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COMPARISION OF ULTRASOUND AND LANDMARK GUIDED TECHNIQUE FOR SUPERIOR LARYNGEAL NERVE BLOCK AND GLOSSOPHARYNGEAL NERVE BLOCK TO AID AWAKE FIBREOPTIC INTUBATION

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ABSTRACT
Background: Awake intubation elicits airway and hemodynamic responses and results in patient pain. Effective airway anaesthesia is crucial for effective airway examination and intubation.

Materials and methods: Thirty members of the American Society of Anaesthesiologists' physical status I–II patients, ages 18–60, who were going to have awake fiber-optic intubation were put into one of two groups: the landmark group (L, n = 15) or the ultrasound group (U, n = 15). All of the patients were given a nebulized 4% lignocaine (3 mL) dose and a Trans tracheal shot of 2% lignocaine (3 mL). The primary outcome is the quality of the airway anaesthesia, which is measured by the lack of airway reflexes during the procedure. Secondary outcomes measured were the time taken for performing the procedure, effects on haemodynamic variables and patient perception of pain and discomfort during intubation

Results: Group U experienced significantly higher-quality anaesthesia than Group L ($P < 0.001$). Group U had a shorter mean intubation time (4.6 ± 0.7 mins) than Group L (5.6 ± 0.8 mins, $P < 0.001$). In Group L, there was a substantial rise in heart rate, mean arterial pressure, and patient perception of pain.

Conclusion: As part of the preparation for awake fiber-optic intubation, ultrasound for glossopharyngeal nerve block and ibSLN block enhances patient tolerance and the quality of airway anaesthesia.

Keywords: airway block, ultrasound, ibSLN, Glossopharyngeal nerve, fiber-optic intubation.

1. INTRODUCTION
When it comes to managing a problematic airway, awake fiber-optic intubation is a well-respected method. The patient's psychological and pharmaceutical readiness is crucial to the technical success of awake fiber-optic intubation [1]. Many methods have been reported to achieve airway anaesthesia because awake intubation causes discomfort to patients. These methods include topical application of local anaesthetics and injection of local anaesthetic agents at specific anatomic landmarks to block the afferent neural transmission from the oropharynx and larynx [2].

The vagus nerve is the source of the superior laryngeal nerve (SLN), which descends posterior to the carotid artery and heads towards the larynx. It splits into external and internal branches at the level of the hyoid bone. The base of the tongue, the epiglottis, and the mucous membrane of the larynx above the level of the vocal cords are all innervated sensory by the internal branch. The internal branch reaches the thyrohyoid membrane and travels directly inferior to the larger horn of the hyoid bone. The cricothyroid muscle receives its motor supply from the external branch [3]. An internal branch of SLN (ibSLN) block is often administered in patients having awake fiber-optic intubation as a component of airway anaesthesia. This is traditionally

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accomplished by identifying the superior horn of the thyroid cartilage and the larger horn of the hyoid bone as anatomic landmarks [4].

Regional anaesthesia, which is separated into topical anaesthesia and nerve blocks, is one of the analgesic strategies used during awake intubation. Lidocaine spray, viscous lidocaine, and nebulized lidocaine have all been utilised in topical anaesthesia [5].The three types of nerve blocks that are often utilised in combination are glossopharyngeal, recurrent laryngeal, and superior laryngeal nerve blocks [6]. Anatomic landmark strategy for a peristyloid approach was used to administer a glossopharyngeal nerve block in a research that included superior laryngeal, recurrent laryngeal, and glossopharyngeal nerve blocks [7].

For a patient whose airway was expected to be challenging, we did ultrasound-guided superior laryngeal, recurrent laryngeal, and glossopharyngeal nerve blocks to enable awake intubation.

2. MATERIALS AND METHODS

After obtaining ethical committee approval and written informed consent, thirty patients were divided into two groups by computer generated numbers.

Patients aged 18 years to 60 years, ASA I and ASA II were included in this study. Patients who were allergic to local anaesthetics, having local pathology of neck, bleeding diathesis and intellectual impairment were excluded from study.
The patients were premedicated with injection glycopyrrolate 10micro gm /kg and injection midazolam 0.03mg/kg. 4% Lignocaine nasal pack was done for all patients.

Group L received landmark guided superior laryngeal and glossopharyngeal nerve block and Group U received ultrasound guided superior laryngeal and glossopharyngeal nerve block. Trans-tracheal injection with 3ml 2%lignocaine was administered to all patients. General anaesthesia technique was standardised for 2 groups.

