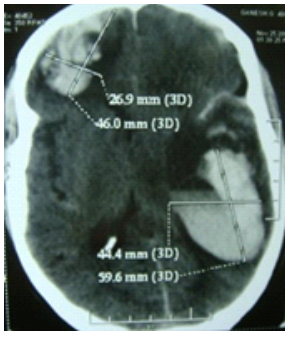


Fig 1a: Rt frontal & Lt temporal contusions

fig 1b: increase insize of contusions

- Of these 14 patients, 7 patients were managed surgically(50%) based on Brain trauma foundations recommendations for surgical management and the remaining 7 patients were managed conservatively(50%) as these patients didn't meet the criteria for surgical management(chart 3).

Chart 3: comparison of management strategies

FRESH HEMORRHAGES:

- In the group of 8 patients showing fresh hemorrhages, majority were small brain contusions and fracture hematomas(fig 2a,2b).

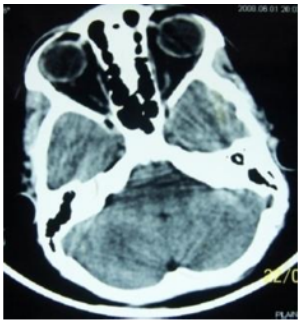


Fig 2a: Rt temporal #, no hematoma

Fig 2a: Rt temporal #, no hematoma

- Of these 8 patients who showed fresh hemorrhages, 2 patients had large extradural hemorrhages, both in temporal regions with associated fracture skull that warranted surgical management (25%) and
- the remaining 6 patients with fresh small brain contusions were managed conservatively(75%).(chart 4).

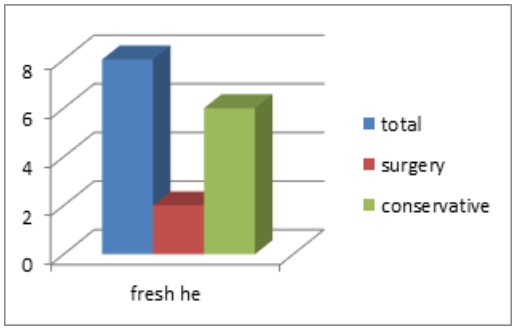
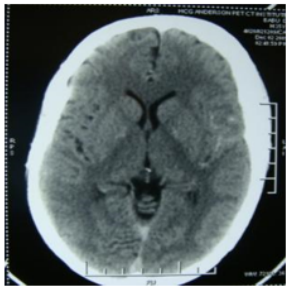


Chart 4: fresh hematomas and management strategies

RESOLVING HEMORRHAGES

In this study 54 patients showed some evidences of resolution of hemorrhage either in the form of decrease in volume or decrease in mass effect and edema(fig 3a,3b) constituting about 23%.



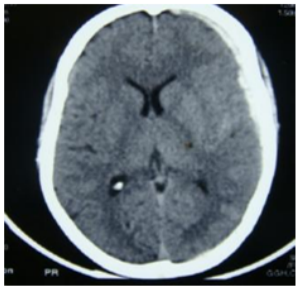


Fig 3a: Lt fronto parietal thin SDH

Fig 3b: showing evidences of some resolution

The evidences of resolution were more evident in 48hrs CT brain, seen in 50 patients and another 4 patients showed some resolution in 24hrs CT brain itself(chart 5).

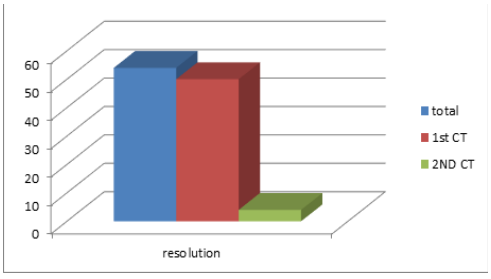


Chart 5: resolution of hematomas in follow up scans

NO CHANGES IN CT BRAIN

There were about 159 patients who showed no changes in both 24hrs and 48 hrs CT brain which constitutes 67% of studied patients(chart 6).

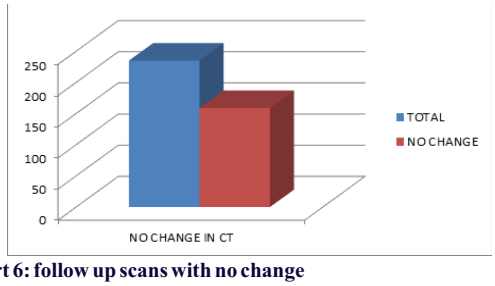


Chart 6: follow up scans with no change

24 HRS VS 48 HRS CT BRAIN

- In the group of 22 patients who showed additional changes majority were picked up by the 24hrs CT brain itself. 21 out of 22 patients showed additional changes in 24hrs CT brain itself.

CT CHANGES AND CHANGE IN MANAGEMENT

- The influence of radiologic changes identified in the follow-up CT brain, on the management were studied. Of the 22 patients who

showed changes in follow-up CT Brain, 9 patients were surgically treated(40.9%), others were managed conservatively either by increasing antiedema or addition of new antiedema measures(chart 7).

