



# Craniofacial Injury in a Child by Agricultural Fan Blade: A Case Report

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## Abstract

Farm machine-related injuries in children are common modality of head injury. We describe here a case of threshing fan blade injury to head and its successful management. A 10-year-old male was brought to the emergency department of All India Institute of Medical Sciences (AIIMS) Patna with the complains of accidental fall on the fan blade of the thresher machine. On arrival he had a Glasgow Coma Scale of E1VTM5 status, bilateral pupil mid-dilated and sluggish reaction to light. On secondary survey, he had a lacerated wound of size 15 × 4 × 2 cm extending from left side forehead to right temporal region exposing bone and brain parenchyma herniation through the wound. A noncontrast computed tomography head showed B/L frontal contusion with gross edema, subarachnoid hemorrhage, and intraventricular hemorrhage. There was fracture of bilateral frontal bone extending to right parietotemporal bone. Patient was taken to operating room, where after painting and draping, the wound was irrigated with normal saline. The herniated brain was removed, securing hemostasis with surgical and Bovie cautery. He underwent a prolonged neurorehabilitation and made a complete recovery after 3 months of injury. Bihar is an eastern part of India where agriculture plays a major role in rural livelihood. Winnowing fan machines are used to separate the grain from the husk. Children have peculiar behavior to inspect things and this curious behavior leads to coming in contacts with the open blade. Falling on even a stationary blade can sometimes lead to head injury. Early surgery with meticulous wound debridement and closure of dura is required. Covering the fan blade as well as careful parenting of children will prevent further injuries.

## Keywords

- ▶ farm-related brain injury
- ▶ fan blade injury
- ▶ head injury
- ▶ winnowing machine
- ▶ tertiary center

## Introduction

Bihar is predominantly an agriculture-based state. Farm machine-related injuries in children are common modality of head injury.<sup>1-3</sup> We describe here a case of threshing fan blade injury to head and its successful management.

## Case Report

A 10-year-old male was brought to the emergency department of All India Institute of Medical Sciences (AIIMS) Patna with the complaints of accidental fall on the fan blade of the thresher machine (▶ **Fig. 1**). On arrival, he had a Glasgow Coma Scale

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**Fig. 1** Agricultural machine causing fan blade injury.

(GCS) of E1VTM5 status, bilateral pupil mid-dilated, and sluggish reaction to light. On secondary survey, he had a lacerated wound of size  $15 \times 4 \times 2$  cm extending from left side forehead to right temporal region exposing bone and brain parenchyma herniation through the wound (**Fig. 2**). Baseline laboratory parameters showed hemoglobin of 12.1, total leucocyte count of 12,000, platelet count of 2,35,000, and serum  $\text{Na}^+$  of 136,  $\text{K}^+$  of 4.2

A noncontrast computed tomography (NCCT) head showed B/L frontal contusion with gross edema, subarachnoid hemorrhage, and intraventricular hemorrhage. There was fracture of bilateral frontal bone extending to right parietotemporal bone (**Fig. 3**). A diagnosis of penetrating

compound head injury by agricultural fan blade was made. Patient was taken to operating room (OR), where after painting and draping, the wound was irrigated with normal saline. The herniated brain was removed, securing hemostasis with surgical and Bovie cautery. Lax duraplasty was done with harvested pericranium and wound closed in layers (**Fig. 4**).

Postoperatively patient was shifted to neuro intensive care unit and was kept on sedation and mechanical ventilation. He was started on cerebral decongestants, broad-spectrum antibiotic, and antiepileptic. On postoperative day 1, GCS was E1VTM5 status. A repeat NCCT head showed development of gross edema in the brain. Cerebral decongestants were continued and barbiturate coma was induced for next 48 hours. Tracheostomy was done on postoperative day 4. A repeat NCCT head on postoperative day 8 showed resolution of edema. His GCS also improved to E3VTM6 status (**Fig. 5**). On postoperative day 14, he became E4VTM6. He was later shifted toward where he was decannulated. He developed left-sided hemiparesis for which he was started on physiotherapy. He underwent a prolonged neurorehabilitation and made a complete recovery after 3 months of injury (**Fig. 6**).

