



## Case report

## An unusual case of attempted suicide by a depressive woman: Self-inflicted intracranial stabbing

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## ABSTRACT

Self-inflicted stab injury to the skull, particularly in the neurocranium, is a rare method used to commit suicide. Herein is presented a case of a 26-year old woman with a temporal wound found by her partner in their home. No weapon was found in the approximate environment and the victim said that she fell. A CT scan performed at admission to the emergency room was interpreted as being compatible with injury from falls. A second CT scan in a neurosurgical unit suggested a cranio-cerebral injury from a sharp object; aggression was suspected. The discording elements led to an interview with a psychiatrist and diagnosis of attempted suicide through the action of a knife in the context of severe depression. This is a rare case that implicates a depressive woman and stabbing directly to the neurocranium.

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## 1. Introduction

Self-inflicted stab wounds to the body are uncommon events in the medico-legal field [1–3]. In particular, penetrating stab wounds to the head, that are often the result of accidents [4,5], aggression [6], or homicides [7], are only very rarely the result of a self-inflicted lesion in the context of attempted suicide or suicide. Furthermore, it is rare for the brain to be touched by penetrating stab injury [8–12] owing to the hard protection presented by the skull, particularly the neurocranium. Among the reported cases of self-inflicted lesions to the skull in the context of suicide almost all have implicated men [13] and a wide variety of instruments have been used. In most cases manual force was used, classically involving a knife [14–19], or nails [20–23], but more surprisingly a needle [24], a chopstick [25], a ballpoint pen [26], and a toothbrush [27] have also been reported. In contrast to power tools, such as a drill [28] or a nail gun [29,30], when manual force is used the limiting factor is the penetrating capacity of the instrument [31] into the bone and resistance of the latter that varies according to the target area. Penetration into the neurocranium is more

achievable in the squama of temporal bone due to its scale-like, thin structure [18] and via the orbital area [32,33] that presents weak areas such as the lacrimal or ethmoidal bones through which even a pencil has been able to reach the brain [34].

The present report describes an original case of a depressive woman who attempted suicide by a self-inflicted stab wound with a knife directly to the neurocranium.

## 2. Case

A 26-year old woman, mother of a 12-month old baby, was hospitalised in an emergency ward after her partner found her unconscious in their home upon returning from work. He noted a wound to the right temporal area as well as traces of blood in the environment and called the emergency medical services. The woman in question told the rescue services that she only remembered falling and hitting the washbasin. The couple's baby was found unharmed in his bed. Emergency personnel did not notice any suspect elements in the flat. At no time was the police called. Upon her admittance to the emergency room, the patient presented a Glasgow score of 13 with a left hemiparesis and anisocoria. The initial CT brain scan was affected by artefacts and was difficult to interpret: "at the level of the posterior fossa, there is a hyperdense, peripontal and cisternal zone indicative of a haemorrhagic process. Furthermore, there are no elements indicative of a

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supra-tentorial meningeal haemorrhage other than a hyperdense right temporal span. Moderate diffuse intracerebral oedema". The same evening the patient was transferred to the surgical intensive care unit of a University Hospital with the following details: "the anamnesis probably reflects a fall with a right temporal impact this morning, followed by several falls during the day".

Upon her arrival in the neurosurgical intensive care unit, the clinical record showed: "conscious, right temporal wound, clean but subject to oedema, ptosis of the right eyelid with non reactive right mydriasis, oriented but with memory disorders". The systematic exam of the body found "several recent bilateral bruises at the level of the knee and wrist", but did not mention any others injuries such as cuts to the hands or forearms, hesitation marks or tentative wounds. The CT brain scan repeated upon her arrival on Day 1 for a suspected meningeal haemorrhage showed: "haemorrhage at the level of the cisterns of the base in front of the brainstem. Linear right temporal hyperdensity not following a vascular trajectory and extending from the right temporal plate to the brainstem passing through the right cavernous sinus which may consequently explain the ptosis and right mydriasis. There is a homolateral temporal perilesional oedema. In the bony window, a fracture line can be seen at the level of the temporal bone in relation to a point of penetration. Conclusions: the examination argues in favour of a cranio-cerebral wound produced by a sharp instrument with a point of penetration at the level of the right temporal bone and extending into the cerebral parenchyma to the level of the brainstem passing through the plane of the cavernous sinus" (Fig. 1). This led to the medical staff and police to consider the patient as a victim of aggression, and her partner to become a potential suspect. The contradictory elements between the medical imaging and the patient's version of events resulted in her being referred to a psychiatrist.

