



# Attempted Suicide by Intracranial Nail Penetration: A Case Report and Review of Literature

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Intracranial nail penetration injuries due to suicide attempts have been previously reported. The most commonly involved tools are pneumatic nail guns. However, patients who attempt suicide by hammering nails into their own heads are rare. We report the case with a history of schizophrenia who attempted suicide by hammering three nails into his head. He was discharged after emergent nail removal and proper postoperative treatment without neurological deficit at one-year follow-up. Because life-threatening injuries may also result from damage to other organ systems, the management of these injuries should follow the Advanced Trauma Life Support guidelines. Surgeon should perform either extraction or craniotomy according to complexity of the injuries. Another major issue is the prevention of future suicide attempts.

**Key words:** attempted suicide, intracranial nail penetration

## Introduction

Most intracranial nail penetration injuries result from industrial accidents and suicides. The prognoses of patients with intracranial nail penetration injuries depend on the injury location. Although devastating complications are uncommon, reports of such complications are increasing.<sup>1-5</sup> Many of such injuries resulted from a single nail penetrating into the head owing to a suicide attempt during the onset of acute psychiatric disturbances. The most commonly involved tools are pneumatic nail guns.<sup>1-4</sup> However, patients who attempt suicide by hammering nails into their own heads are rare.<sup>5</sup> Here, we report a 49-year-

old man with a history of schizophrenia who attempted suicide by hammering three nails into his own head.

## Case Report

A 49-year-old man, who had a 12-year history of schizophrenia and undergone regular medical treatment, attempted suicide by hammering three nails into his own head at home. Afterwards, he was brought to our emergency department (ED) where his consciousness was found to be clear without any emotional disturbances. He was fully aware of his surroundings and had normal muscle strength. He denied experiencing auditory hallucinations. Physical examination demonstrated no other traumatic

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injuries. His pupils were both 3 mm in size with symmetrical reaction to light. There were no obvious focal neurological deficits. Skull radiographs revealed two 5 cm nails penetrating into the cerebral parenchyma and one situated on the skull near the midline (Fig. 1).

Emergent brain computed tomography (CT) without contrast showed no evidence of intracerebral hemorrhage (Fig. 2). After tetanus vaccination, emergent operation was performed by making a 5 cm skin incision over each nail entry, followed by careful removal of the nails with pliers. The whole nail extraction process was uneventful with minimal blood loss. The wounds were thoroughly irrigated with normal saline before closure. Immediate postoperative follow-up brain CT (Fig. 3) showed minimal pneumocephalus without evidence of intracerebral hemorrhage. He was transferred to the intensive care unit postoperatively and extubated on the same day. Cefazolin was administered as prophylactic antibiotics for two days. We transferred him to the psychiatric ward two days after operation without notable neurological deficits. No sequelae were noted during the one-year follow-up period.

## Discussion

Because patients with intracranial nail penetration injuries may have concomitant life-threatening damage to other organ systems, the Advanced Trauma Life Support (ATLS) guidelines remain the gold standard of management. Here we report a case of attempted suicide by self-hammering of nails through the skull.

Several previous reports have described foreign object penetration of the head. Despite the apparent severity on radiological examination, the morbidity and mortality associated with these injuries were low. Nevertheless, although most intracranial nail penetrations were without neurological deficits, some were associated with fatal outcomes.<sup>1-5</sup>

Complications of intracranial penetration injuries including epidural, subdural, intracerebral, and subarachnoid hemorrhages are related to the injury site and entry depth.<sup>1-4</sup> Endocrinological insufficiency via disruption of the hypothalamic pituitary axis, seizure disorder, and infection have also been reported.<sup>9</sup> Mortality from these low-velocity injuries is rare and

