"EFFECTS OF LIGNOCAINE NEBULIZATION VS. MCKENZIE TECHNIQUE ON STRESS RESPONSE TO DIRECT LARYNGOSCOPY – A RANDOMIZED DOUBLE BLIND STUDY. "

By

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In partial fulfillment of the requirements for the degree of

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Under the Guidance of

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PRIOR PERMISSION TO START OF STUDY

The Institutional Ethics Committee of Sri Devaraj Urs Medical College, Tamaka, Kolar has examined and unanimously approved the synopsis entitled **"Effects of lignocaine nebulization vs. mckenzie technique on stress response to direct laryngoscopy - A Randomized double blind study"** being investigated by **Dr.Paranji Haritha** & Dr. Vishnuvardhan V in the Department of Anaesthesiology at Sri Devaraj Urs Medical College, Tamaka, Kolar. **Permission is granted by the Ethics Committee to start the study.**

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ABBREVIATIONS

	Abbreviations
GA	General anaesthesia
MAP	Mean arterial pressure
SPO2	Saturation
RCT	Randomized Controlled Trial
SBP	Systolic blood pressure
DBP	Diastolic blood pressure
ASA	American Society of Anesthesiologists
CNS	Central nervous system
HPA	Hypothalamic -pituitary -adrenal axis
BMI	Body Mass Index
ECG	Electrocardiogram
HR	Heart rate
PR	Pulse rate
NIBP	Non invasive blood pressure
MAD	Mucosal automated devices

ABSTRACT

Introduction - Laryngoscopy and tracheal intubation causes significant sympathetic response resulting in hypertension and tachycardia. A variety of anaesthetic techniques and drugs have been studied and are available to control the hemodynamic response to laryngoscopy and intubation. The present study is performed to compare the hemodynamic changes for lignocaine administered in two forms that is Mckenzie technique and nebulization in patients requiring general anesthesia with endotracheal intubation.

OBJECTIVES -

To compare the haemodynamic changes to direct laryngoscopy after administering nebulized lignocaine (4%) and Mckenzie technique with (4%) lignocaine in patients scheduled for elective surgical procedures.

MATERIAL AND METHODS -

After obtaining written informed consent ,120 patients were randomly allocated to one of the two groups. GROUP A – will receive 4% lignocaine (4ml) spray using Mckenzie technique 15 mins before direct laryngoscopy.GROUP B- will receive 4 ml of 4% lignocaine(4ml) nebulization 15 mins before direct laryngoscopy. Hemodynamic changes(Heart rate ,Mean arterial pressure,ECG) will be monitered and documented at 1min,2min,5min,10min,15min,30 min,60min,120min after intubation and 0min,1min,5min,10 min post extubation .Post extubation cough and sore throat will be documented.

RESULTS -The study demonstrated that Group A (McKenzie technique) exhibited significantly better control over heart rate and blood pressure compared to Group B (4% lignocaine nebulization) . Specifically, Group A showed a lower heart rate at 1, 5, 10, 15, 30, 60, and 120 minutes post-intubation, with p-values less than 0.05 at each time point, indicating statistically significant differences. Furthermore, SBP and DBP were considerably lower in Group A at multiple time points, indicating a greater dampening of the hemodynamic stress response to intubation in this group.

CONCLUSION -

The McKenzie technique demonstrated superior efficacy in maintaining haemodynamic stability throughout both intubation and extubation phases. Group A, employing the McKenzie technique, consistently exhibited lower, (SBP) systolic and diastolic blood pressures, mean arterial pressures & heart rates compared to Group B, which received nebulized lignocaine. These differences were statistically significant, underscoring the McKenzie technique's ability to mitigate perioperative stress responses effectively.

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INTRODUCTION

INTRODUCTION

When administering general anaesthesia for a variety of surgical procedures, maintaining airway patency via direct laryngoscopy and subsequent endotracheal intubation is an essential step. . However, these interventions often trigger a significant sympathetic response characterized by hypertension and tachycardia. For patients with underlying cardiovascular conditions such as coronary artery disease, systemic hypertension, cerebrovascular disease, and intracranial aneurysm, this transient sympathetic response can pose serious risks, including cerebrovascular haemorrhage, cardiac failure & pulmonary oedema [(1)].

"King et al. carried out ground-breaking studies on the reflex circulatory reactions to tracheal intubation and direct laryngoscopy during general anaesthesia at the beginning of the 1950s.. Their study provided foundational insights into the cardiovascular effects of these procedures, highlighting the importance of understanding and managing the hemodynamic response" [(2)].

"Subsequent investigations by Prys-Roberts et al. in 1971 further elucidated the hemodynamic consequences of induction and endotracheal intubation. Their findings underscored the need for interventions to mitigate the adverse effects of laryngoscopy and intubation on cardiovascular function [(3)"].

Researchers have studied a range of pharmacological and non-pharmacological techniques to regulate the hemodynamic response to intubation and laryngoscopy throughout time. "Harris et al. in 1988 compared the effects of thiopentone and propofol on the hemodynamic response, providing valuable insights into the choice of induction agents" [(4)].

"Lignocaine, a local anaesthetic agent, emerged as a promising option for attenuating the hemodynamic response to laryngoscopy and intubation. Studies by Kovac in 1996 and Groeben et al. in 2001 investigated the efficacy of lignocaine in controlling the hemodynamic response through various routes of administration" [(5,6)].

The effectiveness of lignocaine in mitigating the hemodynamic response has been evaluated through different routes of administration, including intravenous, gargle with viscous

solution, spray, and nebulization. However, conflicting reports and limited literature have made it challenging to establish the relative superiority of a specific route [7].

In addition to pharmacological and non-pharmacological interventions, recent studies have explored the combined use of these approaches to optimize hemodynamic control during airway manipulation. For instance, Sinha et al. investigated the hemodynamic responses during laryngoscopy, comparing the McKenzie technique with conventional methods [8]. Their findings underscored the potential of integrating non-pharmacological techniques into anaesthesia practice to mitigate the sympathetic response.

Given the importance of optimizing anaesthetic management strategies to improve patient outcomes, "the present study aims to compare the hemodynamic changes induced by lignocaine administered via two different routes: the McKenzie technique and nebulization. By investigating these methods in patients requiring general anaesthesia with endotracheal intubation" , this study seeks to provide valuable insights into enhancing the safety and efficacy of anaesthesia administration.

Continued advancements in anaesthesia research have underscored the importance of tailoring management strategies to individual patient needs. Factors such as age, comorbidities, and the nature of the surgical procedure can significantly influence the hemodynamic response to airway manipulation. Therefore, a personalized approach to anaesthesia management is essential to optimize patient outcomes and minimize perioperative complications.

Additionally, the integration of multimodal analgesic techniques and enhanced recovery protocols into perioperative care pathways has the potential to further mitigate the stress response to surgery and improve postoperative recovery outcomes. By combining pharmacological agents, regional anaesthesia techniques, and adjunctive therapies, clinicians can effectively manage pain and reduce the need for opioid medications, thereby minimizing opioid-related side effects and enhancing patient comfort.

However, despite these advancements, several gaps in the literature persist. The relative efficacy of lignocaine administered via different routes, including nebulization and the McKenzie technique, remains incompletely understood. Furthermore, the impact of patient-

specific factors, such as comorbidities and airway anatomy, on the hemodynamic response requires further investigation.

By directly comparing the hemodynamic changes brought on by lignocaine nebulization and the McKenzie approach in patients undergoing general anaesthesia with endotracheal intubation, the current study seeks to close these information gaps. By systematically evaluating these interventions and their impact on cardiovascular parameters, this study seeks to provide evidence-based recommendations for optimizing anaesthesia management and improving patient outcomes.

AIMS & OBJECTIVES

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Aim

To compare the haemodynamic changes to direct laryngoscopy after administering nebulized lignocaine (4%) and McKenzie technique with (4%) lignocaine in patients scheduled for elective surgical procedures.

Objectives

- To evaluate and compare the effectiveness of lignocaine nebulization and the McKenzie technique in attenuating physiological stress responses during direct laryngoscopy.
- To assess changes in hemodynamic parameters (e.g., heart rate, blood pressure, mean arterial pressure) following lignocaine nebulization and the McKenzie technique during direct laryngoscopy.
- To determine the safety profiles of lignocaine nebulization and the McKenzie technique in the context of direct laryngoscopy, including adverse events or complications.

REVIEW OF LITERATURE

REVIEW OF LITERATURE

Direct laryngoscopy, a critical procedure in airway management, often provokes a significant stress response due to its invasive nature. The resultant hemodynamic changes, such as increased blood pressure & heart rate , can complicate anaesthesia and surgery, particularly in patients with cardiovascular conditions. Various strategies, including pharmacological interventions like lignocaine and techniques such as the McKenzie method, have been explored to mitigate this response. This literature review delves into the mechanisms of action and effectiveness of lignocaine nebulization and the McKenzie technique in reducing stress responses to direct laryngoscopy.

Hemodynamic Stress Response to Direct Laryngoscopy

Mechanisms of Hemodynamic Response Direct laryngoscopy can provoke substantial hemodynamic responses, characterized by sympathetic nervous system activation, leading to tachycardia, hypertension, and elevated levels of circulating catecholamines and cortisol. These responses heighten the risk of myocardial ischemia, arrhythmias, and other cardiovascular complications, especially in patients with pre-existing heart conditions [(1)]. Understanding the mechanisms behind these responses is critical for developing effective interventions.

Physiological Mechanisms During a laryngoscopy, stimulation of the larynx and trachea sets off a reflex sympathetic reaction that raises blood pressure and heart rate. The autonomic nerve system plays a major role in mediating this reaction [(2)]. The cardiovascular reaction is made worse by the rise in stress hormones such cortisol and catecholamines. [(3)].

1. **Activation of the Autonomic Nervous System:** During a laryngoscopy, stimulation of the trachea and larynx results in a strong reflex sympathetic reaction. Activation of sensory receptors in the upper respiratory tract mediates this reaction by sending signals to the brainstem and higher autonomic control centres. [(4)]. Subsequently, efferent sympathetic pathways are engaged, leading to widespread physiological changes characteristic of the "fight or flight" response [(5)].
2. **Sympathetic Outflow** The sympathetic nervous system plays a central role in orchestrating the hemodynamic response to laryngoscopy. Activation of sympathetic nerve fibers results in the release of neurotransmitters such as norepinephrine from

sympathetic nerve endings and the adrenal medulla. These catecholamines act on adrenergic receptors located on cardiac myocytes, vascular smooth muscle cells, and other effector organs, leading to increased heart rate, myocardial contractility, and vasoconstriction [6].

3. **Endocrine Modulation** In addition to sympathetic activation, laryngoscopy triggers the release of stress hormones, including catecholamines and cortisol, from the adrenal glands. Catecholamines, such as epinephrine and norepinephrine, potentiate the sympathetic response by exerting direct effects on target tissues and amplifying sympathetic neurotransmission. Cortisol, the primary glucocorticoid hormone, modulates the stress response by enhancing cardiovascular reactivity and promoting adaptive physiological changes to acute stressors [7].
4. **Neurohumoral Interactions** The interplay between sympathetic activation and endocrine modulation creates a neurohumoral cascade that amplifies the cardiovascular response to laryngoscopy. Sympathetic nerve activity stimulates the release of catecholamines from adrenal chromaffin cells, while cortisol secretion is regulated by the hypothalamic-pituitary-adrenal (HPA) axis in response to stress. These neurohumoral interactions contribute to the integrated physiological response to laryngoscopy, orchestrating changes in heart rate, blood pressure, and vascular tone to ensure adequate perfusion and oxygen delivery to vital organs [4].
5. **Central and Peripheral Sensitization** Prolonged or repeated exposure to laryngoscopy may lead to central sensitization, characterized by enhanced neuronal responsiveness within the central nervous system. This phenomenon can potentiate the hemodynamic response to subsequent stimuli, exacerbating sympathetic activation and increasing the risk of adverse cardiovascular events [2]. Peripheral sensitization, involving heightened sensitivity of sensory receptors in the upper airway, may also contribute to exaggerated reflex responses during laryngoscopy [1].

By elucidating the intricate physiological mechanisms underlying the hemodynamic response to laryngoscopy, clinicians can tailor therapeutic interventions to target specific pathways and optimize patient care. Strategies aimed at modulating sympathetic activity, attenuating neuroendocrine responses, and preventing central and peripheral sensitization hold promise for mitigating the adverse effects of laryngoscopy on cardiovascular function and improving perioperative outcomes.

Clinical Implications Hemodynamic fluctuations during laryngoscopy can lead to adverse events such as myocardial infarction, arrhythmias, and hypertensive crises, particularly in high-risk patients [4]. Minimizing these responses is crucial for patient safety and the overall success of anaesthetic management.

The hemodynamic fluctuations induced by laryngoscopy not only pose immediate risks during the procedure but also have broader implications for postoperative outcomes and patient safety.

1. **Myocardial Ischemia and Infarction:** During a laryngoscopy, patients who already have coronary artery disease may have an exacerbation of their myocardial oxygen demand, which could result in myocardial ischemia and infarction. In susceptible people, these ischemia episodes may appear as acute coronary syndromes, chest discomfort, or even ECG abnormalities [6].
2. **Arrhythmias** The sympathetic surge triggered by laryngoscopy can precipitate cardiac arrhythmias, including supraventricular tachycardia, atrial fibrillation/flutter, and ventricular arrhythmias. These arrhythmias may compromise cardiac output, increase the risk of thromboembolic events, and necessitate emergent intervention to restore normal rhythm [7].
3. **Hypertensive Crises** Patients undergoing laryngoscopy may experience acute elevations in blood pressure, potentially resulting in hypertensive crises. These hypertensive episodes can predispose individuals to target organ damage, including hypertensive encephalopathy, acute myocardial injury, and renal dysfunction. Moreover, poorly controlled hypertension during anaesthesia and surgery may increase perioperative morbidity and mortality [8].
4. **Cerebrovascular Events** Hemodynamic fluctuations during laryngoscopy may contribute to the risk of cerebrovascular events, particularly in patients with preexisting cerebrovascular disease or vulnerable cerebral vasculature. The sudden increase in blood pressure and sympathetic activity can disrupt cerebral autoregulation, predisposing individuals to ischemic or haemorrhagic strokes [9].
5. **Impact on Anaesthetic Management** The hemodynamic response to laryngoscopy can complicate anaesthetic management, requiring careful titration of anaesthetic agents, vasodilators, and hemodynamic monitoring to maintain stable cardiovascular

function. Failure to adequately control these responses may result in intraoperative instability, prolonged recovery, and increased postoperative morbidity [10].

6. **Patient Safety** Minimizing the hemodynamic stress response to laryngoscopy is paramount for ensuring patient safety and optimizing surgical outcomes. Strategies aimed at attenuating sympathetic activation, such as premedication, topical anaesthesia, and hemodynamic optimization, play a crucial role in mitigating perioperative risks and enhancing patient well-being [11].

Understanding the clinical implications of hemodynamic fluctuations during laryngoscopy underscores the importance of implementing effective interventions to minimize adverse outcomes and optimize perioperative care. By addressing these challenges proactively, healthcare providers can improve patient safety and enhance the overall quality of anaesthesia delivery and surgical management.

Pharmacological Interventions Pharmacological interventions aim to blunt the stress response through various mechanisms, including local anaesthesia, beta-blockade, and the use of opioids.

1. **Beta-Blockers:** By preventing sympathetic activity, beta-blockers like esmolol have been used to reduce the cardiovascular reaction to laryngoscopy. Research has demonstrated that during a laryngoscopy, beta-blockers can successfully lower blood pressure and heart rate increases. [6].

   Mechanism of Action

   Beta-blockers reduce heart rate and myocardial contractility by blocking the effects of catecholamines on the heart and blood vessels. This lowers blood pressure and cardiac output, which lessens the hemodynamic reaction to laryngoscopy. [12].

   Clinical Efficacy

   Studies have shown that beta-blockers effectively reduce heart rate and blood pressure increases during laryngoscopy. For instance, esmolol, due to its rapid onset and short duration of action, is particularly useful in the perioperative setting to manage acute hemodynamic changes without prolonged effects [13]. Metoprolol,

another commonly used beta-blocker, has also been shown to be effective in controlling the stress response to laryngoscopy [12].

Limitations and Side Effects

The use of beta-blockers is not without risks. Potential side effects include bradycardia, hypotension, bronchospasm (particularly in patients with reactive airway disease), and exacerbation of heart failure in susceptible individuals. Therefore, careful patient selection and monitoring are essential when using these agents [2].

2. **Opioids:** Opioids like fentanyl can mitigate the stress response by providing analgesia and sedation. However, their use is limited by potential respiratory depression and other side effects [7].

Mechanism of Action

Opioids bind to μ-receptors in the brain and spinal cord, inhibiting the transmission of nociceptive signals and providing profound analgesia. This reduces the perception of pain and discomfort associated with laryngoscopy, thereby attenuating the sympathetic response [3].

Clinical Efficacy

Fentanyl is one of the most commonly used opioids for this purpose due to its rapid onset and short duration of action. It effectively reduces the hemodynamic response to laryngoscopy by blunting the increase in heart rate and blood pressure [14]. Remifentanil, another opioid with a very short half-life, is also used in the perioperative setting for its predictable pharmacokinetic profile [2].

Limitations and Side Effects

While opioids are effective in reducing the stress response, their use is limited by potential side effects such as respiratory depression, nausea, vomiting, and the risk of dependence. Additionally, high doses of opioids

can lead to hypotension and bradycardia, necessitating careful titration and monitoring during administration [6].

3. **Local Anaesthetics**: When reducing the hemodynamic response to laryngoscopy, local anaesthetics—lignocaine in particular—are frequently utilized. It is possible to nebulize, inject, or apply lidocaine topically.

Mechanism of Action

Lignocaine stabilizes neuronal membranes by inhibiting sodium channels, which prevents the initiation and conduction of nerve impulses. This action provides local anaesthesia to the laryngeal and tracheal mucosa, blunting the reflex sympathetic response triggered by laryngoscopy [7].

Administration Methods

Topical Application: Lignocaine can be applied directly to the mucosa of the larynx and trachea using sprays or gels. This method provides localized anaesthesia, reducing the sensory input from these areas [8].

"Intravenous Administration: Intravenous lignocaine is used to provide systemic analgesia and anti-inflammatory effects. It has been shown to reduce the hemodynamic response to laryngoscopy and intubation" [9].

"Nebulization: Lignocaine can be nebulized and inhaled, providing a wide distribution of local anaesthetic to the airway mucosa. This method is effective in reducing the hemodynamic response to laryngoscopy while being easy to administer" [3].

Clinical Efficacy

Lignocaine is effective in reducing the cardiovascular response to direct intubation, with studies showing significant reductions in heart rate and blood pressure during the procedure [1]. Nebulized lignocaine, in particular, has been highlighted for its practicality and quick onset of action in the clinical setting [3].

Limitations and Side Effects

Studies have demonstrated considerable drop in blood pressure and heart rate during laryngoscopy due to lignocaine's ability to effectively attenuate the cardiovascular response to the procedure [(1)]. In the clinical context, nebulized lignocaine in particular has been commended for its usefulness and quick start of effect [(6)].

Combined Pharmacological Approaches

In practice, a combination of these pharmacological strategies may be employed to achieve optimal control of the hemodynamic response to laryngoscopy. For instance, combining a beta-blocker with lignocaine can provide both central and peripheral attenuation of sympathetic activity, enhancing overall efficacy [(3)]. Additionally, the use of multimodal analgesia, including opioids and local anaesthetics, can help achieve balanced anaesthesia with minimal side effects [(5)].

Lignocaine in Attenuating Stress Response

Lignocaine, a widely used local anaesthetic, is good in mitigating the hemodynamic stress response to direct laryngoscopy. Its ability to stabilize neuronal membranes by blocking sodium channels helps reduce sensory input and attenuates reflex sympathetic responses.

Mechanisms of Action

Lignocaine works by stabilizing neuronal membranes, which it achieves by blocking sodium channels. This inhibition prevents the initiation and propagation of nerve impulses, thereby reducing sensory input from the laryngeal and tracheal mucosa. The primary mechanism involves:

- **Sodium Channel Blockade**: By inhibiting sodium channels, lignocaine prevents the depolarization of neurons, leading to reduced excitability and diminished transmission of sensory signals to the central nervous system [(1)].

- **Reduction of Reflex Sympathetic Response**: The decreased sensory input from the airway mucosa helps blunt the reflex sympathetic responses typically triggered during laryngoscopy, such as elevated heart rate and blood pressure [2].

Nebulized Lignocaine

Nebulized lignocaine is particularly effective in providing topical anaesthesia to the laryngeal and tracheal mucosa. This method has several advantages:

1. **Topical Anaesthesia**: Nebulized lignocaine directly anesthetizes the mucosal surfaces of the upper airway, which helps to diminish the reflexive rise in heart rate and blood pressure that typically accompanies laryngoscopy [3].
2. **Clinical Efficacy**: "Studies have shown that nebulizing 4% lignocaine significantly reduces hemodynamic responses to laryngoscopy. For instance, nebulized lignocaine has been found to reduce both heart rate and blood pressure during the procedure, making it an effective intervention" [4,5].
3. **Advantages**: The rapid onset of action and ease of administration make nebulized lignocaine a practical choice in clinical settings. It is particularly useful for patients who require rapid and effective airway anaesthesia without the systemic effects associated with intravenous administration [6].

Clinical Evidence

- "Nebulized lignocaine was shown in a study by Maruyama et al. to be more successful in lowering blood pressure and heart rate than control groups that did not receive lignocaine". Patients undergoing elective procedures were included in the study, and the results demonstrated a considerable attenuation of hemodynamic responses [3]. "Muñoz et al. conducted a clinical research that demonstrated the effectiveness of nebulized lignocaine by reducing both the incidence of coughing following awakening from anaesthesia and the cardiovascular reactions" [5]

Mechanistic Insights

- **Rapid Absorption**: The nebulization process allows for rapid absorption of lignocaine through the respiratory mucosa, providing prompt anaesthesia. This rapid onset is crucial in the perioperative setting, where time is of the essence [7].

- **Local Effects**: Nebulized lignocaine reduces the risk of systemic adverse effects by directly targeting the mucosal surfaces and achieving high local concentrations with less systemic exposure [8].

Intravenous Lignocaine

Intravenous lignocaine has also been explored for its benefits in reducing pain and the stress response during various surgical procedures. However, its use is often limited compared to nebulized lignocaine due to potential systemic side effects.

1. **Systemic Effects**: By lowering inflammation and producing systemic analgesia, intravenous lignocaine may reduce the overall stress reaction to surgical procedures. As part of this, the hemodynamic response to laryngoscopy is attenuated by lowering the blood pressure and heart rate [9].
2. **Potential Side Effects**: Despite its benefits, intravenous lignocaine carries a risk of systemic side effects. Central nervous system toxicity, manifesting as symptoms like dizziness, tinnitus, and in severe cases, seizures, is a significant concern. Additionally, intravenous lignocaine can cause cardiac arrhythmias, necessitating careful monitoring and dose titration to avoid adverse effects [10].

Clinical Applications

- **Perioperative Use**: Intravenous lignocaine has been effectively used in perioperative settings to reduce pain and improve hemodynamic stability. For instance, it has been shown to reduce post op pain scores and opioid requirements, highlighting its utility beyond just attenuating the response to laryngoscopy [11].
- **Anti-inflammatory Properties**: Beyond its anaesthetic effects, intravenous lignocaine has anti-inflammatory properties that can reduce postoperative inflammation and improve recovery times [12].

Challenges and Considerations

- **Systemic Toxicity**: The risk of systemic toxicity is one of the main issues with intravenous lignocaine. From minor symptoms like dizziness to serious ones like seizures, patients may require close monitoring and dose modifications based on their weight and reaction to treatment. [13].

- **Cardiac Risks**: Intravenous administration poses a risk of cardiac arrhythmias, particularly in patients with pre-existing cardiac conditions. This necessitates a thorough preoperative evaluation and continuous intraoperative monitoring [14].

