DOI: 10.7860/JCDR/2025/76754.20984

Original Article

Biochemistry Section

Association between Preanaesthetic Check-up Parameters and Postoperative Recovery Score: A Cross-sectional Study

SNEHA HENRY[1], MOONA ABDUL KADIRU[2], R SHYAM KRISHNAN[3], HARRIS MOHAMMED PARAVENGAL[4], KESHAV ANAND[5], MAZHAR ZULFIKAR[6]

ABSTRACT

Introduction: Elective surgeries are typically preceded by a thorough health assessment conducted by an anaesthetist during the Preanaesthesia Check-Up (PAC). This process involves evaluating the patient's medical history, conducting a physical examination and reviewing laboratory test results. The PAC not only focuses on the clinical utility and cost-effectiveness of tests, but also aims to optimise the patient's outcome by addressing any unidentified health issues before the procedure.

Aim: To analyse laboratory reports associated with the PAC and evaluate their impact on postoperative recovery.

Materials and Methods: This observational, cross-sectional study was conducted at Malabar Medical College Hospital and Research Centre a tertiary care hospital in North Kerala, India, from August to October 2023. A total of 102 postoperative patients were enrolled in the study over a two-month period. Demographic and laboratory data were collected using a structured questionnaire. Statistical analysis was performed using the Chi-square test with Jamovi software, and a p-value of <0.05 was considered statistically significant.

Results: Among the 102 patients studied, male participants accounted for a higher proportion (59.8%) compared to females. Co-morbidities were present in 51/102 (50%) of the study population, with Hypertension (HTN) being the most prevalent {(n=32/102), which accounted for 32/51 (62%) of those with co-morbidities}, followed by Diabetes Mellitus (DM) (n=16/51). General Anaesthesia (GA) was administered to 64/102 (62.7%) of the participants, and 93 (91.2%) underwent procedures lasting longer than one hour. Random Blood Sugar (RBS) levels were deranged in 23.5% of the patients, while Renal Function Tests (RFT) were within normal limits for 98.04% of the cohort. A poor Quality of Recovery (QoR) score (<70) was observed in 15.7% of the patients.

Conclusion: The present study demonstrated a significant association between co-morbidities and postoperative recovery. The preanaesthesia check-up is a useful and cost-effective tool for preventing perioperative morbidity.

Keywords: Anaesthesia, Biological markers, Blood glucose, Co-morbidity, Diabetes mellitus, Hypertension, Myles quality of recovery-15 score, Postoperative period, Preoperative care, Surgical procedure

INTRODUCTION

The PAC is a cornerstone of the perioperative care of surgical patients. The evaluations carried out by anaesthesiologists are popularly referred to as the Preanaesthetic Check (PAC). The PAC usually precedes the delivery of anaesthesia for surgical procedures [1]. Following the PAC, the anaesthetist assigns a score to the patients based on the American Society of Anaesthesiologists (ASA) classification, which is a simple scoring system to predict physiological status and help prevent perioperative risks [2].

A comprehensive PAC includes reviewing the patient's history, conducting a physical examination, and examining medical records when available. An effective PAC not only reduces perioperative morbidity and mortality but also decreases the need for unnecessary investigations and consultations [3]. However, in some countries, this can lead to a lack of conformity with centre-specific and, more often, practitioner-specific practices. This individualised practice arises from practitioners adopting local norms or formulating their own protocols for conducting a preanaesthetic check-up, stemming from varied disease patterns, symptomatology, and co-morbidities that are unique to their geographical region [4].

Standard pre-operative tests can be divided into three groups: discretionary tests, which are for specific clinical indications; baseline tests; and screening tests. There is always a substantial risk of disturbances in the postoperative period, and screening tests aim to reveal clinically undetected diseases [5].

Recovery from anaesthesia and surgery is a critical indicator of the quality of perioperative care. Many recovery tools have been studied, among which the Quality of Recovery-15 (QoR-15) score is an extensively validated tool for assessing perioperative care. The QoR-15 comprises fifteen questions that assess five domains of patient-reported health status: pain, physical comfort, physical independence, psychological support, and emotional state, using a 10-point numerical rating scale. The score ranges from zero, indicating very poor recovery, to a maximum score of 150, representing excellent recovery [6].

Despite its widespread use, no studies to date have explored the relationship between the PAC and postoperative recovery as measured by tools like the QoR-15. The present study aimed to bridge this gap by analysing the significance of laboratory reports from the PAC in predicting postoperative recovery and examining the association between co-morbidities and recovery outcomes.