The psychiatrist diagnosed severe depression with anxiety and suicidal ideation over a period of 7 days without any triggering life event reported by the patient. She explained that she had attempted to put an end to her life by driving a knife into her head as a "last resort". No sign of psychosis was found by the clinical examination. Attempted suicide by stabbing the skull with a sharp instrument such as a knife was therefore retained. The psychiatrist also interpreted as deliberate drug intoxication in the context of attempted suicide an episode of toxic coma that had occurred two years previously and that had at the time been thought to be accidental. The anamnesis of the patient later revealed a diagnosis of bipolar disorder without psychiatric follow-up. Treatment for depression was started and transfer to a psychiatric ward was decided once the medical situation was stabilised. In the morning of Day 3, the patient confirmed her attempted suicide by stabbing.

On the neuro-surgical level, management consisted of simple supervision and a control CT scan was performed on Day 9 which evidenced an image of parenchymatous contusion in the right temporal region, cerebral oedema with obliteration of the Sylvian aqueduct and stigmata of sub-arachnoidal haemorrhage.

On the clinical level, there was neurological improvement with complete recovery of the hemiparesis and partial recovery of the oculomotor nerve. The patient left the neurosurgical ward on Day 10 for transfer to a psychiatric hospital.

### 3. Discussion

Few cases of self-inflicted intracranial lesions have been reported. A systematic review conducted by Large et al., who examined case reports of self-inflicted intracranial injury published in English between 1960 and 2008, found only 47 published cases and reported an additional 5 unpublished ones occurring in New South Wales over a decade; 20 were in the context of suicide [13]. There are several characteristics that differentiate the current



Fig. 1. CT scan performed neurosurgical intensive care unit that evoked a stab wound. Non-contrast CT brain scan showing haemorrhagic linear wound tract in the right temporal lobe with no mass effect.

report from the previous ones of suicide or attempted suicide by stabbing to the skull. Firstly, previous cases concerned men in particular; only three cases involving women have been published [20,35,36]. This is further underlined by Bukur et al. who did not find any case of a woman among a total of 753 patients admitted for self-inflicted penetrating injuries in the context of an emergency room in Los Angeles from 1997 to 2007 [8]. Secondly, the point of penetration to the neurocranium is also uncommon: in the case reported here it was temporal, and we found only one such case of stab injury isolated to this bone in the literature, and which concerned a man [37]. In cases of multiple stabs, the points of penetration have frequently included the temporal area, although the forehead was the predominant zone of impact [17,19], whereas in cases of a single stab this was frontal [14], parietal [15], or orbital [16]. The latter represents an anatomical boundary for the neurocranium and has frequently been the path leading to intracranial injury (30% of cases identified in the systematic review reported by Large et al. [13]). However, direct stabbing to the skull may be differentiated from such cases as these have often been associated with self-enucleation, particularly in the psycho-analytic concept of Oedipus complex [38], and the brain injury often considered as secondary to this owing to the weak bone structure [17,19]. Thirdly, although this atypical mode of suicide or attempted suicide has been reported and is well known to be used by psychotics such as schizophrenics [15,16,18,39] (although not exclusively [17,30,35]), the patient of the current report was suffering from severe depression.

The case presented herein is rare, as, to our knowledge, no other case of suicide by stabbing directly to the neurocranium involving a woman suffering from depression has been reported. It combines three aspects rarely associated with self-inflicted intracranial injury, that may it self be under-recognised [13]. We believe that the case is of medico-legal importance as it provides the plausibility of such a scenario for future cases that are less than clear-cut and therefore require diagnosis by exclusion. The latter aspect is illustrated here as no knife was found in proximity of the subject which differs to previous reports of self-inflicted knife

injury as all or part of the knife had remained in the skull [14–16,19] or was found next to the victim [17]. Furthermore, the presence of the subject's baby in the traumatic environment was not in favour of attempted suicide, and there was a loss of forensic evidence both on the subject and the scene owing to the emergency services initially considering the case as an accident. The final diagnosis was retained only after exclusion of accidental injury and attack, thanks in large part to the CT scan and clinical aspects including the lack of defensive injuries on the upper limbs and the presence of a unique lesion on the body [40].

