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The Impact of Hypotensive Techniques on Recovery Time in Rhinoplasty Patients at Al-Kafeel Hospital

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Abstract—Background: *Controlled hypotension is commonly employed during surgical procedures to provide a clearer surgical field, minimize intraoperative blood loss, reduce the need for postoperative blood transfusions, and decrease the risk associated with electr ocautery. This descriptive and observational study investigates the association between various hypotensive strategies and postoperative rec overy time in patients undergoing rhinoplasty at Al-Kafeel Hospital. Amies of study Th The demographic analysis revealed that the majority of patients were between 14–24 years old, with a predominance of females and patients having a BMI within the 18.5–24.9 range. e study was carried out in the operating rooms of Al-Kafeel Hospital, with a total sample of 50 patients who underwent rhinoplasty surgery.* ***Study Design and Methodology***: *The research was divided into three main components: Part 1: Collection of demographic data, including age, height, weight, and calculation of body mass index (BMI). Part 2: Monitoring and recording of blood pressure values before and during the surgical procedure. Pa rt 3: Postoperative assessment of patients using the Aldrete scoring system to evaluate recovery status.* ***Results***: *Analysis of the data revealed that the majority of patients in the study were female. The application of positive end-expiratory pressure (PEEP) at 8 cmH_2O proved effective in maintaining controlled hypotension during surgery. Furthermore, the administration of Angised and metoprolol contributed posi tively to blood pressure control but should be administered cautiously due to potential side effects. The stu dy found that the combination of hypotensive techniques with remifentanil led to the most favorable outcomes in terms of rapid recovery and reduced postoperative pain. Co nversely, the use of isoflurane as a sole anesthetic agent was associated with delayed awakening and increased agitation during recovery and is therefore not recommended.*

Keywords— *Controlled hypotension, ENT anesthesia, Recovery duration, Rhinoplasty surgery.*

I. INTRODUCTION

Rhinoplasty, a surgical procedure aimed at reshaping the nose for either aesthetic or functional purposes, demands high precision and visibility within a narrow operative field[1]. One of the major challenges faced during rhinoplasty is controlling intraoperative bleeding, which can obscure the surgical site and increase the duration and complexity of the procedure. To address this issue, controlled hypotension is commonly employed as an anesthetic technique [2]. The purposeful lowering of a patient's arterial blood pressure below normal levels during surgery is known as regulated or induced hypotension [3]. This approach aims to minimize blood loss, improve the surgeon's field of view, and reduce the need for blood transfusions and extensive use of electrocautery. The success of hypotensive anesthesia depends not only on its ability to reduce bleeding but also on how it affects the patient's hemodynamic stability and recovery [4]. An ideal hypotensive technique should effectively lower blood pressure without compromising organ perfusion or causing postoperative complications. A poorly managed hypotensive technique may lead to delayed awakening, agitation, respiratory depression, or cardiovascular instability. Therefore, evaluating the relationship between these techniques and patient recovery is essential for improving perioperative outcomes in rhinoplasty procedures [5].

There are various methods to induce controlled hypotension, including pharmacological agents such as beta-blockers (e.g., metoprolol), vasodilators (e.g., Angised/nitroglycerin), inhalational anesthetics (e.g., isoflurane), and short-acting opioids (e.g., remifentanil). Each method has its own mechanism of action, benefits, and risks. For instance, remifentanil, a potent ultra-short-acting opioid, provides excellent control over blood pressure and depth of anesthesia while allowing for rapid postoperative recovery. In contrast, inhalational agents like isoflurane can effectively reduce blood pressure but may be associated with delayed awakening and increased agitation during emergence from anesthesia [6, 7].

Salman, Taki [8], [9] Non-pharmacological methods such as positive end-expiratory pressure (PEEP) also play a role in enhancing the effectiveness of hypotensive anesthesia. PEEP improves oxygenation and reduces venous return, contributing to a controlled drop in blood pressure. However, excessive PEEP may affect cardiac output and must be carefully monitored. The link between the use of these hypotensive techniques and postoperative recovery is of particular interest. Recovery time is typically assessed using standardized scoring systems such as the Aldrete score, which evaluates respiration, circulation, consciousness, activity, and oxygen saturation. A faster return to baseline function not only improves patient satisfaction but also reduces the time spent in the post-anesthesia care unit (PACU), optimizing hospital resource use.