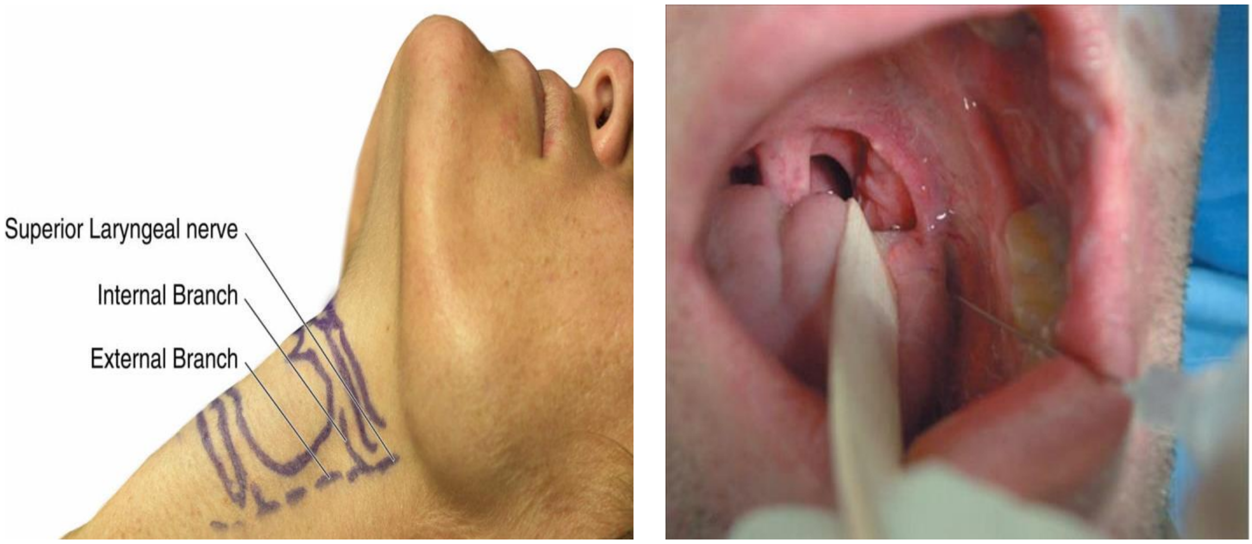

Figure 1 landmark for superior laryngeal nerve and glossopharyngeal nerve block

Figure 2 USG image for SLN block

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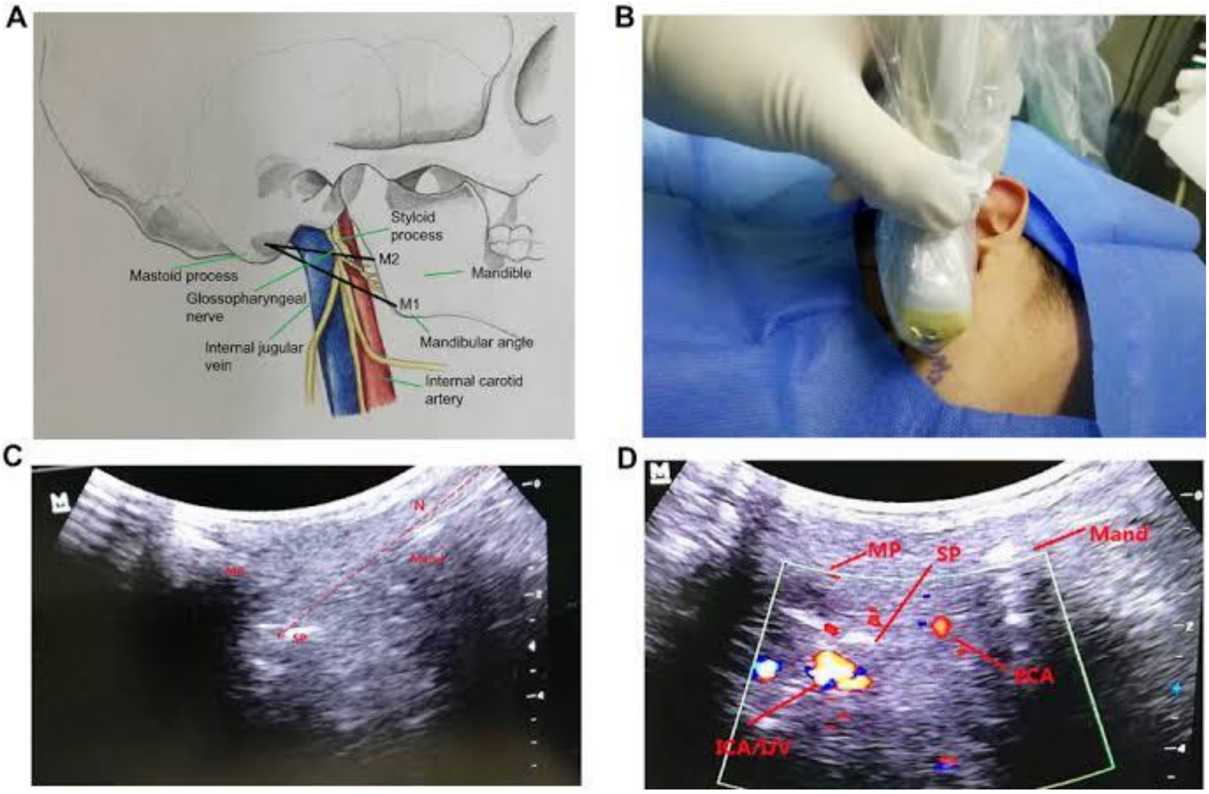

