

Efficacy of Bilateral Superior Laryngeal Nerve Block for Diagnostic Direct Laryngoscopy

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Abstract

Background: Direct laryngoscopy (DLS) is a routine diagnostic procedure employed by otorhinolaryngologist which is being painful and causing severe discomfort to the patient is usually done under general anesthesia.

Aim: To study the efficacy of bilateral superior laryngeal nerve blocks in diagnostic DLS, a routine procedure to diagnose pathological abnormalities involving larynx.

Materials and Methods: A total of 40 patients scheduled for diagnostic DLS were selected, 2% lignocaine 2 ml was injected bilaterally to block superior laryngeal nerve. The success of the block was assessed by comfort of the patient, quality of analgesia, duration of blockade, and cardiovascular stability.

Results: There is a high success rate accounting for 82.5% (33 patients) with very less failure accounting for 17.5% (7 patients). Failed block is mostly attributed to the lack of proper skill in instituting the block during the initial period of study. Even with the successful procedure, there was a significant hemodynamic alteration which includes mild tachycardia and hypertension. This is a point of concern.

Conclusion: Bilateral superior laryngeal nerve block in combination with oral topical analgesia and transtracheal block has a success rate of 82.5% and provides adequate analgesia to the patients to undergo a stressful procedure of DLS.

Key words: Cardiovascular stability, Direct laryngoscopy, Duration of blockade, Quality of analgesia, Superior laryngeal nerve block

INTRODUCTION

Diagnostic laryngoscopy is a diagnostic procedure used by otorhinolaryngologist in the diagnosis of tumors and other pathological conditions involving larynx and oropharynx. This diagnostic procedure being painful causes severe discomfort to the patient is usually done under general anesthesia.¹ Most of the patients belong to older age group and are affected with systemic disorders. This minor diagnostic procedure is risky if we subject these patients to general anesthesia. This atraumatic

procedure is associated with numerous life-threatening complications. An obstructing supraglottic mass, a displaced or narrow trachea, a head and neck tumor extending to temporomandibular joint may limit laryngoscopy and intubation.^{2,3} Airway management with light plane of general anesthesia may cause patient discomfort, laryngospasm, and bronchospasm. Patient discomfort, laryngospasm may be overcome by muscle relaxation, but bronchospasm may be dangerous and difficult to treat.⁴ Sympathetic and parasympathetic stimulation may cause myocardial ischemia and dysrhythmias. Sympathetic stimulation leads to hypertension and tachycardia. Light anesthesia, hypoxia or hypercarbia may predispose to dysrhythmias.^{5,6} Sharing the airway with surgeon requires the use of small endotracheal tubes leading to narrow lumen for ventilation and tube become dislodged or obstructed. Most of the above problems are avoided if the procedure is conducted in a sedated, awake patient with intact airway reflex under regional anesthesia.^{2,3} The

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regional technique employed to provide anesthesia of the airway is a combination of bilateral superior laryngeal nerve block with topical anesthesia of the oral cavity and transtracheal instillation of the local anesthetic through the cricothyroid membrane.

Aim

To study the efficacy of bilateral superior laryngeal nerve blocks in diagnostic direct laryngoscopy (DLS), a routine procedure to diagnose pathological abnormalities involving larynx.

MATERIALS AND METHODS

Totally 40 patients scheduled for diagnostic DLS were selected in the Department of Otorhinolaryngology in Kilpauk Medical College and Hospital, Chennai. An informed written consent was obtained. A good rapport was developed with patients and was explained about the procedure involved. History regarding systemic disorders such as hypertension, diabetes mellitus, ischemic heart disease, and congestive cardiac failure, was taken. A thorough examination of cardiovascular system, respiratory system, airway assessment was done. All the patients were made to gargle 2% lignocaine viscous 10 ml for 8-10 min before the procedure. Patients were shifted to operating table, and they were made in supine position. Pulse and blood pressure were recorded non-invasively. An intravenous infusion was started in one of the forearm veins. With the patient lying in supine position, the head was maximally extended and the hyoid bone was identified by palpation. Since the hyoid bone is movable, and this mobility serves as a useful identifying sign. Under strict aseptic precaution, a 21 G needle was introduced laterally and directed at the greater cornu of hyoid bone. The carotid sheath was retracted posteriorly, and the bone was contacted. The needle was then walked caudally until it slipped of the hyoid bone through the thyrohyoid membrane laterally and the laryngeal mucosa medially, where the ramifications of the internal branch of superior laryngeal nerve are present. After careful aspiration, 2% lignocaine 2 ml was injected, and the block was repeated on opposite side too. Lignocaine 4% 2 ml was injected via cricothyroid puncture at the end of maximal expiration. This provides topical anesthesia of trachea, as a cough produced by spray of lignocaine introduced directly into the trachea spreads anesthetic droplets from carina to the inferior surface of the vocal cords. The interior of the larynx is anesthetized by superior laryngeal nerve block, and topical application of local anesthetic solution to the oral cavity completed anesthesia of the upper airway. The parameters studied before and after administering the block and after DLS were pulse rate (PR), systolic blood

