

## CASE REPORT/CAS CLINIQUE

## SELF-INFLICTED TRANSPARIETAL INTRAVENTRICULAR NAIL: CASE REPORT AND SURGICAL TECHNIQUE

*AUTO-INFLICTION TRANSPARIETALE ET INTRAVENTRICULAIRE D'UN CLOU: RAPPORT DU CAS ET TECHNIQUE CHIRURGICALE*UDOH David Okon<sup>1</sup>OKUNDIA Patrick<sup>1</sup>AIRIOHUODION Ehi<sup>1</sup>

1. Neurological Surgery Division, Department of Surgery, University of Benin Teaching Hospital, Benin City, Edo State, Nigeria

E-Mail Contact - UDOH David Okon : [daveudoh \(at\) yahoo \(dot\) com](mailto:daveudoh@yahoo.com)**Key words:** *Intracranial Nail; Open Cranial Procedure; Psychiatric Evaluation;***Mots clés :** *Clou Intracrânien ; Plaie crânio- cérébrale; Technique chirurgicale ; Psychiatrie.*

## ABSTRACT

**Background**

Deliberate self-harm with stone- or hammer-driven nail through the cranium is unusual. The need is stressed for comprehensive radiological evaluation with computed tomography (CT) scan, with or without angiography, and removal through an open cranial procedure under general anaesthesia, rather than extraction through a burrhole under local anesthetic infiltration.

**Methods**

We present here a 27-year old male who presented at our Teaching Hospital setting with a self-inflicted hand-driven intracranial nail to the left parietal region. He had a detailed neurological examination, was evaluated pre-operatively with computerised tomography of the brain and underwent an open cranial procedure under general anaesthesia for nail retrieval. Psychiatric unit evaluated and managed him for chronic depression.

**Results**

The transparietal, intraventricular 10cm long nail was retrieved and associated abscess evacuated by an open cranial procedure. Pre-operative neurological impairments regressed and his mood stabilized with anti-depressants. He was discharged without further deficits and has remained well for over four years

**Conclusion**

Self-inflicted hand-driven intracranial nail is a very rare form of penetrating cranio-cerebral trauma. Preoperative computerised tomography scan of the brain, meticulous open cranial removal under general anaesthesia and psychiatric management enable discharge without further injury or deficits. On the other hand, removal through a burrhole or just pulling out the nail would not allow intraoperative visualisation of associated lesions; the latter also predispose to further vascular and parenchymal brain injuries, worsening neurological impairments.

**RESUME****Contexte**

S'infliger délibérément des maux en s'enfonçant un clou dans le crane a l'aide d'un marteau ou d'une pierre est peu commun. Il fait mettre l'accent sur une évaluation radiologique compréhensive avec scanner, avec ou sans angiographie, et un prélèvement par une procédure d'ouverture crânienne sous anesthésie générale au lieu d'une extraction a travers un trou de fraise crânien sous infiltration anesthésique locale.

**Méthodes**

Nous présentons ici un jeune homme de 27 ans qui s'est présenté a notre centre hospitalier universitaire avec un clou qu'il s'est lui-même enfoncé de la main dans le crâne, plus spécifiquement dans la région pariétale gauche. Il a subi un examen neurologique détaillé, a été évalué avant l'opération par une tomographie du cerveau, et a subi une procédure crânienne ouverte sous anesthésie générale pour l'extraction du clou. L'unité psychiatrique l'a ensuite évalué et il a été traité pour dépression chronique.

**Résultats**

Le clou transparietal intraventriculaire de 10cm a été retiré et l'abcès associé a été évacué par une procédure crânienne ouverte. La détérioration neurologique acquise avant l'opération a régressé et son état psychologique a été stabilisé avec des antidépresseurs. Il est sorti de l'hôpital sans autres déficits et est resté en bonne santé pendant plus de quatre ans.

**Conclusion**

L'auto-infliction intracrânienne d'un clou enfoncé de la main est une très rare forme de trauma pénétrant la zone cranio-cérébrale. La tomographie préopérative du cerveau, le prélèvement par une ouverture méticuleuse sous anesthésie générale, et la bonne gestion de l'unité psychiatrique ont permis un bon traitement du patient sans autres blessures ou déficits. D'autre part l'extraction du clou par le trou d'une fraise crânienne ou tout simplement tirer le clou n'aurait pas permis une visualisation intraopérative des lésions associées, ces dernières prédisposant le patient a d'autres lésions cérébrales vasculaires et parenchymales, aggravant ainsi les détériorations neurologiques.

**INTRODUCTION**

Unusual cranio-cerebral injuries with penetrating nail are more commonly inflicted with nail guns in Europe and America [1,3,2,9,13,5]. Occasional cases of hand-driven nails occur in underdeveloped countries, though very rare [10,6,14].

