Section: Otorhinolaryngology

Original Research Article

EPISTAXIS AND ITS MANAGEMENT IN HOSPITALISED PATIENTS IN A TERTIARY CARE CENTRE

Harshit Gupta[1], Madhuri Kaintura[2], Rishabh Dogra[3], Apoorva Kumar Pandey[4], Arvind Varma[5], Tripti Maithani[6], Sharad Hernot[7], Fatma Anjum[8]

[1]*Junior Resident, Shri Guru Ram Rai Institute of Medical and Health Sciences, Dehradun, India.*
[2]*Assistant Professor, Shri Guru Ram Rai Institute of Medical and Health Sciences, Dehradun, India.*
[3]*Assistant Professor, Shri Guru Ram Rai Institute of Medical and Health Sciences, Dehradun, India.*
[4]*Professor, Shri Guru Ram Rai Institute of Medical and Health Sciences, Dehradun, India.*
[5]*Professor, Shri Guru Ram Rai Institute of Medical and Health Sciences, Dehradun, India.*
[6]*Professor & HOD, Shri Guru Ram Rai Institute of Medical and Health Sciences, Dehradun, India.*
[7]*Associate Professor, Shri Guru Ram Rai Institute of Medical and Health Sciences, Dehradun, India.*
[8]*Senior Resident, Shri Guru Ram Rai Institute of Medical and Health Sciences, Dehradun, India.*

Received *: 02/12/2024*
Received in revised form *: 21/01/2025*
Accepted *: 06/02/2025*

Corresponding Author:
Dr. Fatma Anjum,
Senior Resident, Shri Guru Ram Rai Institute of Medical and Health Sciences, Dehradun, India.
Email: studiesent@gmail.com.

DOI: 10.70034/ijmedph.2025.1.172

Source of Support: Nil,
Conflict of Interest: None declared

Int J Med Pub Health
2025; 15 (1); 921-928

ABSTRACT

Background: Epistaxis, or nose-bleeding, is a frequent health concern, affecting approximately 60% of the population. Epistaxis may be classified as anterior or posterior, with various local and systemic causes. While most nosebleeds resolve spontaneously, severe cases can be life-threatening. The primary treatment strategies include conservative methods like nasal packing and cauterization; however, later, surgical interventions may become necessary.
Aim: To study the clinical etiology and management strategies of epistaxis in a tertiary care centre.
Material and Methods: A descriptive study was conducted on 100 randomly selected epistaxis patients. Detailed clinical evaluations and necessary investigations were performed. Patients received appropriate treatments, including anterior and posterior nasal packing, cauterization and surgical interventions (e.g., ESPAL, septoplasty) as needed. Data was tabulated and analysed.
Results: The study revealed three peaks in the incidence of epistaxis: childhood (<16 years), young adults (21-30 years), and older adults (>51 years). Winter had the highest incidence followed by summer. Most cases were anterior (63%), with primary epistaxis being more prevalent (68%). Hypertension (40%) and diabetes (36%) were common systemic conditions, and trauma was the most frequent secondary cause (9%). Anterior nasal packing (45%) and chemical cauterization (35%) were the most common treatments, with surgical intervention in 10% of cases.
Conclusion: This study highlights the clinical patterns of epistaxis and effective management strategies. These findings emphasize the need for targeted interventions, particularly in at-risk groups, and the importance of early diagnosis and management in tertiary care setting.
Key words: Epistaxis, Nose bleed, Chemical cauterization, Septoplasty, TESPAL

INTRODUCTION

Epistaxis, or nose-bleeding, has been a health concern for humans for centuries. It is the most common emergency in Otorhinolaryngology, affecting around 60% of the population. Of these cases, approximately 6% require medical attention.[1-4] Epistaxis is most frequently seen in children between 2 and 10 years old and in older adults aged 50 to 80.[5] While most nosebleeds resolve on their own, some can become severe and life-threatening, requiring hospitalization.

The causes of epistaxis can be divided into local and systemic factors. Local causes include issues within the nose, paranasal sinuses, and nasopharynx.