MATERIALS AND METHODS

The present study was a observational, cross-sectional study conducted at the Malabar Medical College Hospital and Research Centre, a tertiary care hospital in North Kerala, India, from August 2023 to October 2023. Approval was obtained from the Institutional Research Committee and the Ethics Committee, with reference number IEC No. MMCH&RC/IEC/2023. Informed verbal consent was obtained from all patients prior to the collection of the data mentioned above.

Inclusion criteria: The inclusion criteria for the study encompassed all prescheduled elective postoperative patients evaluated 24 hours after surgery. The study included patients who had undergone procedures under either local or General Anaesthesia (GA).

Additionally, only patients who were cognitively oriented and able to successfully complete the questionnaire were considered eligible for participation.

Exclusion criteria: The exclusion criteria for the study included patients who declined to provide consent, those who had not fully recovered from anaesthesia and were disoriented, patients who underwent emergency surgeries, and those below the age of 18 years.

Sample size calculation: Sample size estimation was not performed, as the study was designed to span two months. The study cohort included all consenting postoperative patients in the recovery room who had fully recovered from anaesthesia within 24 hours following elective surgery. A total of 102 patients met the eligibility criteria and were enrolled.

Study Procedure

After obtaining written informed consent, data collection was conducted over a two-month period. Patients were monitored in the postoperative recovery unit immediately after surgery. Data were recorded using a standardised collection form and subsequently transferred to an electronic spreadsheet. Patients were stratified into groups based on two parameters: type of anaesthesia (General Anaesthesia [GA]/Spinal Anaesthesia [SA]/Combined Spinal-epidural [CSE]) and surgical duration (less than or greater than one hour).

Demographic data, including age, gender, and laboratory investigations, were collected for each participant. Additional data on the duration of surgery (less than or more than one hour), type of anaesthesia {General Anaesthesia (GA), Spinal Anaesthesia (SA), or Combined Spinal-Epidural (CSE)} and history of co-morbidities were also collected. The laboratory data gathered included Fasting Blood Sugar (FBS), Random Blood Sugar (RBS), serum creatinine, urea, electrolytes, total bilirubin, and liver enzymes.

The Myles QoR-15 Questionnaire, a psychometric evaluation tool, was used as an endpoint to analyse the immediate outcomes of patients post-surgery. The total score, based on responses to 15 questions, ranges from 0 to 150, with a good response recorded as a score of ≥70 and a poor response recorded as a score of <70 [6].

The objectives of the study were to investigate the association between the PAC results and the QoR 24 hours postoperatively, using the Myles QoR Questionnaire, and to examine the association between co-morbidities and postoperative recovery in patients.

STATISTICAL ANALYSIS

The Jamovi 2.6.13 software was used for the analysis of the variables. The Chi-square test was employed for data analysis. A p-value of <0.05 was considered statistically significant.

RESULTS

Population statistics: The study population comprised 102 patients ranging from 21 to 86 years of age. The highest number of patients were aged between 60 and 69 years 28 (27.5%). The gender distribution revealed that males accounted for 61 (59.8%) of the study population, while females comprised 41 (40.2%). Nearly half of the patients 48 (47%) presented with co-morbidities. General Anaesthesia (GA) was the predominant anaesthetic technique, administered in 64 (62.7%) of cases.

The most common co-morbidities among the study population were Hypertension (HTN) in 32/102 (31.4%) of patients, followed by Diabetes Mellitus (DM) in 15.7%. A small proportion 3/102 (2.9%) of patients presented with a combination of three co-morbidities: DM, HTN, and Coronary Artery Disease (CAD). Within the study population, there was one patient each with the following disorders: Chronic Obstructive Pulmonary Disease (COPD), hyperthyroidism, and rheumatoid arthritis, as well as five patients with hypothyroidism. Since the numbers were not statistically significant, they are not depicted in the table.

Fasting Blood Sugar (FBS) was assessed in only 14 patients, of whom 4/14 (3.9%) had deranged values. Similarly, Random Blood Sugar (RBS) was evaluated in 100/102 (98%) of patients, out of which 24/102 (23.5%) showed deranged levels. FBS was not routinely measured for all patients during the PAC check-up; only 14 out of 102 patients had their FBS taken, whereas RBS was performed on 100 out of 102 patients. Likewise, not all patients had co-morbidities; about 51 out of 102 (50%) of the study population had co-morbidities.

