

Hypoesthesia of the Cutaneous Branch of Cervical Plexus after Shoulder Arthroscopy under General Anesthesia with Ultrasound Guided-Interscalene Block

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We present an uncommon case of hypoesthesia in the posterior and upper third of the superior area on the left ear auricle, after arthroscopic surgery of the shoulder in the lateral position under general anesthesia with ultrasound guided-interscalene brachial plexus block. A 65-year-old man underwent arthroscopic rotator cuff repair of the left shoulder in the right lateral decubitus position. Two days after operation, he complained of numbness around the left auricle; his symptoms persisted until 6 weeks after surgery. Audiometry and sensory examinations were normal. He recovered naturally by 6 months postoperatively. Postoperative neurological deficits that may not be block-related can be attributed to a combination of factors, such as patient-, anesthesia-, and surgery-related factors, including direct trauma, positioning, and retraction. Anesthesiologists should be aware that the injury may not be block-related and consider other possible causes. (**Ewha Med J 2017;40(4):168-170**)

Received August 24, 2017
Revised September 9, 2017
Accepted September 19, 2017

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Key Words

Hypoesthesia; Shoulder arthroscopes;
Peripheral nerves; Patient positioning

Introduction

Arthroscopic shoulder surgery is associated with considerable postoperative pain [1,2]. Ultrasound guided-interscalene brachial plexus block (ISB), in conjunction with general anesthesia, is often used because it provides effective pain control [3]. Shoulder arthroscopy can be performed with the patient in either the lateral decubitus or beach chair position, according to the surgeon's preference and based on their training [4]. Neurovascular injury has been rarely reported in both positions; however, the traction used in the lateral decubitus position can damage peripheral nerves and the brachial plexus, and compression and rotation of the head in both positions is a risk factor for neurovascular injury [5-7].

We present an uncommon case of hypoesthesia in the posterior and upper third of the superior area on the left ear auricle, after arthroscopic surgery of the shoulder in lateral position under general anesthesia with ultrasound guided-ISB.

Case

A 65-year-old man (weight 66 kg and height 168 cm) was scheduled for arthroscopic rotator cuff surgery of the left shoulder in the right lateral decubitus position. His medical history included well-controlled hypertension, stable angina pectoris, and vertebra-basilar insufficiency treated with aspirin, olmesartan, isosorbide dinitrate, and alprazolam. His preoperative evaluation results, including laboratory testing, chest X-ray,

electrocardiogram and transthoracic echocardiography, were within normal ranges, except for an increase in aspartate aminotransferase/alanine aminotransferase. Before induction of general anesthesia, the ISB was placed under sterile conditions, using ultrasound and light sedation with midazolam and fentanyl. The patient was placed in the supine position with the head turned to the right. Using a high frequency (5–12 MHz) linear probe, the hypoechoic superior and middle trunk (between the anterior and middle scalene muscles) was identified in the short-axis view. A 50 mm, 22 gauge short bevel insulated needle (Stimuplex; Braun, Melsungen, Germany) was used, and the needle tip was advanced between the superior and middle trunk within the sheath, using the in-plane method from the medial to distal direction. After localization and negative aspiration, 12 mL of 0.5% ropivacaine was injected. There was no pain during injection. General anesthesia was induced 10 minutes later (150 mg propofol, 100 µg fentanyl, and 40 mg rocuronium), and the patient was placed in the right lateral decubitus position. His head was maintained in the neutral position with firm plaster fixation, and the eyes and ear, especially the side touching the bed, were checked and protected. An axillary roll was placed for optimal ventilation and protection of the neurovascular structure. Pressure points were padded. The nonoperative arm was placed on an arm board, and the left operative arm was placed in a foam traction sleeve that was connected to a traction device. A 6 kg-weight was applied for horizontal traction, with 45° abduction and 15° forward flexion of the shoulder. The arthroscopic procedures included rotator cuff repair with bioanchors and acromioplasty of the left shoulder. The operation and anesthesia times were 55 and 110 minutes, respectively. Two days after the operation, he complained of numbness around the left auricle, and this symptom persisted for 6 weeks after surgery. Audiometry and a sensory examination were performed by ear-nose-throat and neurology specialists. Testing results were normal but there was still numbness in the sensory territory of the left greater and lesser occipital nerve. The patient refused additional specific electromyography and recovered naturally after 6 months.

