IMPACT OF POST OPERATIVE CT ON THE DECISION OF A NEUROSURGEON IN CASE OF TRAUMATIC HEAD INJURY

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ABSTRACT

Background: Importance of post-operative serial CT scans in trauma patients is not properly studied in our setup. Objective to do this study is to note post-operative changes in serial CT scans in trauma patients and to determine how this effect neurosurgeons decision in terms of management.

Methods: In this study 212 patients of head trauma were followed. These patients were operated in Neurosurgery ward and were referred for their post-operative CT scans. Post-operative CT scans were studied to determine recurrence of the lesion, expansion of the lesion or development of any new lesion.

Results: Out of 212 patients the post-operative repeat CT scan showed significant changes in the form of expansion or recurrence of old lesion or development of the new lesion in 39 (18.3%) of patients .In them 22 (56.4%) cases required re intervention. In our study 137 (64.6%) patients were classified as having favorable outcome at discharge while 75(35.3%) cases were in the unfavorable group. Overall mortality was 26 (12.3%) cases of which 12(47.1%) cases were reported to have changes in post-operative CT scan and 6(23%) of them underwent a repeat surgical manipulation.

Conclusion: Post-operative CT scans in patients of traumatic intracranial lesion is an important monitoring tool. Changes in Neurosurgeon leading diagnosis and management after CT were common.

INTRODUCTION

CT (Computed Tomography) ranks as one of the top five medical developments in the last 40yrs, according to most medical surveys. CT revolutionized radiology, in fact medicine as a whole[1]. CT scanning is now so much advanced that even sub millimeter resolution images can be achieved in fraction of a second.[2] After advent of CT in 1972, CT is now becoming investigation of choice for many health problems so its use is increasing. The majority (80%) of the annual increase in CT use can be explained by increased frequency of CT scanning, while only 20% are attributed to increased number of patients.[3] Factors that promote the increased use of CT include its availability, efficiency, image resolution, non-invasive nature and the higher patients demand and expectation and also for medico legal purposes.[4] Most of the health care providers are in favor of this aspect; that CT has a positive effect in patients management.[5] In view of the overpopulation and vehicle use, head injury is becoming the commonest health problem. It has been estimated that approximately 50,000 craniotomies are performed annually in Pakistan alone. In the current era of health care CT is the investigation of choice for screening of traumatic head injury. Early post-operative period in patients who are operated for intracranial lesions due to trauma is the most crucial period in terms of recovery as well as the development of delayed traumatic lesions.[6] Extradural hematoma is one of the most common intracranial lesion which usually arise late, and can increase in its size and volume. It can also recur after evacuation[7]. Other changes that can be noted on post-operative CT are expansion of acute subdural hematoma and contusion, recurrent bleed in resected contusion bed, expansion of intra cerebral hemorrhage as well as recurrent or new onset intracranial hematoma. They all can worsen the prognosis of patients who are already been operated and are recovering in the ward.[8,9] There is a consensus agreement that CT brain should be repeated within 72 hours after surgery, however, the impact of post-operative CT changes and their effect on the clinical course and outcome has been described very little.[8,10]

We therefore aimed to conduct a prospective observational study where the impact of postoperative CT on clinical course and outcome is determined.

OBJECTIVE

To determine the effect of post-operative CT on the decision of a neurosurgeon and to determine its impact on clinical course and outcome.

MATERIAL AND METHODS

This is a prospective observational study done over a period of 15 months. A total of 212 patients of head trauma were referred by Neurosurgeons for CT evaluation. Prior to CT, neurosurgeons were surveyed to elicit their leading diagnosis, confidence in that diagnosis (confidence range, 0%-100%), a rule out diagnosis, and a management plan if CT were not avail-

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able. Post-operative CT were done in all these patients and surveys were repeated after post-operative CT to determine any change and to determine its impact on Neurosurgeon's management plan and also to see its effect on outcome.

Study is conducted between April 2015 and June 2016 in Radiology department and Neurosurgery department of Hayatabad Medical Complex Peshawar.

Inclusion criteria:

All patients above age of 12 years were included in this study who were subjected to post-operative repeat CT scans.

Exclusion criteria:

Patients who were discharged or expired after first CT scan.