Figure 3 USG picture for glossopharyngeal nerve block

The main goal was to evaluate the level of airway anaesthesia using a 5-point rating systemby an observer who entered the operating room after the airway block and was blind to the block procedure. The following criteria were used to grade the level of airway anaesthesia: 0 represented no coughing or gagging in response to intubation; 1 represented mild coughing and/or gagging that did not interfere with intubation; 2 represented moderate coughing and/or gagging that interfered with intubation minimally; 3 represented severe coughing and/or gagging that made intubation difficult; and 4 represented extremely severe coughing and/or gagging that required additional local anaesthetic and/or a change in technique to achieve successful intubation.

The duration of intubation, its impact on hemodynamic parameters, and the patient's experience of pain and discomfort during the procedure were the secondary objectives. The duration between inserting a fiberscope through the nose and successfully placing the endotracheal tube, as confirmed by the presence of end-tidal CO2, was called the "time to intubation." Effects on hemodynamic variables were measured baseline, during intubation, and one minute following intubation. These variables included heart rate (HR), mean arterial pressure (MAP), and oxygen saturation. A 12-hour postoperative period was used to evaluate the patient's experience of pain and discomfort during intubation using a numerical rating scale (NRS) (0–10 scale, with 0 being no discomfort and 10 being greatest discomfort).

Data's collected were -Quality of airway anaesthesia by grading, Time taken for performing the procedure and intubation, Mean heart rate and mean arterial pressure, Numerical rating scale. Statistical analysis was done using SPSS software version 20. All values are expressed as mean and standard deviation. Chi square test and student's unpaired T test were applied.

3. RESULTS

Thirty patients aged from 18 years to 60 years were enrolled in this study. Demographic profile and airway measurements were comparable in both groups. Mean age in Group L was 38.45±4.56 years and in Group U was 37.92±5.26 years.

Group U had a lower tracheal intubation time (mean 4.6 ±0.7mins) than Group L (mean 5.6 ± 0.8 minutes, $P < 0.001$).

Parameters	Group L	Group U	P Value
Time taken for performing the procedure (mins)	7.2±1.1	5.9±1.1	0.003
Time taken for intubation (mins)	4 .6±0.7	5.6±0.8	0.001
Mean heartrate(bpm) Before intubation During intubation 1min after intubation	70.35±3.41 73.67±1.39 73.93±1.51	72.32 ±2.57 80.73±1.90 78.74±1.35	0.085 0.001 0.001
Mean MAP(mmHg) Before intubation During intubation 1min after intubation	79.70±6.43 82.87±1.83 80.73±1.90	83.01±3.56 92.93±1.99 90.44±1.17	0.092 0.001 0.001

In comparison to Group U, the impact of tracheal intubation on HR and MAP was considerably greater in Group L, as evidenced by a higher peak (during intubation) and post-intubation values relative to pre-intubation baseline values [Table 1].