We present one patient with a self-inflicted intracranial nail injury emphasizing thorough pre-operative radiological, neurosurgical and psychiatric evaluation. We also describe our approach to intraoperative management and nail retrieval devoid of risks of further injury.

**MATERIALS AND METHODS/ CASE MATERIAL****Case summary**

A 27-year old unemployed right-handed Nigerian male presented two days after driving a 10cm long nail through his own skull using a thick block of wood held in the right hand. He complained of vertical headaches and right-sided weakness. A 3-cm rusty nail-head jutted out 2cm left of the vertex. His Glasgow coma score was 15, but he had right dysgraphaesthesia and spastic hemiparesis worse in the lower extremity. Psychiatric evaluation revealed social problems and chronic depression. He was commenced on antidepressants. Cranial computerized tomography (fig.1) showed a transparietal nail (with its distal end in the body of the left lateral ventricle) associated with pneumocephalus and cerebritis. He had a limited left parietal craniectomy with abscess evacuation and retrieval of nail. Pre-operative neurological impairments improved and he has remained well on neurosurgical and psychiatric follow-up.

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### ***Details of operative treatment (fig.2)***

Under endotracheal anaesthesia with muscle relaxation, an extended parietal flap was raised across the midline to the right and encircling the nail. Cranial nail entry point exposed, a 4cm radius half-circle craniectomy was centred on the nail (which was still held by an intact bony spur to control its movement) - with the base of the half-circle craniectomy on the midline for access to the superior sagittal sinus. Durotomy was completed with a radial incision freeing the nail from dura. Using hand-held retractors with narrow blades, the intraparenchymal course of the nail was exposed to the body of the lateral ventricle; 10 ml of abscess was evacuated around the nail for microbiology. With the entire extra- and intracranial extent of the nail in view, the bony spur securing the nail was finally excised to retrieve the nail. Copious irrigation was done with ceftriazone-constituted warm saline irrigation fluid. Durotomy was carried out with interrupted vicryl and scalp was apposed with interrupted nylon stitch.

Antibiotics were continued for four weeks. Left hemiparesis worsened after surgery, but improved gradually to normal power with physiotherapy. His mood improved with antidepressants and he was discharged to out-patient for follow up. He has remained well after four years of follow-up at the neurosurgical and psychiatric out-patient departments.

### **DISCUSSION**

Penetrating cranio-cerebral injuries, on the whole, are uncommon in civilian practice [1, 3, 10, 7, 12]. Penetrating injury to the brain is usually accidental or suicidal, self infliction being more common than accidental discharges [1, 5].

Some intracranial nails have been successfully removed with skull radiographs as the sole radiological evaluation, and without CT [14]. The latter is, however, important to demonstrate the extent and direction of the nail, involved neurovascular structures and associated parenchymal lesions (haemorrhage, abscess or aneurysm); it is important as well for operative planning and the prediction of postoperative neurological sequelae [2,8,4]. A combination of CT and angiography as preoperative examination will give assurance of safety in these cases, showing aneurysms, extravasations, etc[9, 5, 11]. The primary pre-operative concern is the formation of a traumatic pseudoaneurysm; this prompts both preoperative and follow-up cerebral angiography- for haematomas and aneurysms may not be seen on initial scans[9,11].

Although most patients presenting to the hospital with intracranial nail survive with good mental status, those with major vascular damage, brain stem or diencephalic injury may not. The route of entry, thus, is important: Nail injuries through the roof of the mouth into the skull base could be fatal [8].

For those patients who survive, clinical decision making should focus on preventing further cortical or vascular damage and rational management strategy should permit discharge without further injury [13, 5].

There are reports of intracranial nails removed under sedation or local anaesthesia, with gentle rotatory movements or through a burr hole[10, 14]. However, an open cranial procedure permits exposure of the whole nail length, elevation of depressed skull fracture, abscess evacuation and visualization of vascular structures and aneurysms [5].

### **CONCLUSION**

Self-inflicted hand-driven intracranial nail is a very rare form of penetrating cranio-cerebral trauma preoperative computerised tomography scan of the brain; meticulous open cranial removal and psychiatric management enable discharge without further injury or deficits.



Figure 1:

cranial computerized tomography scans brain (sagittal)



Figure 2:

Cranial computerized tomography scan brain (coronal)



Figure3:

Illustration of operative technique

*a: scalp flap (extended 3cm across the midline to the right) and edge of scalp incision*

*b: outer (left parietal) edge of craniectomy*

*c: bone spur (at the right parietal edge of craniectomy opening) left to support the nail prevent its movement during exposure of the intracranial course of the nail*

*d: dura mater and dural incisions*

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