Systemic causes encompass a variety of conditions, such as hematological disorders, liver diseases, cardiovascular issues, renal diseases, and certain medications. In around 10% of cases, the exact cause remains unknown and is classified as idiopathic. Hypertension, though a possible contributing factor, is not always present in these cases.[6]

Age is an important factor in the occurrence of nosebleeds. Anterior nosebleeds are more common in younger individuals, often caused by foreign objects or nose picking. In contrast, posterior nosebleeds are more frequent in older adults. Trauma-related nosebleeds typically affect individuals under 35, while non-traumatic nosebleeds are more common in those over 50.[5-8]

Identifying anterior epistaxis is relatively straightforward as blood is visibly seen flowing from the nostril(s). However, diagnosing posterior epistaxis is considerably more difficult because blood isn't readily visible externally; instead, the patient may swallow blood. Consequently, the severity of posterior epistaxis may only become apparent when vital signs deteriorate, such as a drop in blood pressure and signs of shock.[9] The concern regarding posterior epistaxis in older individuals is heightened due to their increased likelihood of experiencing rapid deterioration in their clinical condition.[10]

Accordingly, the effectiveness of treatment relies on factors such as the underlying cause, location, and severity of the bleed, as well as any accompanying medical conditions. Treatment options encompass a range of approaches, including conservative measures and surgical interventions, aimed at achieving hemorrhage control.

In this descriptive study, our aim was to analyse the clinical presentations and identify the causes of epistaxis, as well as to examine the current management strategies employed in a tertiary care centre in India.

Aim: To study the clinical etiology of epistaxis and its management strategies in a tertiary care centre.

MATERIALS AND METHODS

A descriptive study was conducted in the department of Otorhinolaryngology, Shri Mahant Indiresh Hospital.

The descriptive study was conducted on randomly selected 100 patients with bleeding from nose for various clinical causes after obtaining their informed written consent.

Patients were subjected to a detailed clinical work-up after resuscitation and control of bleeding. Relevant history and detailed examination was recorded in a proforma of all the cases. Nasal endoscopy was done. Those patients who required further investigations to confirm the diagnosis were investigated as per the etiology.

In patients with suspected coagulopathy, complete blood count, PT/INR/APTT, LFT and clotting factor profile was done.

In certain patients, radiological investigations like CT PNS (contrast/non-contrast) or MRI PNS (contrast/ non-contrast) were done wherever necessary. Patients with bleeding disorders were referred to a pediatrician/general physician for detailed investigations and further management.

Inclusion Criteria

- Patient with epistaxis presenting in Shri Mahant Indiresh Hospital were included.
- Patients who agreed to take part in the study.

Exclusion Criteria

- All patients not consenting for the study.

A detailed history was taken and examination was done to identify predisposing factors and site of bleed. The patient was assessed in a semi-recumbent position. The nose was inspected for bleeding site using Thudicum nasal speculum or nasal endoscope where-ever necessary.

Wherever there was an identifiable cause such as Foreign body/ nasal mass/ tumour/ trauma/ Bleeding polypus/ granuloma: it was treated.

Wherever bleeding point was identified, it was cauterized using TCA/Silver Nitrate chemical cautery(Figure 1) circumferentially with cotton tip on a Jobson Horne probe. Precautions were taken to avoid over application of TCA to avoid septal perforation.

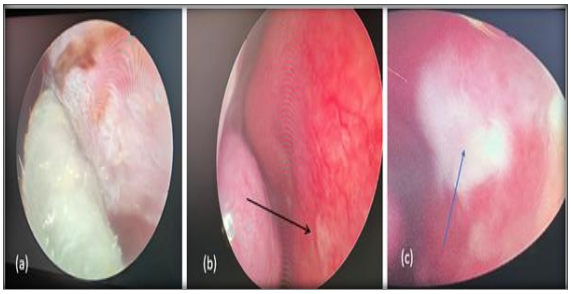


Figure 1: Showing 20%TCA application

a) Showing cotton tip applicator
b) Black arrow points to a small area which has been cauterized
c) To a large raw area in the nasal septum(blue arrow).

Those cases which failed on chemical cauterization were cauterized using bipolar cautery under local anesthesia (4% xylocaine surface anesthesia).

In cases of profuse bleed, control of bleeding was done using anterior nasal packing. Under all aseptic care, anterior nasal packing was done using 1m long ¼ inch ribbon gauge impregnated with liquid paraffin and antibiotic ointment in layers. Anterior nasal pack was kept for 48-72 hours under antibiotic coverage.

