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Role of Computed Tomography in Penetrating Orbital Trauma

Medical Science

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ABSTRACT

Fifty eight patients with penetrating orbital and ocular injuries reported to a forward hospital between 2008 and 2015. The injuries were caused by improvised explosive devices/artillery shells (84%) or by bullets (16%). They were evaluated by emergency CT (Computed Tomography). We report our unique experience in pre and post operative evaluation of these injuries. The CT findings, their usefulness and impact on management are discussed.

INTRODUCTION

Penetrating ocular and orbital trauma due to missile injuries are potentially dangerous as the fragments can involve any part of eye, orbit, optic nerve or optic pathway. The extent of damage cannot be accurately assessed by clinical examination or conventional radiography, as the missile and associated damage can not be elucidated with these methods. Computed tomography seems to be an ideal investigation modality to accurately localize these foreign bodies and to demonstrate the extent of damage. This has vital therapeutic implication as precise anatomical localization is mandatory prior to their attempt at removal. Inspite of very promising prospects, no proper study is available so far and limited literature is available as regards the utilization of CT scan in evaluation of these injuries. This report details our experience of CT in penetrating missile ocular and orbital injuries.

PATIENT AND METHODS

A latest generation state of art CT scan was used in the present study. Penetrating missile injuries of eye that were received in this hospital during 2008 and 2015 form the basis of this report. The patients often had multiple injuries and prioritization for treatment was done as per standard protocols (1,2). Neurological assessment was done as per Glasgow coma scale. 15 patients underwent operations as part of management. Post operative CT scans were done in all cases having associated head injury.

RESULTS

A total of 58 patients underwent CT scans during 2008 and 2015 for penetrating injury to eye and orbit. Their mean age was 24 years (range 19-54 years). All patients were male. Gun shot wounds were seen in 11 patients and splinter injuries in the remaining 47.

In case of penetrating ocular injuries, CT scan accurately revealed underlying pathology in terms of presence and location of foreign bodies, bony fragments, fractures and missile track. CT findings are listed in Table 1. Three patients with associated multiple injuries died before they could be operated. Postoperative mortality occurred in 3 patients due to multiple associated injuries. Serial postoperative CT scans were done in 09 patients having associated head injury.

One patient was referred to CT scan after eye evisceration as a big splinter seen in plain X-ray in orbit could not be felt and removed during evisceration. CT scan revealed a deep seated splinter partly in the orbit and partly intracranial. It was removed by neuro-surgeon.

Two patients had optic nerve transection by a splinter and could only be localized by CT scan. One patient presented with bitemporal hemianopia & CT Scan done later revealed optic chaismal injuries by splinters

Maxillary fractures, sinus involvement and retained foreign bodies were common findings. 3-D reconstruction of badly mutilated cases was done. This was of great help for reconstructions with help of maxillo-facial surgeon.

DISCUSSION

CT scan is an unique investigative modality for non invasive evaluation of ocular injuries caused by bullets and splinters. In fact, in no other area has CT a greater effect on patient management than in cases of the traumatized patient (3-7). CT has been shown to be an excellent tool in haemodynamically stable patients. It provides accurate information about injury, delineates extent and severity of associated bony injuries and precisely localizes splinters and bullets. Thus pre operative information is vital to critical decision making. CT scan assumes grater role in evaluation of these injuries as MRI is contraindicated in presence of metal projectiles. (8-10)

Table 1
CT findings in ocular & orbital injuries (n=58)

Findings	Number of patients
Orbital fractures	25
Vitreous hemorrhage	31
Retinal detachment	07
Associated intracranial fragment	01
Optic nerve transection	02
Metallic foreign bodies (IOFB)	27
Optic chaismal injuries	01
Maxillary fractures	21
Sinus involvement	17
Metallic foreign bodies(Intraorbital)	28

Note:- Many patients had multiple findings

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