

## Penetrating brain injury with 2 nails as an attempt of suicide

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**Abstract:** We report the case of a 47-year-old man that was admitted to our hospital secondary to a penetrating brain injury with 2 nails as an attempt of suicide. Emergency head CT scan revealed the presence of 2 nails intracranially. The patient underwent surgical removal of the nails by minimal craniectomy. The particularity of the case is the minimal invasiveness of the approach completed by specific follow-up imagistic studies to maximise the outcome.

### History

We present the case of a 47 years old man with no medical or psychiatric history who tried to commit suicide by shooting a nail gun in his temple. Patient was referred to the closest hospital where the CT scan of the brain revealed the presence of 2 nails intracranially. He was then transferred to our facility for definitive neurosurgical management.

### Examination

At presentation, it was noted that the patient was in remarkably good condition with a Glasgow Coma Scale score of 14 (motor 6, verbal 5, Eye 3). A close examination of the scalp revealed 2 small (approx. 5mm) penetrating wounds over right temporal fossae. No portion of any of the nails was visible on the external examination of the head as the wounds were sutured at the previous hospital. The neurological examination

demonstrated an incomplete abducens palsy of the right eye, trochlear palsy of the right eye, with diplopia and a slight right-sided hemiparesis. Admission laboratory results were within reference limits. The psychiatric evaluation confirmed acute predominantly delusional psychotic disorder. The thorough examination of the CT scan of the brain revealed 2 linear radiopacities with a linear thickness of 0,4 cm and a length of 6,2 cm in the form of nails with a right temporal bone point of entry with comminuted fracture and slight depression at this level. They pass the right temporal lobe and pass beyond the median line, the tip of one being located at the petrous part of the left temporal bone and the other's tip next the fourth ventricle (figure 1). The foreign bodies produce artefacts at the level of the brain, which does not allow the visualization of possible brain damage in their vicinity (figure 2).



Figure 1



Figure 2

#### ***Preoperative management***

Brain CT angiography was performed preoperatively to assess the circulation and demonstrated no evidence of arterial trauma (figure 3).

#### ***Operation***

Under general anesthesia, minimal right temporal craniectomy was performed (figure 4) by the means of carefully raising the comminuted bone fragments right adjacent to the nails with the help of Kerrison Rongeurs. Both nails were extracted by gentle traction

and the musculocutaneous incision was rapidly sutured.

#### ***Postoperative course***

Following the neurosurgical procedure, the patient directly underwent brain CT scan for assessing the cerebral parenchyma lesions (figure 5).

Antibiotics (Meropenem and Vancomycin) and anticonvulsants were prophylactically administered.

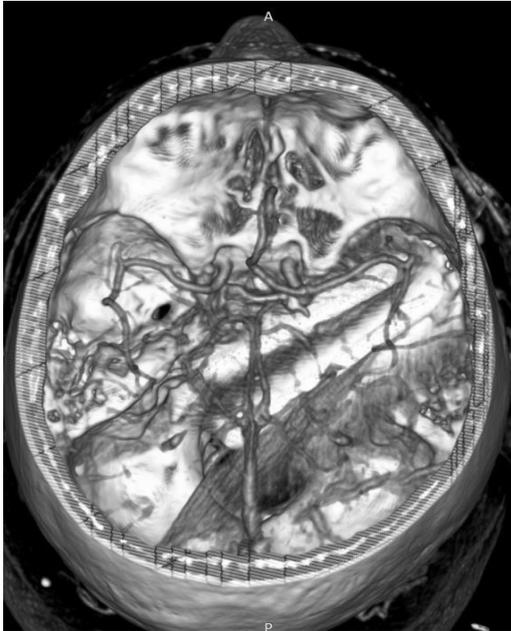


Figure 3

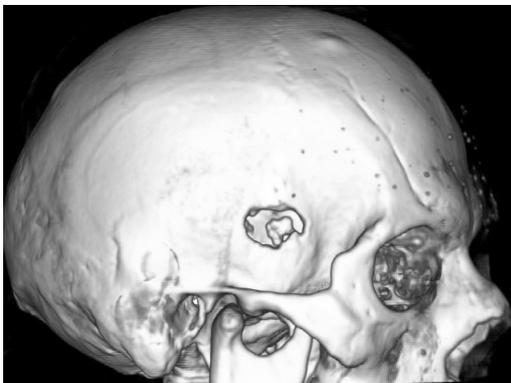


Figure 4

Infection control was done by the aid of Contrast-Enhanced CT scan of the brain 6 days postoperatively and a brain magnetic resonance 10 days after surgery, both ruling out any signs of infection. Furthermore, a cerebral angiography DSA revealed intact anterior and posterior circulation on both sides without any vascular abnormalities.

Clinically, without fever, biologically, laboratory results within reference limits and neurologically, GCS 15p with a slight improvement of palsies.

Given the patient's possible admission that all injuries were self-inflicted, he was transferred to a psychiatric service.



Figure 5 - No abnormal findings except a low-density lesion along the path of the nail and small pneumocephalus

## Discussions and literature review

In 40% of cases, penetrating skull injuries are fatal because of damage to critical structures, vascular disruption, concussion blast injury, or meningitis. (1, 2, 3, 4, 5, 6, 7). Regarding the operation technique there are 2 main options: either by emergency craniotomy under general anesthesia or in an awaked fashion with only local agents (8, 9). The decision is ultimately the choice of the neurosurgeon. As for the infection control there are several measurements to consider: as large as possible debridement of the surrounding tissue, drain catheters inserted in the remaining cavity, and of course broad-spectrum antibiotics. In our case we choose to be as minimally invasive as possible.

## Conclusions

Preoperative cerebral angiography and CT scan are highly recommended to precisely evaluate the brain tissue and vascular damage. We don't find it mandatory for a wide surgical exposure, but brain CT scans should be repeated as soon as possible. Careful neurological examination of the patient as well as late contrast-enhanced images are essential to reveal any potential complications.

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