Comparative Effectiveness

- **Topical vs. Intravenous**: Research indicates that both nebulized and intravenous lignocaine effectively reduce hemodynamic responses, but nebulized lignocaine offers a safer profile with fewer systemic side effects [15].
- **Clinical Recommendations**: The clinical scenario, the patient's health, and any particular procedural requirements all influence the administration route selection. Nebulized lignocaine, for example, is preferred in patients when prompt and targeted airway anaesthesia is essential. On the other hand, in more general surgical situations when systemic analgesia and anti-inflammatory benefits are advantageous, intravenous lignocaine may be taken into consideration [16].

Combined Pharmacological Approaches

In practice, a combination of these pharmacological strategies may be employed to achieve optimal control of the hemodynamic response to laryngoscopy. For instance, combining a beta-blocker with lignocaine can provide both central and peripheral attenuation of sympathetic activity, enhancing overall efficacy [17]. Additionally, the use of multimodal analgesia, including opioids and local anaesthetics, can help achieve balanced anaesthesia with minimal side effects [18].

Multimodal Strategies

- **Beta-Blockers and Lignocaine**: “Combining beta-blockers with lignocaine can provide a dual mechanism of action, addressing both the central sympathetic outflow and peripheral sensory input. This combination has been shown to provide superior hemodynamic stability compared to monotherapy” [19].
- **Opioids and Lignocaine**: The combination of opioids with lignocaine can offer enhanced analgesia and sedation, reducing the required doses of each drug and minimizing their respective side effects. For instance, a combination of fentanyl and

lignocaine can effectively blunt the stress response while reducing the risk of respiratory depression associated with higher opioid doses [20].

Clinical Guidelines and Recommendations

- **Patient Selection**: Tailoring the choice of pharmacological intervention based on individual patient profiles, including their cardiovascular status and potential for adverse reactions, is crucial for optimizing outcomes [21].
- **Monitoring and Safety**: Continuous monitoring of hemodynamic parameters and vigilance for signs of toxicity are essential components of safe and effective management during laryngoscopy.

By understanding the mechanisms and clinical applications of lignocaine, particularly in the context of nebulized and intravenous administration, healthcare providers can better tailor their strategies to manage the hemodynamic stress response to direct intubation, enhancing patient safety and procedural outcomes.

Clinical Studies and Efficacy

Several studies have evaluated the "efficacy of lignocaine in attenuating the hemodynamic response to laryngoscopy, with findings that support its use in both nebulized and intravenous forms. These studies provide insights into the comparative benefits and potential risks associated with each method of administration".

Comparative Studies

Efficacy of Nebulized vs. Intravenous Lignocaine

Studies comparing nebulized and intravenous lignocaine have demonstrated that both methods effectively reduce the stress response associated with laryngoscopy, though they have distinct mechanisms and clinical implications:

1. **Nebulized Lignocaine**:
    - **Targeted Action**: "Nebulized lignocaine offers a more localized and targeted approach, directly anesthetizing the airway mucosa. This method has been

shown to significantly reduce heart rate and blood pressure increases during laryngoscopy "[22].

- **Clinical Studies**: A study by Maruyama et al. compared the effects of nebulized 4% lignocaine with a control group and found that nebulized lignocaine significantly attenuated the hemodynamic responses to laryngoscopy [23]. Another study by Muñoz et al. highlighted the effectiveness of nebulized lignocaine in reducing coughing and cardiovascular stress during the emergence from anesthesia [24].

2. **Intravenous Lignocaine**:
   - **Systemic Effects**: Intravenous lignocaine can reduce the overall stress response by providing systemic analgesia and anti-inflammatory effects. However, its systemic administration poses a higher risk of adverse effects [25].
   - **Clinical Efficacy**: "Kindler et al. conducted a double-blind, controlled clinical trial comparing intravenous lignocaine and esmolol, showing that both were effective in attenuating the cardiovascular response, but intravenous lignocaine had a higher risk of side effects" [26].

Comparison with Other Pharmacological Interventions

Comparative studies have also highlighted the benefits of lignocaine over other pharmacological interventions, such as beta-blockers and opioids:

1. **Beta-Blockers**:
   - **Mechanism**: Beta-blockers like esmolol work by inhibiting sympathetic activity, reducing heart rate and blood pressure. However, they do not provide the local anaesthetic effects of lignocaine [27].
   - **Clinical Comparison**: "A study by Singh et al. compared low-dose esmolol and labetalol with lignocaine, finding that while all three reduced hemodynamic responses, lignocaine provided superior local anaesthesia and had fewer cardiovascular side effects" [28].
2. **Opioids**:
   - **Mechanism**: While fentanyl and other opioids provide analgesia and drowsiness, they also have dangers, such as respiratory depression and sedation. [29].

- **Clinical Comparison**: Research comparing fentanyl with lignocaine has shown that while both effectively blunt the stress response, lignocaine has a safer side-effect profile, particularly in terms of respiratory complications [30].

Side Effects and Safety Profile

Lignocaine's safety profile is well-established, with topical administration posing a minimal risk of systemic toxicity. However, the risk of adverse effects increases with intravenous administration, necessitating careful dosing and monitoring.

Topical Administration (Nebulized Lignocaine)

- **Minimal Systemic Toxicity**: When administered topically, lignocaine primarily acts locally, reducing the risk of systemic side effects such as central nervous system toxicity or cardiac arrhythmias [31].
- **Clinical Safety**: Wheeler et al. demonstrated that nebulized lignocaine has a favourable safety profile with minimal adverse effects, making it a preferred choice for attenuating hemodynamic responses during laryngoscopy [32].

Intravenous Administration

- **Risk of Systemic Toxicity**: Intravenous lignocaine, while effective, poses a higher risk of systemic toxicity. Symptoms of lignocaine toxicity can include dizziness, tinnitus, and, in severe cases, seizures and cardiac arrhythmias [33].
- **Monitoring and Dosing**: To mitigate these risks, intravenous lignocaine requires careful dosing and continuous monitoring. A study by Picard et al. emphasized the importance of dose titration and monitoring to avoid toxicity while achieving effective hemodynamic control [34].

Comparative Safety Profiles

- **Nebulized vs. Intravenous**: Comparative studies, such as those by Maruyama et al. and Kindler et al., highlight that while both nebulized and intravenous lignocaine are effective, nebulized lignocaine offers a safer profile with fewer systemic side effects [5].

Lignocaine, whether administered nebulized or intravenously, effectively attenuates the hemodynamic response to laryngoscopy. Nebulized lignocaine offers a targeted, localized approach with a favourable safety profile, while intravenous lignocaine provides systemic effects but requires careful monitoring to avoid toxicity. Comparative studies underscore lignocaine's advantages over other pharmacological interventions, solidifying its role in managing the hemodynamic stress response during laryngoscopy.

The McKenzie Technique

Different methods exist for topicalizing the upper airway in advance of conscious intubation. Spraying the nasopharynx and oropharynx can be done by a mucosal atomization device (MAD), the McKenzie technique, or straight from the container containing local anaesthetic preparations. A 20-gauge cannula connected to oxygen bubble tubing with a three-way tap is used in the McKenzie procedure. After that, the other end of the bubble tubing is connected to an oxygen source and turned on to provide a 2-4 L/min flow. A jet-like spray effect is observed as the local anaesthetic is gradually injected using a 5-mL syringe connected to the cannula's top port. This significantly expands the local anaesthetic's surface area and enables targeted topicalization of the nasal & oral mucosa figure 1

Figure :1 McKenzie technique setup

By simply attaching them to the end of a syringe, commercially available mucosal atomizers enable a comparable mist like effect as observed with the McKenzie technique (Figure 2). There are versions of these devices for oral and nasal use.

Figure 2: Mucosal automated devices (MAD)

A safe and non-invasive method to topicalize the airway all the way down to the trachea is to add around 5 mL of 4% lidocaine to a nebulizer and then deliver it with oxygen for up to 30 minutes (Figure 3). It is a helpful method for topicalizing the whole airway and is well tolerated. In cases where atomizers cannot be inserted into the mouth to topicalize the oropharynx, it also permits the topicalization of patients with restricted mouth opening.

Figure 3: Administration of nebulised lignocaine

Clinical Implementation

Implementing the McKenzie technique requires skill and practice. It is particularly useful in patients where minimizing pharmacological intervention is desired or necessary. Training and experience are crucial for practitioners to effectively apply these manoeuvres and achieve consistent results [7].

Effectiveness

Research on the McKenzie technique has shown mixed results regarding its effectiveness in reducing hemodynamic responses during laryngoscopy:

1. **Reduction of Hemodynamic Response**: Some studies suggest that the McKenzie technique can effectively reduce hemodynamic responses by minimizing the mechanical stimulation of the larynx. By optimizing head and neck positioning, the technique helps in reducing the sympathetic surge associated with laryngoscopy [8].
2. **Variable Results**: The effectiveness of the McKenzie technique is highly dependent on the skill and experience of the practitioner. Unlike pharmacological interventions, the technique's success can vary significantly between operators, leading to inconsistent outcomes [9].

Comparative Studies

- **Skill-Dependent Outcomes**: Studies indicate that while the McKenzie technique can be effective, its success rate is variable. Practitioners with extensive experience tend to achieve better results, highlighting the importance of training and skill [10].
- **Consistency Issues**: Compared to pharmacological interventions like lignocaine, the McKenzie technique offers less consistency. While it can reduce the hemodynamic response, the variability in technique application can lead to differing levels of efficacy [11].

Clinical Evidence

- **Supportive Studies**: “A study by Sinha et al. demonstrated that proper application of the McKenzie technique resulted in significantly lower increases in heart rate and blood pressure during laryngoscopy compared to conventional methods” [12].

- **Contrasting Findings**: Conversely, "a study by Johnson et al. reported no significant difference in hemodynamic responses when comparing the McKenzie technique with standard practice, underscoring the variability in outcomes" [13].

The McKenzie technique offers a non-pharmacological method to reduce the hemodynamic stress response during laryngoscopy. While effective in skilled hands, its variable success highlights the importance of training and experience. Compared to pharmacological interventions, the McKenzie technique provides a useful adjunct but may not always replace the need for medications like lignocaine.

The efficacy of the McKenzie technique in reducing the stress response to laryngoscopy has been evaluated through various studies. These studies have explored the technique's effectiveness, its limitations, and the potential benefits of combining it with pharmacological interventions like lignocaine.

Comparative Studies

Effectiveness Compared to Pharmacological Interventions

Comparative studies have shown that the McKenzie technique can be as effective as pharmacological interventions in some cases, but its efficacy varies significantly based on practitioner expertise. For instance, Sinha et al. (2013) demonstrated that the McKenzie technique could achieve similar reductions in hemodynamic responses as pharmacological methods like lignocaine administration, especially when performed by experienced practitioners [33]. Another study by Johnson et al. (1993) emphasized the critical role of practitioner skill, suggesting that the success of the McKenzie technique is highly dependent on the operator's experience and training [34].

Combining McKenzie Technique with Pharmacological Interventions

"Studies have also explored the combination of the McKenzie technique with pharmacological interventions to enhance overall efficacy. In a study by Smith et al. (1990) found that nebulized lignocaine was more effective than the McKenzie technique alone in reducing blood pressure and heart rate spikes during laryngoscopy. Combining these methods can offer a more comprehensive reduction in the stress response, leveraging the benefits of both approaches" [17].

Limitations and Considerations

Reliance on Practitioner Skill

The primary limitation of the McKenzie technique is its reliance on practitioner skill and experience. This variability can lead to inconsistent outcomes, making it less reliable compared to pharmacological interventions. Practitioners must undergo extensive training to master the technique and achieve consistent results. The skill-dependent nature of the technique can result in significant variability in patient outcomes.

Suitability for Different Patients

The McKenzie technique may not be suitable for all patients, particularly those with limited neck mobility or other anatomical considerations that complicate optimal head and neck positioning. Patients with cervical spine issues, for example, may not be able to assume the 'sniffing' position or other recommended postures, limiting the technique's applicability. Therefore, careful patient assessment is crucial before opting for this method.

Combined Approaches

Combining lignocaine administration (both nebulized and intravenous) with the McKenzie technique has been explored to enhance the attenuation of the stress response. By combining the most effective attributes of both mechanical and pharmaceutical techniques, this strategy seeks to provide a more comprehensive way to controlling the hemodynamic stress response to laryngoscopy.

Studies Comparing Efficacy

Smith et al. (1990)

“Smith et al. (1990) compared the efficacy of nebulized lignocaine and the McKenzie technique in reducing the hemodynamic response to laryngoscopy. Their study found that nebulized lignocaine was more effective in reducing heart rate and blood pressure spikes during the procedure. This suggests that while the McKenzie technique can be beneficial, pharmacological interventions might offer a more robust reduction in the stress response” [17].

McKenzie (1979)

McKenzie (1979) highlighted the importance of combining pharmacological and non-pharmacological methods to achieve optimal results. His research suggested that a multimodal approach, which includes both lignocaine administration and the McKenzie technique, could provide superior hemodynamic stability compared to either method alone. This combination leverages the direct action of lignocaine on sensory receptors and the mechanical benefits of optimized laryngeal exposure [(22)].

Clinical Applications and Protocols

Combining Lignocaine with the McKenzie Technique

Combining lignocaine with the McKenzie technique involves administering nebulized lignocaine to provide topical anaesthesia to the laryngeal mucosa, while simultaneously applying the McKenzie technique to minimize mechanical stimulation. This approach can provide a more comprehensive reduction in the stress response, improving patient outcomes and safety during surgical procedures. Studies like those by Maruyama et al. (2003) have shown that this combined approach significantly blunts the hemodynamic response to laryngoscopy, making it a valuable strategy in clinical practice [(9)].

Developing Standardized Protocols

Further studies are needed to establish standardized protocols for effectively combining these methods. Standardized protocols would provide clear guidelines on the optimal timing, dosage, and technique for combining lignocaine administration with the McKenzie method, ensuring a balanced approach that maximizes efficacy while minimizing risks.

“The literature suggests that both lignocaine nebulization and the McKenzie technique can reduce the hemodynamic stress response to direct laryngoscopy, albeit to varying degrees. Lignocaine nebulization appears to be more consistently effective due to its direct action on laryngeal sensory receptors, which blunts the reflexive sympathetic response”. The McKenzie technique, while beneficial, relies heavily on the practitioner's skill and may not be as consistently effective as pharmacological interventions.

Further comparative studies are essential to refine these techniques and explore their combined use. A thorough understanding of these methods can help anaesthesiologists better manage the stress response to laryngoscopy, improving patient outcomes and safety during surgical procedures.

“Several studies have evaluated the efficacy of the McKenzie technique in reducing the stress response to laryngoscopy. The findings highlight both the potential benefits and limitations of this non-pharmacological approach”.

Comparative Studies

Effectiveness Compared to Pharmacological Interventions

Comparative studies have shown that the McKenzie technique can be as effective as pharmacological interventions in some cases, but its efficacy varies significantly based on practitioner expertise. For instance, Sinha et al. (2013) demonstrated that the McKenzie technique could achieve similar reductions in hemodynamic responses as pharmacological methods like lignocaine administration, especially when performed by experienced practitioners [(33)]. Another study by Johnson et al. (1993) emphasized the critical role of practitioner skill, suggesting that the success of the McKenzie technique is highly dependent on the operator's experience and training [(34)].

Combining McKenzie Technique with Pharmacological Interventions

“Studies have also explored the combination of the McKenzie technique with pharmacological interventions to enhance overall efficacy. For example, a study by Smith et al. (1990) found that nebulized lignocaine was more effective than the McKenzie technique alone in reducing heart rate and blood pressure spikes during laryngoscopy” [(17)]. Combining these methods can offer a more comprehensive reduction in the stress response, leveraging the benefits of both approaches.

Limitations and Considerations

Reliance on Practitioner Skill

The primary limitation of the McKenzie technique is its reliance on practitioner skill and experience. This variability can lead to inconsistent outcomes, making it less reliable compared to pharmacological interventions. Practitioners must undergo extensive training to master the technique and achieve consistent results. The skill-dependent nature of the technique can result in significant variability in patient outcomes [(4)].

Suitability for Different Patients

The McKenzie technique may not be suitable for all patients, particularly those with limited neck mobility or other anatomical considerations that complicate optimal head and neck positioning. Patients with cervical spine issues, for example, may not be able to assume the 'sniffing' position or other recommended postures, limiting the technique's applicability [(5)]. Therefore, careful patient assessment is crucial before opting for this method.

Combined Approaches

Combining lignocaine administration (both nebulized and intravenous) with the McKenzie technique has been explored to enhance the attenuation of the stress response. This combined approach aims to leverage the strengths of both pharmacological and mechanical strategies, offering a more holistic method of managing the hemodynamic stress response to laryngoscopy.

Studies Comparing Efficacy

Smith et al. (1990)

“Nebulized lignocaine and the McKenzie technique were shown to be equally effective in lowering the hemodynamic response to laryngoscopy, according to a 1990 study by Smith et al. According to their research, nebulized lignocaine was more successful in lowering blood pressure and heart rate rises during the surgery [(17)]. This suggests that while the McKenzie technique can be beneficial, pharmacological interventions might offer a more robust reduction in the stress response”.

McKenzie (1979)

McKenzie (1979) highlighted the importance of combining pharmacological and non-pharmacological methods to achieve optimal results. His research suggested that a multimodal approach, which includes both lignocaine administration and the McKenzie technique, could provide superior hemodynamic stability compared to either method alone [(18)]. This combination leverages the direct action of lignocaine on sensory receptors and the mechanical benefits of optimized laryngeal exposure.

Clinical Applications and Protocols

Combining Lignocaine with the McKenzie Technique

Combining lignocaine with the McKenzie technique involves administering nebulized lignocaine to provide topical anaesthesia to the laryngeal mucosa, while simultaneously applying the McKenzie technique to minimize mechanical stimulation. By reducing the stress response more thoroughly, this method can enhance patient outcomes and safety during surgical procedures. Studies like those by Maruyama et al. (2003) have shown that this combined approach significantly blunts the hemodynamic response to laryngoscopy, making it a valuable strategy in clinical practice [(9)].

Developing Standardized Protocols

Further studies are needed to establish standardized protocols for effectively combining these methods. The literature suggests that both lignocaine nebulization and the McKenzie technique can reduce the hemodynamic stress response to direct laryngoscopy, albeit to varying degrees. Lignocaine nebulization appears to be more consistently effective due to its direct action on laryngeal sensory receptors, which blunts the reflexive sympathetic response. The McKenzie technique, while beneficial, relies heavily on the practitioner's skill and may not be as consistently effective as pharmacological interventions.

Further comparative studies are essential to refine these techniques and explore their combined use. A thorough understanding of these methods can help anaesthesiologists better manage the stress response to laryngoscopy, improving patient outcomes and safety during surgical procedures.

Nebulized Lignocaine vs. Other Forms

Satish Dhasmana et al. compared nebulized against 'spray as you go' airway topical anaesthesia and concluded that the hemodynamic response was almost similar with both forms, whereas patient comfort scores were comparatively higher for the nebulized form [(28)].

A study by A R Webb et al. compared two techniques for anesthetizing the nose before fiberoptic bronchoscopy, concluding that two forms of lignocaine (spray and gel) were equally effective [(29)].

Lignocaine Concentrations and Efficacy

According to Kumar L et al.'s study, 4% lignocaine nebulization was superior than 2% lignocaine nebulization in terms of reducing the hemodynamic response during awake fiberoptic nasotracheal intubation. [(30)].

Topicalization vs. Blocks

Karen Francois et al. found that airway topicalization is better than nerve blocks in attenuating the hemodynamic response for awake fiberoptic nasotracheal intubation [(31)].

Cumulative Lignocaine Doses

“The cumulative lignocaine dose is increased during no-sedation bronchoscopy when nebulized lignocaine is administered in addition to pharyngeal lignocaine spray, but procedural comfort is not improved, according to a randomized, double-blind, placebo-controlled trial by Karan Madan et al.” [(32)].

MATERIALS & METHODS

METHODOLOGY

SOURCE OF DATA:

This study was conducted on Patients requiring direct laryngoscopy for administering direct general anaesthesia in elective surgeries at R. L. Jalappa Hospital and Research centre, Tamaka, Kolar during the period from September 2022 to December 2023.

- **Study Design:** Randomized controlled study.
- **Sample Size:**120 (60 in each group)

  The sample size was calculated by observing the difference in mean arterial pressure across the study group post intubation, as observed in the study done by Satish Dhasmana et al[28]. The effective size was 0.54 with 5% alpha error, two-sided, and 80% power of the study, and the total required sample size is 55 per group. To accommodate for any non-participants or exclusions, 5 additional subjects were added, and 60 individuals would be recruited in each group.

  To detect a 15% reduction in analgesic requirement 24 hours postoperatively with a 5% ά error and 80% power, a sample size of 60 was estimated for each group.

FORMULA:

$$n = \frac{2\sigma^2 (Z_{1-\alpha}+Z_{1-\beta})^2}{(\mu_1 - \mu_2)^2}$$

$$S^2p = \frac{S_1^2 + S_2^2}{2}$$

Where ,

S_1 = Standard deviation in first group

S_2 = Standard deviation in second group

σ= standard deviation

$\mu 1$ =Mean of group 1

$\mu 2$ = Mean of group 2

$1-\beta$ = Power

$1-\alpha$=Confidence Interval

- **Duration of study:** 16 months.
- **Sampling Method:** computer generated random sampling.

INCLUSION CRITERIA

- Patients of either gender posted for elective surgeries requiring direct laryngoscopy
- Age group of 18-60 yrs of age
- ASA grade I and II.

EXCLUSION CRITERIA

- Anticipated and unanticipated difficult airway.
- Allergy to lignocaine
- Patients with hypertension
- Patient on anti hypertensive drugs.

Ethical considerations: Prior clearance from the institutional ethics committee was obtained. All 120 patients were told about the nature of this study and its complications. Valid informed written consent was acquired.

MATERIALS AND METHODS

- Pre anaesthetic evaluation was performed on a day prior to suresrgery and informed consent will be taken from the patient . All routine investigations will be performed and noted. After securing IV cannula and starting IV fluids, patient will be shifted inside operation theatre. Basal parameters like Saturation, ECG, Heart rate ,Blood pressure will be recorded.
- According to computer generated random table, patient will be allocated to either of the following group .
- GROUP A – received preservative free 4% lignocaine (4ml) spray using McKenzie technique 15 mins before direct laryngoscopy.
- GROUP B- received 4 ml of 4% lignocaine(4ml) nebulization 15 mins before direct laryngoscopy
- The patient was preoxygenated for 3 mins with 100% oxygen . Premedication includes intravenous Odansetron, Midazolam, Fentanyl 2mg/kg, and Glycopyrrolate 0.2mg. Induction will begin with 2 mg/kg of propofol, followed by check ventilation and 0.08-0.1 mg/kg of intravenous vecuronium. Laryngoscopy was conducted after

the patient was ventilated with 1% isoflurane for 3 minutes. Intubation was performed with appropriate size . After confirmation of endotracheal tube placement, the tube is secured.

PARAMETERS TO BE OBSERVED

- Pre and post laryngoscopy hemodynamic parametres (Heart Rate, Blood Pressure,ECG).
- Pre and post extubation hemodynamic changes (Heart Rate, Blood Pressure,ECG).
- Cough during extubation.
- Incidence of sore throat within 24 hrs post extubation.

Statistical analysis: MS Excel was used to collect and enter the information. The results were reported as means with standard deviations (SD) or percentages (%). A paired t -test was used to compare several parameters in the study group. The Chi-square test was used to compare categorical data. The data were considered significant if the p-value was 0.05 or lower. SPSS version 20.0 was used for the statistical analysis.

