Pain Physician. 2006;9:157-158, ISSN 1533-3159

LETTERS TO THE EDITOR

A Modification of the Interscalene Brachial Plexus Block Technique that Allows Multiple Blocks to be done with Minimal Morbidity and Discomfort

To the Editor:

We have previously published an article describing a new approach to the interscalene brachial plexus block (1). This technique uses the bony anatomy of the cervical spine as a landmark for directing the needle to the correct position, with the needle type being a 22-gauge B-bevel shielded needle. However, studies are conflicting regarding bevel types and their association with peripheral nerve injury. While Selander et al (2) reported that short-bevel needles produce less injury, Rice and McMahon (3) reported more frequent, more severe and prolonged nerve injury following the use of a 27-degree (short-bevel) needle as opposed to a 12-degree (long-bevel needle). It would appear that B-bevel needles, having a blunter tip due to a bevel of >45 degrees, may create more tissue trauma when inserted into the neck than do the sharp-tipped A bevel needles with a bevel of <20 degrees. A shielded needle is also thicker due to the insulating material around the needle. This letter describes the use of a 27-gauge regular beveled non-shielded needle to perform the block technique that we previously described (1). Since the 27-gauge needle is very thin, it can be used without anesthetizing the skin with local anesthetic.

Fig. 1. ***Necessary equipment*** *a. Peripheral nerve stimulator with alligator clips; b. EKG pad; c. Unshielded needle; d. Extension tubing*

This method employs minor modifications to the our original technique and has been of very helpful when treating patients with Complex Regional Pain Syndrome, who often need numerous consecutive blocks during the course of treatment. This method can also be used as a regular block technique for patients having shoulder surgery, since it causes less discomfort for the patient.

In order to carry out this block, the following equipment is needed (Fig. 1)

1. A nerve stimulator with alligator clips on the end (Fig. 1 a) (5)
2. Grounding pad or EKG pad (Fig. 1 b)
3. A 27-gauge, 1½ -inch, A-bevel, unshielded needle (Fig. 1 c) (4) (We use one which has a metal hub, since our leads from the nerve stimulator have alligator clips on the end).
4. Extension tubing, preferably long in length and low-volume (Fig. 1 d).
5. The anesthetic agent of choice

The patient is positioned lying on a gurney, with the head tilted away from the site of injection. The electrode pad is put on the arm on the side to be injected, although it can actually be put anywhere else. However, less voltage is used if the grounding pad is closer to the needle. We connect the negative lead of the nerve stimulator to this electrode and the positive lead to the hub or the shaft of the 27-gauge, 1½ -inch, A bevel, un-shielded needle to be used for the block. The needle is then connected to the extension tubing, the syringe is filled with the anesthetic of choice and the tubing and needle are flushed with local anesthetic, before insertion.

The neck is prepped and pressure is applied with the forefinger and second finger of the hand not holding the needle, anterior and posterior to the palpated transverse process of the cervical spine at a level of C6. (i.e. the level of the cricoid cartilage). The midpoint between the two fingers is then noted, and approximately 3 mm anterior to the midpoint, the 27-gauge needle is inserted medially with a 45-degree caudad angulation, with stimulator settings of 1.5 Milli Amps and 2 Hz. The needle is advanced until good stimulation in the arm is obtained, and adjusted until maximum stimulation is obtained at the lowest current. Then, after aspiration, 1ml of the anesthetic solution is injected, at which time all stimulation should cease. If electrical stimulation does not stop, the needle is readjusted until stimulation is no longer evident with injection of 1 cc of the local anesthetic. If this results in cessation of all stimulation in the patient's arm, then the rest of the anesthetic is injected. This does require firm pressure on the plunger, because of the high resistance associated with the small bore needle; 15-20 cc's of local anesthetic is usually injected for a suitable block.

