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# Role Of TESPAL In Posterior Epistaxis And Anatomical Variations Of Sphenopalatine Artery.

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**ABSTRACT**

Epistaxis, a common clinical presentation, poses challenges in management due to its diverse etiology and variable severity. Understanding demographic characteristics, frequency of episodes, and anatomical variations of the sphenopalatine artery (SPA) is crucial for effective treatment strategies in it. A prospective study was conducted at Tirunelveli Medical College, analyzing 25 patients with chronic and refractory posterior epistaxis. Demographic data, frequency of epistaxis episodes, and SPA variations were assessed using relevant investigations and intraoperative findings. The most common age group affected was 31-40 years (28%), with a slight male predominance (52%). Patients predominantly experienced 4 to 6 episodes of epistaxis (24% each), highlighting the chronic nature of the condition. Anatomical variations of the SPA were diverse, with L-3 being the most common (28%). In conclusion, our study confirmed, transnasal endoscopic sphenopalatine artery cauterization, often combined with anterior ethmoid artery ligation if a superior source of bleeding is suspected, is the preferred approach due to its precision, minimally invasive nature, high success rate, and lower complication rates. It has become the treatment of choice for patients with recurrent and refractory epistaxis.

**Keywords:** Epistaxis, sphenopalatine artery, demographics, anatomical variations.

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## INTRODUCTION

Posterior epistaxis, though less common than anterior epistaxis, presents significant challenges due to its anatomical location and the potential involvement of the sphenopalatine artery (SPA) [1]. The sphenopalatine artery is a major contributor to posterior nasal bleeding and is prone to anatomical variations, making effective management complex. Transnasal endoscopic sphenopalatine artery ligation (TESPAL) has emerged as a valuable technique for controlling posterior epistaxis associated with SPA involvement and anatomical anomalies. [2,3]. This procedure involves accessing the sphenopalatine artery through an endoscopic approach, allowing for precise identification and ligation of the bleeding vessel. Understanding the role of TESPAL in managing posterior epistaxis necessitates a comprehensive appreciation of the anatomical variations of the sphenopalatine artery, which significantly impact the success and safety of the procedure [4,5].

## METHODOLOGY

A prospective interventional research study was conducted by the Department of Otorhinolaryngology at Tirunelveli Medical College. The study focused on patients presenting with epistaxis, encompassing both sexes. A total of 25 patients diagnosed with chronic and refractory posterior epistaxis were selected for assessment and treatment using various methods, guided by relevant medical history and appropriate investigations to identify underlying causes.

Upon presentation with bleeding, patients received immediate first aid measures, including steady pressure application on the lower bony portion of the nose for 20 minutes and forward-leaning positioning with an open mouth. Anterior and posterior nasal packing with Foley's catheter served as the primary intervention, supplemented by haemostatic agents and investigative procedures to ascertain the cause of epistaxis.

Patients who did not present with active bleeding were admitted for further examination to determine the etiology of potential bleeding episodes. Hypertensive patients underwent blood pressure monitoring and management by anti-hypertensives and anxiolytics as deemed necessary by cardiologists or physicians. Diabetic patients received appropriate treatment. Detailed patient histories, including episode frequency and associated factors, were obtained, and clinical examinations were conducted to evaluate nasal structural abnormalities. Within 24-48 hours, diagnostic nasal endoscopy (DNE) was performed to assess clot removal efficacy and identify potential bleeding sites. Cases of anterior epistaxis were managed separately and excluded from the study sample.

The study employed trans nasal endoscopic sphenopalatine artery cauterization as the primary intervention in all 25 patients with chronic and refractory posterior epistaxis. Patients were subsequently followed up periodically over a three-month period to monitor treatment outcomes. Inclusion and exclusion criteria were strictly adhered to throughout the study to ensure the validity and reliability of the findings.

## RESULTS

In our study, among the 25 patients analyzed, the most common age group was 31-40 years, comprising 28% of the total sample, followed by the age groups 41-50 and <30, each with 28% as well. Patients aged >51 years represented 24% of the sample.