In cases where anterior nasal packing didn't suffice and bleeding continued, Posterior nasal packing was done using Foley's catheter. Nasopharyngeal tamponade was achieved using a Foley catheter (size 12 or 14) placed along the floor of the nasal cavity until it reaches the nasopharynx. The Foley catheter was then inflated with 15 ml of water and pulled forward to engage in the posterior choana, after

which anterior packing was inserted. Care was taken to secure the Foley catheter anteriorly without causing pressure on the columella. Another method used was by preparing a postnasal pack by tying three silk ties to a piece of gauze rolled into the shape of a cone. A rubber catheter was then passed through the nasal cavity and brought out from the mouth. Silk thread ends were then tied to it and catheter was withdrawn from the nose. Then the pack was guided into the nasopharynx. Silk threads were then tied after inserting an anterior nasal pack. Third silk thread was cut short and taped to angle of mouth for easy removal. Antibiotics and opiate analgesia were necessary after posterior nasal pack insertion. Once in place, posterior packs remained for at least 48-72 hours.

In few cases of recurrent epistaxis with intractable bleeding from nose, surgery was done. Surgeries done included ESPAL (endoscopic ligation of sphenopalatine artery) and septoplasty.

In Septoplasty, 0 degree nasal endoscope was introduced in the nasal cavity. Killian's incision was given and mucoperichondrial and mucoperiosteal flap was elevated. Deviated part of the nasal septum was identified and removed. Incision was stitched and nasal packing was done.

In ESPAL, 0 degree endoscope was introduced in the nasal cavity. Middle meatus antrostomy was done. Flaps were elevated from posterosuperior end of the maxillary sinus ostia. Crista ethmoidalis was identified. Branches of sphenopalatine artery was identified and coagulated using bipolar cautery. Nasal packing was done.

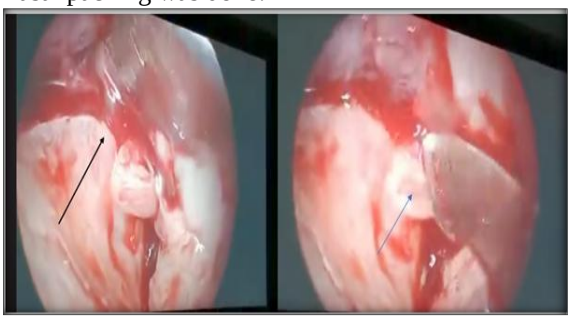


Figure 2: Showing sphenopalatine artery (blue arrow) and crista ethmoidalis (black arrow) during ESPAL

In all cases, any underlying co-morbid condition was identified and treated simultaneously.

All the data was gathered and tabulated. Following definitions were used:

Structured Clinical Classification:[11]

Primary Epistaxis- No proven factors

Secondary Epistaxis- Proven causal factor

Childhood <16 years

Adult >16years

Anterior Epistaxis - Bleeding point anterior to pyriform aperture

Posterior Epistaxis- Bleeding point posterior to pyriform aperture.

RESULTS

Table 1: Distribution of cases according to Age

Age Group	Frequency	Percent
0-10	15	15
11-20	9	9
21-30	18	18
41-50	8	8
51-60	33	33
61-70	16	16
71-80	1	1

Table 1 distributes the cases according to age, wherein we can see 3 peaks. First is childhood i.e. less than 16 years where we found 21 cases; then young adults, 21-30 years and lastly old age>51 years.

Table 2: Distribution of cases according to Seasonal Variation

Season	Frequency	Percent
Spring	12	12
Summer	23	23
Autumn	9	9
Monsoon	4	4
Winter	52	52

Table II highlights a substantial seasonal variation in the distribution of cases, with winter showing a significantly higher number of cases followed by summer. Winter was defined as December to February; Spring was defined as March and April; Summer was defined as May and June, Rainy season July, August and September; and Autumn was defined as October and November according to weather atlas.[12]

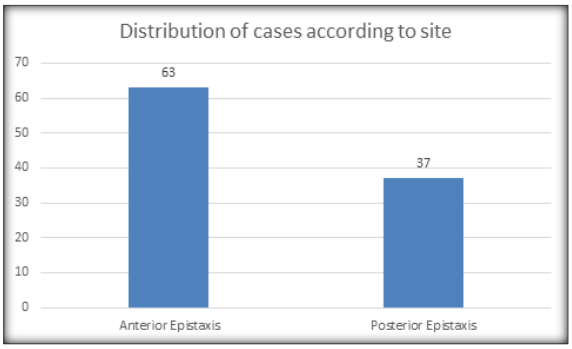
As regards the time of epistaxis, we found the following. These timings were divided on the basis of duty timings in the hospital for ease of data collection.