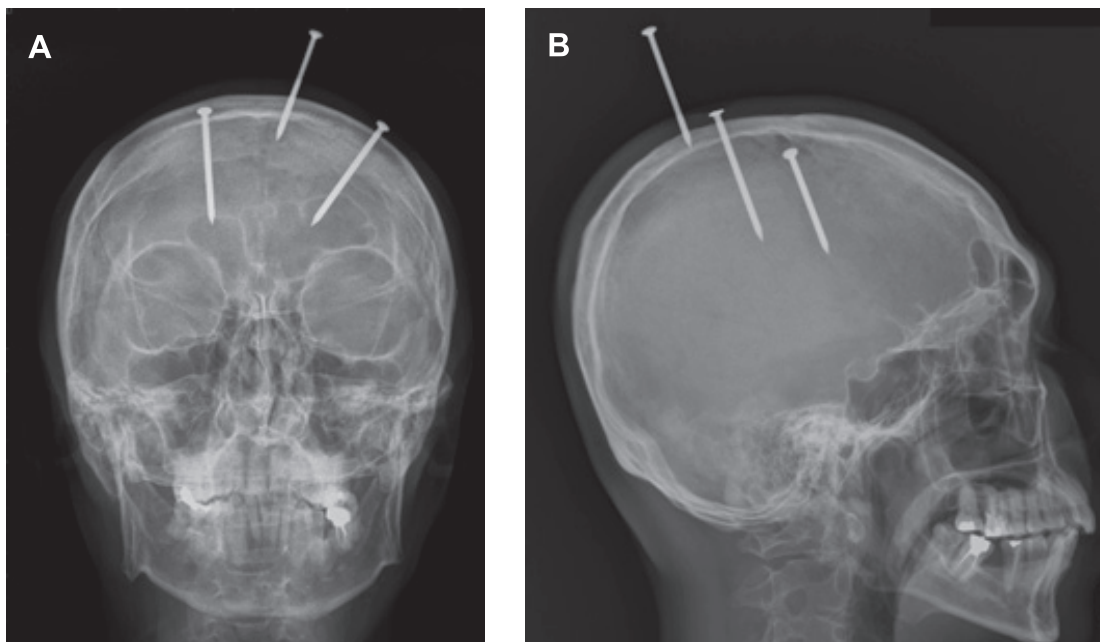


Fig. 1 (A) Anteroposterior, and (B) lateral radiographs of the skull showing two 5 cm nails penetrating into cerebral parenchyma and one near the midline.

usually occurs when the diencephalic structures are injured.

Vascular injuries can also accompany intracranial nail penetrations such as traumatic pseudoaneurysms.<sup>6</sup> According to the literature, there are two methods for managing intracranial nail penetration injuries, namely extraction or craniotomy.<sup>1-5</sup> Nails that have not completely penetrated the calvaria can be extracted without major complications,<sup>7-8</sup> while craniotomy could be performed on encountering injuries from multiple nails especially in cases of complete

calvaria penetration. However, the strategy for nail removal should be tailored according to the patient's condition and pattern of brain injury. In our case, we made 5 cm surgical incisions through which the nails were slowly extracted. An immediate small craniotomy would have been performed if hemostasis had not been easily achieved.

To the best of our knowledge, there is no official guidance on the optimal duration of prophylactic antibiotics. The risk factors for infection include retained fragments, contami-