#### 4. Conclusion

This original case adds to the literature on the rarely observed suicide or attempted suicide by stabbing directly to the skull. It is the first such case to implicate a depressive woman, which is of medico-legal importance when investigating similar cases in the future.

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#### Conflict of interest

The authors declare no conflict of interest.

#### Contributors

L.B. collected and interpreted data, and wrote the first draft of the manuscript. F.A. made the psychiatric diagnosis, interpreted data and contributed to the drafting of the manuscript. E.C. collected data and contributed to the drafting of the manuscript. F.A. collected data and contributed to the drafting of the manuscript. D.L. interpreted data and contributed to the drafting of the manuscript. S.G. interpreted data and contributed to the drafting of the manuscript.

#### References

- [1] F. Abdullah, A. Nuernberg, R. Rabinovici, Self-inflicted abdominal stab wounds, *Injury* 34 (2003) 35–39.
- [2] J.F. Fekete, A.D. Fox, Successful suicide by self-inflicted multiple stab wounds of the skull, abdomen, and chest, *J. Forensic Sci.* 25 (1980) 634–637.
- [3] M. Kaliszan, G. Kernbach-Wighton, R. Bouhaidar, Multiple self-inflicted stab wounds to neck, chest and abdomen as a unique manner of suicide, *J. Forensic Sci.* 55 (2010) 822–825.
- [4] M.A. Rothschild, B. Karger, V. Schneider, Puncture wounds caused by glass mistaken for with stab wounds with a knife, *Forensic Sci. Int.* 121 (2001) 161–165.
- [5] Z. Mackerle, P. Gal, Unusual penetrating head injury in children: personal experience and review of the literature, *Childs Nerv. Syst.* 25 (2009) 909–913.
- [6] M. Bauer, D. Patzelt, Intracranial stab injuries: case report and case study, *Forensic Sci. Int.* 129 (2002) 122–127.
- [7] T. Oki, H. Asamura, T. Hayashi, M. Ota, Unusual intracranial stab wounds inflicted with metal tent stakes for a case involving a family murder suicide, *Forensic Sci. Int.* 202 (2010) e19–e21.
- [8] M. Bukur, K. Inaba, G. Barmparas, J.J. DuBose, L. Lam, B.C. Branco, T. Lustenberger, D. Demetriades, Self-inflicted penetrating injuries at a level I trauma center, *Injury* 42 (2011) 474–477.
- [9] T. Ohshima, T. Kondo, Eight cases of suicide by self-cutting or -stabbing: consideration from medico-legal viewpoints of differentiation between suicide and homicide, *J. Clin. Forensic Med.* 4 (1997) 127–132.
- [10] O.B. Nielszen, M.M. Large, Potentially lethal suicide attempts using sharp objects during psychotic illness, *Crisis* 32 (2011) 37–42.
- [11] L.A. Assuncao, A. Santos, T. Magalhaes, Suicide by sharp force injuries—a study in Oporto, *Leg. Med. (Tokyo)* 11 (Suppl. 1) (2009) S216–S219.
- [12] F. Ventura, A. Bonsignore, M. Gallo, F. Fortunato, F. De Stefano, A fatal case of suicidal stabbing and cutting, *J. Forensic Leg. Med.* 17 (2010) 120–122.
- [13] M. Large, N. Babidge, O. Nielszen, Intracranial self-stabbing, *Am. J. Forensic Med. Pathol.* 33 (2012) 13–18.
- [14] S. Mashiyama, O. Fukawa, M. Kawase, N. Noshita, S. Takada, Stab injury of the brain by kitchen knife, No Shinkei Geka 34 (2006) 497–502.
- [15] M. Iwakura, T. Kawaguchi, K. Hosoda, Y. Shibata, H. Komatsu, A. Yanagisawa, E. Kohmura, Knife blade penetrating stab wound to the brain—case report, *Neurol. Med. Chir. (Tokyo)* 45 (2005) 172–175.
- [16] M. Chui, L.N. de Tilly, R. Moulton, D. Chui, Suicidal stab wound with a butter knife, *CMAJ* 167 (2002) 899.