- **Morning Time(8am to 2 pm)**: This time period has 36 cases. This indicates that a significant portion of cases are admitted in the morning.
- **Afternoon time(2pm – 8pm)**: This time period has the fewer cases with 22 cases. This shows

that fewer cases are admitted in the evening compared to other times.

- **Night Admission(8pm to 8am)**: This time period has the highest number of cases with 42 cases.

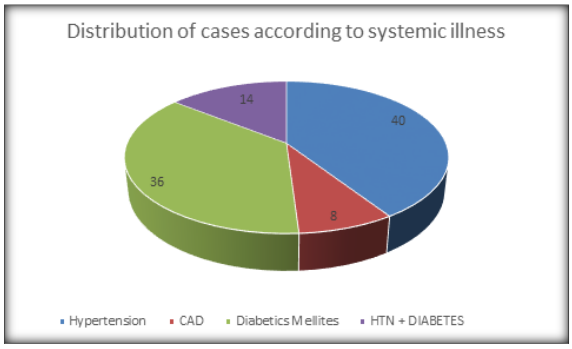
This finding shows a clear variation in the distribution of cases based on the time of epistaxis, with the majority of cases being from 5am to 8 am.



Graph 1: Distribution of cases according to type of site

- The vast majority of nosebleeds (63.0%) are anterior, meaning they originate from the front part of the nose.
- A smaller portion (37.0%) are posterior, meaning they originate from the posterior part of the nose. Graph 1 shows this distribution.

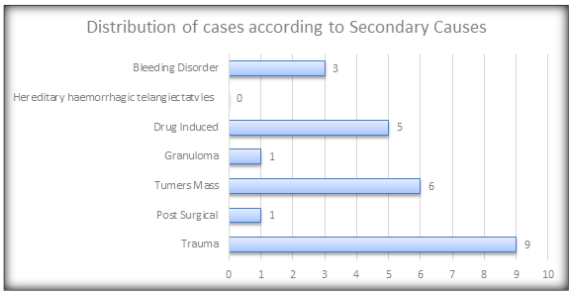
A majority of the cases (68.0%) are classified as primary. A smaller portion (32.0%) are classified as secondary. The distribution according to table 3 indicates that primary cases are significantly more common than secondary cases in the data presented.



Graph 2: Distribution of cases according to systemic illness

- **Hypertension** is the most common systematic illness, present in 40.0% of the cases.
- **Diabetes Mellitus** is the second most common, present in 36.0% of the cases.
- Cases with both **Hypertension and Diabetes** constitute 14.0% of the total.
- **Coronary Artery Disease (CAD)** is the least common, present in 8.0% of the cases.

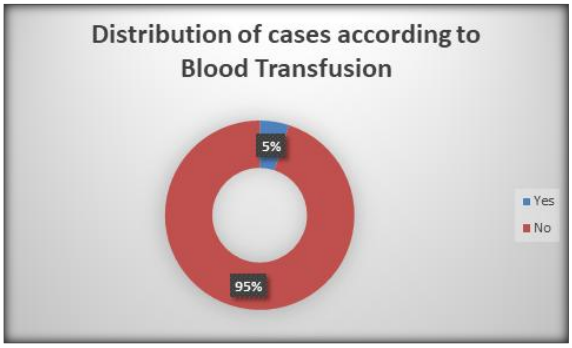
Graph 2 distributes epistaxis according to systemic diseases which shows that hypertension and diabetes mellitus are prevalent conditions among the cases, with some having both conditions. CAD is less commonly observed in this dataset.



Graph 3: Distribution of cases according to Secondary Causes

- Trauma is the most common secondary cause, accounting for 9.0% of cases.
- Foreign Body/ Tumor / Mass is the second most common, accounting for 6.0% of cases.
- Drug Induced conditions account for 5.0% of cases.
- Bleeding Disorder accounts for 3.0% of cases.
- Post-Surgical and Granuloma each account for 1.0% of cases.
- Hereditary Haemorrhagic Telangiectasia- no cases reported.