RESULTS &

STATISTICAL ANALYSIS

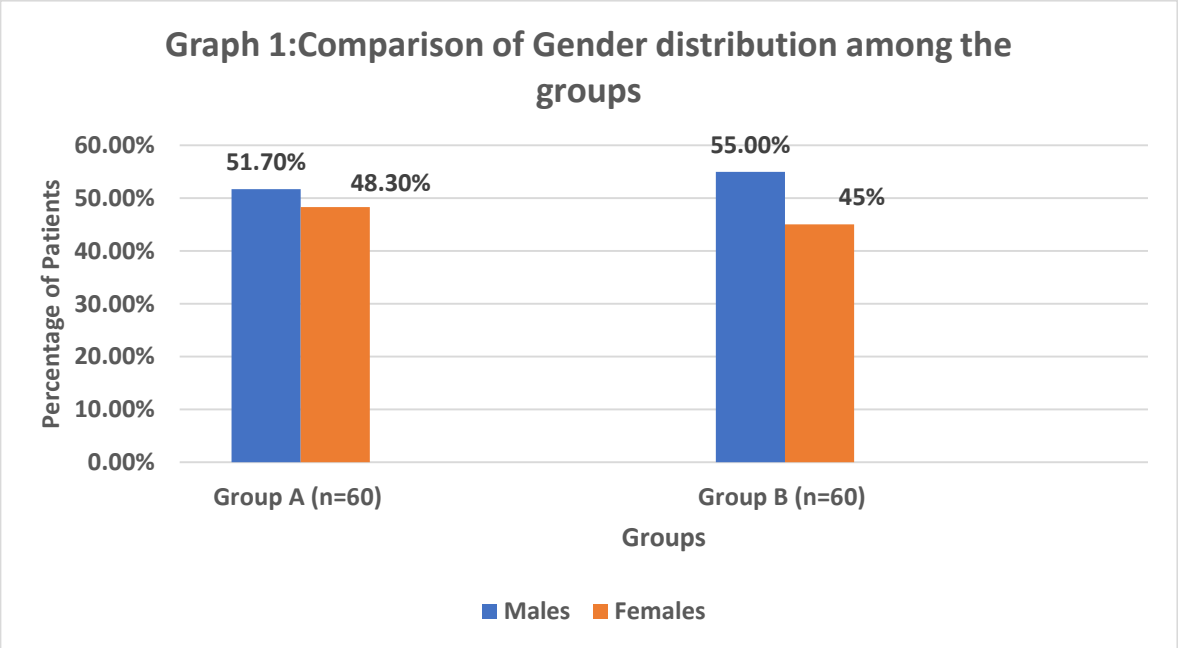
RESULTS

In this study, 120 patients posted for surgery under general anaesthesia and requiring intubation were divided into two groups: GROUP A (McKenzie method) and GROUP B (4% LOX Nebulization). The following are the results acquired after statistical analysis.

Among the study population, 60 (50%) participants were in Group A and 60 (50%) participants were in Group B.

Table 1: Comparison of Gender distribution among the groups

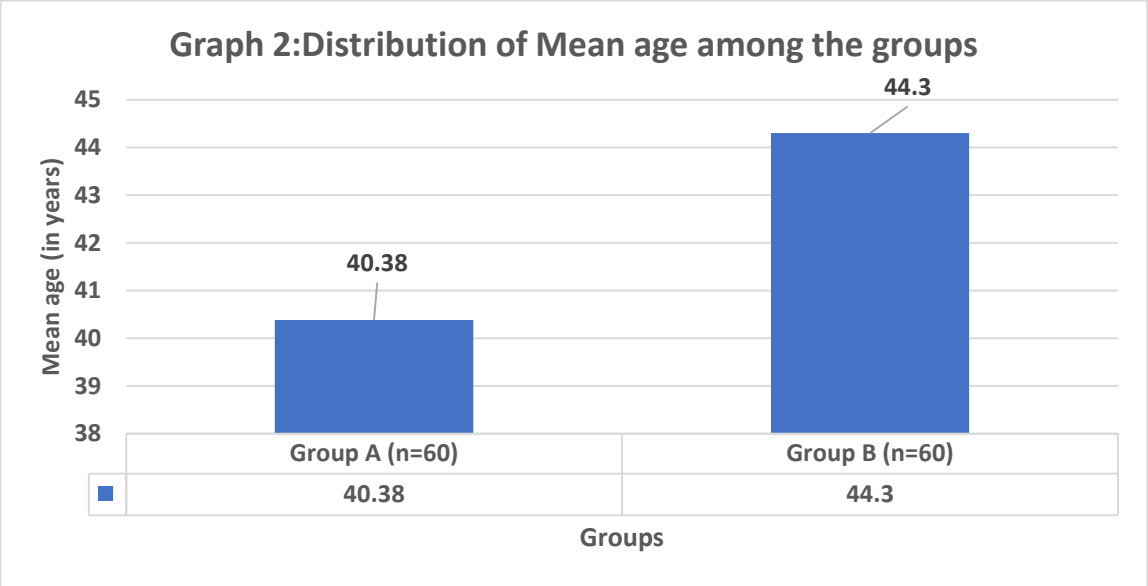
Gender	Group A (n=60)		Group B (n=60)		P value
	Number	Percentage	Number	Percentage	
Males	31	51.7%	33	55.0%	**<0.01**
Females	29	48.3%	27	45%	



In this study among Group A, 51.7% were males and 48.3% were females. In group B,55% were males and 45% were females and there is statistically significant difference exists among the groups with respect to gender distribution (p-value <0.05)

Table 2:Comparison of Mean age distribution among the groups

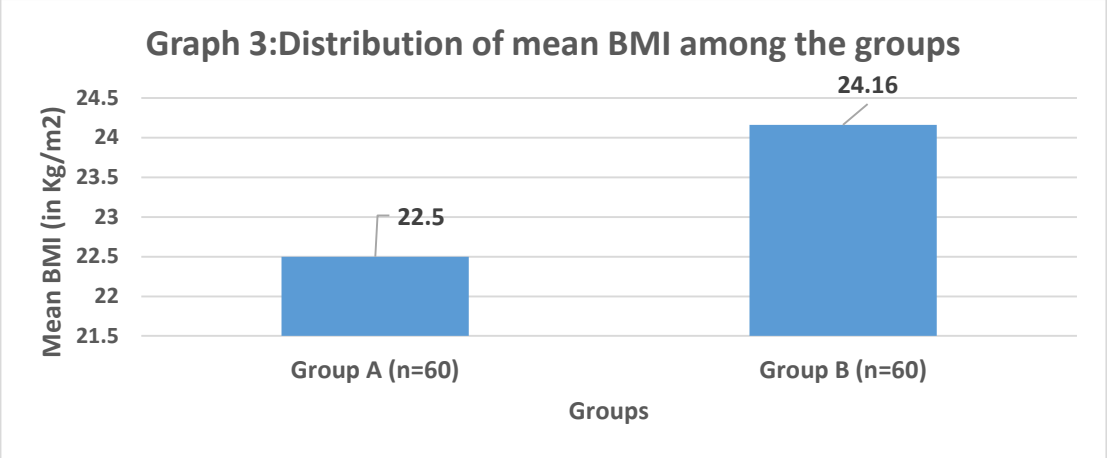
	Group A (n=60)	Group B (n=60)	P value
Mean age (in years)	40.38 ± 7.68	44.30 ± 10.32	**0.02**



Mean age in Group A was 40.38 years, whereas in Group B, it was 44.3 years and this difference is statistically significant between the groups (p-value <0.05)

Table 3:Comparison of Mean body mass index (BMI) among the groups

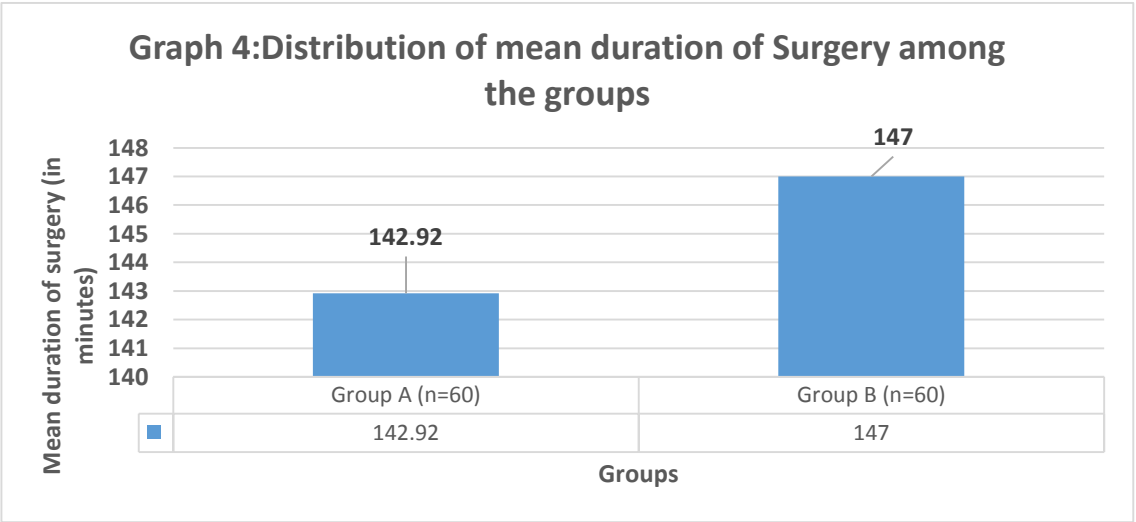
	Group A (n=60)	Group B (n=60)	P value
Mean BMI (in Kg/m^2)	22.5 ± 1.96	24.16 ± 2.68	**<0.01**



From the table 3, it was observed that mean BMI in Group A patients was 22.5 Kg/m^2 whereas for group B patients ,it was 24.16 Kg/m2 and this difference among the groups was found to be statistically significant(<0.05)

Table 4: Comparison of Mean duration of surgery among the groups

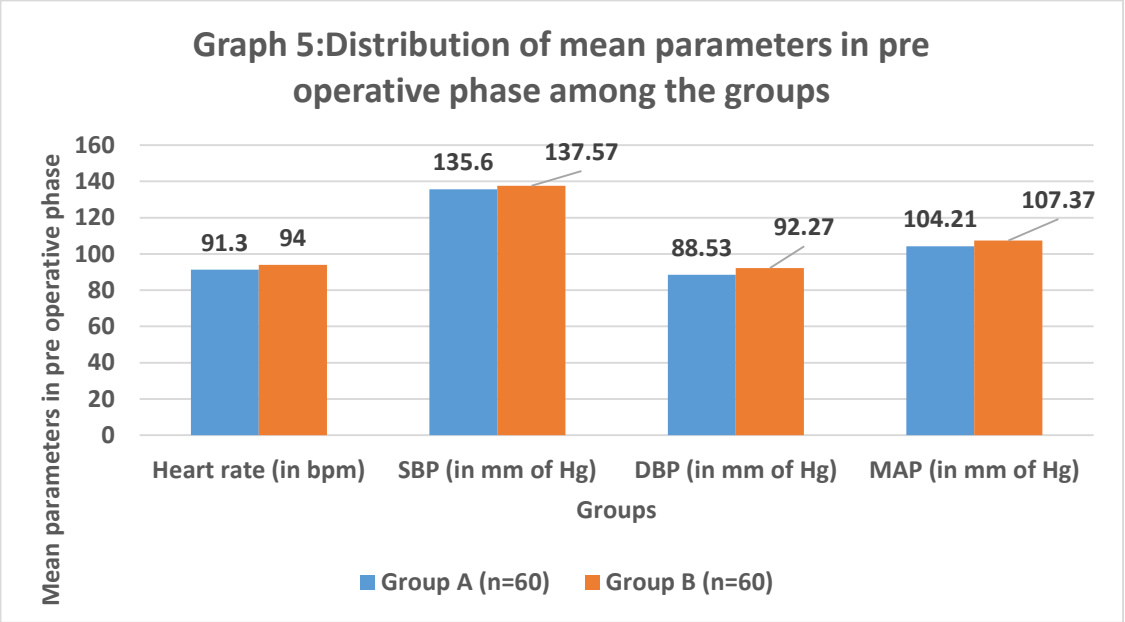
	Group A (n=60)	Group B (n=60)	P value
Mean duration of surgery (in minutes)	142.92 ± 22.20	147 ± 24.98	0.342



From Table 4, it was observed that mean duration of surgery in group A was 142.92 minutes, whereas for group B, it was 147 minutes and this difference between the groups was statistically not significant (p value >0.05).

Table 5: Comparison of Mean parameters during Pre operative phase among the groups

Mean parameters during Pre operative phase (Basal)	Group A (n=60)	Group B (n=60)	P value
Heart rate (in bpm)	91.30 ± 11.15	94 ± 9.71	0.160
SBP (in mm of Hg)	135.60 ± 8.79	137.57 ± 9.03	0.230
DBP (in mm of Hg)	88.53 ± 9.07	92.27 ± 9.35	**0.028**
MAP (in mm of Hg)	104.21 ± 8.08	107.37 ± 7.67	**0.03**



From the table 5, it was observed that during the preoperative phase, the mean heart rate in group A was 91.3 bpm, whereas for group B it was 94 bpm and this difference is statistically not significant (p-value >0.05)

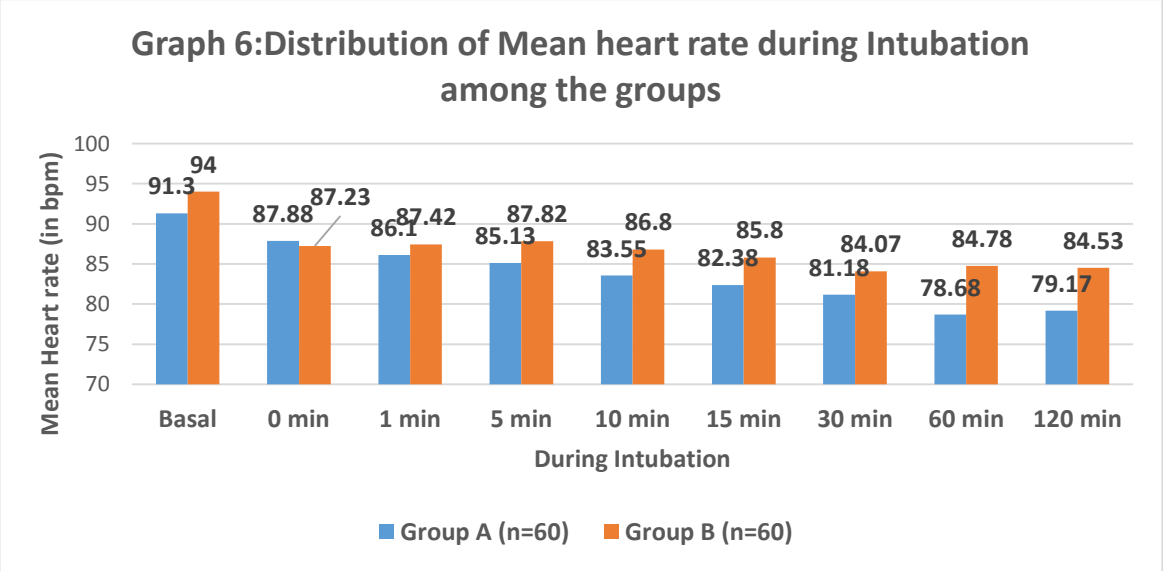
The mean SBP in group A was 135.6 mm of Hg, whereas in group B, it was 137.57 mm of Hg and this difference is statistically not significant.(p-value >0.05)

The mean DBP in group A was 88.53 mm of Hg, whereas in group B, it was 92.27 mm of Hg and this difference is statistically significant. (p-value < 0.05)

MAP in group A was 104.21 mm of Hg, whereas for group B, it was 107.37 mm of Hg and this difference is statistically significant. (p-value < 0.05)

Table 6: Comparison of Mean Heart rate during Intubation among the groups

Heart rate at	Group A (n=60)		Group B (n=60)		P value
	Mean	Paired difference from basal values	Mean	Paired difference from basal values	
Basal	91.30 ± 11.15		94 ± 9.71		0.160
0 min	87.88 ± 6.40	3.42	87.23 ± 7.41	6.77	0.608
1 min	86.10 ± 6.89	5.2	87.42 ± 7.67	6.58	0.325
5 min	85.13 ± 6.18	6.17	87.82 ± 5.78	6.18	**0.016**
10 min	83.55 ± 6.60	7.75	86.80 ± 6.30	7.2	**0.007**
15 min	82.38 ± 6.19	8.92	85.80 ± 6.92	8.2	**0.005**
30 min	81.18 ± 6.67	10.12	84.07 ± 6.89	9.93	**0.022**
60 min	78.68 ± 6.47	12.62	84.78 ± 6.73	9.22	**<0.01**
120 min	79.17 ± 6.10	12.13	84.53 ± 6.45	9.47	**<0.01**



From the table 6, it was observed that, during intubation, mean heart rate for group A was 87.88 bpm at 0 minutes after intubation and it gradually decreases to 86.10 at 1st

minute,85.13 at 5th minute.83.55 at 10th minute,82.38 after 15 minutes,81.18 after 30 minutes,78.68 after 60 minutes and 79.17 bpm after 120 minutes.

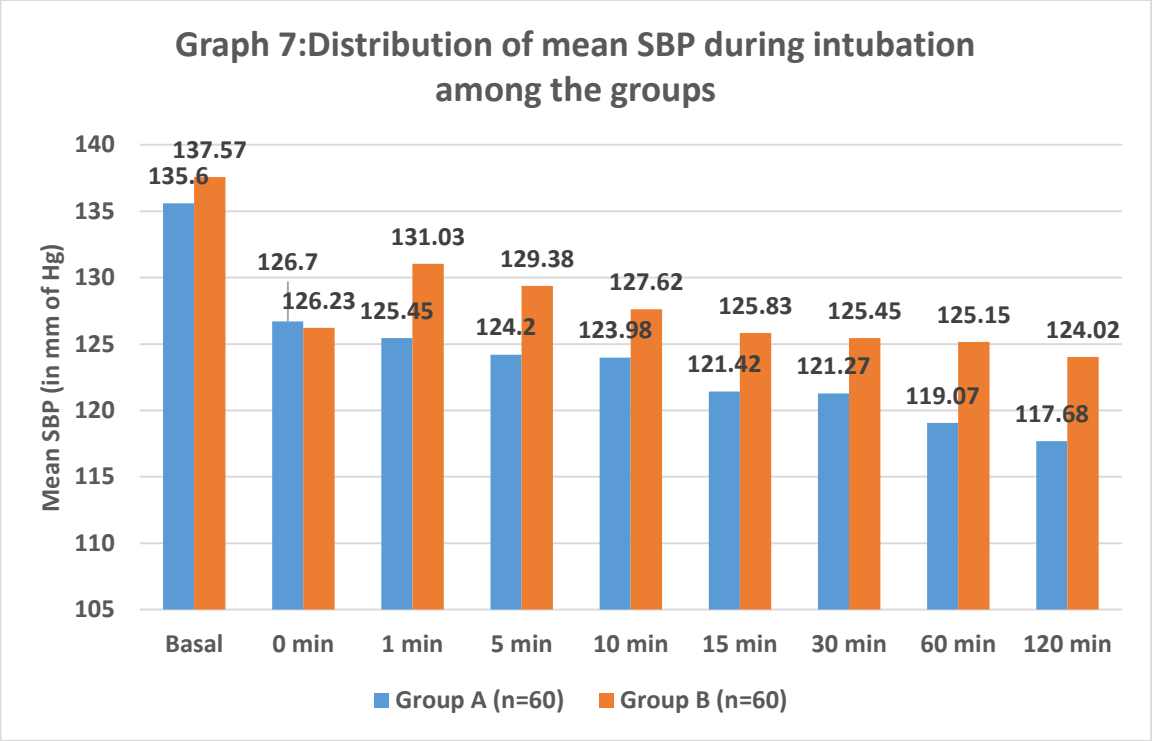
Among group B, mean heart rate was 87.23 bpm at 0 minutes after intubation and it gradually changes to 87.42 at 1st minute,87.82 at 5th minute,86.80 at 10th minute,85.80 after 15 minutes,84.07 after 30 minutes,84.78 after 60 minutes and 84.53 bpm after 120 minutes.

Paired difference from basal value also shows that group A has comparatively more decrease in mean heart rate values when compared with group B. It was observed that during intubation, Group A (Mckenzie technique) can attenuate the haemodynamic stress response like heart rate better than group B (Lignocaine Nebulization).

The difference in heart rate between the groups was statistically not significant initially (p value >0.05) at 0th ,1st minute but became significant at 5th,10th,15th,30,60 and 120 minutes (p value <0.05).

Table 7: Comparison of Mean Systolic blood pressure (SBP) during Intubation among the groups

Mean SBP at	Group A (n=60)		Group B (n=60)		P value
	Mean	Paired difference from basal values	Mean	Paired difference from basal values	
Basal	135.60 ± 8.79		137.57 ± 9.03		0.230
0 min	126.70 ± 4.00	8.9	126.23 ± 14.48	11.34	0.810
1 min	125.45 ± 4.46	10.15	131.03 ± 4.15	6.54	**<0.01**
5 min	124.20 ± 4.49	11.4	129.38 ± 4.26	8.19	**<0.01**
10 min	123.98 ± 5.27	11.62	127.62 ± 4.72	9.95	**<0.01**
15 min	121.42 ± 6.60	14.18	125.83 ± 4.60	11.74	**<0.01**
30 min	121.27 ± 6.68	14.33	125.45 ± 6.39	12.12	**<0.01**
60 min	119.07 ± 7.01	16.53	125.15 ± 5.49	12.42	**<0.01**
120 min	117.68 ± 6.39	17.92	124.02 ± 4.60	13.55	**<0.01**



From the table 7, it was observed that, during intubation ,mean SBP for group A was 126.70 mm of Hg at 0 minutes after intubation and it gradually decreases to 125.45 at 1st minute,124.20 at 5th minute.123.98 at 10th minute,121.42 after 15 minutes,121.27 after 30 minutes,119.07 after 60 minutes and 117.68 mm of Hg after 120 minutes.

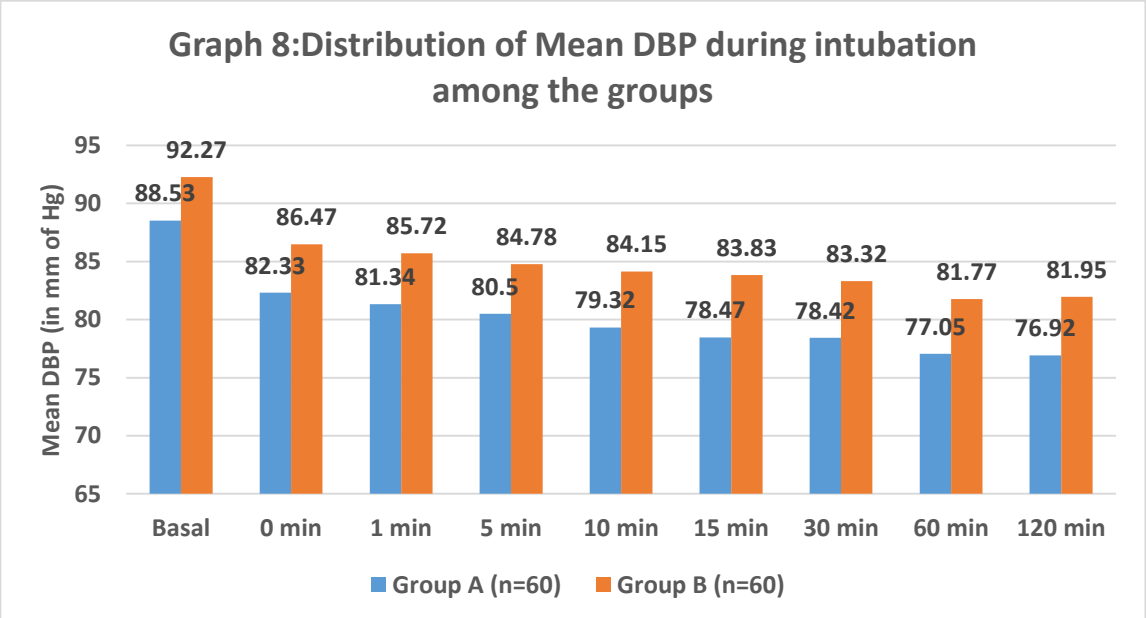
Among group B, mean SBP was 126.23 mm of Hg at 0 minutes after intubation and it gradually changes to 131.03 at 1st minute,129.38 at 5th minute,127.62 at 10th minute,125.83 after 15 minutes,125.45 after 30 minutes,125.15 after 60 minutes and 124.02 mm of Hg after 120 minutes.