The current study, conducted at Al-Kafeel Hospital, aims to explore the relationship between various hypotensive techniques and patient recovery in the context of rhinoplasty surgery. It investigates which methods provide optimal intraoperative blood pressure control while minimizing complications and promoting efficient recovery [10, 11]. The study analyzes data from 50 patients, focusing on their demographic characteristics, intraoperative blood pressure

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readings, and postoperative recovery scores.On the other hand, the exclusive use of isoflurane appears to result in delayed recovery and increased postoperative agitation, making it less suitable as a standalone agent for controlled hypotension in rhinoplasty [12]. In object, this study emphasizes the importance of selecting appropriate hypotensive strategies in ENT procedures, particularly rhinoplasty. While several methods are available, their impact on both intraoperative performance and postoperative recovery must be carefully balanced. Through this research, healthcare professionals can gain deeper insight into the safest and most effective techniques for achieving controlled hypotension, ultimately leading to better surgical outcomes and enhanced patient care.

II. METHODOLOGY

This chapter presents the research design used in this study, including sample selection, instrument construction, data collection, and data analysis.

Study Design: A descriptive and empirical study design was used to explain the relationship between hypotensive techniques, recovery time, and their effects on patients undergoing rhinoplasty at Al-kafeel Hospital. This study was conducted in the operating rooms of Al-kafeel Hospital.

Study SampleA total of 50 samples were obtained for this study.

Study parameters: Part 1: Demographic data (BMI, age, height, and weight). Part 2: Measurement of blood pressure before and during surgery. Part 3: Measurement of recovery time and Part 4: Measurement of Aldrete score post-operation.

Data Collection Method

We designed the data collection form based on study requirements, in agreement with the department administrator. Analyzed data used SPSS software to extract and analyze results from the collected cases.

Statistical Analysis. The data were computerized and analyzed using descriptive statistics, including frequency and percentage methods. Study Limitations Difficulties accessing the operating room before the staff at Al-kafeel Hospital Hospital. Most surgeries used multiple techniques, making it difficult to determine the best approach.

III. RESULTS

The findings from Table (1) show that the highest percentage (33.3%) of patients were within the 25-34 age group, whereas the lowest percentage (16.7%) belonged to the 45-55 age group. Regarding hypotensive techniques, the most commonly used technique was Remifentanil (44%), while the least used method was inhalation (Isoflurane) combined with mechanical ventilation (14%). The study also found that female patients comprised the majority (56.0%), representing 28 out of 50 patients, while male patients accounted for 44.0% (22 out of 50 patients). Regarding BMI, the majority of patients (40%) had a BMI between 25-29.9, while only 13.35% had a BMI above 30. The results also indicated that there was only a slight variation in the use of hypotensive techniques between ASA1 and ASA2 patients. Before anesthesia induction, patients received premedication to prevent sympathetic stimulation. The premedication include : Lidocaine (1.5 mg/kg), Benzodiazepine (1-2 mg/kg) , Metoprolol (1-2 mg/kg).All administered intravenously for stress-free induction. A large-bore cannula was inserted away from the surgical site, and deep anesthesia induction with full vital sign monitoring was performed. Fluid management was optimized by calculating input/output, evaluating blood loss, maintaining body temperature, and using capnography. Blood loss was replaced with either an equal amount of colloid or 2-3 times the volume using crystalloid solutions.

TABLE 1: This section presents the demographic characteristics of the study sample, including age, BMI, sex, and ASA classification.

Rating of Age		Frequency	percent
Age (years)	14-24	25	50.0
	25-34	11	20.0
	35-44	10	20.0
	45-55	5	10.0
	Total	50 sample	100%

Rating of BMI		Frequency	percent
BMI	<18.5	8	16.0
	18.5- 24.9	20	40.0
	25-29.9	14	28.0
	>30	8	16.0
	Total	50 sample	100%

Rating of sex		Frequency	percent
SEX	Female	28	56.0
	Male	22	44.0
	Total	50 sample	100%

Rating of ASA		frequency	percent
ASA	ASA1	30	60.0
	ASA2	20	40.0
	Total	50 sample	100%

All results obtained from this study indicate that controlled hypotension effectively reduced blood pressure using various techniques. The highest percentage (44%) of patients (22out of 50) underwent Remifentanil infusion (0.2-0.5 mcg/kg/min).