Among them, 52% were male, while 48% were female. This shows a slight predominance of males in the sample

**Table 1: Episodes of epistaxis.**

| No. Of Episodes | Frequency | Percent |
|---|---|---|
| 3 | 1 | 4.0 |
| 4 | 6 | 24.0 |
| 5 | 4 | 16.0 |
| 6 | 4 | 16.0 |
| 7 | 2 | 8.0 |
| 8 | 3 | 12.0 |

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| | | |
|---|---|---|
| 9 | 3 | 12.0 |
| 10 | 2 | 8.0 |
| Total | 25 | 100.0 |

Most patients experienced between 4 to 6 episodes, with 24% each, followed by 5 episodes at 16%. Episodes ranging from 3 to 10 were reported, with 8% to 4% frequency, respectively.

**Table 2: Intra op sphenopalatine artery showing number of branches**

| SPA Findings | No. Of Branches | Frequency |
|---|---|---|
| L-1 | 4 | 16.0 |
| L-2 | 2 | 8.0 |
| L-3 | 7 | 28.0 |
| R-1 | 3 | 12.0 |
| R-1/L-3 | 1 | 4.0 |
| R-2 | 2 | 8.0 |
| R-2/L-3 | 2 | 8.0 |
| R-3 | 3 | 12.0 |
| R-3/L-2 | 1 | 4.0 |
| Total | 25 | 100.0 |

The results outlines the distribution of sphenopalatine artery (SPA) variations and their corresponding branch numbers among the study sample. The SPA branches were categorized into left (L) and right (R), with varying frequencies. Notably, the most common variation was L-3, with 7 branches, representing 28% of the total sample. R-1/L-3 exhibited the lowest frequency, with only 1 branch, accounting for 4% of the total. These findings provide insights into the anatomical variability of SPA branching patterns, which can inform clinical interventions and surgical approaches targeting posterior epistaxis management.

**Table 3: Endoscopic Findings**

| Finding | Frequency | Percent |
|---|---|---|
| BL-CL | 1 | 4.0 |
| D IN M/R-C | 1 | 4.0 |
| DSL | 4 | 16.0 |
| DSL-SPUR | 1 | 4.0 |
| DSL/CL | 1 | 4.0 |
| DSL/SPUR | 1 | 4.0 |
| DSR | 2 | 8.0 |
| DSR/C | 1 | 4.0 |
| DSR/CL | 1 | 4.0 |
| DSR/L-C | 1 | 4.0 |
| DSR/R-CL/L-C | 1 | 4.0 |
| DSR/SPUR | 1 | 4.0 |
| L-C | 1 | 4.0 |
| L-CL | 2 | 8.0 |
| L-D IN M/C | 1 | 4.0 |
| R-C | 1 | 4.0 |
| R-C/DSL | 1 | 4.0 |
| R-C/L-CL | 1 | 4.0 |
| R-CB/C | 1 | 4.0 |
| R-D IN M/R-C | 1 | 4.0 |
| Total | 25 | 100.0 |

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**Table 4: Follow up**

| Follow-Up Time | NB | No Follow-Up | Total |
|---|---|---|---|
| 1 week | 25 | 0 | 25 |
| 4 weeks | 24 | 1 | 25 |
| 8 weeks | 23 | 2 | 25 |
| 12 weeks | 23 | 2 | 25 |
| Total | 95 (96%) | 5 (4%) | 100 |

## DISCUSSION

The study revealed significant anatomical variations in the branching pattern of the sphenopalatine artery, highlighting the complexity of managing posterior epistaxis cases. Cauterization was performed in 25 patients, with four undergoing bilateral cauterization, nine on the right side, and twelve on the left side. Saline nasal drops and decongestants were prescribed for two weeks post-operatively, and all patients were followed up weekly for the first four weeks for endoscopic removal of crusts and discharge, then monthly for three months. Twenty-five patients were discharged on the third post-operative day, with two patients failing to attend the 4-week review. However, there were no recurrences reported in the entire study period, resulting in a success rate of 100%. This underscores the effectiveness of the management protocol, including cauterization and post-operative care, in achieving favorable outcomes in posterior epistaxis cases.

The higher prevalence of epistaxis in the 31-50 years age range is consistent with previous literature, which suggests that this demographic is more prone to nasal bleeding due to various factors such as environmental exposure, hypertension, and medication usage. However, the occurrence of epistaxis in younger individuals (<30 years) is noteworthy and warrants further investigation into potential risk factors specific to this age group [7, 8].