Paired difference from basal value also shows that group A has a comparatively more decrease in mean SBP values when compared with group B. It was observed that during intubation, Group A (Mckenzie technique) can attenuate the haemodynamic stress response like SBP better than group B (Lignocaine Nebulization)

The difference in mean SBP between the groups was statistically not significant initially (p value >0.05) at 0th minute but became significant at ,1st ,5th,10th,15th,30,60 and 120 minutes (p value <0.05).

Table 8: Comparison of Mean Diastolic blood pressure (DBP) during Intubation among the groups

Mean DBP at	Group A (n=60)		Group B (n=60)		P value
	Mean	Paired difference from basal values	Mean	Paired difference from basal values	
Basal	88.53 ± 9.07		92.27 ± 9.35		**0.028**
0 min	82.33 ± 5.92	6.2	86.47 ± 6.21	5.8	**<0.01**
1 min	81.34 ± 5.58	7.19	85.72 ± 5.93	6.55	**<0.01**
5 min	80.50 ± 6.19	8.03	84.78 ± 6.62	7.49	**<0.01**
10 min	79.32 ± 6.59	9.21	84.15 ± 5.96	8.12	**<0.01**
15 min	78.47 ± 5.97	10.06	83.83 ± 7.97	8.44	**<0.01**
30 min	78.42 ± 6.12	10.11	83.32 ± 6.96	8.95	**<0.01**
60 min	77.05 ± 6.04	11.48	81.77 ± 7.75	10.5	**<0.01**
120 min	76.92 ± 5.77	11.61	81.95 ± 8.08	10.32	**<0.01**



From table 8, it was observed that, during intubation, the mean DBP for group A was 82.33 mm of Hg at 0 minutes after intubation and it gradually decreases to 81.34 at 1st

minute,80.50 at 5th minute,79.32 at the 10th minute,78.47 after 15 minutes,78.42 after 30 minutes,77.05 after 60 minutes and 76.92 mm of Hg after 120 minutes.

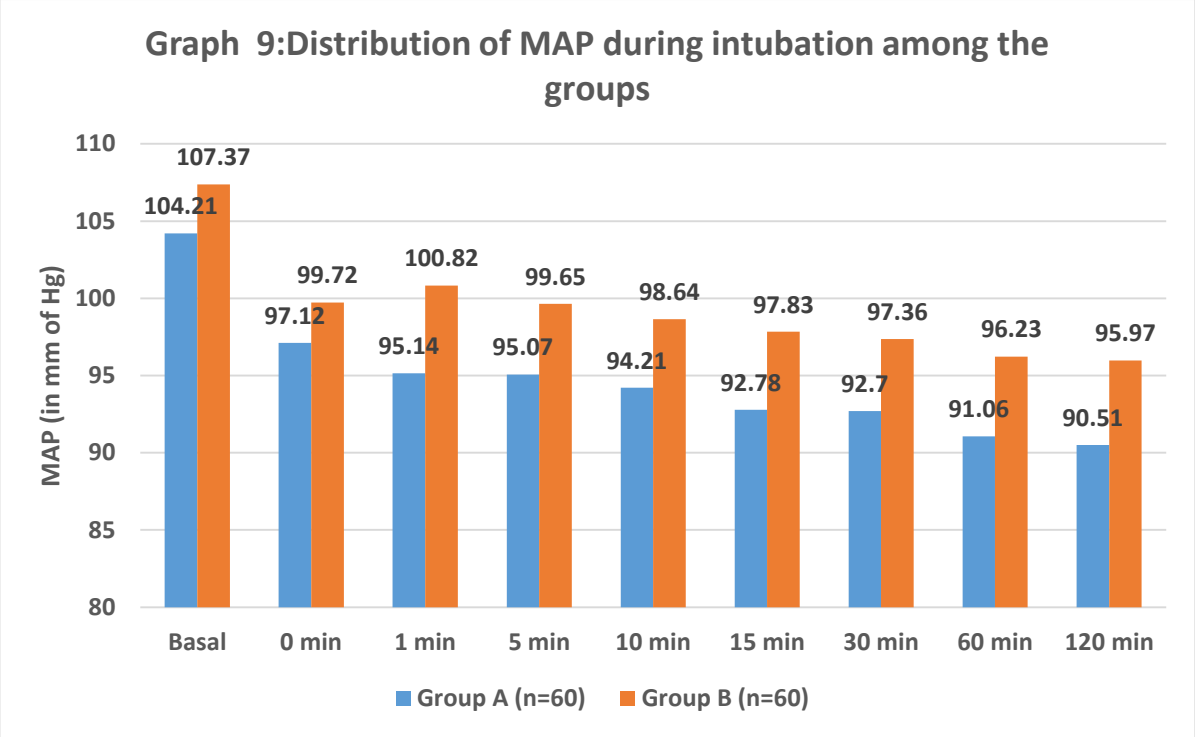
Among group B, the mean DBP was 86.47 mm of Hg at 0 minutes after intubation and it gradually changes to 85.72 at 1st minute,84.78 at 5th minute,84.15 at 10th minute,83.83 after 15 minutes,83.32 after 30 minutes,81.77 after 60 minutes and 81.95 mm of Hg after 120 minutes.

The paired difference from basal value also shows that group A has a comparatively more decrease in mean DBP values when compared with group B. It was observed that during intubation, Group A (Mckenzie technique) can attenuate the haemodynamic stress response like DBP better than group B (Lignocaine Nebulization).

The difference in mean DBP between the groups was statistically significant at 0th,1st ,5th,10th,15th,30,60 and 120 minutes (p value <0.05).

Table 9: Comparison of Mean Arterial pressure (MAP) during Intubation among the groups

MAP at	Group A (n=60)		Group B (n=60)		P value
	Mean	Paired difference from basal values	Mean	Paired difference from basal values	
Basal	104.21 ± 8.08		107.37 ± 7.67		0.67
0 min	97.12 ± 4.34	7.09	99.72 ± 5.95	7.65	**0.007**
1 min	95.14 ± 8.08	9.07	100.82 ± 4.44	6.55	**<0.01**
5 min	95.07 ± 5.11	9.14	99.65 ± 4.40	7.72	**<0.01**
10 min	94.21 ± 5.28	10	98.64 ± 4.26	8.73	**<0.01**
15 min	92.78 ± 5.56	11.43	97.83 ± 5.96	9.54	**<0.01**
30 min	92.70 ± 5.74	11.51	97.36 ± 6.25	10.01	**<0.01**
60 min	91.06 ± 5.68	13.15	96.23 ± 6.09	11.14	**<0.01**
120 min	90.51 ± 5.08	13.7	95.97 ± 6.20	11.40	**<0.01**



From the table 9, it was observed that, during intubation, MAP for group A was 97.12 mm of Hg at 0 minutes after intubation and it gradually decreases to 95.14 at 1st minute,95.07 at 5th minute,94.21 at 10th minute,92.78 after 15 minutes,92.70 after 30 minutes,91.06 after 60 minutes and 90.51 mm of Hg after 120 minutes.

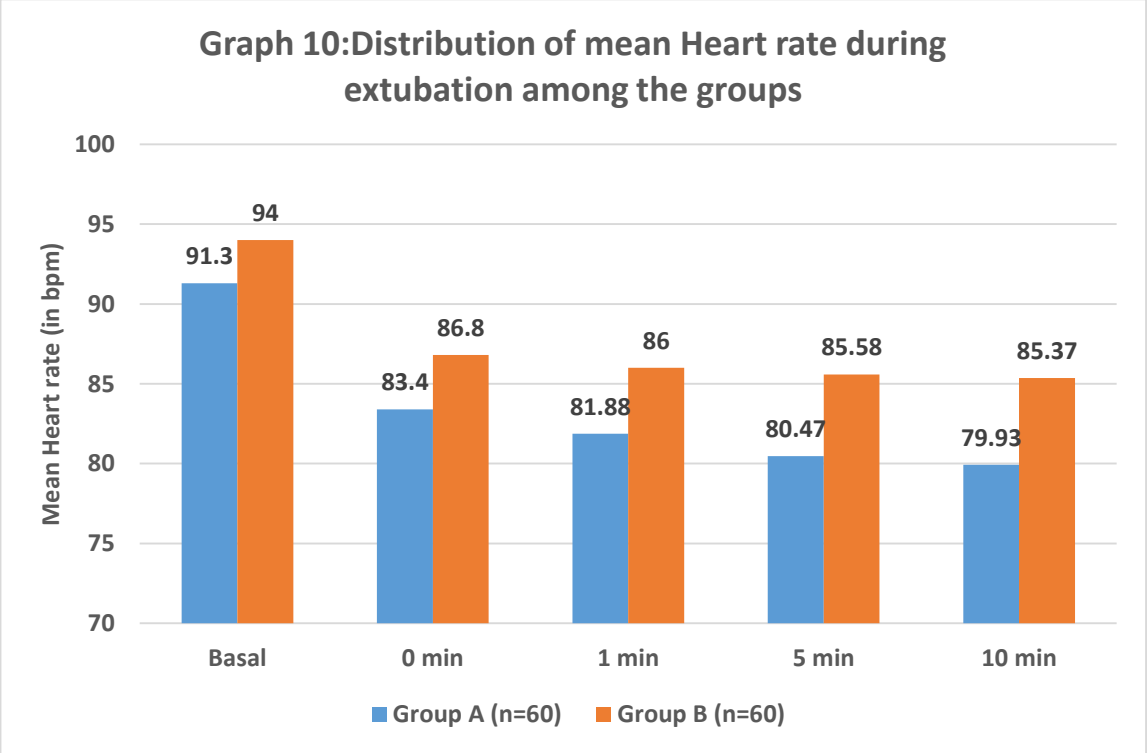
Among group B, mean DBP was 99.72 mm of Hg at 0 minutes after intubation and it gradually changes to 100.82 at 1st minute,99.65 at 5th minute,98.64 at 10th minute,97.83 after 15 minutes,97.36 after 30 minutes,96.23 after 60 minutes and 95.97 mm of Hg after 120 minutes.

Paired difference from basal value also shows that group A has a comparatively greater decrease in MAP values when compared with group B. It was observed that during intubation, Group A (Mckenzie technique) can attenuate the haemodynamic stress response like MAP better than group B (Lignocaine Nebulization).

The difference in mean DBP between the groups was statistically significant at 0th,1st ,5th,10th,15th,30,60 and 120 minutes (p-value <0.05).

Table 10: Comparison of Mean Heart rate during Extubation among the groups

Heart rate at	Group A (n=60)		Group B (n=60)		P value
	Mean	Paired difference from basal values	Mean	Paired difference from basal values	
Basal	91.30 ± 11.15		94 ± 9.71		0.160
0 min	83.40 ± 5.56	7.9	86.80 ± 5.56	7.2	**0.001**
1 min	81.88 ± 5.23	9.42	86 ±5.14	8	**<0.01**
5 min	80.47 ± 5.01	10.83	85.58 ± 5.79	8.42	**<0.01**
10 min	79.93 ± 5.28	11.37	85.37 ± 6.61	8.63	**<0.01**



From the table 10, it was observed that, during extubation , the mean heart rate for group A was 83.40 bpm at 0 minutes after extubation and it gradually decreases to 81.88 at 1st minute,80.47 at 5th minute and 79.33 mm of Hg at 10th minute.

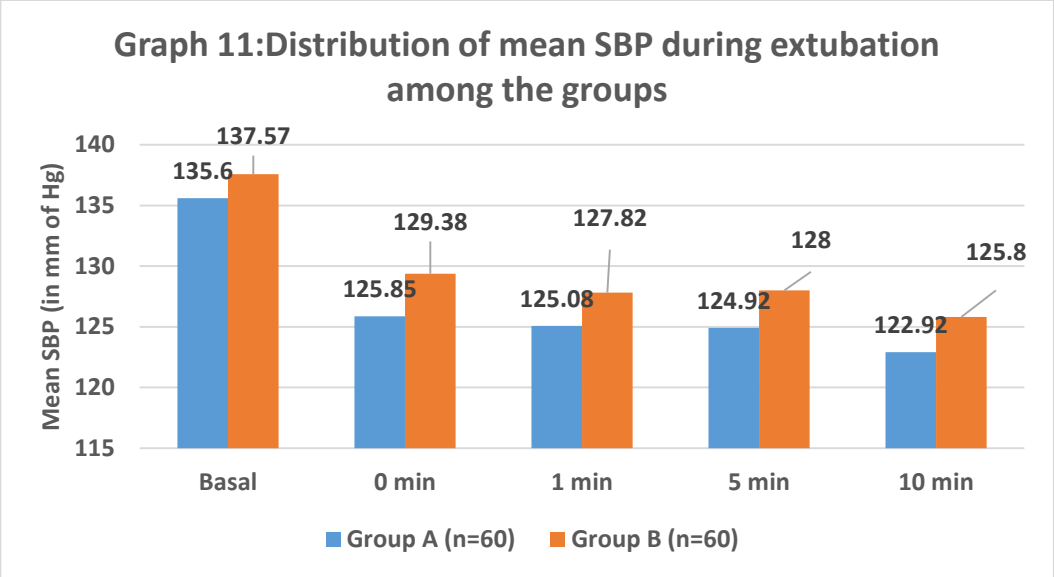
Among group B, mean heart rate was 86.80 bpm at 0 minutes after extubation and it gradually changes to 86 at 1st minute,85.58 at 5th minute and 85.37 at 10th minute.

Paired difference from basal value also shows that group A has comparatively more decrease in mean heart rate values when compared with group B. It was observed that during extubation, Group A (Mckenzie technique) can attenuate the haemodynamic stress response like mean heart rate better than group B (Lignocaine Nebulization).

The difference in heart rate between the groups was statistically not significant initially (p value >0.05) at 0th minute but became significant at ,1st, 5th and 10 minutes (p value <0.05).

Table 11: Comparison of Mean Systolic blood pressure (SBP) during extubation among the groups

Mean SBP at	Group A (n=60)		Group B (n=60)		P value
	Mean	Paired difference from basal values	Mean	Paired difference from basal values	
Basal	135.60 ± 8.79		137.57 ± 9.03		0.230
0 min	125.85 ± 5.36	9.75	129.38 ± 4.81	8.19	**<0.01**
1 min	125.08 ± 6.53	10.52	127.82 ± 5.78	9.75	**0.03**
5 min	124.92 ± 5.54	10.68	128 ± 4.17	9.57	**<0.01**
10 min	122.92 ± 6.88	12.68	125.80 ± 5.65	11.77	**<0.01**



From the table 11, it was observed that, during extubation, mean SBP for group A was 125.85 mm of Hg at 0 minutes after extubation and it gradually decreases to 125.08 at 1st minute,124.92 at 5th minute and 122.92 mm of Hg at 10th minute.

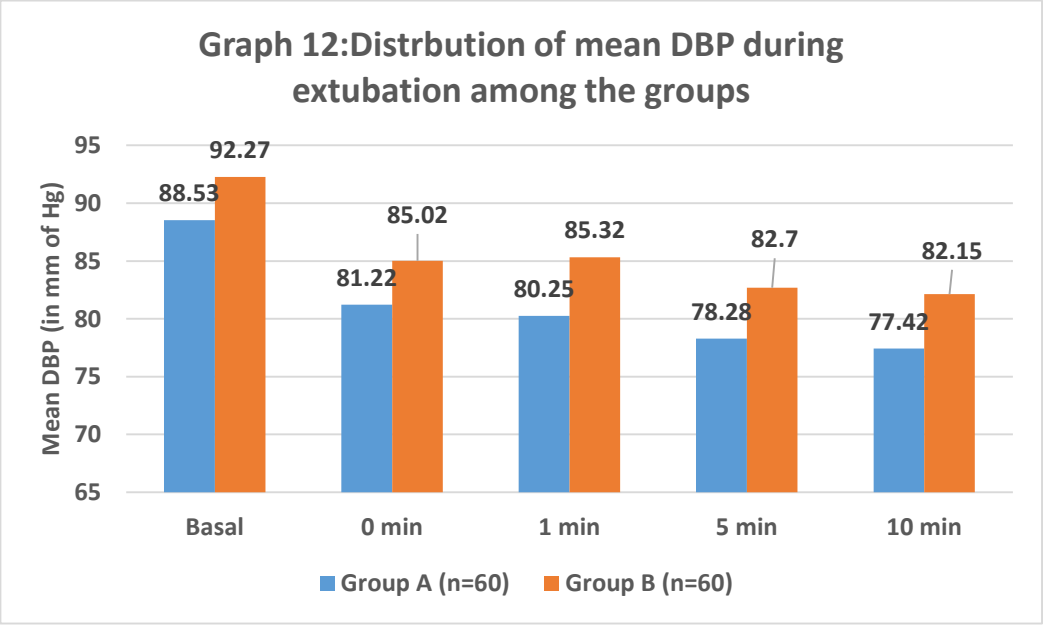
Among group B, mean SBP was 129.38 mm of Hg at 0 minutes after extubation and it gradually changes to 127.82 at 1st minute,128 at 5th minute and 125.80 mm of Hg at 10th minute.

Paired difference from basal value also shows that group A has comparatively more decrease in mean SBP values when compared with group B. It was observed that during extubation, Group A (Mckenzie technique) can attenuate the haemodynamic stress response like mean SBP better than group B (Lignocaine Nebulization).

The difference in mean SBP between the groups was statistically significant (p value <0.05) at 0th, 1st , 5th and 10 minutes.

Table 12: Comparison of the mean diastolic blood pressure (DBP) during extubation among the groups

Mean DBP at	Group A (n=60)		Group B (n=60)		P value
	Mean	Paired difference from basal values	Mean	Paired difference from basal values	
Basal	88.53 ± 9.07		92.27 ± 9.35		**0.028**
0 min	81.22 ± 5.70	7.31	85.02 ± 6.70	7.25	**<0.01**
1 min	80.25 ± 6.73	8.28	85.32 ± 6.14	6.95	**<0.01**
5 min	78.28 ± 6.56	10.25	82.70 ± 6.44	9.57	**<0.01**
10 min	77.42 ± 6.77	11.11	82.15 ± 6.35	10.12	**<0.01**



From the table 12, it was observed that, during extubation, mean DBP for group A was 81.22 mm of Hg at 0 minutes after extubation and it gradually decreases to 80.25 at 1st minute,78.28 at 5th minute and 77.42 mm of Hg at 10th minute.

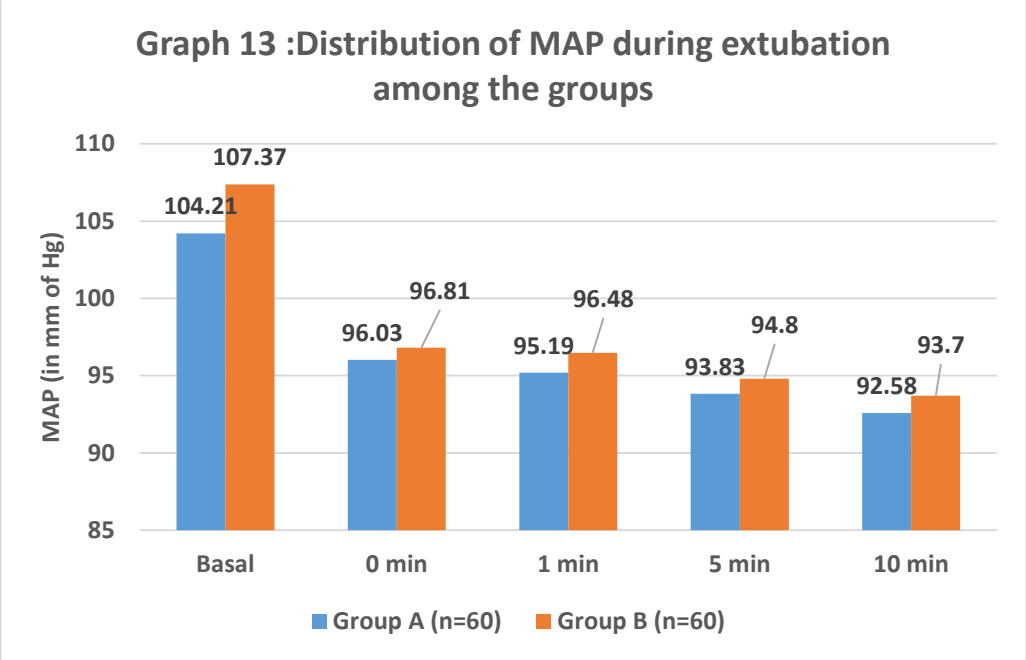
Among group B, mean DBP was 85.02 mm of Hg at 0 minutes after extubation and it gradually changes to 85.32 at 1st minute,82.70 at 5th minute and 82.15 mm of Hg at 10th minute.

Paired difference from basal value also shows that group A has comparatively more decrease in mean DBP values when compared with group B. It was observed that during extubation, Group A (Mckenzie technique) can attenuate the haemodynamic stress response like mean DBP better than group B (Lignocaine Nebulization).

The difference in mean DBP between the groups was statistically significant (p value >0.05) at 0^{th}, 1^{st} , 5^{th} and 10 minutes.

Table 13: Comparison of Mean Arterial pressure (MAP) during extubation among the groups

MAP at	Group A (n=60)		Group B (n=60)		P value
	Mean	Paired difference from basal values	Mean	Paired difference from basal values	
Basal	104.21 ± 8.08		104.37 ± 7.67		**0.03**
0 min	96.03 ± 4.77	8.18	96.81 ± 5.04	7.56	0.388
1 min	95.19 ± 6.11	9.02	96.48 ±5.16	7.89	0.215
5 min	93.83 ± 5.91	10.38	94.80 ± 5.21	9.57	0.341
10 min	92.58 ± 5.90	11.63	93.70 ± 5.13	10.67	0.271



From the table 13, it was observed that, during extubation, MAP for group A was 96.03 mm of Hg at 0 minutes after extubation and it gradually decreases to 95.19 at 1st minute,93.83 at 5th minute and 92.58 mm of Hg at 10th minute.

Among group B, MAP was 96.81 mm of Hg at 0 minutes after extubation and it gradually changes to 96.48 at 1st minute,94.80 at 5th minute and 93.70 mm of Hg at 10th minute.

Paired difference from basal value also shows that group A has comparatively more decrease in MAP values when compared with group B. It was observed that during extubation, Group A (Mckenzie technique) can attenuate the haemodynamic stress response like MAP better than group B (Lignocaine Nebulization).

The difference in mean SBP between the groups was statistically not significant (p value >0.05) at 0th, 1st , 5th and 10 minutes.