Graph 3 highlights that trauma is a leading secondary cause, followed by tumor/mass and drug-induced conditions. Other causes like post-surgical complications, granuloma, and bleeding disorders are less common



Graph 4: Distribution of cases according to Blood Transfusion

Graph 4 shows that:

- 5.0% of cases required a blood transfusion.
- 95.0% of cases did not require a blood transfusion.

Table 3: Distribution of cases according to type of epistaxis

Type	Frequency	Percent
Primary	68	68
Secondary	32	32

Table 4: Distribution of cases according to Management

Indirect	Frequency	Percent
Anterior Nasal Packing	45	45
Posterior Nasal Packing	8	8
Septal Surgeries	3	3
Endoscopic Ligations	4	4
Direct		
TCA applications	35	35
Bipolar	10	10
Bleeding Polypus/Tumour/Foreign body Removal	6	6

Table 4 tabulates the following:

1. Indirect Treatment Methods:

- Anterior Nasal Packing: 45 cases (45.0%)
- Posterior Nasal Packing: 8 cases (8%)
- Septal Surgeries: 3 cases (3%)
- Endoscopic Ligations: 4 cases (4%)

2. Direct Treatment Methods:

- TCA Applications: 35 cases (35%)
- Bipolar: 10 cases (10%)
- Bleeding Polypus/Tumor/Foreign Body Removal: 6 cases (6%)

DISCUSSION

Nosebleeds, also known as epistaxis, can be a symptom of many different conditions. Anterior epistaxis is easier to treat when compared to posterior epistaxis. Also, thorough examination is needed to rule out all causes of epistaxis.

In this study, we found that childhood epistaxis was about 21% of all the cases which is higher as compared to a study conducted by Adoga et al[13] which had a childhood epistaxis frequency of around 8%. In a study conducted by Varshney et al,[14] childhood epistaxis was found to be about 15%. In another study conducted by Yan et al,[15] highest incidence of pediatric epistaxis was found between the age group of 3-5 years. The most common cause was finger nail trauma in this age group in our institute followed by foreign body and lastly bleeding disorder seen in 2 patients in this age group. In this study, we saw 3 peaks, first childhood, second young adults and third in elderly >51 years. This was found to be different from a study conducted by Sharma et al,[16] where the maximum numbers of patients were between the age group of 21 to 30 years and least number of patients in geriatric age group. Epistaxis was found to be more prevalent in the young adults in a study conducted by Eziyi et al.[17] Young children in a developing country like ours, are prone to be left unsupervised quite frequently, resulting in foreign body insertion and finger nail trauma. In children, injury to the Kiesselbach plexus is also common due to their tendency to pick their noses, leading to anterior epistaxis. Young adults are more likely to experience nosebleeds due to assaults or roadside accidents. In elderly patients, the prevalence of hypertension contributes to arteriosclerosis, which increases the fragility of blood vessels, making them more prone to epistaxis. This is especially true during activities that increase intra-abdominal pressure, such as straining or weightlifting.[18]

In this study, we found maximum number of patients of epistaxis during winter season. It was different from a study conducted by Sharma et al,[16] where maximum numbers of patients were found during the summer season. Our study was in conformation with the study conducted by Chaaban et al,[19] where most patients of epistaxis were found more during winter season. This can be attributed to the fact that dryness increases in winter season. Cruz AA et al. concluded in their study that patients sensitive to dry and cold weather experience a shedding of the epithelial layer when exposed to cold, dry air, which was statistically significant compared to other groups. Summer is typically more humid than winter, which tends to be drier and colder. This dryness makes the nasal mucosa more vulnerable to micro abrasions, increasing the likelihood of epistaxis.[20] Winther B et al. identified additional factors contributing to the higher incidence of epistaxis during winter months, including: (i) changes at the cellular level, such as disruption of the epithelial cell barrier, and (ii) the mechanical effects of increased sneezing or nose blowing due to the cold.[21] These factors are most likely linked to the colder climate and exposure to indoor heating during winter, which lowers ambient humidity and causes more water evaporation from the nasal mucosa. This increases the risk of drying out and triggering epistaxis.[22] For this same reason, i.e. high humidity, epistaxis is less in rainy season.