Regarding gender distribution, there was a slight predominance of males, comprising 52% of the study population, compared to 48% females. This finding aligns with existing literature suggesting a higher prevalence of epistaxis in males, attributed to factors such as occupational hazards, trauma, and hormonal differences [7, 8]. However, the relatively close distribution between genders in this study indicates that epistaxis can affect both males and females, emphasizing the importance of considering gender-specific risk factors and management strategies.

Analysis of the frequency of epistaxis episodes revealed a varying pattern among the study population. The majority of patients experienced between 4 to 6 episodes, each accounting for 24% of the total sample. This suggests a significant proportion of patients with recurrent epistaxis, requiring ongoing management and intervention [9]. The observation that 16% of patients reported 5 episodes and 16% reported 6 episodes further emphasizes the chronic nature of epistaxis in this cohort. The presence of patients experiencing 3 to 10 episodes highlights the wide variability in the severity and recurrence of epistaxis, which may be influenced by underlying comorbidities, environmental factors, and anatomical variations.

The study also investigated the anatomical variations of the SPA, a key vascular structure implicated in posterior epistaxis. The findings revealed diverse branching patterns, with the most common variation being L-3, accounting for 28% of the total sample. This is consistent with previous anatomical studies indicating a high prevalence of multiple branches originating from the SPA. Interestingly, the presence of variations such as R-1/L-3 and R-2/L-3 suggests asymmetrical branching patterns between the left and right sides, which may have clinical implications in the management of posterior epistaxis. Understanding these variations is crucial for clinicians performing interventions targeting the SPA, such as cauterization and embolization, as they may need to adapt their approach based on individual anatomical characteristics [9, 10].

The findings of our study have several clinical implications for the management of posterior epistaxis. Firstly, the observed age distribution underscores the importance of considering age-specific

risk factors and comorbidities when assessing and managing patients with epistaxis. Additionally, the gender prevalence highlights the need for gender-sensitive approaches to treatment and prevention. The frequency of epistaxis episodes suggests the chronic and recurrent nature of the condition in many patients, necessitating long-term management strategies aimed at reducing recurrence and improving quality of life. Clinicians should consider a multidisciplinary approach involving otolaryngologists, hematologists, and cardiologists to address underlying systemic conditions contributing to epistaxis. The anatomical variations of the SPA underscore the importance of preoperative imaging and careful anatomical assessment before performing interventions targeting this vascular structure. Future research could focus on elucidating the clinical significance of specific SPA variations and their impact on treatment outcomes [11, 12]. Table 4 summarizes the follow-up results at 1, 4, 8, and 12 weeks post-intervention. At 1 week, all 25 patients had follow-up, while at 4 weeks, 24 patients had follow-up and 1 did not. At 8 weeks, 23 patients had follow-up, with 2 patients missing their appointments. Similarly, at 12 weeks, 23 patients had follow-up, and 2 did not attend their appointments. In total, 95 patients (96%) had follow-up appointments, while 5 patients (4%) did not attend their scheduled appointments throughout the follow-up period. As Sphenopalatine artery is the major contributor of nasal blood supply, it is more logical to adopt Transnasal Endoscopic Sphenopalatine artery Cauterization. It can be combined with anterior ethmoid artery ligation if a superior source of bleeding is suspected. The most common cause of epistaxis is idiopathic, affecting older individuals, with males being more frequently affected than females. Recurrent or refractory bleeding warrants surgical intervention such as ligation or cauterization. In acute cases, securing the airway is paramount. Surgery aims to occlude the offending artery while preserving sinonasal function.

Despite the valuable insights provided by this study, several limitations should be acknowledged. The relatively small sample size of 25 patients may limit the generalizability of the findings to broader populations.

## CONCLUSION

In conclusion, our study confirmed , transnasal endoscopic sphenopalatine artery cauterization, often combined with anterior ethmoid artery ligation if a superior source of bleeding is suspected, is the preferred approach due to its precision, minimally invasive nature, high success rate, and lower complication rates. It has become the treatment of choice for patients with recurrent and refractory epistaxis.

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