- Other techniques included Angesid (0.25-0.5 mcg/kg/min) and Metoprolol (1-2 mg/kg every 15 minutes). The lowest percentage (14%) was observed in patients receiving Isoflurane inhalation (2-2.5 MAC) and mechanical ventilation (MV) with 8 cmH2O PEEP, increased tidal volume, and higher respiratory rate.

TABLE 2: Distribution of Study Sample According to Dose and SiËng Position This table illustrates the variation in the study sample based on the administered dose and sitting position during the procedure.

Rating of Dose		Frequency
Dose of remifentanyl Infusion of (0.2 – 0.5) micro/kg/min	Total	22
	Percent of study	44
Dose of inhalation (isoflurane) continuous (2 –2.5) mac	Total	7
	Percent of study	14.0
Dose of drug (Angesid) (0.25 – 0.5) mc Metoprolol (1-2)mg/iv every 15 min	Total	15
	Percent of study	30.0
Sitting of peep 8 cmH2o	Total	6
	Percent of study	12.0

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Findings indicate a clear variation in the effectiveness of different hypotensive techniques: The highest percentage (44%) of patients (22out of 50) received Remifentanil for controlled hypotension. This method was considered the most effective as it resulted in: Faster emergence from anesthesia on the surgical table, Shorter recovery time, Less postoperative pain, Better surgical field visibility for the surgeon. The lowest percentage (14%) (7 out of 50 patients) received Isoflurane for controlled hypotension.

TABLE 3: Distribution of the Study Sample Based on the Method of Hypotensive Technique Used During Surgery

Rating of method		frequency	Percent
method	Technique by inhalation	7	14.0
	By Angesid + metoprolol	15	30.0
	By mechanical ventilation	6	12.0
	By remifentanyl	22	44.0
	Total	50 sample	100%

IV. Discussion

The findings of this study highlight the effectiveness and relative advantages of various controlled hypotension techniques employed during surgical procedures. Among the studied methods, Remifentanil infusion (0.2–0.5 µg/kg/min) emerged as the most frequently used and effective technique, applied in 44% of patients. This aligns with recent literature which supports Remifentanil's role in achieving rapid and reversible hypotension with minimal adverse effects, making it highly favorable in surgical settings requiring a clear operative field and minimal bleeding [13]. Studie such as those by Al-Hassan, Weissman [14] has also confirmed that Remifentanil contributes to faster emergence from anesthesia, reduced postoperative pain, and shorter recovery time—benefits consistent with our study outcomes.

In contrast, Isoflurane inhalation (2–2.5 MAC) with mechanical ventilation, used in 14% of cases, was the least preferred hypotensive technique. While Isoflurane is a traditional agent for inducing hypotension, it is often associated with delayed recovery and variable blood pressure control. Our findings corroborate those by غانم and شذى [15]who noted that volatile anesthetics like Isoflurane are less effective in producing stable hypotension and may negatively impact postoperative recovery due to longer duration of action and potential respiratory complications when combined with mechanical ventilation.

Another commonly used approach was the combination of Angesid (Dexmedetomidine) and Metoprolol, accounting for 30% of cases. This regimen offers a multimodal strategy: Dexmedetomidine provides sedation and analgesia without respiratory depression, while Metoprolol, a beta-blocker, contributes to hemodynamic stability. [16]supports the use of Dexmedetomidine for controlled hypotension, indicating its efficacy in reducing intraoperative bleeding and improving surgical visibility. The beta-blocker Metoprolol has also been shown to be effective in lowering heart rate and mean arterial pressure without significant side effects, which matches the outcomes seen in our patient cohort [8].

The distribution of hypotensive technique usage among ASA I and ASA II patients showed minimal variation, suggesting that these methods are broadly applicable and safe across patients with low to moderate surgical risk. Premedication protocols, which included Lidocaine, Benzodiazepine, and Metoprolol, were employed to attenuate sympathetic responses during anesthesia induction, contributing to the overall hemodynamic stability observed.

The demographic analysis revealed that the majority of patients were between 14–24 years old, with a predominance of females and patients having a BMI within the 18.5–24.9 range [17, 18]. This demographic composition may have contributed to the successful implementation of controlled hypotension protocols, as younger, healthier patients tend to tolerate these techniques better.

In terms of clinical implications, Remifentanil appears to be the most favorable option for achieving controlled hypotension, especially in elective surgical procedures requiring minimal bleeding and enhanced surgeon visibility. However, anesthesiologists should tailor the hypotensive method to individual patient needs, considering factors such as cardiovascular status, surgical duration, and recovery goals.

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