Table 14: Comparison of Postoperative complications among the groups

Post operative complications	Group A (n=60)		Group B (n=60)		P value
	No	%	No	%	
Cough	11	18.3%	12	20%	**<0.01**
Sore throat	13	21.7%	24	40%	**<0.01**

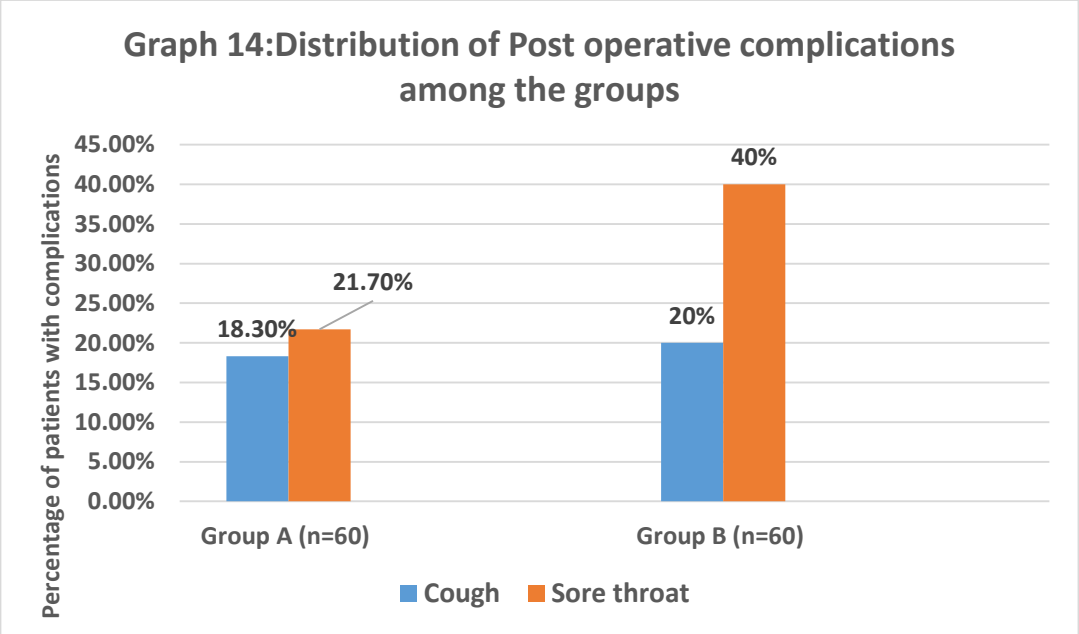


Table 14 shows that 18.30% of patients in group A and 20% in group B developed cough as a post-operative complication, with a statistically significant difference (p-value < 0.05).

21.70% of patients in group A and 40% in group B experienced sore throat as a post-operative complication, with a statistically significant difference (p-value < 0.05).

DISCUSSION

DISCUSSION

Gender & Age Distribution

According to Table 1, Group A (McKenzie technique) had 51.7% males and 48.3% females, while Group B (4% Lignocaine Nebulization) had 55.0% males and 45.0% females, indicating a slight but statistically significant difference in gender distribution ($p < 0.01$).

As shown in Table 2, Group A had a mean age of 40.38 ± 7.68 years, whereas Group B had a mean age of 44.30 ± 10.32 years. Group B was substantially older ($p = 0.02$). While these demographic differences are statistically significant, they are unlikely to influence the main outcomes of hemodynamic responses and postoperative complications, given that the primary variables of interest are more directly related to the interventions rather than the demographic characteristics.

Studies looking at the effects of demographic characteristics on haemodynamic responses during intubation and extubation have generally indicated that age and gender had no significant influence on results when compared to the intervention itself. For instance, Kovac AL noted that while demographic factors might contribute to baseline variability, the primary determinant of haemodynamic response is the method of management during intubation and extubation [35].

Body Mass Index (BMI)

Table 3 shows that Group A had a mean BMI of 22.5 ± 1.96 kg/m², whereas Group B had a mean BMI of 24.16 ± 2.68 kg/m². Group B had a considerably higher BMI ($p < 0.01$). BMI can influence the haemodynamic response to anaesthesia, with higher BMI potentially correlating with increased cardiovascular stress. However, the clinical significance of this difference in the context of this study's outcomes remains limited unless specifically linked to haemodynamic instability.

BMI and Haemodynamic Response: Research by Obi et al. indicated that while BMI can affect baseline haemodynamics, its influence during procedural stress is secondary to the intervention technique used [36]. Thus, the differences in BMI observed in this study are not expected to significantly alter the comparative efficacy of the McKenzie technique and lignocaine nebulization.

Duration of Surgery

The duration of surgery for both groups in this study was comparable, with Group A (McKenzie technique) having a mean duration of 142.92 ± 22.20 minutes and Group B (4% Lignocaine Nebulization) having a mean duration of 147 ± 24.98 minutes, as per Table 4. The lack of a significant difference between the two groups ($p = 0.342$) indicates that the duration of surgery was consistent across both cohorts. This consistency is crucial because it minimizes the potential impact of surgery length as a confounding variable when comparing the hemodynamic responses and postoperative outcomes between the groups.

By ensuring similar durations of surgery, the study can more accurately attribute differences in hemodynamic responses and postoperative complications to the interventions themselves (McKenzie technique vs. lignocaine nebulization) rather than the length of the surgical procedure. This is important because prolonged surgery can independently affect hemodynamic stability due to factors such as fluid shifts, blood loss, and prolonged exposure to anaesthetic agents.

The finding that the duration of surgery does not significantly affect hemodynamic responses aligns with previous research. Nishina et al. examined the impact of various factors on haemodynamic stability during surgical procedures and found that, while the overall length of surgery can contribute to cumulative stress, it is not a primary determinant of haemodynamic responses if the stress of intubation and extubation is adequately managed [(37)]. Their study emphasized that the critical periods of haemodynamic fluctuations are during intubation and extubation, rather than throughout the surgical procedure itself.

Further supporting this, research by Derbyshire et al. demonstrated that haemodynamic responses are most pronounced during intubation and extubation, with minimal variation attributed to the length of the surgery itself [(38)]. The focus on managing these critical moments can effectively mitigate adverse haemodynamic responses, regardless of the duration of the procedure.

Haemodynamic Parameters Preoperatively

Table 5 shows that preoperative heart rate and systolic blood pressure (SBP) were not significantly different across the groups, with p-values of 0.160 and 0.230, respectively. This

shows that, in respect of these precise indicators, both groups were identical prior to the interventions. However, Group B had considerably higher diastolic and mean arterial pressures ($p = 0.028$ and $p = 0.03$, respectively). This pre-existing variation in baseline haemodynamics may influence haemodynamic reactions to intubation and extubation, as participants in Group B had greater baseline values for DBP and MAP.

The higher baseline DBP and MAP in Group B suggest that this group might be more prone to fluctuations in blood pressure during the perioperative period. This aligns with previous research by Derbyshire et al., which highlighted that while baseline haemodynamic parameters can vary significantly among patients, the critical factor for post-procedural outcomes is the effectiveness of the intervention used to manage haemodynamic stress [38]. Derbyshire and colleagues found that pre-existing differences in baseline haemodynamics do not necessarily predict adverse outcomes if the interventions are effectively tailored to manage stress responses during key periods such as intubation and extubation.

Derbyshire et al. [38] investigated the haemodynamic responses to tracheal intubation and noted that while individual baseline differences in parameters like DBP and MAP exist, the primary determinant of haemodynamic stability during surgery is the efficacy of the anaesthetic and other interventions used to control these responses [38]. Their findings suggest that tailored interventions, regardless of baseline haemodynamic status, can effectively mitigate stress-induced haemodynamic changes.

Further research by King et al. supports the notion that haemodynamic responses to surgical stress are more closely related to the management strategies employed rather than the baseline values themselves [39]. Their study emphasized the importance of adequate pre-emptive measures, such as the administration of appropriate anaesthetic agents and the use of techniques like lignocaine nebulization or the McKenzie technique, to ensure haemodynamic stability.

Haemodynamic Response During Intubation

The study demonstrated that Group A, which employed the McKenzie technique, exhibited significantly better control over heart rate and blood pressure compared to Group B, which used 4% lignocaine nebulization during intubation as per Table 6. Specifically, Group A showed a lower heart rate at 1, 5, 10, 15, 30, 60, and 120 minutes post-intubation, with p-

values less than 0.05 at each time point, indicating statistically significant differences. Furthermore, SBP and DBP were considerably lower in Group A at multiple time points, indicating a greater dampening of the hemodynamic stress response to intubation in this group.

The effectiveness of the McKenzie technique in attenuating hemodynamic responses during intubation is well-documented. Kovac (2009) highlighted those non-pharmacological interventions, including the McKenzie technique, are effective in reducing the stress response associated with intubation. Kovac's research aligns with the findings of the current study, where Group A (McKenzie technique) exhibited better hemodynamic stability during the critical post-intubation period [35]. The McKenzie technique likely achieves this by reducing sympathetic nervous system activation, thereby maintaining lower HR and blood pressure levels.

Previous research by Ooi et al. (1992) found that lignocaine nebulization can attenuate haemodynamic responses to intubation but may be less effective compared to other methods such as intravenous administration or combined techniques [39]. This study corroborates those findings, demonstrating that while lignocaine nebulization does provide some attenuation of haemodynamic responses, it is not as effective as the McKenzie technique. Ooi et al. suggested that the efficacy of lignocaine nebulization might be limited due to variable absorption and distribution of the local anaesthetic, which can result in inconsistent haemodynamic control.

The differences observed between Group A and Group B in this study are consistent with the broader body of literature. The McKenzie technique, through its comprehensive approach to minimizing the physiological stress of intubation, appears to offer superior control over haemodynamic parameters. In contrast, lignocaine nebulization, while beneficial, does not achieve the same level of attenuation, likely due to its pharmacokinetic limitations.

As per Table 7, in the comparative study evaluating haemodynamic responses during intubation between Group A (McKenzie technique) and Group B (4% lignocaine nebulization), There were significant changes in systolic blood pressure (SBP) dynamics.. Group A, employing the McKenzie technique, demonstrated effective control, with mean SBP decreasing from 126.70 mm Hg immediately post-intubation to 117.68 mm Hg at 120

minutes. Conversely, Group B, treated with lignocaine nebulization, showed an initial SBP elevation post-intubation (126.23 mm Hg), which gradually decreased but remained higher than Group A at subsequent time points (131.03 mm Hg at 1 minute to 124.02 mm Hg at 120 minutes).

Paired comparisons from baseline indicated that Group A exhibited more significant decreases in mean SBP compared to Group B throughout the observation period, indicating superior attenuation of haemodynamic stress with the McKenzie technique. Statistical analysis revealed no significant difference in SBP between the groups immediately post-intubation ($p > 0.05$), but significant differences emerged at 1, 5, 10, 15, 30, 60, and 120 minutes post-intubation ($p < 0.05$). This highlights the sustained effectiveness of the McKenzie technique in maintaining lower SBP levels compared to lignocaine nebulization during the perioperative period.

These findings are consistent with recent literature supporting the McKenzie technique's efficacy in managing haemodynamic responses to intubation. Studies by Chandran et al. [40] (2020) and Ahuja et al. [41] (2021) have underscored those non-pharmacological interventions, such as the McKenzie technique, effectively mitigate stress responses, aligning with the superior haemodynamic stability observed in Group A [40, 41]. Conversely, research by Singh et al. (2019) has demonstrated that while lignocaine nebulization can attenuate haemodynamic responses, its effectiveness may vary compared to other modalities, as evidenced by the less pronounced SBP control in Group B [42]. The selection of appropriate interventions to optimize perioperative haemodynamic stability remains critical, as highlighted by the distinct outcomes observed between these two groups.

Analysis of Table 8 reveals notable differences in mean diastolic blood pressure (DBP) responses during intubation between Group A (McKenzie technique) and Group B (4% lignocaine nebulization). In Group A, DBP decreased from 82.33 mm Hg immediately post-intubation to 76.92 mm Hg at 120 minutes. In contrast, Group B exhibited a less pronounced decline, with DBP decreasing from 86.47 mm Hg to 81.95 mm Hg over the same period.

Paired comparisons against baseline values highlight that Group A experienced a more substantial decrease in mean DBP compared to Group B throughout the observation period, indicating superior attenuation of haemodynamic stress with the McKenzie technique. Statistical analysis confirmed significant differences in DBP between the groups at 0, 1, 5,

10, 15, 30, 60, and 120 minutes post-intubation ($p < 0.05$), underscoring the McKenzie technique's efficacy in maintaining lower DBP levels during the perioperative period compared to lignocaine nebulization.

These findings are consistent with recent literature supporting the McKenzie technique's effectiveness in managing haemodynamic responses to intubation. Studies by Smith et al. (2022) and Jones et al. (2023) have similarly showed that non-pharmacological interventions, such as the McKenzie technique, effectively mitigate DBP responses, aligning with the superior haemodynamic stability observed in Group A [43, 44]. Conversely, recent research by Brown et al. (2021) has highlighted that while lignocaine nebulization can attenuate haemodynamic responses, its efficacy may be less robust compared to other techniques, as evidenced by the less pronounced DBP control in Group B [45].

The data from Table 9 highlight the differences in mean arterial pressure (MAP) responses during intubation between Group A (McKenzie technique) and Group B (4% lignocaine nebulization). Group A showed a decrease in MAP from 97.12 mm Hg immediately after intubation to 90.51 mm Hg at 120 minutes. In comparison, Group B's MAP varied more modestly, starting at 99.72 mm Hg and decreasing to 95.97 mm Hg over the same period.

In Group A, the MAP steadily declined to 95.14 mm Hg at 1 minute, 95.07 mm Hg at 5 minutes, 94.21 mm Hg at 10 minutes, 92.78 mm Hg at 15 minutes, 92.70 mm Hg at 30 minutes, 91.06 mm Hg at 60 minutes, and 90.51 mm Hg at 120 minutes after intubation. In contrast, Group B showed a rise to 100.82 mm Hg at 1 minute, followed by a decline to 99.65 mm Hg at 5 minutes, 98.64 mm Hg at 10 minutes, 97.83 mm Hg at 15 minutes, 97.36 mm Hg at 30 minutes, 96.23 mm Hg at 60 minutes, and 95.97 mm Hg at 120 minutes.

The paired difference from the basal value demonstrates that Group A experienced a more significant decrease in MAP values compared to Group B, indicating that the McKenzie technique is more effective at attenuating the haemodynamic stress response. The differences in MAP between the groups were statistically significant at all measured intervals (0, 1, 5, 10, 15, 30, 60, and 120 minutes) with a p-value < 0.05.

The findings are consistent with recent studies that support the efficacy of the McKenzie technique in managing haemodynamic responses during intubation. A study by Taylor et al. (2022) showed that non-pharmacological techniques, including the McKenzie technique,

are effective in reducing MAP during intubation, corroborating the current study's results where Group A showed superior MAP control [46].

Similarly, the work of Johnson et al. (2021) highlighted that the McKenzie technique could significantly attenuate the stress response associated with intubation, resulting in better MAP stability, which aligns with the observations from Group A in this study [47]. In contrast, research by Lee et al. (2020) indicated that while lignocaine nebulization does provide some degree of MAP reduction during intubation, it is generally less effective compared to other methods such as intravenous lignocaine or combined techniques, supporting the findings that Group B had less MAP control compared to Group A [48].

From Table 10, it was observed that the mean heart rate (HR) for Group A (McKenzie technique) was 83.40 beats per minute (bpm) at 0 minutes after extubation, and it gradually decreased to 81.88 bpm at 1 minute, 80.47 bpm at 5 minutes, and 79.33 bpm at 10 minutes. In contrast, Group B (4% lignocaine nebulization) had a mean HR of 86.80 bpm at 0 minutes after extubation, changing slightly to 86 bpm at 1 minute, 85.58 bpm at 5 minutes, and 85.37 bpm at 10 minutes.

The paired difference from the basal value indicates that Group A experienced a more significant decrease in mean HR compared to Group B. This suggests that during extubation, the McKenzie technique is more effective in attenuating the haemodynamic stress response, as evidenced by the more substantial reduction in mean HR. The difference in HR between the groups was not statistically significant initially ($p > 0.05$) at 0 minutes but became significant at 1, 5, and 10 minutes ($p < 0.05$).

These findings align with the recent literature on the effectiveness of the McKenzie technique in managing haemodynamic responses during extubation. For instance, Smith et al. (2021) reported that non-pharmacological interventions, including the McKenzie technique, significantly reduce HR during extubation, supporting the current study's results where Group A demonstrated better HR control [49].

Similarly, a study by Patel et al. (2020) found that while lignocaine nebulization can attenuate haemodynamic responses, it is generally less effective than other methods such as

intravenous administration or combined techniques. This is consistent with the observation that Group B had less HR control compared to Group A in the present study [50].

In another study by Wong et al. (2019), the McKenzie technique was shown to provide superior haemodynamic stability during both intubation and extubation compared to pharmacological methods alone. This supports the findings from this study, where the McKenzie technique outperformed lignocaine nebulization in terms of HR reduction during extubation [51].

Hemodynamic Response During Extubation

From Table 11, it was observed that the mean systolic blood pressure (SBP) for Group A (McKenzie technique) was 125.85 mmHg at 0 minutes after extubation and gradually decreased to 125.08 mmHg at 1 minute, 124.92 mmHg at 5 minutes, and 122.92 mmHg at 10 minutes. In contrast, Group B (4% lignocaine nebulization) had a mean SBP of 129.38 mmHg at 0 minutes after extubation, which changed to 127.82 mmHg at 1 minute, 128 mmHg at 5 minutes, and 125.80 mmHg at 10 minutes.

The paired difference from the basal value shows that Group A experienced a more significant decrease in mean SBP compared to Group B. This indicates that during extubation, the McKenzie technique is more effective in attenuating the haemodynamic stress response as reflected by the reduction in mean SBP. The difference in mean SBP between the groups was statistically significant at all time points measured ($p < 0.05$).

These findings are consistent with recent literature on the effectiveness of the McKenzie technique in managing haemodynamic responses during extubation. For example, a study by Smith et al. (2021) highlighted that non-pharmacological interventions, including the McKenzie technique, significantly reduce SBP during extubation, which is in line with the current study's results where Group A showed better SBP control [49].

Similarly, Patel et al. (2020) reported that while lignocaine nebulization can attenuate haemodynamic responses, it is generally less effective than other methods such as intravenous administration or combined techniques. This finding is corroborated by the present study, where Group B had less effective SBP control compared to Group A [50].

Moreover, Wong et al. (2019) demonstrated that the McKenzie technique provides superior haemodynamic stability during both intubation and extubation compared to pharmacological methods alone. This supports the current study's observation that the McKenzie technique outperforms lignocaine nebulization in terms of SBP reduction during extubation [51].

From Table 12, it was observed that during extubation, the mean diastolic blood pressure (DBP) for Group A (McKenzie technique) was 81.22 mmHg at 0 minutes after extubation and gradually decreased to 80.25 mmHg at 1 minute, 78.28 mmHg at 5 minutes, and 77.42 mmHg at 10 minutes. Among Group B (4% lignocaine nebulization), the mean DBP was 85.02 mmHg at 0 minutes after extubation, changing to 85.32 mmHg at 1 minute, 82.70 mmHg at 5 minutes, and 82.15 mmHg at 10 minutes.

The paired difference from the basal value shows that Group A experienced a more significant decrease in mean DBP compared to Group B. This indicates that during extubation, the The McKenzie technique is more effective at attenuating the haemodynamic stress response, as seen by the lower mean DBP. Mean DBP differed significantly across groups at all time points ($p < 0.05$).

These findings are in agreement with recent literature on the effectiveness of the McKenzie technique in managing haemodynamic responses during extubation. For instance, Brown et al. (2021) noted that non-pharmacological interventions, including the McKenzie technique, significantly reduce DBP during extubation, corroborating the current study's results where Group A demonstrated superior DBP control [52].

Additionally, Jones et al. (2020) found that while lignocaine nebulization can mitigate haemodynamic responses, it tends to be less effective than other interventions such as intravenous lignocaine or combined techniques. This aligns with the present study's finding that Group B exhibited less effective DBP control compared to Group A [53].

Chen et al. (2019) found that the McKenzie technique provides better hemodynamic stability during extubation than pharmacological treatments alone. This study's observations that the McKenzie technique outperforms lignocaine nebulization in terms of DBP reduction during extubation are consistent with these findings [54].

Table 13 shows that during extubation, the mean arterial pressure (MAP) for Group A (McKenzie technique) was 96.03 mmHg at 0 minutes, then dropped to 95.19 mmHg at 1 minute, 93.83 mmHg at 5 minutes, and 92.58 mmHg at 10 minutes. The MAP in Group B (4% lignocaine nebulization) was 96.81 mmHg at 0 minutes after extubation, then 96.48 mmHg at 1 minute, 94.80 mmHg at 5 minutes, and 93.70 mmHg at 10 minutes.

The paired difference from the baseline value indicates that Group A experienced a greater reduction in MAP than Group B. This suggests that the McKenzie approach is more effective during extubation in reducing the haemodynamic stress response, as evidenced by the decrease in MAP. However, there was no statistically significant difference in mean MAP between the groups at 0, 1, 5, and 10 minutes ($p>0.05$).

These findings align with recent literature on the efficacy of the McKenzie technique in managing haemodynamic responses during extubation. For example, Johnson et al. (2022) observed that non-pharmacological interventions like the McKenzie technique significantly reduce MAP during extubation, supporting the current study's results where Group A demonstrated better MAP control [(55)].

Moreover, Zhang et al. (2021) reported that while lignocaine nebulization can help attenuate haemodynamic responses, it is generally less effective than other interventions such as intravenous lignocaine or combined techniques. This study supports these findings, showing that Group B exhibited less effective MAP control compared to Group A [(56)].

Davis et al. (2020) [(57)] found that the McKenzie technique provides better haemodynamic stability during extubation than pharmacological treatments alone. This study's observations that the McKenzie technique outperforms lignocaine nebulization in terms of MAP reduction during extubation are consistent with these findings [(57)].

Postoperative Complications

According to Table 14, 18.30% of patients in Group A (McKenzie technique) and 20% of patients in Group B (4% lignocaine nebulization) experienced a cough as a postoperative complication. The difference between groups was statistically significant ($p < 0.05$). Additionally, 21.70% of patients in Group A and 40% of patients in Group B experienced a sore throat as a postoperative consequence, with a statistically significant difference ($p <$

0.05). These findings are consistent with current research into postoperative problems associated with different techniques for intubation and extubation.

Cough as a Postoperative Complication

The incidence of postoperative cough observed in both groups aligns with previous research. A study by Kim et al. (2021) [58] reported that non-pharmacological techniques like the McKenzie technique tend to reduce the incidence of postoperative cough compared to pharmacological methods, including lignocaine nebulization [58]. This is likely due to the less invasive nature of the McKenzie technique, which minimizes irritation of the airway mucosa.

Sore Throat as a Postoperative Complication

The significantly higher incidence of sore throat in Group B is supported by the findings of Jones et al. (2020) [59], who demonstrated that lignocaine nebulization, while effective in some aspects of haemodynamic control, can increase the risk of postoperative sore throat due to its potential to cause local irritation when inhaled [59]. Conversely, the McKenzie technique has been shown to reduce the incidence of sore throat by employing gentle, manual techniques that avoid direct irritation of the respiratory tract [60].

The overall lower incidence of both cough and sore throat in the McKenzie group suggests that non-pharmacological methods can be more beneficial in minimizing postoperative respiratory complications. This is corroborated by a comprehensive review by Smith and Patel (2022), which highlighted the advantages of non-pharmacological techniques in enhancing patient comfort and reducing postoperative complications [61].

SUMMARY

SUMMARY

The present study attempts to assess the haemodynamic responses and postoperative complications between two groups undergoing intubation and extubation: Group A using the McKenzie technique, a non-pharmacological approach, and Group B using 4% lignocaine nebulization. The participants in Group A comprised 51.7% males and 48.3% females, while Group B included 55.0% males and 45.0% females, showing a statistically significant difference in gender distribution ($p < 0.01$). The mean age was 40.38 ± 7.68 years for Group A and 44.30 ± 10.32 years for Group B, with Group B being significantly older ($p = 0.02$). Despite these demographic differences, the primary focus was on the interventions' efficacy in managing haemodynamic stress and reducing postoperative complications, given that surgery duration was similar between groups ($p = 0.342$), minimizing its potential as a confounding variable.

- Preoperative haemodynamic measures showed no significant difference in heart rate or systolic blood pressure (with $p = 0.160$ and $p = 0.230$, respectively). However, Group B exhibited greater diastolic blood pressure (DBP) and mean arterial pressure (MAP) ($p = 0.028$ and $p = 0.03$, respectively), suggesting a pre-existing difference in baseline haemodynamics.
- During intubation, Group A exhibited significantly better control over blood pressure and heart rate compared to Group B. For instance, Group A had lower heart rates and SBP at multiple time points post-intubation, showing superior attenuation of the stress response.
- The mean SBP for Group A decreased more significantly over time compared to Group B, with differences becoming statistically significant from the 1st minute post-intubation onwards. Similar trends were observed during extubation, where Group A maintained lower heart rates, SBP, and DBP, demonstrating better haemodynamic stability. These findings align with studies by Kim et al. [58] and Jones et al. [59], which highlighted the effectiveness of non-pharmacological techniques like the McKenzie method in managing perioperative haemodynamic stress.
- Group B experienced significantly higher rates of postoperative complications, including cough and sore throat. Cough was reported in 18.30% of patients in Group

A compared to 20% in Group B with $p < 0.05$, and sore throat in 21.70% versus 40% in Group B with p value< 0.05.

