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Research Article

EARLY CT SCAN CAN BE DECEIVING IN PEDIATRIC HEAD INJURY

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ABSTRACT

CT scan brain is routinely done as initial investigation in all head injury patients. Sometime, the scans are within 3 hours, with evidence of minimal bleed, in such cases should CT brain be repeated is still a matter of debate, in view of radiation exposure to pediatric patient. We present a case of 12-year-old child, whose CT brain showed minimal extra-axial bleed and was alert, playful with only complaints of mild headache and vomiting. Repeat CT showed large EDH which required surgical intervention. Risk – benefit ratio of radiation in pediatric patient should be considered meticulously and unnecessary scans should be avoided. But if patient have increased ICP signs and symptoms, repeat CT may be necessary and expedient

INTRODUCTION

Background

Since 1970s, after commercial availability of computed tomography (CT) scan, its use has been exponentially increasing. Repeat CT are also done routinely for reconfirmation and also to avoid litigations. An estimated 30% of computed tomography tests are reported be unnecessary. [1]Road traffic accidents (RTA) are the major cause of mortality and morbidity in developing nations. According to official statistics 150,785 persons were killed and 494,624 injured in road traffic crashes in India in 2016. However, this is probably an underestimate for injuries, as not all injuries are reported to the police. [2] In these trauma cases CT brain is routinely done on arrival to Emergency department, irrespective of the interval from trauma. Sometime, the scans are within 3 hours with evidence of minimal bleed, in such cases is repeat CT required in a conscious, alert, playful patient with only complaints of vomiting is still a matter of debate, in view of radiation exposure to pediatric patient. We present a case of pediatric head injury, who presented with history of vomiting and headache only.

Case Report

12 years old boy, known case of Goltz syndrome child born to mother who suffered from Chikungunya in gestational period. He was operated for bone deformity corrections, for all the limbs at other hospital. He presented to us in emergency with history of head injury about a hour ago, and complaints of vomiting and headache. He was conscious, alert, GCS 15/15, no focal neuro deficit, ambulant, no external injury. All the limbs were with caves deformity and postoperative status. CT Brain showed small extra-axial bleed, [Figure 1] was managed conservatively.

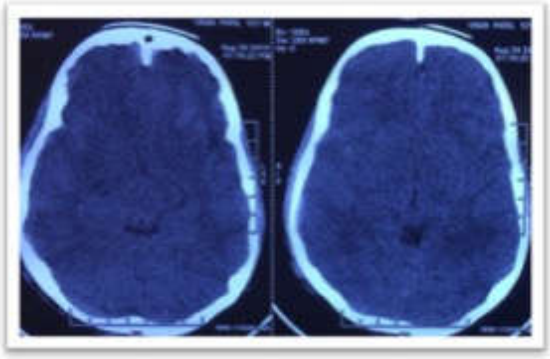

Fig 1 Early CT scan brain

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He was looking drowsy and had hypotension so was shifted to ICU, and managed with IV fluids for dehydration and other medications and management as per hospital trauma protocol. In view of query subclinical seizures, EEG was done showed abnormal discharges and anticonvulsant was upgraded. He improved symptomatically and was shifted to ward. During his course, he had same intensity of headache and few episodes of vomiting, and was alert, active, playful. So, conservative management was continued. Repeat CT was done after 3 days, showed large EDH. [Figure 2]

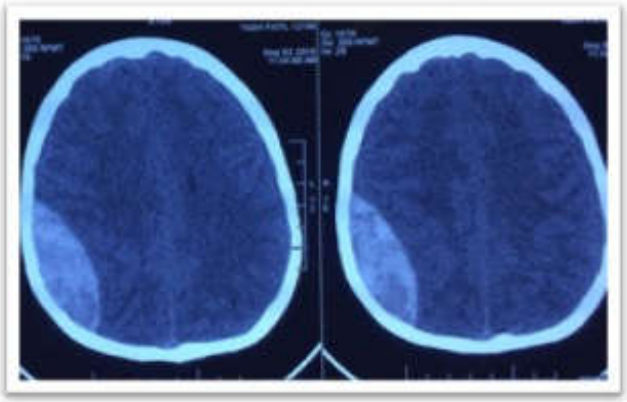

Fig 2 Repeat CT scan brain

He was planned for emergency surgery and craniotomy with evacuation of EDH was done. Postoperatively he improved, headache and vomiting decreased. Repeat CT brain showed post op changes and no EDH. [Figure 3]. He was later discharge in stable condition.

