

# Emergency surgical management of traumatic superior sagittal sinus injury: An unusual case

Sudhansu Sekhar Mishra, Souvagya Panigrahi, Srikant Das, Sanjay Kumar Behera

Department of Neurosurgery, S. C. B. Medical College and Hospital, Cuttack, Odisha, India

## ABSTRACT

Head injuries following fall of heavy objects are not very uncommon in developing countries. However, compound depressed skull fracture with superior sagittal sinus (SSS) laceration caused by a flying asbestos fragment in a stormy afternoon is an unusual mode of head injury. We report such an unusual case of compound depressed skull fracture by an asbestos fragment injuring the middle third of SSS and its successful surgical management in a 14-year-old child. The role of computed tomography (CT) scan of head with 3D reconstruction is highlighted. Early steps taken in this case to check the profuse bleeding, which helped save the life of this boy is interesting to note.

**Key words:** 3D reconstruction, flying asbestos, profuse bleeding, superior sagittal sinus laceration, surgical management

## INTRODUCTION

Treating traumatic dural sinus injuries puts a high demand on every neurosurgeon. General surgeons are usually afraid of dural sinus injury as a possible complication in the emergency treatment of severe head injury patients. Therefore, knowledge of appropriate treatment of this kind of head injury is essential. Recent development in computed tomography (CT) scan in the form of 3D reconstruction is helpful in this scenario as the preoperative knowledge of the anatomical site is essential for proper planning of surgical management of dural sinus injury.

## CASE REPORT

A 14-year-old boy sustained head injury over the vertex while walking. A piece of asbestos hit his head, penetrated, and caused a compound depressed fracture over the superior sagittal sinus (SSS). He was exsanguinated with blood and became unconscious at the scene of injury. As he was rushed to the nearby primary health center (PHC), the asbestos piece was removed, profuse bleeding was checked by scalp suturing with a piece of gauge *in situ*, and

he was referred to a higher center immediately. On arrival to our emergency department, his Glasgow Coma Score (GCS) was 12/15 and pupils were equal and reacting. Local examination showed a stitched wound lying over his skull in the midline at its junction with the coronal suture [Figure 1].

Following resuscitation, emergency CT of the head with 3D reconstruction was done. This demonstrated a subgaleal foreign body (FB), compound depressed skull fracture in the midline, and underlying brain contusion [Figure 2]. From the site of skull and brain injury as seen in the 3D reconstructed view of CT scan, we suspected injury of the middle third of SSS. The patient was shifted to emergency operation theater with two units of whole blood kept ready. On exploration of the wound, a piece of gauge was found in place providing the tamponade effect [Figure 3]. The gauge piece was removed. Exploration of the wound revealed depressed skull fracture with a piece of bone entering into the brain matter [Figure 3]. A circumferential craniectomy was done with wide exposure of the SSS. It was found to be lacerated laterally with surrounding brain contusion. Thorough debridement was done, contused brain evacuated, and the lacerated sinus was suture repaired. Perioperative blood loss of about 200 ml, mostly from the injured sinus, was taken care of by transfusing one unit of blood. Postoperative period was uneventful and he had no neurological deficits, evidence of infection, or symptoms of raised intracranial pressure (suggestive of SSS thrombosis) at the time of discharge. CT scan head with 3D reconstruction at the time of

Access this article online	
Quick Response Code:	Website: www.ijns.in
	DOI: 10.4103/2277-9167.102286

**Address for correspondence:** Dr. Souvagya Panigrahi, Department of Neurosurgery, S. C. B. Medical College and Hospital, Cuttack, Odisha – 753 007, India. E-mail-souvagya.ms@gmail.com

discharge showed no new hemorrhage [Figure 4]. His parents were advised to bring the child for cranioplasty at a later date.