In our study, maximum number of patients presented with epistaxis during 5am to 8am. No direct relation could be established based on diurnal variation but in a study conducted by Manfredini et al,[23] morning predominance was found. In another study conducted by Sadick et al,[24] yet again morning predominance was found. The cause of morning epistaxis remains unclear. However, the physiological nasal cycle, which involves the involuntary contraction and dilation of blood vessels in the inferior turbinate mucosa, may play a role. This process can lead to congestion of the nasal blood vessels overnight.[25] As a result, changes in temperature, air humidity, and atmospheric pressure may disturb the nasal cavity's self-regulation mechanisms.[26]

In this study, anterior epistaxis was found to be more common, i.e., in 63 patients while posterior epistaxis in 37 patients. According to a study conducted by Sharma et al,[16] similar findings like in our study, were found with predominance of anterior epistaxis but with 91.12% of patients while only 8.98% had

posterior epistaxis. In studies, conducted Emanuel et al,[27] similar results were found. Anterior epistaxis is common as the area lies at the entrance to the nasal cavity and is subject to extremes of heat, cold, and high and low moisture; it is easily traumatized. The mucosa over the septum in this area is fragile, making this the site of most epistaxis.[22]

In our study, Primary epistaxis was found to be the most common cause followed by secondary causes. 68% of our study population had idiopathic cause of epistaxis which is in concordance with literature. But, in some studies, as that done by Parajuli et al,[28] showed that 38% population had idiopathic cause followed by 62% as secondary cause of epistaxis. Christensen et al found more patients of primary epistaxis.[29] Primary epistaxis is typically idiopathic, meaning it occurs spontaneously without an obvious cause, although environmental factors may contribute to its onset. Secondary epistaxis, on the other hand, can result from various local or systemic factors. Local causes include dry air, alcohol abuse, infections, chemical irritants, inflammation, allergies, trauma, cancer, and the use of intranasal medications. Systemic factors include the use of anticoagulants and antiplatelet drugs, blood disorders, leukemia, atherosclerosis, and congestive heart failure. Recurrent epistaxis may sometimes be the first sign of an underlying local or systemic neoplastic disease.

In this study, 40% of the study population was hypertensive. This was in conformation with studies conducted by Varshney.[14] Some studies say that hypertension is not the cause of epistaxis but it prolongs the bleeding once it starts because in patients with hypertension there is arterial muscle degeneration that leads to defective muscle layer lacking the power to contract resulting in persistence rather than initiation of bleeding. However, the causative factor that might be responsible for the rupture of vessel is still unknown.[14] In some of our hypertensive patients with epistaxis, uncontrolled hypertension was linked to discontinuation of antihypertensive medications and inadequate treatment due to infrequent check-ups. This highlights the importance of regular blood pressure monitoring and adherence to prescribed medications. Many patients with epistaxis are also anxious, which can lead to transient hypertension, as blood pressure was found to be elevated in most patients upon arrival at the hospital. A study by Byun et al. demonstrated a positive correlation between hypertension and epistaxis.[31] Another study by Adoga et al. found 27% of their population had hypertension, which was lower than our findings.[13]

Chronic vascular damage caused by conditions like high blood pressure may play a role in the development of epistaxis. Several studies suggest that chronic hypertension can increase the frequency of nosebleeds due to its effects on blood vessels, such as atherosclerosis, endothelial dysfunction, and vessel rupture.[32] Patients with both epistaxis and a history of hypertension may experience more severe damage to the arterial walls in the nasal cavity.[22]

Trauma was found to be the most common cause amongst secondary causes with a population of 9 patients (9%). It was lower than a study conducted by Parajuli et al (120) with 13 patients having traumatic epistaxis. Study conducted by Varshney et al (108) had 5 cases (5.68%) with traumatic epistaxis which was lower as compared to our study. 6% study population presented with Foreign Body/ bleeding polypus/sinonasal tumor/nasopharyngeal tumor. It was much higher as compared to study conducted by Varshney et al,[14] in which they had around 1.14% population with tumor etiology of epistaxis. This may be due to the factor that being a tertiary care centre, a lot of cases were referred here from smaller centres.

Blood transfusion was required in only 5% of our study population. In a study conducted by Varshney et al,[14] 6.92% study population required blood transfusion while in Gilyoma et al,[33] blood transfusion required was much higher. This shows that in most our patients, epistaxis was not severe.