Creatinine levels were assessed in all participants, and 3/102 (2.9%) of these patients had borderline high values. Urea levels were evaluated in all patients, with only one individual exhibiting borderline high levels. Creatinine levels were less than 1.4 mg/dL in 99 patients, and urea levels were less than 45 mg/dL in 100 patients, indicating that 98.04% of the study population had normal Renal Function Tests (RFT). Broadly, the majority of laboratory parameters analysed in the study population were within normal ranges, with only a very small percentage of patients showing borderline abnormalities. Abnormal results were defined as cut-off values outside the biological reference intervals provided on the hospital's blood investigation forms [Table/Fig-1].

Variables	n (%)
Age group (in years)	
20-29	8 (7.8)
30-39	14 (13.7)
40-49	24 (23.5)
50-59	19 (18.6)
60-69	28 (27.5)
70-79	8 (7.8)
80-89	1 (1)
Gender distribution	
Males	61 (59.8)
Females	41 (40.2)
Type of anaesthesia	
General (GA)	64 (62.7)
Combined spinal-epidural	38 (37.3)
Duration of surgery	
<1 h	9 (8.8)
≥1 h	93 (91.2)
Co-morbidities	
DM	16 (15.7)
HTN	32 (31.4)
Laboratory parameters	
FBS >126 mg/dL	4 (3.9)
FBS <126 mg/dL	10 (9.8)
RBS ≥140 mg/dL	24 (23.5)
Creatinine <1.4 mg/dL	99 (97.1)
Creatinine ≥1.4 mg/dL	3 (2.9)
Urea <45 mg/dL	100 (98.04)
Urea >45 mg/dL	02 (1.96)
Sodium <145 mEq/L	100 (98.04)
Sodium >145 mEq/L	2 (1.96)
Potassium <5.5 mEq/L	102 (100)
T. bilirubin <1.2 mg/dL	84 (82.4)
T. bilirubin >1.2 mg/dL	18 (17.6)
AST ≤40 IU/L	68 (66.6)
AST >40 IU/L	34 (33.3)
ALT ≤40 IU/L	72 (70.5)
ALT >40 IU/L	30 (29.4)

ALP ≥140 IU/L	15 (14.7)
ALP <140 IU/L	87 (85.3)
QoR score <70	16 (15.7)
QoR score ≥70	86 (84.3)

[Table/Fig-1]: Baseline characteristics of study cohort, showing number (N) and percentage (%).
AST: Aspartate aminotransferase; ALT: Alanine aminotransferase; ALP: Alkaline phosphatase

As for the Myles QoR scores, the majority 86 (84.3%) of patients demonstrated good recovery (scores ≥70/150), while 16 (15.7%) had poor recovery (scores <70/150). The highest recorded score was 145/150, and the lowest was 45/150. General Anaesthesia (GA) was the most commonly administered type of anaesthesia, used in 64 (62.7%) of cases. A significant majority of surgeries 93/102 (91.2%) lasted longer than one hour, with the longest recorded duration being approximately 5.2 hours.

Diabetes Mellitus (DM) and HTN showed a significant association with the Myles QoR scoring, with DM exhibiting a strong association (p=0.009). The duration of surgery and type of anaesthesia did not show any significant difference in score values [Table/Fig-2].