## Discussion

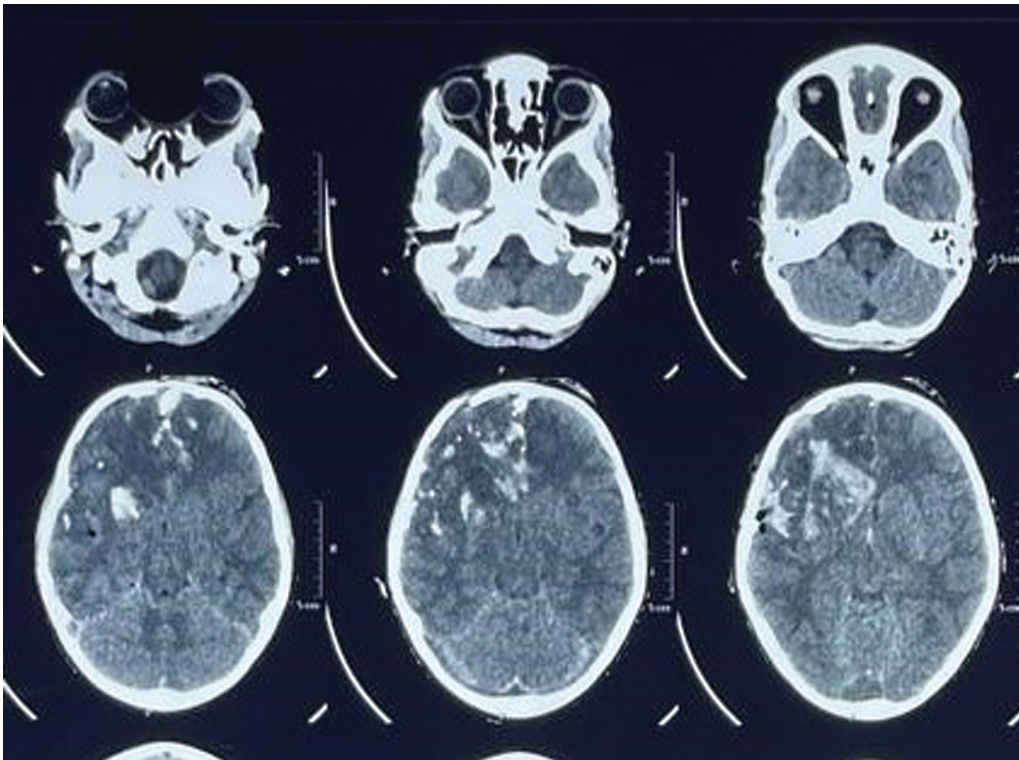
Farm-related brain injuries are not uncommon in agriculture-based system.<sup>1</sup> Bihar is in eastern part of India where agriculture plays a major role in rural livelihood. Winnowing fan machines are used to separate the grain from the husk.<sup>4</sup> These winnowing machines are made by local blacksmith, which are open and potentially dangerous mode of injury. They are used in open fields with no fencing around the machine.

Children have peculiar behavior to inspect things and this curious behavior leads to coming in contacts with the open blade. Even sometime falling on the stationary blade can also lead to head injury.<sup>2</sup>

Such cases need urgent referral to a tertiary center dealing with such kind of injury. A NCCT head should be done to



**Fig. 2** Preoperative clinical image of patient showing extent of injury with brain herniation.



**Fig. 3** Preoperative computed tomography showing B/L frontal contusion with gross edema, subarachnoid hemorrhage, and intraventricular hemorrhage.

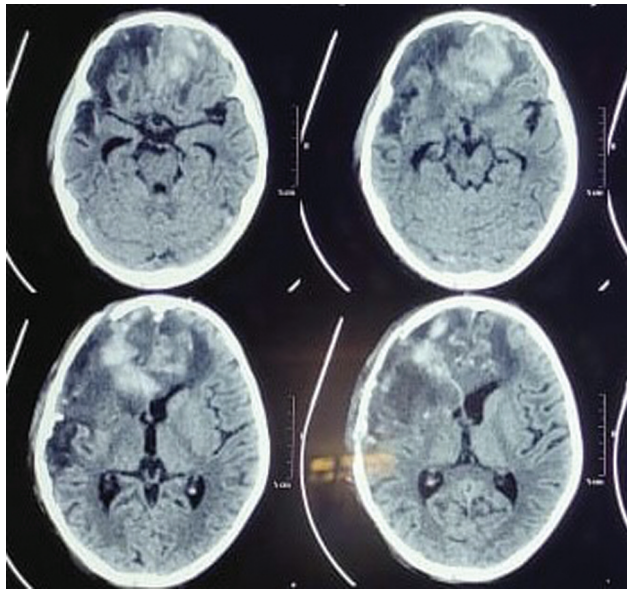
localize the size of contusion/laceration. Patient was taken to OR and careful debridement with removal of foreign body was done. Thorough lavage with saline and primary closure of dura with augmented pericranium was done. In the

postoperative period, patient was kept on broad-spectrum antibiotics, cerebral decongestants, and antiepileptic.

Delay in referral coupled with gross contamination may lead to wound infection.<sup>2,3</sup> Postoperative cerebrospinal fluid



**Fig. 4** Postoperative image showing primary closure of the wound.



**Fig. 5** Resolving edema on postoperative day 8.



**Fig. 6** Follow-up and complete recovery.

leak is another dreaded complication. However, the result is good if such patients are operated early and meticulous debridement is done as we see in our case.

The manufacturer of such fans should make necessary engineering to cover the fan blade with protective cage. Moreover, such place of grain harvesting should be fenced coupled with educating the children to decrease the incidence of fan blade injury.

## Conclusion

Fan blade used in agricultural grain harvesting can lead to devastating head injury in children. Early surgery with meticulous wound debridement and closure of dura is required. Covering the fan blade with careful parenting of children will prevent further injuries.

## Conflict of Interest

None declared.

## References

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