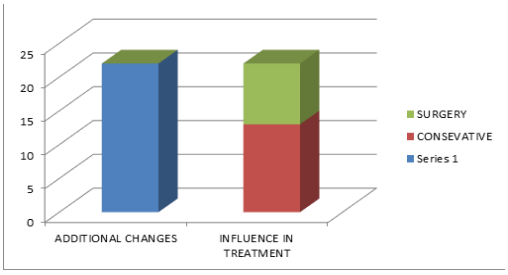


Chart 7: influence on treatment based on follow up scan

LIVES SAVED

- Of the 9 patients who underwent surgery based on follow-up CT Brain, 7 patients survived and 2 expired. Of the 2 expired patients, one patient was suspected to have fat embolism due to compound fracture of both bones leg, another patient had multiple rib fracture with lung contusion, succumbed to pulmonary complication.

RESULTS

From the observations of this study, it has inferred that parenchyma injuries are likely to increase in size. Frontal contusions and temporal contusions are notorious to increase in first 24 hours. Patients with temporal fractures are likely to develop delayed extradural hematomas.

DISCUSSION

Road traffic accidents are on the rise everywhere and it mainly affects the active young and middle aged people. Head injury is a leading cause of death and disability around the globe[2]and is the leading cause of brain damage in children and young adults.[3] Traffic on roads is growing at a rate of 7 to 10% per annum. The emergence of high energy super bikes, poor compliance in wearing helmet compounds the mortality and morbidity of head injury victims. In tamilnadu, Two wheeler accidents constitutes 38% of all road traffic accidents. Almost one fifth of the two wheeler accident victims die. Majority of these people are the sole bread winners for their respective families. A major morbidity or fatality destabilizes the family both psychologically and economically. Though mild head injuries patients fairly do well compared to their moderate and severe head injury counterparts, a small percentage of mild head injury patients of about less than 2% eventually die because of the progression of hematomas or post traumatic complications. The study concentrates on this subset of head injury patients to pick up the radiological progression of hematomas before the patient deteriorates clinically, This is based on the belief that progression of injury usually occurs by 24 hours, most commonly within 6 hours, and may be difficult to detect clinically[4], thereby trying to prevent the head injury related and mortality and morbidity. There are various studies in literature which supports or refute the role of serial CT brain head injury patients. However, many of these studies have included all patients with TBI and do not focus specifically on patients with mild TBI, which account for 75% of all patients with TBI[5]. It has been well accepted that routine followup CT brain is very useful in moderate and severe head injuries[4]. But when it comes to mild head injury patients majority of the studies discourage the practice of routine follow up CT Brain[6]. In general, mild head injury patients are well preserved with minimal or no neurologic deficit. They do not cause permanent or long-term disability, nevertheless, irrespective of the severity of traumatic brain injury, all grades have the potential to cause significant long-lasting disability.[7] Permanent disability is thought to occur in 10% of mild head injury patients. Most mild brain injuries resolves completely within a period of three weeks and almost all people with mild head injury are able to live independently and return to their respective jobs. Although a portion have mild cognitive and social impairments[8]. In a state like Tamilnadu, where there is easy access to CT brain, identifying radiologic progression before clinical deterioration by routine follow up CT brain can be strongly considered.

CONCLUSION:

Though the role of routine follow-up CT brain in mild head injury patients without any clinical deterioration is still contentious, it should be considered wherever possible. Routine CT scan may not be cost effective but for those families for whom it has altered the management & saved their loved ones it matters most .

REFERENCES:

1. Guidelines for the surgical management of traumatic brain injury, Brain trauma foundation;2006(58):3.
2. Sanjay Kumar Singh et al. Road Traffic Accidents in India: Issues and Challenges.Transportation Research procedia; 2017(25): 4708-4719
3. Manisha Ruikar et al. National Statistics of road traffic accidents in India. Journal of Orthopaedics Traumatalogy and Rehabititation; 2013(Vol 6. Issue 1):1-6.
4. Brown CV , Zada G , Salim A , Inaba K , Kasotakis G , Hadjizacharia P et al. Indications for routine repeat head computed tomography stratified by severity of traumatic brain injury. J Trauma; 2007(62):1339–45.
5. Sternbach GL. The Glasgow coma scale. J Emerg Med; 2000(19):67–71
6. Claire B Rosen1, Diego D Luy2, Molly R Deane3, Thomas M Scalea1, Deborah M Stein1. Routine repeat head CT may not be necessary for patients with mild TBI. Trauma surgery and acute care open;2018(3):1-5
7. Nayak NV, Medina B, Patel K, Homnick AT, Mohr AM, Livingston DH, Prestigiacomo CJ, Sifri ZC. Neurologic outcome of minimal head injury patients managed with or without a routine repeat head computed tomography. ; 2013[75(2)]:273-8.
8. Connon FF, Namdarian B, Ee JL, Drummond KJ, Miller JA. Do routinely repeated computed tomography scans in traumatic brain injury influence management? A prospective observational study in a level 1 trauma center. ; 2012[116(3)]:549-57.