The key points with this block are that: 1) pressure must be maintained firmly against the cervical spine throughout the block; 2) the 1 cc of local anesthetic injected initially must abolish all stimulation; 3) the needle needs to be directed 45 degrees caudally at the midpoint of the palpated transverse processes of the cervical spine; and 4) the polarity of the nerve stimulator must be correct (positive on needle, negative on ground), because if the polarity is reversed, higher current is needed to achieve adequate stimula-

Fig. 2. *Right-sided Interscalene Block performed using modified technique with 27-gauge unshielded needle and nerve stimulator attached*

tion (Fig. 2).

We have carried out approximately 3,000 of these blocks using this needle, with a very high success rate (99%). It is of utmost importance that the pressure exerted by the forefinger and middle finger be maintained firmly downwards against the cervical spine, while injecting the local anesthetic. With this technique, the operator who inserts the needle also injects the drugs. In this situation, it is all the more important to maintain pressure on the skin and needle, since this maintains proper needle position and ensures that the anesthetic solution is injected into the correct tissue location, along the cervical nerve roots. If the injection of one cc of local anesthetic solution abolishes all stimulation, then the needle has to be in the sheath and cannot be in a blood vessel, therefore if the needle tip does not move an intravascular injection is impossible. The use of the angulation makes an intraforaminal injection unlikely, as does an injection into the vertebral artery.

The specific advantage of this technique is that one uses a very small needle, which the patient usually doesn't feel. Should one unintentionally penetrate a structure such as the carotid artery or jugular vein, it would cause a minimal number of problems. If indeed one has penetrated a major blood vessel in the area, the needle is so small as to cause no post block bleeding and, since the medication is not injected unless there is ablation of all response with a very small dose of local anesthetic, the tip of needle should be in the sheath surrounding the plexus and intravascular injection of a large amount of local anesthetic is therefore theoretically unlikely.

Numerous consecutive blocks can be carried out with this technique with almost no discomfort to the patient, since the needle, being a regular sharp A-bevel needle, slides through the tissues very easily, whereas the blunt-tipped needle usually used for these blocks creates tissue damage as it continues its path inwards. Should the tip of the needle impale one of the nerves, since it is so small, minimal amounts of damage would occur, and far less than a 22 gauge needle and particularly much less than if one was looking for paresthesias as is described in the older textbooks

These blocks have been used for treating patients with Complex Regional Pain Syndrome, who have required repeat blocks at regular intervals to achieve adequate pain relief. However, we use this technique on a regular basis for all interscalene brachial plexus blocks. Provided that attention is paid to the key points mentioned above, this technique can be carried out with minimal morbidity and discomfort to the patient. During the blocks that we have done, we have had no intra-arterial or intravenous injections, pneumothoraces or nerve damage, and patients are satisfied with the technique, which is technically simple, safe and effective.

References

1. Carden E, Ori A. Applied cervical spine anatomy to the interscalene brachial plexus block. *Pain Physician*. 2005; 8:357-361.
2. Selander D, Dhunér K-G, Lundborg G. Peripheral nerve injury due to injection needles used for regional anesthesia: an experimental study of the acute effects of needle point trauma. *Acta Anaesth Scand* 1977; 21:182-188.
3. Rice A, McMahon S. Peripheral nerve injury caused by injection needles used in regional anesthesia: influence of bevel configuration, studied in a rat model. *Brit J Anaesth* 1992; 69:433-438.
4. 27-gauge, 1.5 –inch, A bevel, unshielded needle, #27 Monoject with aluminum hub; Tyco Healthcare Group, Mansfield, A02048.
5. Digistim 2 Plus. Neuro Technology Inc., P.O. Box 291348 Kerrville, Texas 78029

Edward Carden, MD
Clinical Professor
Department of Anesthesiology
University of Southern California
Keck School of Medicine, Los Angeles
Southern California Academic Pain Management
13160 Mindanao Way, Suite 300
Marina Del Rey, CA 90292
E-mail: tedcarden@comcast.net

Arti Ori, MBChB
Attending Observership
Southern California Academic Pain Management
13160 Mindanao Way, Suite 300
Marina Del Rey, CA 90292
E-mail: artiori1@yahoo.com