Inadvertent brachial plexus anesthesia associated with local anesthetic infiltration during internal jugular venous cannulation: A Case Report

L. Karabiyik and T. Tezer

Abstract: In the development of neurological complications due to central venous cannulation, the properties of the anatomical region and the experience of the practitioner are important. In this case report, an inadvertent brachial plexus anesthesia after repeated local anesthetic infiltrations during failed attempts of internal jugular venous cannulation by an inexperienced practitioner in cardiovascular intensive care unit is described. The neurological complications due to central venous cannulation are reviewed in the light of actual literature data.

Key words: Central venous catheterization; complications; brachial plexus.

INTRODUCTION

Central venous cannulation is commonly used in intensive care units and operating rooms prior to major operations. Internal jugular, subclavian, and femoral veins are generally used for this purpose. The most commonly encountered complications following central venous cannulation are arterial puncture, vascular damage, thrombosis, pneumothorax, haemothorax, air embolism, and sepsis. Furthermore, neurological complications such as brachial plexopathy may occur following subclavian and internal jugular central venous cannulation 1-4. These neurological complications may either be temporary or evolved to become serious. The experience of the physician performing the cannulation together with his/her knowledge of anatomical variants and signals (eg. paresthesia) that warn for potential complications are important factors in the development of these neurological complications. Other possible reasons are the direct traumatic effect of the needle, and pressure caused by the hematoma. In this report, a case of inadvertent brachial plexus anesthesia following excessive dose of local anesthetic infiltration at an incorrect location during failed attempts of internal jugular venous cannulation is presented.

CASE REPORT

In a 66-year-old male patient, supervised in the cardiovascular surgery intensive care unit, central cannulation attempts (Central venous catheter 14 Ga, 20 cm, Introducer Seldinger Needle: 18 Ga × 7 cm, Sentia, Ayra Medikal, Ankara, Turkey) had been made from the right internal jugular vein for hemodynamic monitoring. Local anesthetic had been administered every time the conscious patient felt pain. A total of 15 ml 2% prilocaine (Citaneast 2%, flac) had been injected by an inexperienced first year resident of the cardiovascular surgery clinic. Hematoma development was observed at the site of the attempt associated with two arterial punctures during repeated cannulation attempts (Fig. 1). We were consulted on the patient when a complete sensation and motor loss occurred in his upper right extremity after 5-10 minutes of prilocaine infiltrations.

The patient described severe pain similar to an “electric shock” when a needle was inserted. In the neurological examination, brachial plexus paralysis was defined as complete loss of sensation to both ice and pinprick tests, compared to the other extremities. Sensorial and motor loss were detected in all muscles innervated by musculocutaneous, ulnar, median and radial nerves. In the ultrasound examination conducted at bedside, it was observed that the hematoma did not compress any veins or nerves. During following evaluations, the sensorial...
and motor blocks were found to have spontaneously disappeared after two and a half hours. The location was changed and a same type catheter was placed into the subclavian vein through infraclavicular approach by another experienced practitioner.

**DISCUSSION**

In intensive care units and operating rooms, central venous cannulation is used for purposes such as hemodynamic monitoring, drug administration, parenteral nutrition, transcutaneous venous pacemaker placement, and temporary dialysis catheter placement, or if a peripheral venous line access cannot be established. Brachial plexus injuries have been reported to have developed in subclavian (1, 2) and internal jugular venous cannulations (3, 4), owing to the anatomical proximity of the brachial plexus, internal jugular vein, subclavian artery and vein in the supraclavicular area. It is pointed out that brachial plexus paralysis is caused by compression of hematoma following an arterial puncture, or traumatic nerve injuries caused by the needle tip during repeated injections. In a recent report, brachial plexus paralysis caused by compression of hematoma following an arterial puncture, or traumatic nerve injuries caused by the needle tip during repeated injections. In a recent report, brachial plexus injury after internal jugular vein catheterization has been shown with ultrasoundography by direct compression of central venous catheter in malposition without evidence of puncture hematoma (5). In our case, despite the presence of a hematoma associated with arterial punctures and unsuccessful cannulation attempts, it was shown that the hematoma did not compress the nerves. Therefore, we could conclude that the paralysis was not caused by the hematoma.

Failed attempts of central venous cannulation resulted in a sensation which was described as an “electric shock”-like pain by the patient. Since it was also misinterpreted as pain by the resident, local anesthetic infiltrations to the area were repeated, and thus, the dose of the local anesthetic agent used was increased. Although it is known that 300-400 mg of prilocaine is the sufficient dose range for brachial plexus blockage, the dose at which prilocaine could be safely used near the internal jugular vein has not been clearly described. As the total amount of local anesthetic drugs injected in our patient (15 ml 2%, prilocaine solution) was the sufficient dose (300 mg), the development of right upper extremity paralysis was attributed to the brachial plexus block with the local anesthetic. The fact that the patient’s complaints such as the sensorial and motor blocks completely disappeared spontaneously within 2.5 hours also supports our hypothesis. Brachial plexopathies due to insertion attempts of the central catheter to the subclavian vein have been reported; however, in our patient, as the subclavian catheter was inserted with ease on the first attempt after the patient’s complaints and findings disappeared, subclavian vein cannulation cannot be the cause of the brachial paralysis. This rare complication in our case seems to result from the excessive dose of local anesthetic infiltrated at incorrect locations during failed attempts. This led us conclude that the experience of the physician, together with his/her knowledge of signals that warn for potential complications, are important factors in preventing such complications.

We believe that the frequency of such neurological complications can be reduced by more experienced physicians who performs the central venous cannulation under the supervision of an experienced trainer. Additionally, ultrasound guidance for central venous access should be preferred over the landmark method to avoid repeated injections (6).

**References**