Discussion

Arthroscopic shoulder surgery has become a popular therapeutic and diagnostic procedure during the past two decades

[1]. Shoulder arthroscopy can be performed with the patient in either the lateral decubitus or beach chair position, according to the surgeon's preference and training [4]. There is a tendency to prefer the lateral position, as it maximizes the amount of working space [6,7]. The arm is typically abducted 30° to 45°, with traction in line with the arm [6]. Anesthesia complications continue to show a low incidence, whereas stretch injuries related to traction have been reported in up to 10% of transient neuropraxia patients undergoing arthroscopic shoulder surgery in the lateral position, although these fortunately show complete resolution within 48 hours [4,5].

Contrary to the belief of many patients and some surgeons, nerve injury is not always a result of an improperly performed block. Indeed, 37% of closed claims regarding peripheral nerve blocks are in fact not block-related [8]. Most peripheral nerves are intolerant to stretching beyond 10% of the nerve's normal length. The mechanisms of nerve injury most frequently implicated in shoulder arthroscopy are stretching secondary to traction and direct trauma [4,5]. Patient-, anesthesia-, and surgery-related factors combine to increase vulnerability to, and the severity of, nerve damage via the double-crush phenomenon [1,2]. Double crush syndrome refers to the coexistence of two or more clinical or subclinical insults along the course of a nerve. Nerves with a pre-existing injury or compression are at much greater risk of a second, possibly subclinical, insult; together, these insults may result in permanent nerve injury. Patient positioning is of high importance to minimize potential complications. The patient's head must remain neutral with respect to the body, the headrest must be inspected for integrity to prevent any firm areas coming into direct contact with bony prominences and, during the procedure, the patient must be inspected to ensure that no inadvertent neck flexion/extension or rotation has occurred. Additional protective foam or gel pads may also be used [8–12].

The nerves injured most commonly during shoulder arthroscopy are the musculocutaneous, ulnar, radial, and dorsal digital nerves of the thumb [2,4]. Cases of the occipital nerve injury and greater auricular branch palsy are rare after arthroscopic surgery with ISB [9–12]. Park and Kim [9] described two cases of neuropraxia of the greater auricular nerve, and one of the lesser occipital nerve, which showed resolution within 2 months after shoulder arthroscopy (particularly in the beach chair position) under general anesthesia without a block. In the series by

Ng and Page [12], three cases of greater auricular nerve neuropraxia were described. However, the neuropraxia resolved after 6 weeks, 8 weeks, and 6 months respectively [10–12]. The lesser occipital nerve arises from the second, and sometimes the third, cervical nerve. It runs posteriorly along the sternocleidomastoid muscle, perforating the deep fascia near the cranium and ascending behind the auricle to provide the cutaneous supply [13]. The great auricular nerve is the largest sensory branch among the superficial branches of the cervical plexus arising from the C2 and C3 spinal roots. It projects vertically upward over the sternocleidomastoid muscle, providing sensory innervation of both surfaces of the external ear to a variable extent, as well as of the skin over the mastoid process, a small area behind and above the auricle, and most of the skin covering the parotid gland. It can be aggravated by neck surgery, tumor, or prolonged pressure on the neck [14].

In our case, it was presumed that the hypoesthesia was caused by the effect alone or in combination with the following. First, positioning for arthroscopic shoulder surgery can overstretch or compress the superficial branch of the cervical plexus during efforts to maximize the operative field. Second, a needle inserted in the medial to lateral plane can direct damage to the nerve that runs over the sternocleidomastoid muscle. Last, some patients may have a predisposition to nerve damage (e.g., male sex) and other intraoperative surgical factors that have no relation to peripheral nerve block [15].

In conclusion, postoperative neurological deficits can be attributed to a combination of patient, anesthesia-, and surgery-related factors, including direct trauma, positioning, and retraction [2]. In particular, careful attention must be paid to patient positioning to prevent compression and pressure injuries to the skin and soft tissues, including nerves, particularly when the position is to be maintained for a prolonged period. The majority of deficits show recovery within weeks to months. All physical examinations and patient histories should be documented thoroughly. If the symptoms are minor, observation may be sufficient. Therefore, anesthesiologists should keep in mind that the injury may not be block-related, and thus consider other possible causes.

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