RESULTS

There were 212 patients who were operated in Neurosurgery ward of Hayatabad medical complex for various traumatic lesions with 144 (68%) males and 68 (32%) females in a male to female ratio of 2.1 to 1. There were 104 (49%) cases where the mechanism of injury was RTA, 50 (23.6%) cases of gunshot wound, 54 (25.5%) due to fall and 4 (1.9%) cases of blast injury. The overall mean age was 34.25 years +11.59 SD. Overall on CT examination there were 88 (41.0%) cases of extra Dural hematoma (EDH), 58 (27.3%) cases of acute subtotal hematoma, 38(17.9%) cases of cerebral contusion and 28 (13.2%)cases of intracranial hemorrhage (ICH).

Out of total 212 patients 39(18.3%) cases showed changes in post-operative repeat CT scan. In these 39(18.3%) post-operative CT scans, 22 (56.4%) of cases required re-intervention. In our study 137 (64.6%) patients out of 212 patients were classified as having favorable outcome at discharge while 75(35.3%) cases were in the unfavorable group. Overall mortality was 26 (12.3%) cases of which 12(47.1%) had significant changes on post-operative CT scans and 6(23%) of them underwent a repeat intervention.

Table 1: Traumatic findings at CT brain with special reference to numbes of cases in whom changes were noted in post operative repeat CT scan.

Traumatic findings	Patients (n=212)	Patients having changes on post-operative CT(n=39)
	Frequency (%)	Frequency (%)
Extradural hematoma	88 (41%)	14(36%)
Acute subdural hemorrhage	58 (27.3%)	13(33%)
contusion	38(17.9%)	7(17.9%)
Intracranial hemorrhage	28 (13.2%)	8(20.5%)

Table 2: comparison between post-operative repeat CT scans having changes and no changes in terms of mortality, re-intervention and outcome.

Variable	Patients having no change at post-operative CT scan (n=173)	Patients having changes at post-operative CT scan(n=39)
	Frequency (%)	Frequency (%)
Re Intervention	4(2.3%)	18(46%)
Mortality	16(19.2%)	10(25.6%)
Outcome		
Favorable	115(66.4%)	17(43.58%)
Unfavorable	52(30.05%)	22(56.4%)

Significant differences were found between patients who have changes noted on post-operative CT scans and patients with no changes in CT; in terms of re-operation rate, mortality and outcome at discharge.

DISCUSSION

CT brain without contrast is the investigation of choice for traumatic head injury assessment and is an important tool for a neurosurgeon in establishing diagnosis of intracranial lesion which frequently needs surgical intervention. Gupta PK and associates[11] have concluded from their survey on traumatic head injury that there were 62.04% cases of skull fracture, 46. 33% of intracranial hemorrhages (ICH), 30.36% of Extradural hemorrhages and 19.3% of acute subdural hemorrhages (A SDH). They have also shown that more male members were involved in these injuries. Numerous other studies have shown the same trends, as males are one of the most active members of our society, they have a very dynamic day to day life and therefore are prone to injuries in motor vehicle accidents, falls in their working places etc.[11,12]

Our study also shows similar trends with overall mean age of 34.25 years with male and female in a ratio of 2.1 to 1.

Several studies have discussed timing of repeat CT in head trauma patients and many have demonstrated that almost 50% of patients deteriorate during the initial 72 hours after trauma due to expansion of existing lesions, appearance of new hemorrhagic lesions or due to diffuse cerebral swelling.[10,14,15]

Lobarto RD and coworkers have shown that 37.5% of patient who were found to have new changes on repeat CT showed progressive deterioration while

only 10% of such patient showed no further deterioration during the early post trauma period.[16]

Contrary to this, Sifri ZC and associates[17] investigated the value of follow up CT scan in patients with minimal head injury and small intracranial hematoma. They concluded that repeat CT scan of skull and brain in patients with minimal head injury and normal neurological examination does not result in change at management or intervention is not recommended. In this study we noted that 39(18.3%) of patient showed significant changes in post-operative repeat CT and 56.4% of those (n= 39) underwent a repeat intervention. Similarly among patients who had changes in post-operative CT, 22 (56.4%) cases had an unfavorable outcome. Only 2.3 %(n= 4) of patients among those who have a no changes noted in post-operative CT underwent re-intervention. These findings in our study shows the importance of post-operative repeat CT in traumatic head injury and its impact on Neurosurgeons decision of repeat surgery.

CONCLUSION

Follow up post-operative CT scans in patients of traumatic intracranial lesion is an important monitoring tool. Changes in Neurosurgeon leading diagnosis and management after CT were common.

Serial CT scans in post-operative patients of traumatic intracranial lesions can show appearance of new lesions or recurrence of operated lesions. Positive follow up CT during early post-operative period can affect significantly the clinical course and neurological outcome of the patients.

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