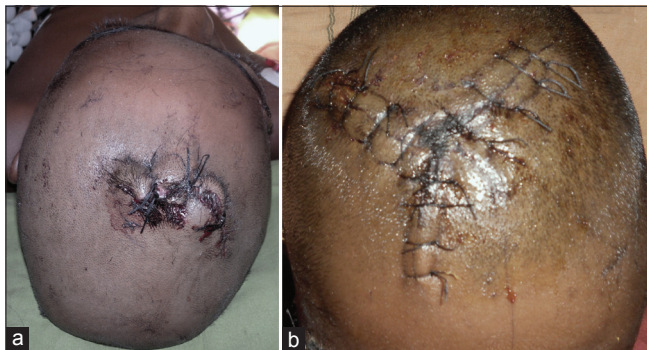
### DISCUSSION

SSS injury is the most common dural sinus injury with a mortality rate of about 41%.<sup>[1]</sup> Bleeding from the sinus adds significantly to the mortality. Checking blood loss at the earliest is life saving as it has been in our case.

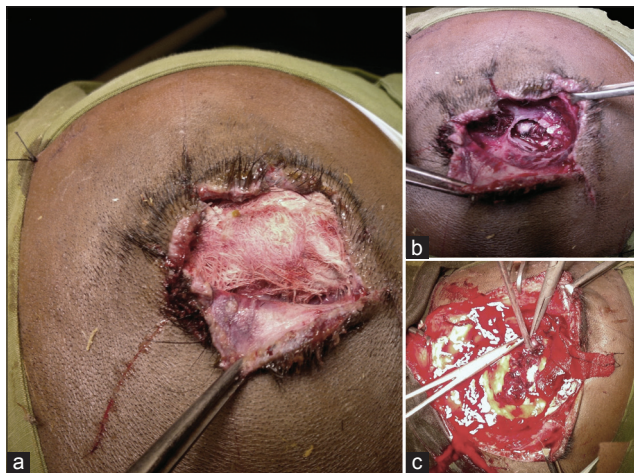
Depressed skull fractures are diagnosed by conventional CT scan of head. In addition to that, X-ray skull helps to localize the fracture site. Recent development in CT scan in the form of 3D reconstruction obviates the need of X-ray skull. Also, it demonstrates the exact site of skull bone fracture and underlying brain lesion. Preoperative knowledge of the anatomical site is essential for proper planning of surgical management of dural sinus injury as it is in our case.

It is a common neurosurgical wisdom that depressed cranial fractures over the SSS should not be elevated

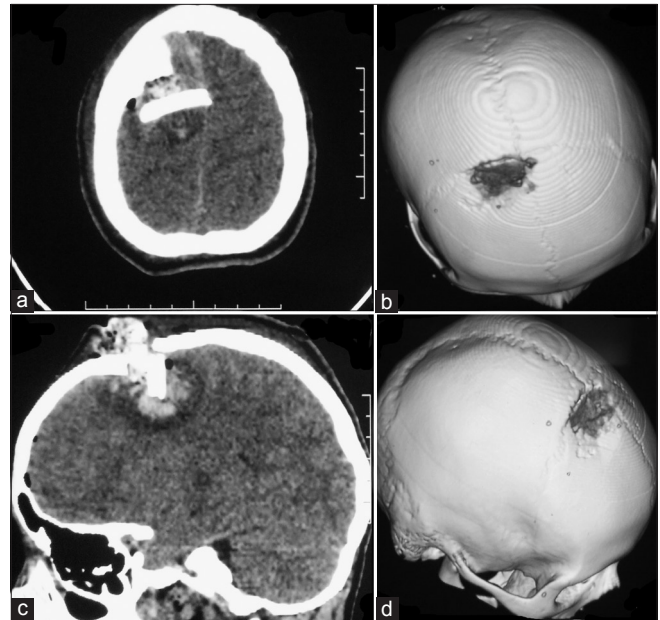
because of the risk of fatal venous hemorrhage. But surgical intervention is indicated in some patients who involve FBs like nails<sup>[2]</sup> or stones.<sup>[3]</sup> Smooth depression can carefully be elevated without any significant bleeding. However, depressed fracture with sharp bony spicule overlying major sinus can result in major bleeding from sinuses,<sup>[4]</sup> which demands immediate surgical intervention. Sinus repair may be required in these cases. Some depressed fractures can cause SSS thrombosis,<sup>[5-7]</sup>