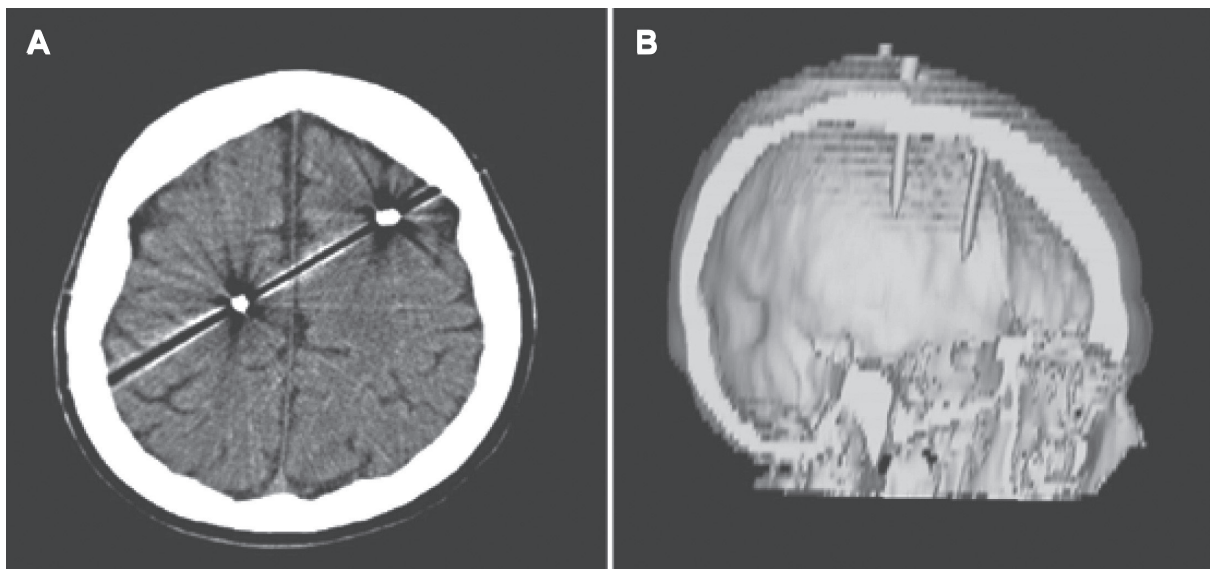


Fig. 2 Computed tomography of the brain including (A) axial view, and (B) three-dimensional reconstruction demonstrating no evidence of intracerebral hemorrhage.

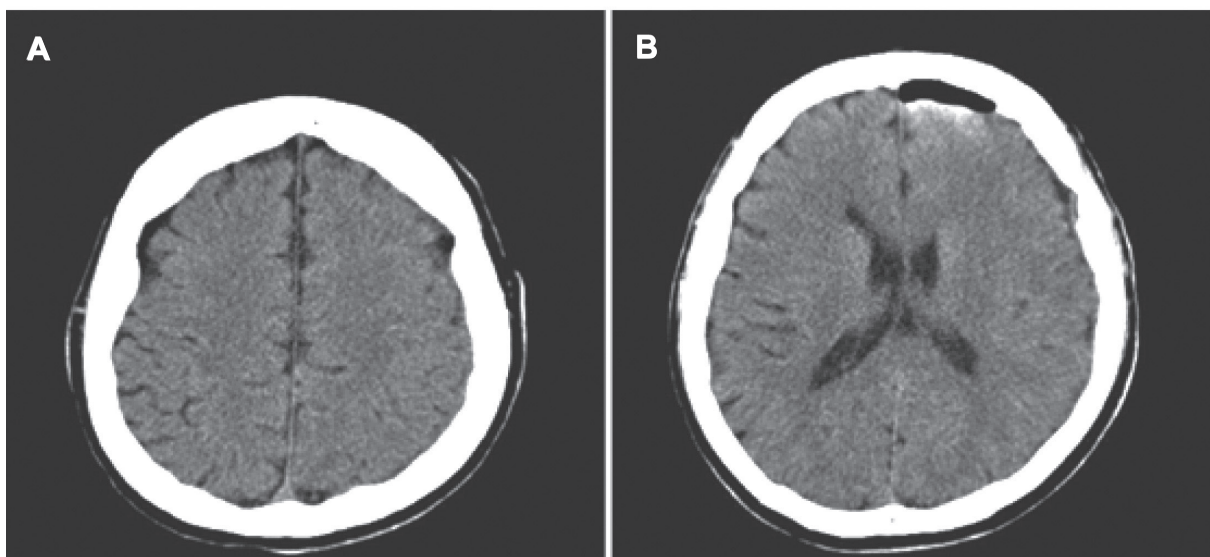


Fig. 3 Postoperative brain computed tomography showing (A) no obvious intracerebral hematoma, and (B) minimal pneumocephalus.

nation of the foreign body, and sinus penetration.<sup>9-10</sup> In our case, cefazolin was administered for two days without complications of intracranial infection.

Command auditory hallucinations, which are known to contribute to suicidal behavior,<sup>11</sup> may help in identifying psychotic individuals at risk of acute suicidal behavior. On the other hand, despite the absence of command auditory hallucinations, a diagnosis of schizophrenia and a history of attempted suicide as in our patient should also alert clinicians to the risk of self-inflicted injuries.

## Conclusion

Most non-accidental nail penetration injuries occur in patients with a psychiatric disease history. When the patient arrives at the emergency department, a complete physical examination is mandatory. Since life-threatening injuries may result from other systems, the management of these injuries should follow the ATLS guidelines. In addition to brain CT scans, digital subtraction angiography should be performed before operation if vascular injury is suspected. The choice of surgical strategy (i.e., extraction or craniotomy) depends on the complexity of the penetration injury. Prevention of further suicide attempts should be the next step of treatment.

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