

## A complication of superficial cervical plexus block used for thyroidectomy

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A superficial cervical plexus block was performed following general anaesthesia for a thyroidectomy to provide intraoperative and post-operative analgesia. The patient suffered a transient motor weakness and numbness on both upper limbs following the procedure which lasted about 12hrs. There were no residual neurological effects.

**Key words:** Superficial cervical plexus, block, thyroidectomy

### Introduction

Superficial cervical plexus block is a mode of regional anaesthesia that is being practised to provide intraoperative and postoperative analgesia for operations involving the neck including thyroidectomy. However, it is unclear whether superficial cervical plexus block offers the best operating conditions or patient satisfaction.

The plexus originates from the anterior rami of the C1-C4 spinal nerves and gives rise to 4 terminal branches- greater auricular, lesser occipital, transverse cervical and suprascapular nerves- that provide sensory innervation to the skin and superficial structures of the anterolateral neck and sections of the ear and shoulder.

The complications of superficial cervical plexus block have yet to be fully evaluated.

Thyroidectomy under general anaesthesia and superficial cervical plexus block is becoming more popular because of its efficacy in reducing the use of supplementary opioids during the intraoperative period<sup>1</sup>. Currently there is a paucity of trials that have assessed the efficacy and complications of superficial cervical plexus block. As this technique becomes more widespread in its use, it is essential to know its efficacy and complications in order to produce clear evidence in favour of this technique.

A case is presented where the patient suffered a transient motor weakness and numbness on both upper limbs following a superficial cervical plexus block for thyroidectomy. The safest cervical plexus anaesthetic block technique has not yet been established.

### Case report

A 48 year old female patient (weight 52kg) was admitted for total thyroidectomy. She had a goitre for 2 years and there were no pressure symptoms such as positional dyspnoea or dysphagia. She didn't have hoarseness of voice or gradual enlargement of the goitre. She was clinically and biochemically euthyroid.

She had not undergone any previous operations. She had a good exercise tolerance that was more than 4 metabolic equivalents.

Examination revealed nothing abnormal except for a multi nodular goitre with a firm consistency with no retrosternal extension. Trachea was in the midline. Her ECG was normal. FBC, blood glucose and electrolytes were all within normal limits.

Thyroid function tests were within normal limits.

On the day of surgery in the operating theatre, anaesthetic machine was checked and drugs were drawn into labelled syringes. Intravenous access was established.

Preoperative monitoring of HR, BP, ECG, and SPO<sub>2</sub> were done. She was preoxygenated with a close fitting mask with 6L/min of oxygen via the circle circuit. She was induced with i.v. fentanyl and propofol and atracurium was given after confirming the ability to ventilate and she was intubated and ventilated. Monitoring of vital parameters continued.

The posterior borders of bilateral sternocleidomastoid muscles were marked

preoperatively and the midpoint between the mastoid process and the clavicular head of the sternocleidomastoid muscle was marked as the entry point for the superficial cervical plexus block.

Bilateral superficial cervical plexus block was given using 0.5% plain bupivacaine 20ml under aseptic conditions. (10ml on each side) A 22G hypodermic needle was inserted at the marked site, 4ml of local anaesthetic was infiltrated in the cephalad direction, 3ml caudally and 3ml in transverse direction in a fan like fashion after negative aspiration for blood or CSF.

She was haemodynamically stable during the intraoperative period and she didn't show signs of inadequate pain relief like tachycardia or hypertension. Additional opioids were not supplemented during the intraoperative period. She had no signs of acute local anaesthetic toxicity. At the completion of surgery she regained spontaneous breathing with a 5ml/kg tidal volume, responded to commands and had a SpO<sub>2</sub> of 98-100%. She was extubated awake after reversing non depolarising neuromuscular blockade. She was haemodynamically stable and there were no signs of immediate post-operative complications of thyroidectomy. She was sent to the ward and post-operative care continued. In the ward about 5-6 hours after the surgery she had complained of weakness and numbness in both upper limbs. The weakness was more pronounced on the left side and it involved C<sub>5</sub>-T<sub>1</sub> dermatomes. She had a moderate degree motor and sensory impairment of both hands. Both radial and ulnar pulses were normal and SpO<sub>2</sub> in both hands were 98-100%. Upper limb reflexes were present. Her vital parameters were monitored all throughout and she remained haemodynamically stable. There was no breathing difficulty or involvement of the lower limbs.