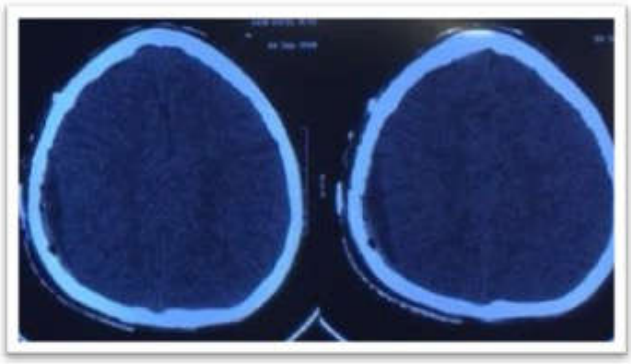

Fig 3 Post-op CT scan brain

DISCUSSION

Since the advent of CT scan, it has become the principle diagnostic tool in the evaluation of head injury, as it aids in rapid and precise detection of intracranial pathology.[3] It is estimated that more than 62 million CT scans per year are currently obtained in the United States, including at least 4 million for children. [4] There are 931 CT-scans and MRIs currently exist in India, the actual number of CT-scans and MRIs in India exceeds IRIA estimates by nearly 133 percent. [5] The indications for timing for CT scan and repeat scan are not well defined. In patients managed conservatively the role of repeat scan has been a subject of debate. [3]

According to the Pediatric Emergency Care Applied Research Network (PECARN) study results, the low-risk patients with TBI are the majority (98%) of those presenting to emergency departments across the US. The children with only loss of consciousness and nothing else had a very low rate of clinically important brain injuries – only 0.5 percent, or 1 in 200 children.[6]Radiation exposure is a concern in both adults and children. However, children are more sensitive to radiation than adults, have longer life expectancy than adults, and may receive a higher radiation dose than necessary if CT settings are not adjusted for their smaller body size. [7]A CT of the abdomen, that lasts less than a minute, delivers up to 10 millisieverts of radiation that one would otherwise get only over a three-year time period from the environment. The dose adds up when a scan is repeated. Radiation dose children and young adults can receive from CT are associated with increased risks of leukaemia and brain tumours.[8]

In the present case, he was alert, active, playful, but had vomiting and mild headache A prospective study of 152 patients found that vomiting was associated with positive CT findings in 40–45% of adult cases [9], but in children post-traumatic vomiting is reported as more likely related to personal or familial disposition to vomiting than the presence of intracranial lesions. [10]. In the present case, his CT scan was done after 3 days, which showed large EDH and subsequently required surgical intervention. There is always a dilemma, that should a scan be repeated and after what interval in a pediatric patient whose initial scan showed only minimal bleed, considering the risk of radiation exposure.

There are articles to support and dissuade the advocacy of repeat CT scan in mild head injury. Few authors advise clinical monitoring alone is safe and sufficient in patients in order to avoid exposure to repeat radiographic imaging.[11] CT scan should be repeated when there is clinical deterioration, and if scan is done early within 3 hours of trauma.[3] We suggest that in pediatric head injury should not be taken lightly, and the risk benefit ratio of the CT scan should be taken into account and persistent vomiting should be also taken as indication for repeat CT scan.

CONCLUSION

Initial CT scan Brain if done within 3 hours of trauma can be deceiving. If such early scan patient has vomiting or headache, repeat CT scan can be beneficial, and should be done within 24 hours. Risk-benefit ratio of radiation in pediatric patient should be considered meticulously and unnecessary scans should be avoided. But if patient have increased ICP signs and symptoms, repeat CT may be necessary and expedient.

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