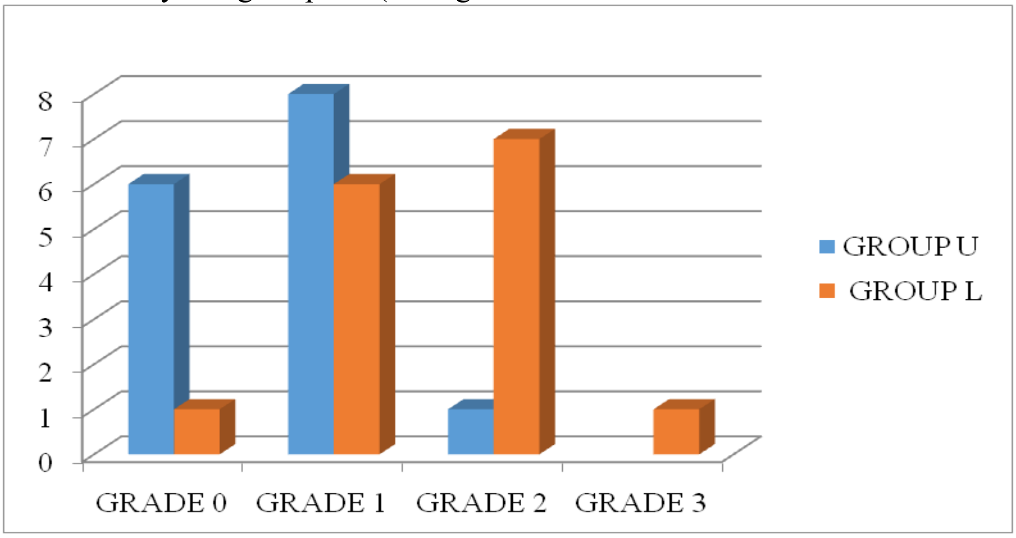

Figure 1: Quality of airway assessment

An observer who was blinded to the block technique evaluated the quality of airway anaesthesia, and found that Group U had considerably (P < 0.001) better quality airway anaesthesia than Group L, with a mean score of 0.66 ± 0.59 versus 1.33 ± 0.60 shown in figure 1.

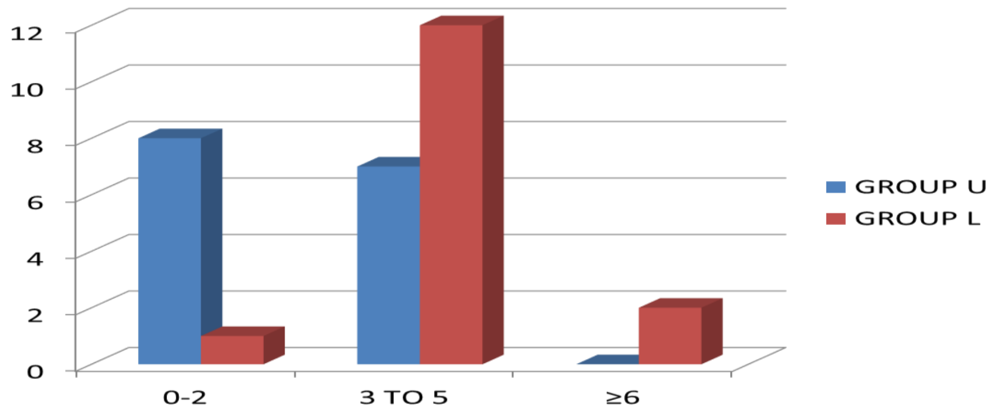

Figure 2: Numerical rating scale

After the procedure, the patients' postoperative perception of pain and discomfort during intubation was evaluated using the NRS [Figure 2]. Group U had considerably greater patient tolerance, with a mean NRS score of 2.66 ± 1.65, compared to Group L, which had a mean NRS score of 4.0 6± 1.73 (P < 0.001).

DISCUSSION

A number of methods, each with possible benefits and drawbacks, are discussed for tracheobronchial tree anaesthesia. A better block success rate with a lower dose of local anaesthesia would be required for the perfect anaesthetic approach. In addition to offering suitable circumstances for intubation, it would be safe and bearable for the patient. In this study, we evaluated a new technique for GPN and SLN using ultrasound guidance. We used the high-frequency linear array probe to define the SLN space and then administered a local anaesthetic drug using the out-of-plane approach. Group U had superior quality of airway anaesthesia, as determined by a blinded observer, with reduced intubation duration, improved patient tolerance, and stable hemodynamics.

Quality of airway anaesthesia was significantly better in group U as compared to group L. Duration of tracheal intubation was shorter in group U when compared to group L. The effect of tracheal intubation on HR and MAP was significantly higher in group L with peak values during intubation and post intubation when compared to group U. Mean NRS score was significantly lower in group U as compared to group L. Our study confirms the findings of study by Uday S Ambi and colleagues that quality of airway anaesthesia and patient tolerance was better with ultrasound guided block. They compared ultrasound and landmark guided superior laryngeal nerve block alone.

CONCLUSION

Ultrasound guided block for ibSLN and glossopharyngeal nerve used as a part of preparation of the airway for awake fiberoptic intubation improves the quality of airway anaesthesia and patient tolerance during the procedure.

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