pressure (SBP) and diastolic blood pressure (DBP). The success of the block was assessed by the comfort of the patient during diagnostic laryngoscopy. The patients were interviewed regarding pain and discomfort after the procedure. A statistical evaluation of the changes in PR, SBP and DBP were undertaken. The efficacy of the block was evaluated by patient's response during diagnostic DLS. The statistical analysis was performed using Student's *t*-test.

RESULTS

This study was conducted on 40 randomly chosen patients. This group consisted of 34 males and 6 females. Most of the patients were aged above 50 years, and only 8 were below 50 years.

From Table 1, it is clear that there were a significant increase in all the parameters observed after the block and during diagnostic laryngoscopy compared to the parameters before the block.

Table 2 shows significant changes in PR, SBP, and DBP before and during the block and also during DLS.

From Table 3, it was noticed that the block was more successful in patients above 50 years of age.

From the Table 4, it is clear that there is negligible difference of success rate between both sexes.

Table 1: Distribution of hemodynamic parameters

Parameters	Mean±SD		
	Before the block	After the block	During DLS
PR (per minute)	77.325±5.654	86.69±5.805	86.205±6.418
SBP	132.5±11.74	142.25±12.051	142.1±12.165
DBP	86.5±6.6596	92.65±6.594	92.5±7.318

DBP: Diastolic blood pressure, SBP: Systolic blood pressure, PR: Pulse rate, DLS: Direct laryngoscopy, SD: Standard deviation

Table 2: Test of significance

Parameters	Before verses during block		Before verses during DLS	
	t	P	t	P
PR	t=7.309	P<0.001	t=6.566	P<0.001
SBP	t=3.665	P<0.001	t=3.591	P<0.001
DBP	t=4.15	P<0.001	t=3.835	P<0.001

DBP: Diastolic blood pressure, SBP: Systolic blood pressure, PR: Pulse rate, DLS: Direct laryngoscopy

Table 3: Distribution of efficacy in age group

Age groups	Success (%)	Failure (%)	Total
<50 years	6 (75)	2 (25)	8
>50 years	27 (84.4)	5 (15.6)	32
Total	33	7	40

Table 4: Distribution of efficacy in gender

Sex	Success (%)	Failure (%)	Total
Male	28 (82.4)	6 (17.6)	34
Female	5 (83.31)	1 (16.7)	6
Total	33	7	40

Table 5: Total success rate

Number of patients	Success (%)	Failure (%)
40	33 (82.5)	7 (17.5)

Table 5 shows that there is a high success rate accounting for 82.5% with very less failure accounting for 17.5%. Failed block is mostly attributed to the lack of proper skill in instituting the block during initial period of study. Even with the successful procedure, there was a significant hemodynamic alteration which includes mild tachycardia and hypertension. This is a point of concern.

DISCUSSION

The study of efficacy of bilateral superior laryngeal nerve block with transtracheal block and topical anesthesia of oral cavity for diagnostic DLS was done in 40 randomly chosen patients. The aim of this study was to find the quality of analgesia, cardiovascular changes, duration of the block and patient comfort.^{7,8} Most of the patients undergoing this procedure belong to older age group are unfit for general anesthesia due to various systemic disorders. Out of 40 patients, the procedure was successful in 33 patients with good analgesia. These patients were comfortable during laryngoscopy and minimal cardiovascular response. The duration of the blockade between 30 and 45 min. The procedure was failure in 4 patients, and these patients were distressed and unable to withstand their diagnostic procedure. Remaining 3 patients had moderate distress but

allowed laryngoscopy. They had significant cardiovascular stress response with severe tachycardia and hypertension and the procedure had to be abandoned.^{9,10}

CONCLUSION

In our study, we find that the bilateral superior laryngeal nerve block in combination with topical analgesia of the oral cavity and transtracheal block has a success rate of 82.5%. It does not interfere much with the cardiovascular status of the patients. This block provides adequate analgesia to the patients to undergo a stressful procedure of DLS.

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