Various parameters compared to QoR score		QoR score <70 n (%)	QoR score ≥70 n (%)	Chi-square value	p-value
Type of anaesthesia	GA	12 (18.8%)	52 (81.3%)	1.219	0.27
	CSE	4 (10.5%)	34 (89.5%)		
Age (in years)	20-29	0	8 (9.3%)	12.8	0.05
	30-39	1 (6.2%)	13 (15.1%)		
	40-49	2 (12.5%)	22 (25.5%)		
	50-59	2 (12.5%)	17 (19.7%)		
	60-69	7 (43.7%)	21 (24.4%)		
	70-79	4 (25%)	4 (4.6%)		
	80-89	0	1 (1.1%)		
Gender	Male	9 (14.8%)	52 (85.2%)	0.326	0.85
	Female	7 (17.5%)	34 (82.5%)		
Duration of surgery	<1 h	0	9 (100%)	1.83	0.18
	≥1 h	16 (17.2%)	77 (82.8%)		
DM	Yes	6 (37.5%)	10 (62.5%)	6.828	0.009
	No	10 (11.6%)	76 (88.4%)		
HTN	Yes	9 (28.1%)	23 (71.9%)	5.455	0.02
	No	7 (10.0%)	63 (90.0%)		
FBS	Not done	16 (18.2%)	72 (81.8%)	1.974	0.43
	<126	0	10 (100%)		
	≥126	0	4 (100%)		
Creatinine	Creatinine <1.4 mg/dL	16 (16.2%)	83 (83.8%)	0.575	0.45
	Creatinine ≥1.4 mg/dL	0	3 (100%)		
Urea	Urea <45 mg/dL	16 (16%)	84 (84%)	0.69	0.406
	Urea ≥45 mg/dL	0 (19.5%)*	2 (80.5%)		
Sodium	Sodium <145 mEq/L	16 (16%)	84 (84%)	0.3	0.54
	Sodium >145 mEq/L	0	2 (100%)		
T. Bilirubin	T. bilirubin <1.2 mg/dL	15 (17.9%)	69 (82.1%)	1.7	0.19
	T. bilirubin >1.2 mg/dL	1 (5.6%)	17 (94.4%)		
AST	AST ≤40 IU/L	12 (18%)	56 (84%)	0.593	0.44
	AST >40 IU/L	4 (12%)	30 (90%)		
ALT	ALT ≤40 IU/L	11 (15.6%)	61 (86.4%)	0.03	0.86
	ALT >40 IU/L	5 (17%)	25 (85%)		
ALP	ALP <140 IU/L	15 (17.6%)	72 (84.4%)	1.08	0.298
	ALP ≥40 IU/L	1 (6.8%)	14 (95.2%)		

[Table/Fig-2]: Association and significance between various parameters and QoR score. Values shown in number (n), Percentage (%).
Fisher's-exact test value

The Myles QoR-15 Questionnaire is a well-regarded tool used to evaluate a patient's health status and recovery following surgery. It includes 15 items divided into five dimensions of recovery: 1) Physical comfort; 2) Emotional state; 3) Physical independence; 4) Psychological support; and 5) Pain relief. Question 7, which concerns receiving postoperative medical support, scored the highest (8.76±1.373/10), followed by question 1 (8.18±2.202/10), which relates to patients being able to breathe comfortably. Question 8, regarding the ability to return to work soon, scored the lowest (3.39±3.206/10) [Table/Fig-3].

Q. No.	Question	Mean±SD
	Question 1-10: How have you been feeling in the past 24 hours	
1	Able to breathe easily	8.18±2.202
2	Able to enjoy food	6.30±2.473
3	Feeling rested	7.18±1.895
4	Have had a good sleep	6.78±2.128
5	Able to look after personal toilet and hygiene unaided	5.26±3.112
6	Able to communicate with family and friends	8.29±1.827
7	Getting support from doctors and nurses	8.76±1.373
8	Able to return to work or usual home activities	3.39±3.206
9	Feeling comfortable and in control	6.67±1.847
10	A general feeling of well-being	6.96±1.813
	Question 11-15: Have you had any of the following in the last 24 hours	
11	Moderate pain	5.09±2.915
12	Severe pain	5.26±3.429
13	Nausea, vomiting	6.00±3.156
14	Feeling worried or anxious	5.60±3.042
15	Feeling sad or depressed	5.80±3.197

[Table/Fig-3]: Myles QoR questions and the average values of the patients. Values in mean, standard deviation and the average score.

DISCUSSION

Hospital visits and scheduled surgeries can be a significant source of anxiety for patients. However, a thorough PAC check-up and good postoperative recovery can alleviate much of this anxiety and improve patient satisfaction. The concept of the PAC clinic was first introduced by Lee JA in 1949, who believed that this clinic facilitated a much faster rehabilitation for surgery patients [7].

An alternative perspective suggests that PACs may divert physicians' attention from more clinically significant issues, potentially harming patients through surgical delays or cancellations. Gupta A and Gupta N have proposed that 60-75% of the preoperative tests performed are clinically unnecessary [8]. This was also supported by Johnson R and Mortimer A in their study on PAC laboratory parameters conducted on 100 patients, which inferred that only 9.1% of the laboratory tests were deranged, and among those, perioperative management was altered in just two cases [5]. Similar findings were observed in the present study, where Renal Function Tests (RFT) were normal for 97.1% of the patients, and liver function tests were normal in approximately 70% of the study population.