Anterior nasal packing was done in 45% patients in our study. In a study conducted by Parajuli et al,[28] 52.38% population underwent anterior nasal packing which was also in conformation with our study. 35.9% population underwent anterior nasal packing in a study conducted by Adoga et al.[13] In our study, posterior nasal packing was done in 8% study population. This was higher than the study conducted by Sharma et al,[16] in which only 1 patient off 304 underwent posterior nasal packing. In a study conducted by Adoga et al,[13] 34.8% study population underwent posterior nasal packing and in study by Parajuli et al,[28] 14 (16.66%) patient required posterior nasal packing which was much higher as compared to our study.

Chemical cauterization was done in 35% of cases in our study. This was much higher than other studies conducted by Varshney et al,[14] where chemical cauterization was done in 19.31% of patients and Parajuli et al,[28] where 14.28% study population were treated chemical cauterization. Silver Nitrate serves as a cauterization agent by delivering free silver ions to the tissue, which later form an eschar and seals the blood vessels. It can be applied to the tissue as a topical agent and is available in the form of a solution or an applicator stick. Silver nitrate needs application of sterile water or moisture naturally present in the wound bed to be activated.[34] Application of a chemical agent to the bleeding site creates a protein-based “eschar” that essentially seals off the blood vessel by causing localized tissue destruction, thus stopping the bleeding. Chemical cauterization was usually done on raw area of anterior septum in patients where no identifiable cause could be found.[28]

Patients who have recalcitrant epistaxis, persisting even after one or more attempts of nasal cautery, a more definitive procedure can be opted for. Septoplasty is theorized to stop epistaxis by inducing fibrosis and reducing vascularity of the nasal septal

mucosa after the mucoperichondrial flap is raised and reposited.[35] Septal surgery, in our study, was required in 3% population only. It was in conformation with a study conducted by Varshney et al,[14] where 4 patients (4.55%) underwent septal surgery.

TESPAL is recommended in bleedings that cannot be stopped despite anterior nasal packing or in patients with posterior epistaxis after the removal of the packing in 48–72 hours.[36,37] When the literature is reviewed, it is seen that the success rate of TESPAL is greater than 85%. Failure to clip the posterior septal branch of the SPA, dislocation of the hemoclips, bleeding diathesis, accompanying anterior ethmoid artery bleedings that were not noticed during the first surgery and bleeding from the collateral vascular structures can be considered among the causes of recurrent bleeding.[38] Endoscopic ligation of artery was done in 4% of our study population. While in studies conducted by Parajuli et al,[28] and Adoga et al,[13] 2 patients had to undergo endoscopic artery ligation.

CONCLUSION

This study aimed to investigate the clinical etiology of epistaxis and its management strategies in a tertiary hospital, focusing on identifying the causes, and effective treatment protocols including the latest guidelines.

The management strategies employed, including anterior nasal packing and cauterization, were effective in controlling bleeding in the majority of cases, demonstrating that these methods are highly effective in a tertiary hospital setting.

These results have important implications for clinical practice in tertiary hospitals. Understanding that hypertension and trauma are also associated with epistaxis can help healthcare providers focus on early diagnosis and targeted management strategies. This study also underscores the importance of effective initial treatment methods, such as nasal packing and cauterization, in reducing recurrence and complications associated with epistaxis. Moreover, recognizing the demographic patterns can aid in developing targeted prevention strategies for at-risk groups. Also, management of co-morbidities is also of equal importance.

Limitation faced by the study was taking 100 randomly selected cases coming to the hospital which can askew the data.

Future research should focus on studies to capture a broader spectrum of epistaxis cases, including those managed in outpatient settings. Additionally, investigating the long-term outcomes of different management strategies could provide a deeper understanding of their efficacy and help develop more comprehensive treatment guidelines. Addressing these areas will be crucial for advancing knowledge in the field of otolaryngology.

The following action plan can be devised as per the study:

1. Seasonal Preparedness: Implement increased readiness and resource allocation for winter months.
2. Gender-Specific Strategies: Address factors contributing to the higher incidence in males.
3. Night Admission Protocols: Enhance night-time medical staffing and protocols.
4. Systemic Illness Management: Integrate hypertension and CAD in routine care for these patients.
5. Age-Focused Interventions: Develop targeted awareness and prevention programs for adults, particularly those aged <10 years and >50 years.

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