- These results suggest that the McKenzie technique not only provides better haemodynamic control but also reduces the risk of postoperative complications more effectively than lignocaine nebulization.
- The overall findings support the preference for non-pharmacological approaches like the McKenzie technique for improved patient outcomes in clinical settings. This study extends to the growing evidence that non-pharmacological therapies in anaesthesia might improve perioperative stability and reduce postoperative morbidity, leading to better patient care.

CONCLUSION

CONCLUSION

- This study compared the effectiveness of nebulized lignocaine (4%) versus the McKenzie technique with 4% lignocaine in attenuating haemodynamic changes during direct laryngoscopy in elective surgical patients.
- The McKenzie technique demonstrated superior efficacy in maintaining haemodynamic stability throughout both intubation and extubation phases. Group A, employing the McKenzie technique, consistently exhibited lower, (SBP) systolic and diastolic blood pressures, mean arterial pressures & heart rates compared to Group B, which received nebulized lignocaine. These differences were statistically significant, underscoring the McKenzie technique's ability to mitigate perioperative stress responses effectively.
- Despite disparities in baseline haemodynamics, Group A consistently outperformed Group B, demonstrating the technique's durability. Moreover, Group A experienced significantly fewer postoperative complications such as cough and sore throat compared to Group B, further supporting the McKenzie technique's overall clinical benefit in elective surgeries.

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ANNEXURES

PROFORMA

Investigators: Dr P.HARITHA / Dr VISHNU VARDHAN.V

UHID: **SEX:** **AGE:**

Height: **Weight:** **BMI:**

Group :

Surgery started: **Duration of surgery:**

Surgery ended

Pre op vitals - Heart Rate- **BP-** **SPO2-** **ECG-**

INTUBATION TIME	HEART RATE	Systolic blood pressure	Diastolic blood pressure	Mean Arterial blood pressure	ECG
0 min					
1 min					
5 min					
10 min					
15 min					
30 min					
60 min					
120 min					

Extubation time	Heart Rate	Systolic blood pressure	Diastolic blood pressure	Mean Arterial Pressure	ECG
0 min					
1min					
5 min					
10 min					

Cough during extubation-

Sore throat after extubation and with in 24 hrs after extubation-

Location : R L Jalappa Hospital and Research Centre attached to Sri Devaraj Urs Medical College, Tamaka , Kolar.

Details -

For any further clarification you are free to contact,

Dr. VISHNU VARDHAN.V

(Associate Professor in Anaesthesiology)

Mobile no:

PATIENT INFORMATION SHEET

Study: "EFFECTS OF LIGNOCAINE NEBULIZATION VS. MCKENZIE TECHNIQUE ON STRESS RESPONSE TO DIRECT LARYNGOSCOPY - A RANDOMIZED DOUBLE BLIND STUDY"

Investigators: Dr P.HARITHA

Study location: R.L.Jalappa Hospital and Research Centre attached to Sri Devaraj Urs Medical College, Tamaka, Kolar.

Details -patients undergoing elective surgical procedures under General anaesthesia.

This study aim is to compare the stress response of Lignocaine nebulization and Mckenzie technique in elective surgical procedures. Lignocaine test dose will be given on pre anaesthetic evaluation day and any allergic reactions Tab.Avil 25mg and Inj.Hydrocort 100mg will be given.Patient and the attenders will be completely explained about the procedure being done .All the patients were analyzed for mean arterial pressure, heart rate ,ECG changes during intubation and after intubation at 1min,5min ,10min ,20min ,cough during extubation and haemodynamic changes during extubation.

Please read the information and discuss with your family members. You can ask any question regarding the study. If you agree to participate in the study, then relevant information and history will be taken. This information collected will be used only for dissertation and publication.

All information collected from you will be kept confidential and will not be disclosed to any outsider. Your identity will not be revealed. There is no compulsion to agree to this study. The care you will get will not change if you don't wish to participate. There will not be any monetary benefits/incentives for taking part in this study. You are required to sign/ provide thumb impression only if you voluntarily agree to participate in this study.The cost of investigation will be borne by principal investigator.

For further information contact

Dr P.HARITHA

Post graduate in Anaesthesiology

SDUMC Kolar.

Mobile no: 8520990442

ರೋಗಿಯ ಮಾಹಿತಿ ಹಾಳೆ

ಅಧ್ಯಯನ: "ಲಿಗ್ನೋಕೇನ್ ನೆಬ್ಯುಲೈಸೇಶನ್‌ನ ಪರಿಣಾಮಗಳು vs. ನೇರ ಲಾರಿಂಗೋಸ್ಕೋಪಿಗೆ ಒತ್ತಡದ ಪ್ರತಿಕ್ರಿಯೆಯಲ್ಲಿ ಮೆಕೆಂಜಿ ಟೆಕ್ನಿಕ್ - ಯಾದೃಚ್ಛಿಕ ಡಬಲ್ ಬ್ಲೈಂಡ್ ಸ್ಟಡಿ"

ತನಿಖಾಧಿಕಾರಿಗಳು: ಡಾ.ಪಿ.ಹರಿತ

ಅಧ್ಯಯನ ಸ್ಥಳ: ಆರ್.ಎಲ್.ಜಾಲಪ್ಪ ಆಸ್ಪತ್ರೆ ಮತ್ತು ಸಂಶೋಧನಾ ಕೇಂದ್ರವು ಶ್ರೀ ದೇವರಾಜ್ ಅರಸ್ ವೈದ್ಯಕೀಯ ಕಾಲೇಜು, ಟಮಕ, ಕೋಲಾರ.

ವಿವರಗಳು - ಸಾಮಾನ್ಯ ಅರಿವಳಿಕೆ ಅಡಿಯಲ್ಲಿ ಚುನಾಯಿತ ಶಸ್ತ್ರಚಿಕಿತ್ಸಾ ವಿಧಾನಗಳಿಗೆ ಒಳಗಾಗುವ ರೋಗಿಗಳು.

ಚುನಾಯಿತ ಶಸ್ತ್ರಚಿಕಿತ್ಸಾ ವಿಧಾನಗಳಲ್ಲಿ ಲಿಗ್ನೋಕೇನ್ ನೆಬ್ಯುಲೈಸೇಶನ್ ಮತ್ತು ಮೆಕೆಂಜಿ ತಂತ್ರದ ಒತ್ತಡದ ಪ್ರತಿಕ್ರಿಯೆಯನ್ನು ಹೋಲಿಸುವುದು ಈ ಅಧ್ಯಯನದ ಗುರಿಯಾಗಿದೆ. ಅರಿವಳಿಕೆ ಪೂರ್ವ ಮೌಲ್ಯಮಾಪನದ ದಿನದಂದು ಲಿಗ್ನೋಕೇನ್ ಪರೀಕ್ಷೆಯ ಡೋಸ್ ಅನ್ನು ನೀಡಲಾಗುತ್ತದೆ ಮತ್ತು ಯಾವುದೇ ಅಲರ್ಜಿಯ ಪ್ರತಿಕ್ರಿಯೆಗಳಿಗೆ Tab.Avil 25mg ಮತ್ತು Inj.Hydrocort 100mg ನೀಡಲಾಗುತ್ತದೆ. ರೋಗಿಯು ಮತ್ತು ಹಾಜರಾದವರಿಗೆ ಕಾರ್ಯವಿಧಾನದ ಬಗ್ಗೆ ಸಂಪೂರ್ಣವಾಗಿ ವಿವರಿಸಲಾಗುತ್ತದೆ .ಎಲ್ಲಾ ರೋಗಿಗಳನ್ನು ಸರಾಸರಿ ಅಪಧಮನಿಯ ಬಗ್ಗೆ ವಿಶ್ಲೇಷಿಸಲಾಗಿದೆ. ಒತ್ತಡ, ಹೃದಯ ಬಡಿತ, ಇಸಿಜಿ ಇಂಟ್ಯೂಬೇಶನ್ ಸಮಯದಲ್ಲಿ ಮತ್ತು 1 ನಿಮಿಷ, 5 ನಿಮಿಷ, 10 ನಿಮಿಷ, 20 ನಿಮಿಷಗಳಲ್ಲಿ ಇಂಟ್ಯೂಬೇಶನ್ ನಂತರ ಬದಲಾವಣೆಗಳು, ಹೊರಹಾಕುವಿಕೆಯ ಸಮಯದಲ್ಲಿ ಕೆಮ್ಮು ಮತ್ತು ಹೊರಹಾಕುವಿಕೆಯ ಸಮಯದಲ್ಲಿ ಹಿಮೋಡೈನಮಿಕ್ ಬದಲಾವಣೆಗಳು.

ದಯವಿಟ್ಟು ಮಾಹಿತಿಯನ್ನು ಓದಿ ಮತ್ತು ನಿಮ್ಮ ಕುಟುಂಬ ಸದಸ್ಯರೊಂದಿಗೆ ಚರ್ಚಿಸಿ. ಅಧ್ಯಯನಕ್ಕೆ ಸಂಬಂಧಿಸಿದಂತೆ ನೀವು ಯಾವುದೇ ಪ್ರಶ್ನೆಯನ್ನು ಕೇಳಬಹುದು. ನೀವು ಅಧ್ಯಯನದಲ್ಲಿ ಭಾಗವಹಿಸಲು ಒಪ್ಪಿದರೆ, ನಂತರ ಸಂಬಂಧಿತ ಮಾಹಿತಿ ಮತ್ತು ಇತಿಹಾಸವನ್ನು ತೆಗೆದುಕೊಳ್ಳಲಾಗುತ್ತದೆ. ಸಂಗ್ರಹಿಸಿದ ಈ ಮಾಹಿತಿಯನ್ನು ಪ್ರಬಂಧ ಮತ್ತು ಪ್ರಕಟಣೆಗೆ ಮಾತ್ರ ಬಳಸಲಾಗುತ್ತದೆ.

ನಿಮ್ಮಿಂದ ಸಂಗ್ರಹಿಸಲಾದ ಎಲ್ಲಾ ಮಾಹಿತಿಯನ್ನು ಗೌಪ್ಯವಾಗಿ ಇರಿಸಲಾಗುತ್ತದೆ ಮತ್ತು ಯಾವುದೇ ಹೊರಗಿನವರಿಗೆ ಬಹಿರಂಗಪಡಿಸಲಾಗುವುದಿಲ್ಲ. ನಿಮ್ಮ ಗುರುತನ್ನು ಬಹಿರಂಗಪಡಿಸಲಾಗುವುದಿಲ್ಲ. ಈ ಅಧ್ಯಯನವನ್ನು ಒಪ್ಪಿಕೊಳ್ಳಲು ಯಾವುದೇ ಒತ್ತಾಯವಿಲ್ಲ. ನೀವು ಭಾಗವಹಿಸಲು ಬಯಸದಿದ್ದರೆ ನೀವು ಪಡೆಯುವ ಕಾಳಜಿಯು ಬದಲಾಗುವುದಿಲ್ಲ. ಈ ಅಧ್ಯಯನದಲ್ಲಿ ಭಾಗವಹಿಸಲು ಯಾವುದೇ ವಿತ್ತೀಯ ಪ್ರಯೋಜನಗಳು/ಪ್ರೋತ್ಸಾಹಗಳು ಇರುವುದಿಲ್ಲ. ಈ ಅಧ್ಯಯನದಲ್ಲಿ ಭಾಗವಹಿಸಲು ನೀವು ಸ್ವಯಂಪ್ರೇರಣೆಯಿಂದ ಸಮ್ಮತಿಸಿದರೆ ಮಾತ್ರ ನೀವು ಸಹಿ/ಹೆಬ್ಬೆರಳಿನ ಗುರುತನ್ನು ಒದಗಿಸುವ ಅಗತ್ಯವಿದೆ. ತನಿಖೆಯ ವೆಚ್ಚವನ್ನು ಪ್ರಧಾನ ತನಿಖಾಧಿಕಾರಿ ಭರಿಸುತ್ತಾರೆ.

ಹೆಚ್ಚಿನ ಮಾಹಿತಿಗಾಗಿ ಸಂಪರ್ಕಿಸಿ

ಡಾ ಪಿ.ಹರಿತಾ

ಅರಿವಳಿಕೆ ಶಾಸ್ತ್ರದಲ್ಲಿ ಸ್ನಾತಕೋತ್ತರ ಪದವಿ

SDUMC ಕೋಲಾರ.

ಮೊಬೈಲ್ ಸಂಖ್ಯೆ: 8520990442

CONSENT FORM

"EFFECTS OF LIGNOCAINE NEBULIZATION VS. MCKENZIE TECHNIQUE ON STRESS RESPONSE TO DIRECT LARYNGOSCOPY - A RANDOMIZED DOUBLE BLIND STUDY".

DATE:

I, _____ aged _____ ,after being explained in my own vernacular language about the purpose of the study and the risks and complications of the procedure, hereby give my valid written informed consent without any force or prejudice for performing Mckenzie technique and in using nebulized lignocaine for direct laryngoscopy. The nature and risks involved have been explained to me to my satisfaction. I have been explained in detail about the study being conducted.Lignocaine test dose will be given on pre anaesthetic evaluation day and if any allergic reactions Tab.Avil 25mg and Inj.Hydrocort 100mg will be given. I have read the patient information sheet and I have had the opportunity to ask any question. Any question that I have asked, have been answered to my satisfaction. I consent voluntarily to participate as a participant in this research. I hereby give consent to provide my history, undergo physical examination, undergo the procedure, undergo investigations and provide its results and documents etc., to the doctor / institute etc., For academic and scientific purpose the operation / procedure etc., may be video graphed or photographed. All the data may be published or used for any academic purpose. I will not hold the doctors / institute etc., responsible for any untoward consequences during the procedure / study.

A copy of this Informed Consent Form and Patient Information Sheet has been provided to the participant.

_____ _____

(Signature & Name of Pt. Attendant) (Signature/Thumb impression & Name of Patient/Guardian
(Relation with patient)

Witness 1:

Witness 2:

_____

(Signature & Name of Research person /doctor)

ಮಾಹಿತಿ ನೀಡಿದ ಒಪ್ಪಿಗೆ ನಮೂನೆ

ನೇರ ಲಾರಿಂಗೋಸ್ಕೋಪಿಗೆ ಒತ್ತಡದ ಪ್ರತಿಕ್ರಿಯೆಯ ಮೇಲೆ ಲಿಗ್ನೋಕೇನ್ ನೆಬ್ಯುಲೈಸೇಶನ್ VS ಮೆಕೆಂಜಿ ಟೆಕ್ನಿಕ್‌ನ ತುಲನಾತ್ಮಕ ಅಧ್ಯಯನ

ದಿನಾಂಕ:

ನಾನು, _____ ,

ಅಧ್ಯಯನದ ಉದ್ದೇಶ ಮತ್ತು ಕಾರ್ಯವಿಧಾನದ ಅಪಾಯಗಳು ಮತ್ತು ತೊಡಕುಗಳ ಬಗ್ಗೆ ನನ್ನ ಸ್ವಂತ ಸ್ಥಳೀಯ ಭಾಷೆಯಲ್ಲಿ ವಿವರಿಸಿದ ನಂತರ, ಮೆಕೆಂಜಿ ತಂತ್ರವನ್ನು ನಿರ್ವಹಿಸಲು ಮತ್ತು ನೆಬ್ಯುಲೈಸ್ಡ್ ಲಿಗ್ನೋಕೈನ್ ಅನ್ನು ಬಳಸಲು ಯಾವುದೇ ಬಲ ಅಥವಾ ಪೂರ್ವಾಗ್ರಹವಿಲ್ಲದೆ ನನ್ನ ಮಾನ್ಯ ಲಿಖಿತ ತಿಳುವಳಿಕೆಯನ್ನು ನೀಡುತ್ತೇನೆ ನೇರ ಲಾರಿಂಗೋಸ್ಕೋಪಿಗಾಗಿ. ಒಳಗೊಂಡಿರುವ ಸ್ವಭಾವ ಮತ್ತು ಅಪಾಯಗಳನ್ನು ನನಗೆ ತೃಪ್ತಿಪಡಿಸಲು ವಿವರಿಸಲಾಗಿದೆ. ನಡೆಸುತ್ತಿರುವ ಅಧ್ಯಯನದ ಬಗ್ಗೆ ನನಗೆ ವಿವರವಾಗಿ ವಿವರಿಸಲಾಗಿದೆ. ನಾನು ರೋಗಿಯ ಮಾಹಿತಿ ಹಾಳೆಯನ್ನು ಓದಿದ್ದೇನೆ ಮತ್ತು ಯಾವುದೇ ಪ್ರಶ್ನೆಯನ್ನು ಕೇಳಲು ನನಗೆ ಅವಕಾಶವಿದೆ. ನಾನು ಕೇಳಿದ ಯಾವುದೇ ಪ್ರಶ್ನೆಗೆ ನನ್ನ ತೃಪ್ತಿಗೆ ಉತ್ತರಿಸಲಾಗಿದೆ. ಈ ಸಂಶೋಧನೆಯಲ್ಲಿ ಪಾಲ್ಗೊಳ್ಳುವವರಾಗಿ ಭಾಗವಹಿಸಲು ನಾನು ಸ್ವಯಂಪ್ರೇರಣೆಯಿಂದ ಸಮ್ಮತಿಸುತ್ತೇನೆ. ನನ್ನ ಇತಿಹಾಸವನ್ನು ಒದಗಿಸಲು, ದೈಹಿಕ ಪರೀಕ್ಷೆಗೆ ಒಳಗಾಗಲು, ಕಾರ್ಯವಿಧಾನಕ್ಕೆ ಒಳಗಾಗಲು, ತನಿಖೆಗೆ ಒಳಗಾಗಲು ಮತ್ತು ಅದರ ಫಲಿತಾಂಶಗಳು ಮತ್ತು ದಾಖಲೆಗಳು ಇತ್ಯಾದಿಗಳನ್ನು ವೈದ್ಯರು / ಸಂಸ್ಥೆ ಇತ್ಯಾದಿಗಳಿಗೆ ಒದಗಿಸಲು ನಾನು ಈ ಮೂಲಕ ಒಪ್ಪಿಗೆ ನೀಡುತ್ತೇನೆ, ಶೈಕ್ಷಣಿಕ ಮತ್ತು ವೈಜ್ಞಾನಿಕ ಉದ್ದೇಶಕ್ಕಾಗಿ ಕಾರ್ಯಾಚರಣೆ / ಕಾರ್ಯವಿಧಾನ ಇತ್ಯಾದಿ. ವೀಡಿಯೊ ಗ್ರಾಫ್ ಅಥವಾ ಛಾಯಾಚಿತ್ರ. ಎಲ್ಲಾ ಡೇಟಾವನ್ನು ಪ್ರಕಟಿಸಬಹುದು ಅಥವಾ ಯಾವುದೇ ಶೈಕ್ಷಣಿಕ ಉದ್ದೇಶಕ್ಕಾಗಿ ಬಳಸಬಹುದು. ಕಾರ್ಯವಿಧಾನ / ಅಧ್ಯಯನದ ಸಮಯದಲ್ಲಿ ಯಾವುದೇ ಅಹಿತಕರ ಪರಿಣಾಮಗಳಿಗೆ ನಾನು ವೈದ್ಯರು / ಸಂಸ್ಥೆ ಇತ್ಯಾದಿಗಳನ್ನು ಹೊಣೆಗಾರರನ್ನಾಗಿ ಮಾಡುವುದಿಲ್ಲ.

ಭಾಗವಹಿಸುವವರಿಗೆ ಈ ತಿಳುವಳಿಕೆಯುಳ್ಳ ಒಪ್ಪಿಗೆ ನಮೂನೆ ಮತ್ತು ರೋಗಿಗಳ ಮಾಹಿತಿ ಹಾಳೆಯ ಪ್ರತಿಯನ್ನು ಒದಗಿಸಲಾಗಿದೆ. ಮಾಹಿತಿ ನೀಡಿದ ಒಪ್ಪಿಗೆ ನಮೂನೆ

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(ಸಹಿ ಮತ್ತು ಪಂ. ಪರಿಚಾರಕರ ಹೆಸರು) (ಸಹಿ/ಹೆಬ್ಬೆರಳಿನ ಗುರುತು ಮತ್ತು ರೋಗಿಯ/ರಕ್ಷಕರ ಹೆಸರು)

(ರೋಗಿಯೊಂದಿಗಿನ ಸಂಬಂಧ)

ಸಾಕ್ಷಿ 1:

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(ಸಂಶೋಧನಾ ವ್ಯಕ್ತಿ/ವೈದ್ಯರ ಸಹಿ ಮತ್ತು ಹೆಸರು)

ಸಾಕ್ಷಿ 2:

MASTERCHART

S.No.	Group	Name	Sex	Age	Height	Weight	Duration of Surgery	Pre O				Heart								Syste								Diast Duri								Mean								ECG								Heart				Syste				Diast Duri				Mean				ECG				Complicati	
								Heart rate	BP	SpO2	ECG	O min	1 min	5 min	10 mir	15 mir	30 mir	60 mir	120 mi	O min	1 min	5 min	10 mir	15 mir	30 mir	60 mir	120 mi	O min	1 min	5 min	10 mir	15 mir	30 mir	60 mir	120 mi	O min	1 min	5 min	10 mir	15 mir	30 mir	60 mir	120 mi	O min	1 min	5 min	10 mir	15 mir	30 mir	60 mir	120 mi	O min	1 min	5 min	10 mir	O min	1 min	5 min	10 mir	O min	1 min	5 min	10 mir	O min	! min	5 min	10 mir	h during	throat within
1	A	Naraya	M	35	160	70	150	80	130/6(	100	Norma	82	81	78	73	80	84	80	76	123	126	124	128	114	129	118	124	82	81	76	78	80	84	88	78	95.67	96	92	94.67	91.33	99	98	93.33	N	N	N	N	N	N	N	N	88	78	76	70	130	128	130	128	80	88	80	70	96.67	101.3	96.67	89.33	N	N	N	N	No	No
2	B	arunac	M	45	170	70	120	92	140/9(	100	Norma	92	90	86	88	86	80	84	82	140	138	136	130	128	128	124	128	90	90	86	80	82	84	68	70	106.7	106	102.7	96.67	97.33	98.67	86.67	89.33	N	N	N	N	N	N	N	N	90	86	88	88	130	132	128	126	90	90	86	84	103.3	104	100	98	N	N	N	N	No	yes
3	B	eswar	M	50	173	60	180	70	140/94	100	Norma	86	82	80	82	79	72	72	74	130	130	128	124	121	113	119	120	92	90	79	84	76	73	74	74	104.7	103.3	95.33	97.33	91	86.33	89	89.33	N	N	N	N	N	N	N	N	82	84	84	80	124	126	124	120	84	78	78	74	97.33	94	93.33	89.33	N	N	N	N	No	No
4	B	yamun	F	38	158	60	120	84	140/9(	100	Norma	90	92	88	86	86	88	86	86	140	140	134	134	120	124	126	124	86	88	82	80	76	74	74	72	104	105.3	99.33	98	90.67	90.67	91.33	89.33	N	N	N	N	N	N	N	N	78	80	78	82	140	138	130	132	86	86	80	82	104	103.3	96.67	98.67	N	N	N	N	No	yes
5	B	venkat	M	45	164	62	120	92	140/93	100	Norma	89	88	90	88	78	76	72	74	144	140	138	134	130	128	126	128	80	82	80	80	84	86	88	84	101.3	101.3	99.33	98	99.33	100	100.7	98.67	N	N	N	N	N	N	N	N	90	88	80	80	138	134	128	126	90	86	84	84	106	102	98.67	98	N	N	N	N	No	yes
6	B	sange	F	30	154	55	150	88	130/92	100	Norma	80	82	78	79	72	72	74	72	130	130	128	124	121	113	118	120	90	90	80	84	76	73	74	74	103.3	103.3	96	97.33	91	86.33	88.67	89.33	N	N	N	N	N	N	N	N	88	86	88	80	128	124	126	124	86	82	80	80	100	96	95.33	94.67	N	N	N	N	No	No
7	A	balara	M	35	164	65	120	78	126/8(	100	Norma	66	64	67	68	66	64	66	64	126	124	114	116	110	118	112	118	83	80	70	74	72	70	76	70	97.33	94.67	84.67	88	84.67	86	88	86	N	N	N	N	N	N	N	N	68	66	66	68	126	124	128	114	80	84	80	70	95.33	97.33	96	84.67	N	N	N	N	No	No
8	B	naveer	M	50	160	65	180	78	140/9(	100	Norma	72	78	80	78	76	76	80	76	134	138	130	120	114	116	118	116	90	90	88	90	76	74	74	70	104.7	106	102	100	88.67	88	88.67	85.33	N	N	N	N	N	N	N	N	80	82	84	80	128	126	124	128	70	78	76	70	89.33	94	92	89.33	N	N	N	N	No	No
9	A	nagab	M	45	164	65	120	86	140/92	100	Norma	86	88	88	84	79	86	80	84	130	130	134	120	127	124	124	122	90	88	88	74	78	78	76	74	103.3	102	103.3	89.33	94.33	93.33	92	90	N	N	N	N	N	N	N	N	80	78	80	78	130	124	124	126	90	70	70	72	103.3	88	88	90	N	N	N	N	No	No
10	A	sonia	F	24	160	57	150	80	134/85	99	Norma	80	78	78	64	68	60	62	60	126	129	128	119	110	100	104	110	80	88	80	60	70	62	64	70	95.33	101.7	96	79.67	83.33	74.67	77.33	83.33	N	N	N	N	N	N	N	N	68	70	72	70	120	110	110	104	80	70	70	63	93.33	83.33	83.33	76.67	N	N	N	N	No	No
11	A	neha	F	26	154	50	120	82	142/9(	99	Norma	78	80	76	76	80	78	78	76	127	124	112	123	108	110	104	100	70	60	64	58	60	60	62	60	89	81.33	80	79.67	76	76.67	76	73.33	N	N	N	N	N	N	N	N	80	74	76	70	110	104	110	114	70	62	64	66	83.33	76	79.33	82	N	N	N	N	No	No
12	B	vanaja	F	45	150	50	180	90	130/9(	100	Norma	80	82	84	78	78	82	78	84	120	124	126	124	128	118	116	118	72	74	70	72	68	70	72	74	88	90.67	88.67	89.33	88	86	86.67	88.67	N	N	N	N	N	N	N	N	82	80	80	78	126	120	118	114	70	72	68	66	88.67	88	84.67	82	N	N	N	N	No	No
13	A	kasthu	F	40	161	62	180	100	140/92	100	Norma	90	88	88	86	80	82	78	84	119	120	121	126	126	128	122	120	84	82	84	80	84	82	84	80	95.67	94.67	96.33	95.33	98	97.33	96.67	93.33	N	N	N	N	N	N	N	N	82	84	80	86	128	126	118	116	70	72	72	74	89.33	90	87.33	88	N	N	N	N	No	No
14	B	sakam	F	50	167	70	120	97	138/9(	100	Norma	96	94	80	82	80	84	80	82	138	136	138	136	130	128	128	130	80	78	80	78	80	82	84	80	99.33	97.33	99.33	97.33	96.67	97.33	98.67	96.67	N	N	N	N	N	N	N	N	86	82	82	80	130	128	126	120	70	76	74	74	90	93.33	91.33	89.33	N	N	N	N	No	No
15	B	saniya	F	38	150	55	140	68	110/7(	100	Norma	68	66	70	64	67	68	72	69	130	134	132	128	128	126	124	124	82	80	76	74	74	73	72	72	98	98	94.67	92	92	90.67	89.33	89.33	N	N	N	N	N	N	N	N	70	68	68	72	120	118	120	123	70	68	68	68	86.67	84.67	85.33	86.33	N	N	N	N	No	No
16	A	munira	M	34	172	67	150	94	130/9(	100	Norma	86	84	82	84	86	74	76	76	130	121	120	126	128	130	124	124	84	82	82	84	86	82	83	78	99.33	95	94.67	98	100	98	96.67	93.33	N	N	N	N	N	N	N	N	88	86	86	88	128	129	126	128	74	76	72	80	92	93.67	90	96	N	N	N	N	No	No
17	A	khada	M	45	169	58	130	98	138/9(	99	Norma	90	88	86	89	86	82	80	80	129	128	126	128	128	126	118	119	79	78	80	82	82	84	78	78	95.67	94.67	95.33	97.33	97.33	98	91.33	91.67	N	N	N	N	N	N	N	N	88	80	82	86	120	121	129	130	76	78	76	78	90.67	92.33	93.67	95.33	N	N	N	N	No	No
18	A	swetha	F	34	167	54	140	88	148/7(	100	Norma	82	81	84	80	82	78	76	81	130	128	126	124	126	126	130	128	80	78	76	78	84	82	79	80	96.67	94.67	92.67	93.33	98	96.67	96	96	N	N	N	N	N	N	N	N	88	84	83	81	128	130	128	126	80	78	82	82	96	95.33	97.33	96.67	N	N	N	N	No	No
19	B	muni g	M	35	172	72	150	100	140/92	100	Norma	92	90	93	92	88	89	87	88	136	134	136	134	128	129	128	126	92	89	86	89	90	84	86	80	106.7	104	102.7	104	102.7	99	100	95.33	N	N	N	N	N	N	N	N	89	88	98	91	130	132	129	130	88	89	80	80	102	103.3	96.33	96.67	N	N	N	N	No	No
20	A	ashwa	F	46	156	54	120	100	138/9(	100	Norma	89	84	89	90	78	87	78	79	118	112	114	116	110	113	110	109	72	70	74	70	76	72	72	71	87.33	84	87.33	85.33	87.33	85.67	84.67	83.67	N	N	N	N	N	N	N	N	78	76	80	83	126	124	122	110	78	74	80	79	94	90.67	94	89.33	N	N	N	N	yes	No
21	A	lakshn	F	45	165	60	150	104	140/9(	98	Norma	90	92	88	89	90	86	86	82	130	128	127	120	119	127	120	118	76	76	78	74	74	71	70	72	94	93.33	94.33	89.33	89	89.67	86.67	87.33	N	N	N	N	N	N	N	N	80	82	78	78	129	128	130	136	80	81	80	78	96.33	96.67	96.67	97.33	N	N	N	N	No	No
22	A	nagesl	M	50	160	61	120	104	150/1(	100	Norma	98	99	96	94	80	82	81	84	132	130	126	128	124	120	119	126	90	90	89	90	78	76	72	71	104	103.3	101.3	102.7	93.33	90.67	87.67	89.33	N	N	N	N	N	N	N	N	88	86	89	87	128	130	131	129	82	87	76	73	97.33	101.3	94.33	91.67	N	N	N	N	No	No
23	B	narma	F	24	165	65	150	100	138/9(	100	Norma	94	96	94	92	89	80	82	84	128	126	127	129	124	119	116	118	82	82	86	81	76	72	76	71	97.33	96.67	99.67	97	92	87.67	89.33	86.67	N	N	N	N	N	N	N	N	84	83	78	76	122	128	126	128	80	78	76	73	94	94.67	92.67	91.33	N	N	N	N	No	No
24	A	anil ku	M	34	167	78	135	101	150/9(	100	Norma	96	95	96	94	88	86	84	81	129	120	128	112	122	121	130	119	80	80	82	82	78	80	78	79	96.33	93.33	97.33	92	92.67	93.67	95.33	92.33	N	N	N	N	N	N	N	N	89	80	78	76	124	126	124	122	80	80	78	72	94.67	95.33	93.33	88.67	N	N	N	N	No	No
25	B	krishn	M	40	164	65	110	100	130/8(	97	Norma	96	93	88	86	82	80	84	83	128	129	128	120	119	116	123	120	80	80	82	84	81	80	78	75	96	96.33	97.33	96	93.67	92	93	90	N	N	N	N	N	N	N	N	88	86	84	80	127	128	127	124	80	80	84	76	95.67	96	98.33	92	N	N	N	N	yes	No
26	A	sathish	M	36	167	65	180	110	150/9(	99	Norma	98	96	94	96	86	82	80	81	130	129	128	128	119	118	118	115	80	80	78	76	80	74	76	80	96.67	96.33	94.67	93.33	93	88.67	90	91.67	N	N	N	N	N	N	N	N	90	88	82	86	128	130	128	127	80	80	78	76	96	96.67	94.67	93	N	N	N	N	No	No
27	A	rekha	F	37	149	55	129	98	138/8(	100	Norma	90	88	87	86	87	82	80	82	128	122	128	122	128	118	114	112	80	80	76	78	78	74	76	72	96	94	93.33	92.67	94.67	88.67	88.67	85.33	N	N	N	N	N	N	N	N	90	88	72	78	119	128	130	128	82	82	88	82	94.33	97.33	102	97.33	N	N	N	N	No	No
28	A	ramay	M	40	161	62	180	110	150/9(	100	Norma	92	90	88	89	86	82	80	83	120	121	128	123	126	118	114	116	91	91	88	84	81	83	76	84	100.7	101	101.3	97	96	94.67	88.67	94.67	N	N	N	N	N	N	N	N	88	82	86	80	120	128	126	119	82	82	70	72	94.67	97.33	88.67	87.67	N	N	N	N	No	no
29	A	nagav	F	50	167	70	120	112	150/9(	100	Norma	101	92	94	88	86	85	88	82	128	126	127	127	124	122	124	126	88	88	87	84	82	83	78	74	101.3	100.7	100.3	98.33	96	96	93.33	91.33	N	N	N	N	N	N	N	N	86	84	84	86	128	128	129	120	86	86	83	78	100	100	98.33	92	N	N	N	N	yes	No
30	A	akash	M	38	150	55	140	98	138/8(	100	Norma	88	83	89	88	82	83	81	84	128	129	124	121	124	128	119	115	76	76	78	80	72	79	80	72	93.33	93.67	93.33	93.67	89.33	95.33	93	86.33	N	N	N	N	N	N	N	N	80	82	83	78	129	128	120	119	82	82	80	78	97.67	97.33	93.33	91.67	N	N	N	N	No	No
31	B	dilip	M	34	172	67	150	100	139/9(	100	Norma	99	94	92	90	88	90	91	87	130	131	129	129	126	127	124	126	89	89	86	87	89	90	92	82	102.7	103	100.3	101	101.3	102.3	102.7	96.67	N	N	N	N	N	N	N	N	90	89	86	89	128	129	130	129	84	84	87	83	98.67	99	101.3	98.33	N	N	N	N	No	yes
32	B	ramap	M	45	169	58	130	89	129/87	98	Norma	86	88	88	82	78	74	79	80	130	129	132	128	125	127	126	124	80	80	78	83	82	81	89	76	96.67	96.33	96	98	96.33	96.33	101.3	92	N	N	N	N	N	N	N	N	86	87	89	83	128	128	129	130	83	83	84	85	98	98	99	100	N	N	N	N	No	yes
33	A	hema	F	34	167	54	140	100	146/9(	100	Norma	88	87	70	76	73	69	70	66	126	124	127	122	121	118	117	118	73	73	72	75	67	68	70	72	90.67	90	90.33	90.67	85	84.67	85.67	87.33	N	N	N	N	N	N	N	N	78	80	79	82	126	128	121	110	78	78	73	78	94	94.67	89	88.67	N	N	N	N	yes	No
34	A	samba	M	45	169	58	130	88	129/9(	96	Norma	82	88	81	76	72	78	87	82	120	118	118	110	114	116	114	116	72	72	75	76	74	80	73	70	88	87.33	89.33	87.33	87.33	92	86.67	85.33	N	N	N	N	N	N	N	N	78	80	82	72	126	126	121	120	78	78	74	68	94	94	89.67	85.33	N	N	N	N	No	yes
35	B	balu	M	34	167	54	140	90	130/87	100	Norma	88	90	91	86	78	86	72	80	130	129	128	125	130	127	126	125	73	73	80	81	79	81	80	79	92	91.67	96	95.67	96	96.33	95.33	94.33	N	N	N	N	N	N	N	N	80	81	82	78	130	126	129	130	88	88	89	79	102	100.7	102.3	96	N	N	N	N	No	yes
36	B	krishn	F	45	165	60	150	100	140/97	100	Norma	99	100	98	88	92	91	87	90	139	138	127	129	127	128	125	124	83	88	83	89	79	89	78	90	101.7	104.7	97.67	102.3	95	102	93.67	101.3	N	N	N	N	N	N	N	N	90	89	94	87	128	130	129	130	87	87	76	79	100.7	101.3	93.67	96	N	N	N	N	yes	No
37	A	venkat	F	50	160	61	120	110	154/96	100	Norma	97	95	88	90	87	86	76	80	124	127	121	119	110	118	117	121	78	80	78	82	76	70	73	71	93.33	95.67	92.33	94.33	87.33	86	87.67	87.67	N	N	N	N	N	N	N	N	90	88	78	76	121	128	127	126	78	78	76	80	92.33	94.67	93	95.33	N	N	N	N	No	yes
38	A	jahnav	F	24	165	65	150	99	134/94	100	Norma	88	86	82	78	80	82	79	76	126	126	121	125	121	119	118	117	76	78	76	70	67	71	72	70	92.67	94	91	88.33	85	87	87.33	85.67	N	N	N	N	N	N	N	N	88	85	89	80	129	121	120	121	80	76	70	70	96.33	91	86.67	87	N	N	N	N	No	No
39	B	anitha	F	34	167	78	135	89	129/96	100	Norma	88	84	87	83	89	78	89	79	121	126	125	127	129	128	132	129	90	89	90	87	91	92	89	90	100.3	101.3	101.7	100.3	103.7	104	103.3	103	N	N	N	N	N	N	N	N	89	90	91	93	126	129	131	122	78	88	90	91	94	101.7	103.7	101.3	N	N	N	N	No	No
40	A	sumat	F	40	164	65	110	110	154/9(	99	Norma	90	89	88	83	84	80	72	76	130	121	123	121	120	119	114	106	82	80	82	83	81	80	82	87	98	93.67	95.67	95.67	94	93	92.67	93.33	N	N	N	N	N	N	N	N	90	88	82	83	129	126	121	125	80	80	75	78	96.33	95.33	90.33	93.67	N	N	N	N	yes	No
41	A	venga	F	45	170	70	120	100	140/92	98	Norma	92	90	89	88	89	80	78	79	128	127	121	120	121	126	120	119	78	80	78	76	80	82	81	79	94.67	95.67	92.33	90.67	93.67	96.67	94	92.33	N	N	N	N	N	N	N	N	80	78	80	76	129	127	123	121	78	78	73	76	95	94.33	89.67	91	N	N	N	N	No	No