According to National Institute for Health and Care Excellence (NICE) guidelines for preoperative elective surgery, RBS, fasting and postprandial sugar levels, and Glycated Haemoglobin (HbA1c) are commonly advised tests, especially for patients over the age of 40 years. Additionally, there is no role in offering an HbA1c test to patients who have not been diagnosed with diabetes [9]. Johnson R and Mortimer A reported 8% abnormal values among the 73%

of glucose tests conducted [5]. Similarly, the cohorts in the present study included 16 diabetic patients, and FBS was evaluated for only 14 of those, of which 3.9% were in the deranged range. The RBS was assessed for 100 patients, with 23.5% falling within the deranged range. HbA1c was not a routinely performed PAC parameter in the study Institution.

The findings presented above were contradictory to the study conducted by Correll DJ et al., which reported that 17% of new co-morbidities were diagnosed in the PAC outpatient department. They found that new co-morbidities were associated with a greater chance of surgical delay (10.7%) or cancellation (6.8%) compared to recognised co-morbidities (0.6% and 1.8%, respectively) [10]. A study by Baradwaj N et al., in Ahmedabad, involving 110 patients, found that 39.5% of patients were newly diagnosed with co-morbidities. This finding contrasts with the current study, which did not identify any new cases of co-morbidities [11].

However, the present study identified a significant difference in the prevalence of Type 2 Diabetes Mellitus (T2DM) and HTN among subjects with Myles scores below and above 70. This suggests that T2DM and HTN have an impact on the postoperative recovery of patients. It would be reasonable to conclude that patients with co-morbidities require special care and attention, which would facilitate better recovery after surgery. The deterioration of Myles Score can be attributed to the psychological or physical ailments associated with these co-morbidities.

Johnson R and Mortimer A reported that 17 patients exhibited high urea concentrations, while 14 patients showed elevated creatinine levels. However, these levels were not sufficiently high to warrant medical treatment. Notably, two out of the eight patients with abnormal random sugar levels required a change in medical management [5]. In contrast, the present study found that only one and three patients had abnormally high urea and creatinine values, respectively, and 24 patients had borderline high RBS values.

de Sousa Soares D et al., concluded that preoperative additional tests are excessively ordered, even for young patients with low surgical risk, with little or no impact on perioperative management [12].

Limitation(s)

The relatively modest sample size of 102 patients limits the generalisability of the study. Additionally, the authors acknowledge that the study was conducted in a single hospital setting, which may further constrain the external validity of the results. As the study was conducted postoperatively, it posed certain difficulties in obtaining consent from all the patients in the recovery room for participation, which could have contributed to selection bias. Furthermore, the present study does not compare the postoperative recovery status of emergency surgeries, adding another layer of selection bias. To better identify and validate the association between PAC and overall postoperative recovery, a multicentre study with a larger cohort is warranted. Such an expanded study would provide more robust evidence regarding the clinical utility of PAC in predicting postoperative recovery trajectories.

CONCLUSION(S)

Routine laboratory tests conducted for preanaesthetic evaluations are often perceived as an additional financial constraint for patients; however, their clinical value is substantial and multifaceted. These investigations serve as essential screening tools for detecting undiagnosed co-morbidities and guiding evidence-based perioperative management strategies. They help reduce complications that can arise in the perioperative period. Additionally, documented laboratory findings ensure that critical health parameters are not overlooked during surgery. PAC also facilitates anaesthetists in building rapport with patients, enabling them to plan the type of anaesthesia and the management of patients in the perioperative period. Furthermore, it assists in identifying co-morbidities that play a significant role in determining the potential outcomes of the surgery. Factors such as co-morbidities, type of surgery, duration of surgery, and postoperative care collectively impact recovery outcomes. In the present study, a substantial number of patients had co-morbidities (n=48/102) and among these, diabetes and HTN showed a significant association with recovery scores (Myles score). By analysing the relationship between patients' PAC findings and postoperative recovery, the present study represents a proactive approach to addressing the acute complications that patients may experience, to some extent, preoperatively.

