

Radial Nerve Injury after Intravenous Cannulation at the Wrist

-A Case Report

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Abstract

Peripheral venous cannulation is one of the commonest procedures performed in hospitals. The dorso-lateral aspect of the wrist is one of the favourite sites. Radial nerve injury, though extremely rare, can be a serious complication and has been reported twice. One patient was left with a permanent work disability due to a painful neuroma. Another patient required surgical intervention to remove a neuroma six months after the initial venous cannulation resulting in almost complete recovery. We report the first case of injury to the radial nerve at the wrist as a complication of venous cannulation where complete recovery occurred spontaneously. In our case, immediate removal of the cannula may be responsible for the improved outcome.

Ann Acad Med Singapore 1999; 28:288-9

Key words: Anaesthesia, Paraesthesia, Venepuncture

Case Report

A 44-year-old male, right-handed and ASA 1 bus driver presented for elective mastoidectomy under general anaesthesia. Preoperative venous cannulation with a 20G cannula (Angiocath™) was first attempted on the dorso-lateral aspect of the right wrist at the base of the anatomical snuffbox. During the cannulation attempt, the patient suddenly complained of an electric shock sensation over the entire right upper limb. He exhibited intense paraesthesia over the radial side of the distal third of the forearm, over the dorsal surface of the thumb and index finger, and over the radial one third of the dorsum of the hand. The cannula was removed because of the persisting paraesthesia. Cannulation was repeated over the dorsum of the right hand uneventfully. Paraesthesia was still present, though with diminished intensity, immediately prior to induction of anaesthesia.

In the immediate postoperative period, the patient still complained of unprovoked paraesthesia over the same area. On the first postoperative day, unprovoked paraesthesia had disappeared but paraesthesia could be elicited over the area of the forearm and hand by gentle tapping or light palpation at the point of failed cannulation. Movement at the wrist joint and hand gripping did not exacerbate or provoke the paraesthesia. Pain, touch

and temperature sensation was normal when compared to the left hand and forearm. There was no motor deficit. Apart from the venepuncture wound on the skin, there was no bruising, haematoma or palpable mass.

On subsequent in-hospital follow-up, the patient showed a gradual improvement. The patient was discharged from hospital on the third postoperative day with the instruction to protect the trigger point from any undue pressure. He was seen again in the outpatient clinic two weeks later. The paraesthesia could still be provoked by palpation at one particular point (the venepuncture point). It had reduced in severity to half its original intensity, but could be elicited over the same area. He had no problems with his job or when playing tennis. The only inconvenience he had was paraesthesia elicited occasionally when the trigger point was touched. On examination, there were no new findings. There were no abnormal palpable masses at the trigger point and trophic changes were absent. After explaining about the risks and benefits of investigation and local or systemic pharmacological treatment, the patient declined further intervention.

Six weeks after the original injury, the patient was contacted by telephone. There had been more improvement in the paraesthesia. He was satisfied with his present condition, despite an incomplete recovery. Ten

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months after the injury, the patient was contacted again. He stated that he was symptom free and that the paraesthesia had completely resolved.

Discussion

Intact nerve consists of passive, conducting axons. Nerve injury, including trauma, transforms nerves into a source of impulses. This abnormal activity can be spontaneous or induced by mechanical or chemical factors. These abnormal regions of axons can be impulse generators, or they can set up reflected potentials on repetitive firing in response to a single axon action potential. Neuromata and damaged axons can lead to such abnormal electrical discharges in trauma-induced mononeuropathy and produce pain, paraesthesia and other neurological problems.

A neuroma is fixed in position and thus the trigger or sensitive point is in a constant position. With damaged axons, as the regeneration process takes place at the rate of 1 mm per day, the sensitive point migrates distally with time. In our patient, as the trigger point is fixed in position, a neuroma is more likely to be the diagnosis. There is, however, no known association between the type of pain and the histopathology of the involved nerve.¹

Neuropathy of the superficial sensory branch of the radial nerve has been reported after surgical release of de Quervain's disease,²⁻⁴ distal third of the forearm injury⁵ and venous cannulation.^{6,7} This sensory branch of the radial nerve is particularly prone to the development of painful neuromata after injury when compared to other nerves; this is because of its anatomical predisposition.⁸ Other nerve injuries after vascular cannulation or puncture are also rare, but have been reported. They include the median nerve⁹ and radial nerve¹⁰ at the antecubital fossa.

Only two cases of radial nerve injury after intravenous cannulation at the wrist have been reported, and both of these resulted in debilitating pain syndromes.^{6,7} One patient was left with a permanent work disability due to a painful neuroma.⁶ The other required surgical intervention to remove a neuroma six months after the initial venous cannulation, resulting in almost complete recovery.⁷ We report the third case, but in our case the patient

fully recovered spontaneously. The difference between our case and the two previously reported is that the symptoms occurred immediately and cannula removal rapidly followed. Indeed, Stahl et al⁷ recommended immediate removal of the cannula in their report.

The dorso-lateral aspect of the wrist will continue to be a favourite and useful site for venous access. One must bear in mind possible, though uncommon, injury to the superficial sensory branch of the radial nerve. We recommend a cannula insertion site 4 cm proximal to the base of the anatomical snuffbox, thus avoiding the usual anatomical path of the nerve. We also recommend use of the patient's non-dominant arm if feasible. Extra caution should be paid when a patient complains of a sensation of electric shock, paraesthesia or abnormal pain during venous cannulation. Under these circumstances, the cannula should be removed immediately and another site used. It should be noted that a patient can only complain of symptoms whilst conscious-it may therefore be best to avoid this site for venous cannulation in anaesthetised patients.

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