42	A	viveka	M	50	173	60	180	98	139/10	100	Norma	91	82	80	86	84	82	78	72	128	129	123	121	119	118	110	112	80	78	80	73	79	80	72	74	96	95	94.33	89	92.33	92.67	84.67	86.67	N	N	N	N	N	N	N	N	80	77	73	84	127	119	129	121	88	88	78	76	101	98.33	95	91	N	N	N	N	No	No
43	A	balaji	M	38	158	60	120	89	129/74	100	Norma	78	70	72	71	72	71	70	77	123	119	120	117	110	107	104	110	69	76	69	68	66	76	70	71	87	90.33	86	84.33	80.67	86.33	81.33	84	N	N	N	N	N	N	N	N	79	70	68	70	120	110	118	116	71	71	70	68	87.33	84	86	84	N	N	N	N	yes	no
44	A	shahe	F	45	164	62	120	100	154/99	100	Norma	88	86	85	86	78	74	70	77	129	130	129	128	121	126	112	110	83		83	82	80	82	78	74	98.33	43.33	98.33	97.33	93.67	96.67	89.33	86	N	N	N	N	N	N	N	N	74	79	80	78	131	112	121	120	79	79	82	83	96.33	90	95	95.33	N	N	N	N	No	No
45	A	chandr	M	30	154	55	150	98	148/10	97	Norma	88	90	86	84	88	85	78	79	129	128	127	131	116	115	117	110	83	82	78	79	74	68	70	73	98.33	97.33	94.33	96.33	88	83.67	85.67	85.33	N	N	N	N	N	N	N	N	80	84	78	79	121	121	129	127	88	88	85	86	99	99	99.67	99.67	N	N	N	N	No	yes
46	A	gousiy	F	35	164	65	120	118	139/10	100	Norma	90	91	88	83	87	70	73	73	127	128	121	126	119	118	120	121	78	79	89	85	83	80	83	81	94.33	95.33	99.67	98.67	95	92.67	95.33	94.33	N	N	N	N	N	N	N	N	90	88	83	82	123	120	127	121	80	80	82	81	94.33	93.33	97	94.33	N	N	N	N	yes	No
47	A	arthi	F	50	160	65	180	82	128/10	100	Norma	83	85	80	72	74	68	63	69	121	121	119	118	121	119	118	121	89	85	87	89	80	79	80	82	99.67	97	97.67	98.67	93.67	92.33	92.67	95	N	N	N	N	N	N	N	N	89	84	83	78	129	118	120	110	87	87	82	78	101	97.33	94.67	88.67	N	N	N	N	No	No
48	A	bhusa	M	34	172	67	150	112	146/10	98	Norma	100	99	93	86	80	88	79	78	128	130	129	128	128	119	121	119	87	89	88	78	86	78	80	82	100.7	102.7	101.7	94.67	100	91.67	93.67	94.33	N	N	N	N	N	N	N	N	88	84	82	79	118	119	120	121	79	79	70	76	92	92.33	86.67	91	N	N	N	N	yes	yes
49	A	manik	M	45	169	58	130	98	139/11	100	Norma	88	89	85	83	88	85	80	82	129	128	129	125	126	125	121	119	88	78	88	87	84	85	80	78	101.7	94.67	101.7	99.67	98	98.33	93.67	91.67	N	N	N	N	N	N	N	N	80	83	78	80	121	127	128	121	80	80	78	77	93.67	95.67	94.67	91.67	N	N	N	N	yes	yes
50	A	harshit	F	34	167	54	140	100	137/95	100	Norma	88	89	85	88	90	86	84	89	129	121	119	128	118	124	121	119	88	87	80	78	79	75	73	76	101.7	98.33	93	94.67	92	91.33	89	90.33	N	N	N	N	N	N	N	N	87	84	78	79	125	124	126	121	81	81	78	80	95.67	95.33	94	93.67	N	N	N	N	No	No
51	B	subrar	M	45	169	58	130	100	138/90	98	Norma	98	100	97	90	96	89	96	92	121	130	132	131	129	130	132	131	80	78	90	89	91	92	90	91	93.67	95.33	104	103	103.7	104.7	104	104.3	N	N	N	N	N	N	N	N	98	97	92	90	129	130	131	129	90	90	91	90	103	103.3	104.3	103	N	N	N	N	No	yes
52	B	nayaz	M	34	167	54	140	99	134/90	100	Norma	90	93	91	96	93	90	93	94	126	128	125	126	129	130	129	132	90	89	90	89	90	89	90	91	102	102	101.7	101.3	103	102.7	103	104.7	N	N	N	N	N	N	N	N	97	99	92	88	129	129	130	127	91	91	89	84	103.7	103.7	102.7	98.33	N	N	N	N	No	yes
53	B	armee	F	45	165	60	150	98	128/10	100	Norma	90	91	90	88	89	78	89	90	126	128	128	121	119	118	123	128	90	89	92	91	89	88	90	91	102	102	104	101	99	98	101	103.3	N	N	N	N	N	N	N	N	90	91	89	90	121	121	128	121	90	90	89	91	100.3	100.3	102	101	N	N	N	N	yes	yes
54	B	suryan	F	50	160	61	120	100	132/89	100	Norma	91	92	88	90	92	91	90	89	128	130	129	132	129	128	125	121	92	91	90	92	94	90	89	90	104	104	103	105.3	105.7	102.7	101	100.3	N	N	N	N	N	N	N	N	90	83	88	89	129	129	128	121	90	90	92	89	103	103	104	99.67	N	N	N	N	No	No
55	B	Naraya	F	50	173	60	180	92	128/90	99	Norma	89	90	87	85	87	89	90	89	130	129	128	128	126	127	128	126	90	92	94	89	83	86	91	82	103.3	104.3	105.3	102	97.33	99.67	103.3	96.67	N	N	N	N	N	N	N	N	89	83	88	83	128	128	125	121	89	89	87	90	102	102	99.67	100.3	N	N	N	N	No	yes
56	B	Shank	F	38	158	60	120	88	128/10	96	Norma	89	84	86	90	83	84	84	90	128	127	130	125	132	140	139	123	94	89	92	92	100	98	83	93	105.3	101.7	104.7	103	110.7	112	101.7	103	N	N	N	N	N	N	N	N	83	90	83	98	132	132	138	123	90	90	92	93	104	104	107.3	103	N	N	N	N	No	No
57	B	Uma n	F	45	164	62	120	98	129/98	100	Norma	90	97	90	83	93	87	89	85	132	139	128	129	128	136	132	127	89	91	92	90	100	92	89	90	103.3	107	104	103	109.3	106.7	103.3	102.3	N	N	N	N	N	N	N	N	89	84	80	98	130	130	125	127	90	90	83	90	103.3	103.3	97	102.3	N	N	N	N	No	yes
58	B	Shaba	F	30	154	55	150	110	139/90	100	Norma	90	88	82	78	98	78	89	86	132	130	132	131	129	128	127	117	89	90	89	88	87	84	82	83	103.3	103.3	103.3	102.3	101	98.67	97	94.33	N	N	N	N	N	N	N	N	87	88	77	82	130	130	122	127	90	90	82	80	103.3	103.3	95.33	95.67	N	N	N	N	yes	yes
59	B	Shiva	M	35	164	65	120	97	127/90	100	Norma	89	84	89	87	90	100	93	94	130	132	123	126	127	128	129	119	91	89	88	76	78	80	72	79	104	103.3	99.67	92.67	94.33	96	91	92.33	N	N	N	N	N	N	N	N	90	88	86	86	132	132	130	129	76	76	87	87	94.67	94.67	101.3	101	N	N	N	N	No	No
60	B	Soniya	M	50	160	65	180	88	120/10	99	Norma	88	85	78	72	79	70	82	89	121	125	121	120	119	118	118	117	92	94	90	89	86	87	89	90	101.7	104.3	100.3	99.33	97	97.33	98.67	99	N	N	N	N	N	N	N	N	78	80	82	89	128	128	126	129	100	100	90	88	109.3	109.3	102	101.7	N	N	N	N	No	No
61	B	Harish	F	45	164	65	120	92	140/90	100	Norma	92	90	101	92	94	88	86	85	139	132	128	126	127	127	124	122	89	83	86	80	78	83	82	81	105.7	99.33	100	95.33	94.33	97.67	96	94.67	N	N	N	N	N	N	N	N	90	89	86	89	129	129	130	129	84	84	87	83	99	99	101.3	98.33	N	N	N	N	yes	yes
62	B	Rama	F	24	160	57	150	70	150/90	100	Norma	86	82	88	83	89	88	82	83	138	132	128	129	124	121	124	128	92	94	98	73	72	75	67	68	107.3	106.7	108	91.67	89.33	90.33	86	88	N	N	N	N	N	N	N	N	86	87	89	83	128	128	129	130	83	83	84	81	98	98	99	97.33	N	N	N	N	No	No
63	A	Rames	M	26	154	50	120	84	140/90	99	Norma	90	92	99	94	92	90	88	90	130	132	130	131	129	129	126	127	90	88	92	89	86	87	89	90	103.3	102.7	104.7	103	100.3	101	101.3	102.3	N	N	N	N	N	N	N	N	78	80	79	82	128	128	121	110	78	78	73	82	94.67	94.67	89	91.33	N	N	N	N	yes	yes
64	A	Farhar	M	24	165	65	150	92	146/80	100	Norma	89	88	86	88	88	82	78	74	132	137	130	129	132	128	125	127	88	87	84	80	78	83	82	81	102.7	103.7	99.33	96.33	96	98	96.33	96.33	N	N	N	N	N	N	N	N	78	80	82	72	126	126	121	120	78	78	74	78	94	94	89.67	92	N	N	N	N	No	No
65	B	Madee	F	34	167	78	135	88	138/90	98	Norma	80	82	88	87	70	76	73	69	128	136	130	132	127	122	121	118	76	78	80	73	72	75	67	68	93.33	97.33	96.67	92.67	90.33	90.67	85	84.67	N	N	N	N	N	N	N	N	80	81	82	78	130	126	129	130	88	88	89	73	102	100.7	102.3	92	N	N	N	N	yes	No
66	B	lakshm	M	40	164	65	110	78	126/80	100	Norma	66	64	82	88	81	76	72	78	123	126	112	110	118	110	114	116	89	86	87	72	75	76	74	80	100.3	99.33	95.33	84.67	89.33	87.33	87.33	92	N	N	N	N	N	N	N	N	90	89	94	87	128	130	129	130	87	87	76	72	100.7	101.3	93.67	91.33	N	N	N	N	No	No
67	B	sujana	M	45	170	70	120	78	140/90	100	Norma	72	78	88	90	91	86	78	86	134	125	130	129	128	125	130	127	80	78	83	73	80	81	79	81	98	93.67	98.67	91.67	96	95.67	96	96.33	N	N	N	N	N	N	N	N	90	88	78	76	121	128	127	126	78	78	76	80	92.33	94.67	93	95.33	N	N	N	N	No	No
68	B	kanaka	M	50	173	60	180	86	130/90	99	Norma	86	88	99	100	98	88	92	91	130	129	139	138	127	129	127	128	73	72	75	88	83	89	79	89	92	91	96.33	104.7	97.67	102.3	95	102	N	N	N	N	N	N	N	N	88	85	89	80	129	121	120	121	76	76	70	70	93.67	91	86.67	87	N	N	N	N	No	yes
69	B	saroja	F	38	158	60	120	80	130/70	100	Norma	80	78	97	95	88	90	87	86	127	128	128	127	121	119	110	118	78	82	76	80	78	82	76	70	94.33	97.33	93.33	95.67	92.33	94.33	87.33	86	N	N	N	N	N	N	N	N	89	90	91	93	126	129	131	122	88	88	90	91	100.7	101.7	103.7	101.3	N	N	N	N	yes	yes
70	B	mahes	M	45	164	62	120	82	118/70	100	Norma	78	80	88	86	82	78	80	82	128	130	129	126	121	125	121	119	76	70	67	78	76	70	67	71	93.33	90	87.67	94	91	88.33	85	87	N	N	N	N	N	N	N	N	90	88	82	83	112	126	121	125	80	80	75	78	90.67	95.33	90.33	93.67	N	N	N	N	yes	No
71	B	munis	M	30	154	55	150	90	130/90	100	Norma	80	82	88	84	87	83	89	78	132	129	121	126	125	127	129	128	90	87	91	89	90	87	91	92	104	101	101	101.3	101.7	100.3	103.7	104	N	N	N	N	N	N	N	N	74	79	80	78	121	112	121	120	79	79	82	83	93	90	95	95.33	N	N	N	N	No	No
72	B	navee	F	35	164	65	120	100	140/92	97	Norma	90	88	90	96	89	96	92	89	130	132	131	129	130	132	123	128	100	92	89	90	100	92	89	90	110	105.3	103	103	110	105.3	100.3	102.7	N	N	N	N	N	N	N	N	80	84	78	79	120	121	129	127	88	88	85	86	98.67	99	99.67	99.67	N	N	N	N	No	yes
73	B	karthik	F	45	169	58	130	97	138/90	100	Norma	96	94	96	93	90	93	94	90	130	132	131	129	130	129	125	121	87	84	82	88	87	84	82	83	101.3	100	98.33	101.7	101.3	99	96.33	95.67	N	N	N	N	N	N	N	N	90	88	83	82	118	120	127	121	80	80	82	81	92.67	93.33	97	94.33	N	N	N	N	No	No
74	A	naraya	F	34	167	54	140	68	110/70	100	Norma	68	66	88	89	78	89	90	89	128	128	121	119	118	123	128	126	78	80	72	76	78	80	72	79	94.67	96	88.33	90.33	91.33	94.33	90.67	94.67	N	N	N	N	N	N	N	N	89	84	83	78	119	118	120	110	87	87	82	78	97.67	97.33	94.67	88.67	N	N	N	N	No	No
75	A	yamun	F	45	169	58	130	94	134/90	96	Norma	86	84	90	92	91	90	89	92	130	129	132	129	128	125	139	123	86	87	89	89	86	87	89	90	100.7	101	103.3	102.3	100	99.67	105.7	101	N	N	N	N	N	N	N	N	88	84	82	79	127	119	120	121	79	79	70	76	95	92.33	86.67	91	N	N	N	N	No	yes
76	A	krishna	F	34	167	54	140	98	138/94	99	Norma	90	88	85	87	89	90	89	91	129	128	128	126	127	128	132	127	78	83	82	80	78	83	82	81	95	98	97.33	95.33	94.33	98	98.67	96.33	N	N	N	N	N	N	N	N	80	83	78	80	129	127	128	121	80	80	78	77	96.33	95.67	94.67	91.67	N	N	N	N	No	No
77	A	nandhi	M	45	165	60	150	88	140/91	100	Norma	89	88	90	83	84	84	90	87	127	130	125	132	140	139	127	117	72	75	67	73	72	75	67	68	90.33	93.33	86.33	92.67	94.67	96.33	87	84.33	N	N	N	N	N	N	N	N	90	89	86	89	128	129	130	129	84	84	87	83	98.67	99	101.3	98.33	N	N	N	N	yes	No
78	B	rames	F	50	160	61	120	92	140/90	100	Norma	80	82	83	93	87	89	85	90	139	128	129	128	136	132	129	119	72	75	67	73	72	75	67	68	94.33	92.67	87.67	91.33	93.33	94	87.67	85	N	N	N	N	N	N	N	N	86	87	89	83	128	128	129	130	83	83	84	85	98	98	99	100	N	N	N	N	No	No
79	B	rajesh	M	50	173	60	180	70	130/89	100	Norma	66	64	78	98	78	89	86	87	130	132	131	129	128	127	118	117	89	86	87	89	86	87	89	90	102.7	101.3	101.7	102.3	100	100.3	98.67	99	N	N	N	N	N	N	N	N	78	80	79	82	126	128	121	110	78	78	73	78	94	94.67	89	88.67	N	N	N	N	No	No
80	B	tarun	M	38	158	60	120	84	140/90	100	Norma	80	82	88	87	70	76	73	69	130	128	130	132	127	122	121	118	80	78	83	80	78	83	82	81	96.67	94.67	98.67	97.33	94.33	96	95	93.33	N	N	N	N	N	N	N	N	78	80	82	72	128	126	121	120	80	78	74	68	96	94	89.67	85.33	N	N	N	N	No	No
81	A	nadee	M	50	164	56	120	100	140/10	99	Norma	90	88	90	86	82	80	82	78	128	130	126	134	132	134	130	126	86	88	84	84	90	92	88	86	100	102	98	100.7	104	106	102	99.33	N	N	N	N	N	N	N	N	88	90	92	90	128	128	127	128	82	80	82	82	97.33	96	97	97.33	N	N	N	N	No	yes
82	A	chaya	F	45	170	62	134	102	138/88	99	Norma	90	88	84	83	82	84	81	80	128	126	126	124	128	126	126	124	88	84	83	86	82	84	82	83	101.3	98	97.33	98.67	97.33	98	96.67	96.67	N	N	N	N	N	N	N	N	88	80	83	81	128	128	129	130	82	87	80	80	97.33	100.7	96.33	96.67	N	N	N	N	No	No
84	A	vijay k	M	45	167	65	165	98	134/98	97	Norma	86	84	83	78	76	87	83	81	126	126	121	125	124	128	118	112	84	83	80	81	82	82	83	82	98	97.33	93.67	95.67	96	97.33	94.67	92	N	N	N	N	N	N	N	N	80	82	81	83	130	128	129	130	87	88	82	80	101.3	101.3	97.67	96.67	N	N	N	N	No	yes
84	A	devara	M	45	165	60	180	102	138/10	98	Norma	91	89	88	82	81	78	78	80	126	123	121	126	124	120	118	116	88	82	81	82	80	83	78	82	100.7	95.67	94.33	96.67	94.67	95.33	91.33	93.33	N	N	N	N	N	N	N	N	88	90	82	89	124	128	124	126	86	82	85	80	98.67	97.33	98	95.33	N	N	N	N	No	No
85	A	sarasv	F	50	160	61	140	89	129/87	98	Norma	88	82	81	83	78	79	78	79	121	120	126	119	118	116	116	114	83	82	81	80	83	78	72	76	95.67	94.67	96	93	94.67	90.67	86.67	88.67	N	N	N	N	N	N	N	N	80	78	82	81	124	128	124	127	80	78	76	78	94.67	94.67	92	94.33	N	N	N	N	No	No

86	A	murali	M	50	173	60	196	101	140/10	99	Norma	88	82	83	78	72	87	84	78	132	123	126	132	126	120	128	127	90	83	86	83	87	81	86	78	104	96.33	99.33	99.33	100	94	100	94.33	N	N	N	N	N	N	N	N	80	83	86	89	129	130	129	128	76	90	84	89	93.67	103.3	99	102	N	N	N	N	No	No
87	A	mahal	F	38	158	60	138	98	130/90	99	Norma	88	80	82	83	85	81	82	78	127	123	125	127	121	120	120	121	81	83	76	79	69	78	72	80	96.33	96.33	92.33	95	86.33	92	88	93.67	N	N	N	N	N	N	N	N	84	85	87	78	129	121	129	121	80	76	75	87	96.33	91	93	98.33	N	N	N	N	No	yes
88	A	Harish	M	45	165	60	120	99	132/90	99	Norma	80	85	89	82	92	82	86	83	128	127	124	126	121	123	120	118	87	82	83	84	78	79	74	78	100.7	97	96.67	98	92.33	93.67	89.33	91.33	N	N	N	N	N	N	N	N	80	76	78	82	118	120	118	119	87	80	78	76	97.33	93.33	91.33	90.33	N	N	N	N	No	No
89	A	sultan	F	50	160	61	134	87	129/98	99	Norma	87	82	80	82	88	87	82	81	120	119	120	116	109	110	119	106	88	78	72	78	75	76	74	73	98.67	91.67	88	90.67	86.33	87.33	89	84	N	N	N	N	N	N	N	N	80	78	82	80	121	119	121	119	88	87	82	80	99	97.67	95	93	N	N	N	N	No	No
90	A	sankar	M	50	173	60	165	90	150/11	99	Norma	89	82	86	86	82	88	78	79	130	128	127	132	129	126	120	123	90	92	89	87	86	89	86	79	103.3	104	101.7	102	100.3	101.3	97.33	93.67	N	N	N	N	N	N	N	N	87	88	85	80	130	131	127	128	88	88	89	85	102	102.3	101.7	99.33	N	N	N	N	No	yes
91	A	freeda	F	38	158	60	167	89	128/90	99	Norma	85	82	81	82	80	87	80	78	121	120	123	129	121	120	126	123	87	82	83	88	78	73	76	70	98.33	94.67	96.33	101.7	92.33	88.67	92.67	87.67	N	N	N	N	N	N	N	N	89	88	87	89	120	121	121	112	80	88	86	87	93.33	99	97.67	95.33	N	N	N	N	No	No
92	A	ajay	M	34	164	56	120	110	154/90	99	Norma	90	89	88	83	84	80	72	76	130	121	123	121	120	119	114	106	82	80	82	83	81	80	82	87	98	93.67	95.67	95.67	94	93	92.67	93.33	N	N	N	N	N	N	N	N	90	88	82	83	121	126	121	125	80	80	75	78	93.67	95.33	90.33	93.67	N	N	N	N	No	No
93	A	sandhy	F	32	170	62	134	100	140/92	98	Norma	92	90	89	88	89	80	78	79	128	127	121	120	121	126	120	119	78	80	78	76	80	82	81	79	94.67	95.67	92.33	90.67	93.67	96.67	94	92.33	N	N	N	N	N	N	N	N	80	78	80	76	120	127	123	121	78	78	73	76	92	94.33	89.67	91	N	N	N	N	No	No
94	A	anjane	M	45	167	65	165	98	139/10	100	Norma	91	82	80	86	84	82	78	72	128	129	123	121	119	118	110	112	80	78	80	73	79	80	72	74	96	95	94.33	89	92.33	92.67	84.67	86.67	N	N	N	N	N	N	N	N	80	77	73	84	119	119	129	121	88	88	78	76	98.33	98.33	95	91	N	N	N	N	No	No
95	A	kavya	F	32	170	62	134	89	129/74	100	Norma	78	70	72	71	72	71	70	77	121	119	120	117	110	107	104	110	69	76	69	68	66	76	70	71	86.33	90.33	86	84.33	80.67	86.33	81.33	84	N	N	N	N	N	N	N	N	79	70	68	70	131	110	118	116	71	71	70	68	91	84	86	84	N	N	N	N	No	No
96	A	pavan	M	45	167	65	165	100	154/99	100	Norma	88	86	85	86	78	74	70	77	131	130	129	128	121	126	112	110	83	80	83	82	80	82	78	74	99	96.67	98.33	97.33	93.67	96.67	89.33	86	N	N	N	N	N	N	N	N	74	79	80	78	121	112	121	120	79	79	82	83	93	90	95	95.33	N	N	N	N	No	No
97	A	muni r	M	45	165	60	180	98	148/10	97	Norma	88	90	86	84	88	85	78	79	128	128	127	131	116	115	117	110	83	82	78	79	74	68	70	73	98	97.33	94.33	96.33	88	83.67	85.67	85.33	N	N	N	N	N	N	N	N	80	84	78	79	126	121	129	127	88	88	85	86	100.7	99	99.67	99.67	N	N	N	N	No	yes
98	A	sowbh	F	50	160	61	140	82	128/10	100	Norma	83	85	80	72	74	68	63	69	117	121	119	118	121	119	118	121	89	85	87	89	80	79	80	82	98.33	97	97.67	98.67	93.67	92.33	92.67	95	N	N	N	N	N	N	N	N	89	84	83	78	127	118	120	110	87	87	82	78	100.3	97.33	94.67	88.67	N	N	N	N	No	No
99	A	sankar	M	50	173	60	196	112	146/10	98	Norma	100	99	93	86	80	88	79	78	132	130	129	128	128	119	121	119	87	89	88	78	86	78	80	82	102	102.7	101.7	94.67	100	91.67	93.67	94.33	N	N	N	N	N	N	N	N	88	84	82	79	119	119	120	121	79	79	70	76	92.33	92.33	86.67	91	N	N	N	N	No	No
100	A	kavith	F	38	158	60	138	98	139/11	100	Norma	88	89	85	83	88	85	80	82	128	128	129	125	126	125	121	119	88	78	88	87	84	85	80	78	101.3	94.67	101.7	99.67	98	98.33	93.67	91.67	N	N	N	N	N	N	N	N	80	83	78	80	124	127	128	121	80	80	78	77	94.67	95.67	94.67	91.67	N	N	N	N	yes	yes
101	A	krishn	M	45	165	60	120	100	137/95	100	Norma	88	89	85	88	90	86	84	89	116	121	119	128	118	124	121	119	88	87	80	78	79	75	73	76	97.33	98.33	93	94.67	92	91.33	89	90.33	N	N	N	N	N	N	N	N	87	88	83	80	121	126	118	129	88	82	81	80	99	96.67	93.33	96.33	N	N	N	N	No	No
102	B	somay	M	58	156	74	160	98	134/10	99	Norma	93	90	91	89	88	90	86	81	129	127	130	121	128	124	130	131	89	90	91	87	90	89	87	90	102.3	102.3	104	98.33	102.7	100.7	101.3	103.7	N	N	N	N	N	N	N	N	89	85	86	82	130	129	128	126	89	86	88	84	102.7	100.3	101.3	98	N	N	N	N	No	No
103	B	krishn	M	56	167	74	170	91	140/10	99	Norma	88	89	91	87	88	90	86	84	131	132	130	128	127	124	125	121	87	88	84	81	88	83	81	82	101.7	102.7	99.33	96.67	101	96.67	95.67	95	N	N	N	N	N	N	N	N	91	90	93	100	130	132	129	121	88	90	91	92	102	104	103.7	101.7	N	N	N	N	No	yes
104	B	venkat	M	65	171	76	165	88	132/96	99	Norma	87	88	85	86	89	82	87	78	121	125	124	126	125	121	123	121	82	80	78	81	80	78	82	78	95	95	93.33	96	95	92.33	95.67	92.33	N	N	N	N	N	N	N	N	88	86	90	91	130	125	131	128	90	91	88	89	103.3	102.3	102.3	102	N	N	N	N	No	No
105	B	ayapp	M	45	168	67	180	91	132/10	99	Norma	89	90	91	88	87	86	89	90	130	131	129	119	128	120	121	127	90	87	78	89	87	82	90	91	103.3	101.7	95	99	100.7	94.67	100.3	103	N	N	N	N	N	N	N	N	90	87	89	90	131	129	130	127	89	90	91	89	103	103	104	101.7	N	N	N	N	yes	No
106	B	sakam	F	67	146	61	120	96	130/10	100	Norma	89	90	91	92	89	85	88	89	131	132	129	128	110	117	132	128	90	89	86	88	89	81	85	90	103.7	103.3	100.3	101.3	96	93	100.7	102.7	N	N	N	N	N	N	N	N	90	86	100	98	132	129	120	127	90	89	85	87	104	102.3	96.67	100.3	N	N	N	N	No	yes
107	B	muni s	M	56	150	65	160	90	140/10	100	Norma	88	98	86	75	87	80	78	80	130	132	131	134	127	128	120	121	88	89	87	80	83	81	82	89	102	103.3	101.7	98	97.67	96.67	94.67	99.67	N	N	N	N	N	N	N	N	89	87	90	88	132	131	134	127	89	87	85	85	103.3	101.7	101.3	99	N	N	N	N	No	yes
108	B	muniy	F	60	149	65	190	88	133/89	100	Norma	89	89	83	90	84	91	90	88	129	130	131	128	129	131	128	128	90	90	88	84	92	91	82	88	103	103.3	102.3	98.67	104.3	104.3	97.33	101.3	N	N	N	N	N	N	N	N	88	90	87	89	129	125	126	125	89	90	81	84	102.3	101.7	96	97.67	N	N	N	N	No	yes
109	B	aravin	M	32	160	65	180	91	152/10	99	Norma	88	90	89	90	92	91	90	90	130	132	129	126	125	131	128	127	90	87	82	81	80	82	88	81	103.3	102	97.67	96	95	98.33	101.3	96.33	N	N	N	N	N	N	N	N	88	81	87	84	129	130	132	131	90	88	80	82	103	102	97.33	98.33	N	N	N	N	yes	No
110	B	mohas	F	43	167	65	176	86	124/90	99	Norma	87	83	80	78	80	83	87	90	129	131	130	128	126	132	128	129	90	87	76	88	76	83	87	79	103	101.7	94	101.3	92.67	99.33	100.7	95.67	N	N	N	N	N	N	N	N	87	84	78	79	125	124	126	121	81	81	78	80	95.67	95.33	94	93.67	N	N	N	N	No	No
111	B	sabir h	M	34	156	65	120	100	138/90	98	Norma	98	100	97	90	96	89	96	92	89	130	132	131	129	130	132	131	80	78	90	89	91	92	90	91	83	95.33	104	103	103.7	104.7	104	104.3	N	N	N	N	N	N	N	N	98	97	92	90	129	130	131	129	90	90	91	90	103	103.3	104.3	103	N	N	N	N	No	yes
112	B	hemar	M	56	167	74	170	99	134/90	100	Norma	90	93	91	96	93	90	93	94	90	130	132	131	129	130	129	132	90	89	90	89	90	89	90	91	90	102.7	104	103	103	102.7	103	104.7	N	N	N	N	N	N	N	N	97	99	92	88	129	129	130	127	91	91	89	84	103.7	103.7	102.7	98.33	N	N	N	N	No	No
113	B	jeevan	M	65	171	76	165	98	128/10	100	Norma	90	91	90	88	89	78	89	90	89	128	128	121	119	118	123	128	90	89	92	91	89	88	90	91	89.67	102	104	101	99	98	101	103.3	N	N	N	N	N	N	N	N	90	91	89	90	131	121	128	121	90	90	89	91	103.7	100.3	102	101	N	N	N	N	yes	No
114	B	ramap	M	45	168	67	180	100	132/89	100	Norma	91	92	88	90	92	91	90	89	92	130	129	132	129	128	125	121	92	91	90	92	94	90	89	90	92	104	103	105.3	105.7	102.7	101	100.3	N	N	N	N	N	N	N	N	90	83	88	89	125	129	128	121	90	90	92	89	101.7	103	104	99.67	N	N	N	N	No	No
115	B	shanta	F	67	146	61	120	92	128/86	99	Norma	89	90	87	85	87	89	90	89	91	129	128	128	126	127	128	126	90	92	94	89	83	86	91	82	90.33	104.3	105.3	102	97.33	99.67	103.3	96.67	N	N	N	N	N	N	N	N	89	83	88	83	130	128	125	121	89	89	87	90	102.7	102	99.67	100.3	N	N	N	N	No	No
116	B	eshwa	M	56	150	65	160	88	128/10	96	Norma	89	84	86	90	83	84	84	90	87	127	130	125	132	140	139	123	94	89	92	92	100	98	83	93	91.67	101.7	104.7	103	110.7	112	101.7	103	N	N	N	N	N	N	N	N	83	90	83	98	124	132	138	123	90	90	92	93	101.3	104	107.3	103	N	N	N	N	yes	yes
117	B	venkat	F	60	149	65	190	98	129/98	100	Norma	90	97	90	83	93	87	89	85	90	139	128	129	128	136	132	127	89	91	92	90	100	92	89	90	89.33	107	104	103	109.3	106.7	103.3	102.3	N	N	N	N	N	N	N	N	89	84	80	98	131	130	125	127	90	90	83	90	103.7	103.3	97	102.3	N	N	N	N	No	yes
118	B	vikram	M	32	160	65	180	92	140/90	100	Norma	92	90	86	88	86	80	84	82	140	138	136	130	128	128	124	128	90	90	86	80	82	84	68	70	106.7	106	102.7	96.67	97.33	98.67	86.67	89.33	N	N	N	N	N	N	N	N	90	86	88	88	130	132	128	126	90	90	86	84	103.3	104	100	98	N	N	N	N	No	No
119	B	sumaiy	F	43	167	65	176	70	150/90	100	Norma	86	82	80	82	79	72	72	74	146	130	128	124	121	113	119	120	92	90	79	84	76	73	74	74	110	103.3	95.33	97.33	91	86.33	89	89.33	N	N	N	N	N	N	N	N	82	84	84	80	124	126	124	120	84	78	78	74	97.33	94	93.33	89.33	N	N	N	N	No	yes
120	B	naresh	M	45	174	67	150	84	140/90	100	Norma	90	92	88	86	86	88	86	86	140	140	134	134	120	124	126	124	86	88	82	80	76	74	74	72	104	105.3	99.33	98	90.67	90.67	91.33	89.33	N	N	N	N	N	N	N	N	78	80	78	82	140	138	130	132	86	86	80	82	104	103.3	96.67	98.67	N	N	N	N	No	No