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Letters to the editor

Acute brachial plexus lesion complicating a stun-gun assault

A woman was assaulted with a stun gun (Security Plus™) and received three brief, direct, high-voltage stun-gun shots to the base of her neck behind the clavicle on the left side. Immediately after receiving the electrical pulses, she was completely paralyzed, while her left arm felt as if it were anesthetized. Her initial examination on the following day revealed two small burns situated precisely on Erb's point on the neck. Motor testing revealed complete palsy involving the rotator cuff, deltoid and biceps muscles of the left arm, although her intrinsic and extrinsic hand muscles were spared. Multimodal sensory loss was also present along the external left arm from the shoulder to the first three digits, and was associated with severe neuropathic pain. Any reflexes in her left arm were completely lost.

Magnetic resonance imaging (MRI) of the brachial plexus failed to reveal any visible lesion. On day 10, electromyography demonstrated abolition of sensory nerve potentials in the lateral cutaneous nerve of the forearm as well as in the median and radial nerves. Needle detection in the shoulder muscles at rest revealed abundant denervation potentials in the infra-/supraspinatus and deltoid muscles, and a moderate pattern in the biceps muscle. No motor potentials were elicited during voluntary contraction of these muscles. This pattern suggested acute axonotmesis of the primary superior trunk of the brachial plexus.

Follow-up at 2 years revealed the progressive resumption of voluntary activity in all previously involved muscles. At the time of the victim's last visit, weakness was still present in the deltoid muscle, as was also the painful sensory hypoesthesia in the forearm, which has remained unchanged on both clinical and electrical examinations. Any improvement was compatible with ongoing axonal sprouting.

Electric stun guns aim to incapacitate subjects by administering high-frequency pulses of high-voltage currents (up to 500 kV). The most popular brand is the TASER, a device that shoots two metallic barbs attached to a cable a few meters long to deliver an electrical shock at a distance, although many other types of stun guns require direct application of the two probes at the tip of the device, as was the case in our present patient.

Significant injuries are evidently seen in $< 0.5\%$ of subjects in real-world use [1]. The side effects of these devices are mostly superficial trauma resulting from penetration of the barbs, but can also include ventricular fibrillation and sudden death [2]. Isolated peripheral nervous system injuries have not been described to date. In one brief report [3], severe burns and long-term pain sequelae were claimed and described, although no details were given regarding the neurological injuries.

To our knowledge thus far, brachial plexus involvement is a complication that has never been described before. In fact, the exceptional severity of our present case was probably due to the prolonged, multiple stimulation and its direct application to Erb's point.

Disclosure of interest

The authors declare that they have no competing interest.

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Locked-in syndrome following meningitis with brainstem abscess

Brainstem abscess complicating bacterial meningitis is a rare entity, and even more so in those with no risk factors. The purpose of the present report is to describe the case of a patient who presented with typical locked-in syndrome due to brainstem abscess.

A 75 year-old male patient with no significant preexisting medical conditions was admitted to our emergency department for febrile confusion. He presented with a typical meningeal syndrome, but with no focal neurological signs. Cerebrospinal fluid (CSF) culture was positive for Gram-positive cocci, eventually identified as methicillin-sensitive *Staphylococcus aureus*, thereby confirming the diagnosis of acute bacterial meningitis. Initial brain magnetic resonance imaging (MRI) excluded encephalitis and showed no abscesses. Broad-spectrum antibiotics (ceftriaxone, amoxicillin, gentamicin) were immediately started, together with adjunctive dexamethasone therapy.

Thorough physical examination failed to find any portal of entry for pathogens. Transesophageal echocardiography was normal, and several blood cultures showed no *S. aureus* bacteremia. Yet, the patient's condition rapidly worsened with coma, requiring orotracheal intubation, sedation and admission to the intensive care unit (ICU). In the absence of intracranial hypertension, a neurological wake-up test was performed on day 5. The patient unexpectedly presented with the classic locked-in syndrome: tetraplegia with anarthria, respiratory-center disruption and preservation of consciousness. Brain and cervical MRI was then performed, and identified brainstem and cervical cord abscesses, ependymitis and epiduritis (Fig. 1). Due to the lesions' localizations, nature and clinical impact, surgical evacuation was discussed, but excluded by our neurosurgical team. In the face of this unfavorable local evolution despite the apparently properly conducted treatment, our decision was to switch antibiotics for a combination of linezolid and fosfomycin, known to be effective against potentially undetected methicillin-resistant *S. aureus* (MRSA), for several days. However, there was no clinical improvement and, thus, in accordance with the patient's and family's wishes, it was agreed to withdraw care on day 20, leading to the patient's death.

S. aureus meningitis is a rare entity, constituting only 1% of all cases of bacterial meningitis worldwide [1]. However, it is associated with a high mortality rate (around 50%). Three pathogenic mechanisms have been described:

- postoperative meningitis secondary to neurosurgical procedures or a CSF shunt device;
- post-traumatic, and;
- hematogenous/spontaneous meningitis caused by *S. aureus* bacteremia after staphylococcal infection outside of the central nervous system.

Hematogenous meningitis usually affects patients with severe underlying conditions (cardiovascular, chronic kidney or liver disease, diabetes mellitus) and intravenous drug users.

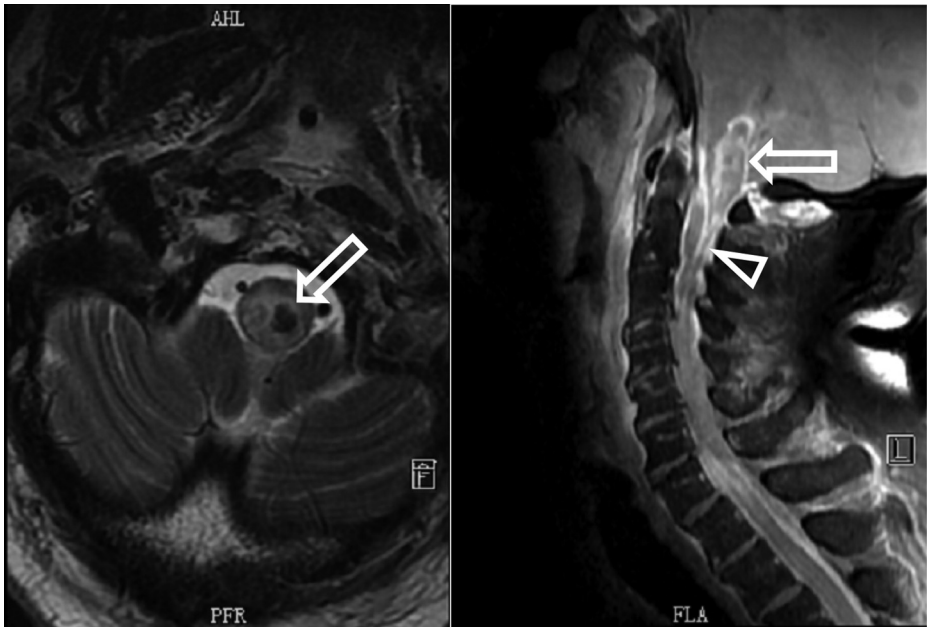

Fig. 1 – MRI of the brain and medulla on (left) T2-weighted and (right) fat-saturated T1-weighted sequences show brainstem abscess, ependymitis (arrows) and epiduritis (arrowhead) with (right) cervical compression of the medulla.