An Improved Technique for Locating the Interscalene Groove

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Brachial block by the interscalene approach can provide relatively safe anesthesia for operations on the neck and upper extremities. However, failures due to incorrect needle placement occur because of inability to delineate the groove between the anterior and medial scalene muscles. We describe a maneuver enabling easier location of the interscalene groove.

Palpation of the interscalene groove as described by Winnie involves placing the index finger lateral to the body of the sternocleidomastoid, and rolling the finger laterally across the anterior scalene until the groove between the middle and anterior scalene muscles is felt. He suggests that the patient be relaxed, but we have found it easier with the muscles contracted. This results in firmer margins, and the finger sinks into the groove. The scalene muscles contract with flexion of the cervical spine and when acting as accessory muscles of respiration.

To demonstrate muscle contractions, two electromyographic (EMG) surface electrodes were placed 5 cm apart along the long axis of the sternocleidomastoid, and two others over the interscalene groove opposite the transverse process of the sixth cervical vertebra. An indifferent electrode was placed on the forehead. A Tektronix A.M. 502 differential amplifier was used with bandpass filter at 10–1,000 Hz set to a gain of 5,000. To measure inspiratory volume the subject was connected by a mouthpiece to a 7-l Krogh spirometer.

Figure 1 shows EMG recordings of both muscle groups during a deep inspiration and flexion of the neck. Similar intense activity is recorded from both sternocleidomastoid and scalene muscles when the neck is flexed. However, during deep inspiration the scalene muscles contract before the sternocleidomastoids. When EMG activity from the scalene muscles is recorded during a slow deep inspiration, activity begins at 20–30 per cent of inspiratory volume (fig. 2). The sternocleidomastoids do not contract until 70 per cent of total lung capacity is approached. Thompson et al. showed that muscle tone in the scalene muscles can be palpatated as soon as minimal EMG activity is evident. Therefore, during a slow deep inspiration, tone in the scalene muscles can be detected before any contraction of the sternocleidomastoid, enabling the anesthesiologist to locate the correct site for local anaesthetic injection more readily.

Thompson et al. also found that patients who had emphysema, asthma, and chronic congestive heart failure developed hypertrophy of the scalene muscles, and that these muscles were more readily palpable in any patient who had dyspnea or hyperventilation. We have found the scalene muscles easier to feel, even in the obese, when the patient takes a deep breath. The scalene muscles contract before the sternocleidomastoids, enabling the anesthesiologist to differentiate between the interscalene groove and the more medial space between the sternocleidomastoid and anterior scalene muscles.

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Fig. 1. Surface EMG recordings from the scalene (X) and sternocleidomastoid (Y) muscles, demonstrating onset of muscle contractions with deep inspiration (shaded arrows) and flexion of the neck (open arrows).

Fig. 2. Surface EMG from the scalene muscles (X) and tidal volume (Z) recorded during quiet breathing (A) and inspiration to total lung capacity (B).
A modified technique to locate the interscalene groove for brachial plexus anesthesia is described. Palpation of the groove is easier when the muscles are firm. During a slow deep inspiration the scalene muscles contract, facilitating location of the groove and successful injection of local anesthetic.

REFERENCES


Sick-sinus Syndrome Manifested during Anesthesia

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Sick-sinus syndrome may be defined as an unexplained and marked sinus bradycardia or sinus arrest with or without associated supraventricular arrhythmias. The following is a case of sick-sinus syndrome first manifested following induction of anesthesia.

REPORT OF A CASE

A 59-year-old woman was admitted with a chief complaint of cold, lower extremities. The patient had originally complained of "stiff" calves for three years; this had progressed to intermittent claudication.

Past medical history included hypertension for 12 years, treated with hydralazine HCl, 25 mg. orally, twice daily. Her only previous operation was a hemilectomy 13 years previously.

On physical examination, the patient weighed 66 kg; height was 165 cm. Cardiovascular findings were a grade 1/VI systolic ejection murmur at the left sternal border. Pulse rates ranged from 96 to 60/min. Blood pressure was 210/120 mm Hg. Femoral, popliteal, and tibial pulses were absent. Auscultation of the chest revealed bilateral ronchi. Laboratory findings were within normal limits. EKG showed left ventricular hypertrophy and strain, and left atrial hypertrophy. Chest x-ray disclosed no abnormality.

Aortography was performed using local anesthesia and showed Leriche syndrome with complete occlusion of the origin of the right common iliac artery and the left common iliac artery at its bifurcation. The remaining vessels in the lower limbs were extremely atherosclerotic, the left more than the right. Both renal arteries were atherosclerotic at their origins. The abdominal aorta was hypoplasic. Stenosis was severe at the origin of the left vertebral artery and moderate at the origins of both internal carotid arteries.

An aorto-bifemoral bypass was scheduled. Pre-medication consisted of atropine 0.4 mg, meperidine, 50 mg, and secobarbital, 100 mg, im, 1/2 hours before operation. Anesthesia was induced with thiopental 250 mg, and succinylcholine, 80 mg, iv, followed by orotracheal intubation without difficulty. Maintenance was with enflurane (1–1.5 per cent). X₂O (3 l/min), O₂ (3 l/min), and pancuronium (total dose 9 mg). Following induction, the pulse rate slowed from 84 to 32/min, and atropine, 0.4 mg, given twice, resulted in a short-lived improvement to 64/min, with a decline to 40–42/min (see fig. 1). Atropine to a total of 2 mg, iv, was given, without response. The blood pressure was well maintained. Arterial blood-gas values obtained at this time were: P."e" 152 mm Hg, P.""O" 31 mm Hg, pH 7.46, Hbg 98.8 per cent. Serum potassium was 4.3 mEq/l.

A temporary demand pacemaker was inserted via the right subclavian vein. The heart rate was maintained at 72–75/min with continuous pacing. Anesthesia and operation for the remainder of the 8 hours were uneventful except for a short period (5–10 min) of severe hypotension following transection of an aberrant renal vein and a period of decreased urinary output, treated with furosemide, 20 mg, iv.