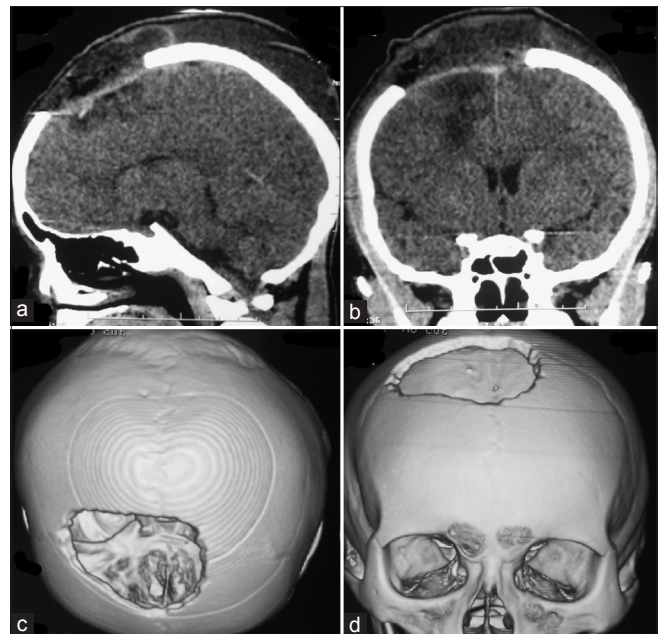
**Figure 1:** (a) Preoperative and (b) postoperative photographs showing the site of injury



**Figure 3:** Intraoperative photographs showing (a) gauge piece *in situ*, (b) skull and brain lesion, and (c) repair of SSS



**Figure 2:** CT brain (a) axial (c) sagittal views show the compression of the SSS and presence of a FB. (b and d) 3D reconstruction images showing the site of skull defect



**Figure 4:** Postoperative CT brain (a) sagittal (b) coronal views and (c and d) 3D reconstructed view

leading to late deterioration. Our patient warranted early surgical treatment in view of iatrogenic FB to prevent infection and delayed development of SSS thrombosis. Also, the presence of a bony spicule in brain parenchyma was a strong indicator of surgery in our case.

We believe that arresting blood loss at the earliest in SSS injury patients is life saving. This can be achieved even in PHCs by general practitioners. Although bleeding from the SSS is a problem, favorable outcome can be ensured at surgery by wide exposure and meticulous sinus repair. Localization of the site of injury by CT scan of head with 3D reconstruction is of paramount importance in preoperative planning.

## REFERENCES

1. Meier U, Görtner F, Knopf W, Klötzer R, Wolf O. The traumatic dural sinus - A clinical study. *Acta Neurochir (Wien)* 1992;119:91-3.
2. Sani S, Jobe KW, Byrne RW. Successful repair of an intracranial nail-gun injury involving the parietal region and the superior sagittal sinus: Case report. *J Neurosurg* 2005;103:567-9.
3. Balak N, Aslan B, Serefhan A, Elmaci I. Intracranial retained stone after depressed skull fracture: Problems in the initial diagnosis. *Am J Forensic Med Pathol* 2009;30:198-200.
4. Ozer FD, Yurt A, Sucu HK, Tektaş S. Depressed fractures over cranial venous sinus. *J Emerg Med* 2005;29:137-9.
5. Tamimi A, Abu-Elrub M, Shudifat A, Saleh Q, Kharazi K, Tamimi I. Superior sagittal sinus thrombosis associated with raised intracranial pressure in closed head injury with depressed skull fracture. *Pediatr Neurosurg* 2005;41:237-40.
6. Tanaka H, Kobata H. Superior sagittal sinus occlusion caused by a compound depressed skull fracture: A case treated by emergency surgery. *No Shinkei Geka* 2004;32:753-8.
7. Yadav YR, Parihar V, Sinha M, Jain N. Simple depressed skull fracture causing posterior third superior sagittal sinus occlusion and elevated intracranial pressure. *Neurol India* 2009;57:830-1.

**How to cite this article:** Mishra SS, Panigrahi S, Das S, Behera SK. Emergency surgical management of traumatic superior sagittal sinus injury: An unusual case. *Indian J Neurosurg* 2012;1:149-51.

**Source of Support:** Nil, **Conflict of Interest:** None declared.