- [17] B. Karger, B. Vennemann, Suicide by more than 90 stab wounds including perforation of the skull, *Int. J. Leg. Med.* 115 (2001) 167–169.
- [18] K. Mitra, P.J. Richards, P.A. Oakley, Self-inflicted transcranial stab wound of the pons, *Injury* 33 (2002) 374–376.
- [19] P. Saint-Martin, S. Prat, M. Bouyssy, S. Sarraj, P. O'Byrne, An unusual death by transcranial stab wound: homicide or suicide? *Am. J. Forensic Med. Pathol.* 29 (2008) 268–270.
- [20] D.L. Reeves, Penetrating craniocerebral injuries. Report of two unusual cases, *J. Neurosurg.* 23 (1965) 204–205.
- [21] C. Gokcek, Y. Erdem, E. Koktekir, M. Karatay, M.A. Bayar, N. Edebalı, C. Kilic, Intracranial foreign body, *Turk. Neurosurg.* 17 (2007) 121–124.
- [22] S.N. Shenoy, A. Raja, Unusual self-inflicted penetrating craniocerebral injury by a nail, *Neurol. India* 51 (2003) 411–413.
- [23] B.K. Puri, A. el-Dosoky, J.S. Barrett, Self-inflicted intracranial injury, *Br. J. Psychiatry* 164 (1994) 841–842.
- [24] O. Peschel, P. Betz, W. Eisenmenger, Self-mutilation with needles, *Med. Sci. Law* 37 (1997) 175–178.
- [25] I. Yamamoto, S. Yamada, O. Sato, Unusual craniocerebral penetrating injury by a chopstick, *Surg. Neurol.* 23 (1985) 396–398.
- [26] K.A. Greene, C.A. Dickman, K.A. Smith, E.J. Kinder, J.M. Zabramski, Self-inflicted orbital and intracranial injury with a retained foreign body, associated with psychotic depression: case report and review, *Surg. Neurol.* 40 (1993) 499–503.
- [27] J.B. Lasky, K.D. Epley, J.W. Karesh, Household objects as a cause of self-inflicted orbital apex syndrome, *J. Trauma* 42 (1997) 555–558.
- [28] A.J. Kelly, I. Pople, B.H. Cummins, Unusual craniocerebral penetrating injury by a power drill: case report, *Surg. Neurol.* 38 (1992) 471–472.
- [29] I.G. Panourias, V.K. Slatinopoulos, D.L. Arvanitis, Penetrating craniocerebral injury caused by a pneumatic nail gun: an unsuccessful attempt of suicide, *Clin. Neurol. Neurosurg.* 108 (2006) 490–492.
- [30] A. Shakir, S.A. Koehler, C.H. Wecht, A review of nail gun suicides and an atypical case report, *J. Forensic Sci.* 48 (2003) 409–413.
- [31] E.K. Chadwick, A.C. Nicol, J.V. Lane, T.G. Gray, Biomechanics of knife stab attacks, *Forensic Sci. Int.* 105 (1999) 35–44.
- [32] S.D. Gawley, C.E. McAvoy, R.M. Best, P.A. Flynn, Traumatic self-induced orbital apex syndrome, *Eye (Lond)* 21 (2007) 1451–1452.
- [33] A. Al-Anazi, I. Al-Luwimi, M. Nasser, Transorbital penetrating craniocerebral injury by a spectacle arm: suicidal attempts, *Br. J. Neurosurg.* 17 (2003) 368–369.
- [34] J. Rosenson, D. Mantuani, Self-inflicted orbital and intracranial pencil, *J. Emerg. Med.* 43 (2012) 490–491.
- [35] F.D. Pascoe, Attempted suicide by hammering nails into the brain, *S Afr. Med. J.* 58 (1980) 101.
- [36] J. Gonzalez-Cruz, R. Cardenas, A. Nanda, Penetrating orbitocranial injury to the sella: case report and review of the literature, *J. La State Med. Soc.* 159 (2007), pp. 310, 312, 314.
- [37] B. Johansson, A. Ericksson, Suicide by driving an awl into the brain, *Am. J. Forensic Med. Pathol.* 9 (1988) 331–333.
- [38] M. Large, D. Andrews, N. Babidge, F. Hume, O. Nielszen, Self-inflicted eye injuries in first-episode and previously treated psychosis, *Aust. N. Z. J. Psychiatry* 42 (2008) 183–191.
- [39] H.L. Field, S. Waldfogel, Severe ocular self-injury, *Gen. Hosp. Psychiatry* 17 (1995) 224–227.
- [40] G.M. Mazzolo, L. Desinan, Sharp force fatalities: suicide, homicide or accident? A series of 21 cases, *Forensic Sci. Int.* 147 (Suppl.) (2005) S33–S35.