REFERENCES

[1] Apfelbaum JL, Connis RT, Nickinovich DG. Practice advisory for preanesthesia evaluation: An updated report by the American Society of Anesthesiologists Task Force on Preanesthesia Evaluation. Anesthesiology. 2012;116(3):522-38.
[2] Doyle DJ, Hendrix JM, Garmon EH. American Society of Anaesthesiologists Classification. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 [updated 2023 Aug 17]. PMID: 28722969. Available from: https://www.ncbi.nlm.nih.gov/books/NBK441940/.
[3] Dhakre V, Nanavati VN, Shakil A, Nagral S. Pre-anaesthetic checkup in India: A review. Surg Pract Sci. 2020;2:100005. Doi: 10.1016/j.sipas.2020.
[4] Haq ZA, Murthy P, Malik I, Lahori VU, Chaudhary S, Ahuja S. Detection of comorbid illnesses during pre-anaesthesia evaluation in a university teaching hospital: A prospective observational study. Natl Med J India. 2014;27(5):256-58.
[5] Johnson R, Mortimer A. Routine pre-operative blood testing: Is it necessary? Anaesthesia. 2002;57(9):914-17. Doi: 10.1046/j.1365-2044.2002.02750.
[6] Stark PA, Myles PS, Burke JA. Development and psychometric evaluation of a postoperative quality of recovery score: The QoR-15. Anaesthesiology. 2013;118:1332-40.
[7] Lee JA. The anaesthetic out-patient clinic. Anaesthesia. 1949;4(4):169-74. Doi: 10.1111/j.1365-2044.1949.tb05837.x. PMID: 18140320.
[8] Gupta A, Gupta N. Setting up and functioning of a pre-anaesthetic clinic. Indian J Anaesth. 2010;54(6):504-07. Doi: 10.4103/0019-5049.72638. PMID: 21224966; PMCID: PMC3016569. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3016569/.
[9] Routine preoperative tests for elective surgery. NICE Guideline [NG45]. 2016. [Cited 2017 Nov 9]. Available from: https://www.nice.org.uk/guidance/NG45.
[10] Correll DJ, Bader AM, Hull MW, Hsu C, Tsen LC, Hepner DL. Value of preoperative clinic visits in identifying issues with potential impact on operating room efficiency. Anaesthesiology. 2006;105:1254-59. Doi: 10.1097/00000542-200612000-00026.
[11] Bhardwaj N, Thakur A, Sharma A. Incidence of various comorbidities among patients coming for pre-anesthetic checkup in a secondary health care hospital. International Journal of Research and Review. 2020;7(7):297-300.
[12] de Sousa Soares D, Brandão RRM, Mourão MRN, de Azevedo VLF, Figueiredo AV, Trindade ES. Relevance of routine testing in low-risk patients undergoing minor and medium surgical procedures. Rev Bras Anestesiol. 2013;63(2):197-201.

PARTICULARS OF CONTRIBUTORS:
1. Associate Professor, Department of Biochemistry, Malabar Medical College Hospital and Research Centre, Kozhikode, Kerala, India.
2. Professor, Department of Anaesthesia, Sree Narayana Institute of Medical Sciences, Ernakulam, Kerala, India.
3. Assistant Professor, Department of Biochemistry, Malabar Medical College Hospital and Research Centre, Kozhikode, Kerala, India.
4. Associate Professor, Department of Surgery, Malabar Medical College Hospital and Research Centre, Kozhikode, Kerala, India.
5. Medical Student, Department of Biochemistry, Malabar Medical College Hospital and Research Centre, Kozhikode, Kerala, India.
6. Junior Resident, Department of Anaesthesia, Malabar Medical College Hospital and Research Centre, Kozhikode, Kerala, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:
Dr. Sneha Henry,
Associate Professor, Department of Biochemistry, Malabar Medical College Hospital and Research Centre, Kozhikode-673323, Kerala, India.
E-mail: snehahenry72@gmail.com

PLAGIARISM CHECKING METHODS: [Jain H et al.]
- Plagiarism X-checker: Nov 14, 2024
- Manual Googling: Apr 10, 2025
- iThenticate Software: Apr 12, 2025 (10%)

ETYMOLOGY: Author Origin

EMENDATIONS: 7

AUTHOR DECLARATION:
- Financial or Other Competing Interests: None
- Was Ethics Committee Approval obtained for this study? Yes
- Was informed consent obtained from the subjects involved in the study? Yes
- For any images presented appropriate consent has been obtained from the subjects. NA

Date of Submission: **Nov 11, 2024**
Date of Peer Review: **Dec 11, 2024**
Date of Acceptance: **Apr 15, 2025**
Date of Publishing: **May 01, 2025**