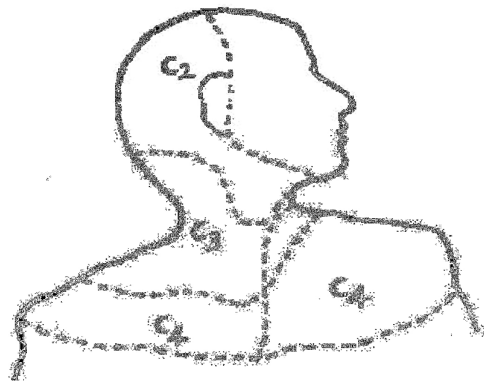
Her upper limb motor power and sensation became normal after 12 hours. There were no residual effects.

### Discussion

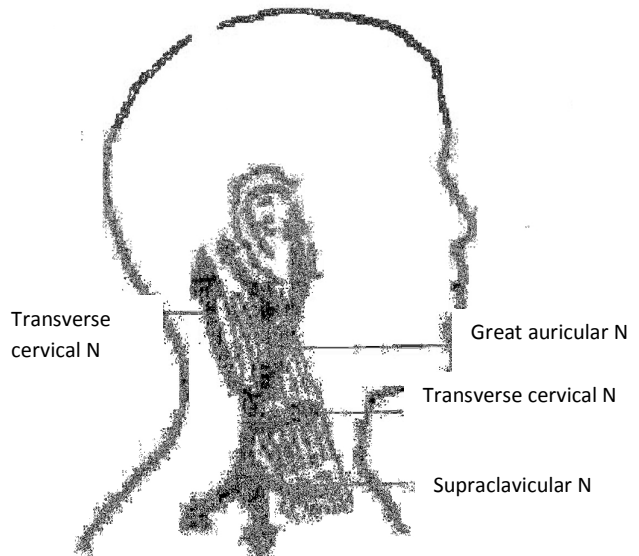
Thyroidectomy under general anaesthesia and superficial cervical plexus block may be advantageous. Superficial cervical plexus block causes anaesthesia of the anterior triangle of the neck through the anterior primary rami of C<sub>2</sub>-

C<sub>4</sub> (Figure 1). The individual nerves emerge as four distinct nerves from the posterior border of the sternocleidomastoid muscle. The lesser occipital nerve usually is a direct branch from the main stem of the second cervical nerve. The larger remaining part of this stem then unites with part of the third cervical nerve to form a trunk that arises as the greater auricular and transverse cervical nerves. Another part of the third cervical nerve runs downward to unite with a major part of the fourth to form the supraclavicular trunk, which then divides into the three groups of supraclavicular nerves (Figure 2).

**Figure 1:** Cutaneous distribution of the cervical plexus



**Figure 2:** Superficial branches of the cervical plexus



The possible mechanism of prolonged motor and sensory block in the discussed case could be due to the usage of a higher concentration (0.5%) and a larger volume (10ml) of plain bupivacaine. The dose used did not exceed the maximum safe dose of bupivacaine which is 104mg (2mg/kg) for this patient.

The injecting needle might have gone too deep within the neck muscles or the drug itself may have seeped through tissue planes to block C<sub>5</sub> to T<sub>1</sub> roots.

Central nervous system toxicity<sup>2,4</sup> is the most serious consequence of cervical plexus block. This complication is usually caused by inadvertent intravascular injection of local anaesthetic rather than absorption. Spinal anaesthesia is a definite risk but rare<sup>2</sup>. Haematoma formation<sup>2</sup> is a risk associated with this procedure.

It has been found that bilateral superficial cervical plexus block reduces the number of general anaesthetics required during thyroidectomy<sup>3</sup>. It also significantly lowers the severity of postoperative pain during the first 24 hours and shortens the hospital stay<sup>3</sup>. In contrast to the above, one study has found that bilateral superficial cervical plexus block or local wound infiltration with 0.25% bupivacaine does not reduce the opioid requirement or pain scores after thyroid surgery.<sup>5</sup>

A likely explanation for the lack of beneficial effects of bilateral superficial cervical plexus block or local wound infiltration is that pain arising from areas that cannot be blocked by a superficial approach is of greater significance than that from cutaneous, subcutaneous, and muscular layers after thyroid surgery

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