

Etiopathogenesis and Management of Epistaxis in Tertiary Care Centre: A Prospective Study**Pramod T Kharadi¹, Viral G Prajapati²**¹Associate Professor, Department of Otorhinolaryngology, Surat Municipal Institute of Medical Education and Research, Surat, Gujarat²Professor and Head, Department of Otorhinolaryngology, Dr. M.K. Shah Medical College and Research Centre, Ahmedabad, Gujarat

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Corresponding author: Dr. Viral G Prajapati

Conflict of interest: Nil

Abstract:

Background and Aim: Although epistaxis is a prevalent condition, its causes vary according to geography, climate, season, and population. Studying the etiopathogenesis and management of epistaxis in a tertiary care centre using various techniques, including medical line of management, anterior and posterior nasal packing, endoscopy-guided electric and chemical cauterization, endoscopy-guided arterial ligation, endovascular embolization, and surgical methods, is the focus of the current research.

Material and Methods: A prospective descriptive study was initiated at the Tertiary Care Teaching Institute of India over the course of one year to determine the etiopathogenesis and management of epistaxis. An exhaustive medical history was obtained from the patient in order to exclude hereditary, systemic aetiologies of epistaxis. A comprehensive systemic and local investigation was undertaken in an effort to identify the cause of epistaxis. After determining the cause, definitive treatment was administered to the patient, which included foreign body removal, correction of the fractured nasal bone, functional endoscopic sinus surgery, septoplasty, excision of the nasal mass, management of hypertension, and transfusion of fresh blood or platelets.

Results: The age of the patients in this study ranged from 2 to 79 years; however, the age group of 11 to 50 comprised the majority of cases (68/100), indicating that epistaxis is a more prevalent issue among young adults and adolescents. Males were found to be 61% more affected than females in our research. Idiopathic epistaxis accounted for 30 (30%) of the cases in which the most prevalent aetiology was unknown. In our study, we identified various local causes, including deviated nasal septum (9%), foreign body nasal septum (6%), haemangioma septum (6%), and others. The majority of the participants in our research exhibited anterior nasal haemorrhage (45%), with the least frequent site being the nasal passages (20%).

Conclusion: We identified numerous aetiologies for epistaxis in our study; however, idiopathic causes were the most prevalent. Additional coexisting conditions of the patients were excluded. Among adolescents and young adults, epistaxis was identified as the most prevalent neurological disorder. Anterior nasal cavity (Little's area) is the most frequently observed site of haemorrhage. Conservative management was applied to the majority of patients.

Keywords: Anterior nasal cavity, Bleeding, Deviated nasal septum, Epistaxis.

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Introduction

Epistaxis, also known as nasal hemorrhage, is a prevalent otorhinolaryngological emergency that poses a difficulty in resource-constrained centers with limited facilities to attend to these patients. [1] In general practice, epistaxis is a common complication that can manifest in three ways: as an emergency situation, a chronic condition characterized by recurrent haemorrhages, or as a symptom of a systemic disorder. [2] In addition to disrupting hemodynamics, it can induce significant anxiety among patients and their family members. An estimated ninety percent of cases of epistaxis go unreported to clinical facilities, with only ten

percent seeking medical attention. [3] Despite this, epistaxis is the most frequently encountered ear, nose, and throat (ENT) emergency, accounting for over 25% of cases, according to an Indian study. [4] There are two distinct categories of site bleeding epistaxis: anterior and posterior. Approximately 90% of cases are classified as anterior epistaxis. [5] Etiology may be local, systemic, or idiopathic, with a multitude of specific aetiologies falling under each of these broad categories. Bleeding control is the principal objective of both anterior and posterior epistaxis management. This is accomplished by

systematically progressing from non-invasive to minimally invasive to invasive techniques, contingent upon the underlying cause. [6]

Epistaxis is classified broadly into three categories of causes: local, general, and idiopathic. Trauma, infection, foreign bodies, neoplasms of the nose and paranasal sinuses, a deviated nasal septum, and atmospheric changes are frequent local causes. Cardiovascular causes, including but not limited to hypertension, mitral stenosis, arteriosclerosis, and blood dyscrasias, chronic liver and kidney diseases, excessive salicylate and anticoagulant use, and acute general infections, are examples of general causes. The aetiology is frequently idiopathic. [7]

Every patient presenting with epistaxis necessitates a personalised clinical evaluation and treatment approach, occasionally determined by investigation. Epistaxis management is multifaceted, necessitating a methodical and structured approach; alternative courses of action differ contingent upon the aetiology, site, and extent of the haemorrhage. Aside from surgical intervention, conservative measures have also been employed to treat epistaxis. Conservative (non-surgical) treatment included anterior and posterior nasal packing, cauterization of the haemorrhage site with electrocautery, and anterior nasal packing. Resection of intranasal tumours, arterial ligation, surgery on the nasal septum, and arterial embolisation constituted the surgical treatment. [8] In order to investigate the etiopathogenesis and management of epistaxis in a tertiary care centre, the present study employs a variety of techniques, including endoscopy-guided electric and chemical cauterization, endoscopy-guided arterial ligation, endovascular embolization, and surgical methods.

Material and Methods

A prospective descriptive study was initiated at the Tertiary Care Teaching Institute of India over the course of one year to determine the etiopathogenesis and management of epistaxis.

The inclusion criteria for the present investigation encompassed individuals of both genders who presented with epistaxis. Inclusion criteria had no age restriction, and written informed consent was obtained before participation in the study.

The exclusion criteria for the present study encompassed patients who declined to provide informed consent. A substance abuse or psychiatric disorder that is anticipated to impede adherence to academic requirements, Individuals who are experiencing critical medical conditions such as myocardial infarction, inadequate follow-up, or have an allergy to any of the active treatment agents or their spray compounds.

One hundred cases from the ENT ward, outpatient department, accident and emergency department,

and patients referred from other departments were included in this study.

An exhaustive medical history was obtained from the patient in order to exclude hereditary, systemic aetiologies of epistaxis. A comprehensive systemic and local investigation was undertaken in an effort to identify the cause of epistaxis. Diagnostic nasal endoscopy, radiology of the nose and PNS, nasopharynx, and thorax, complete hemogram, complete urine examination, coagulation profile, blood grouping, and RH typing; ECG; and FNAC were among the pertinent investigations. A biopsy and fine needle aspiration cytology were performed.

Upon the patient's arrival at the hospital, prompt measures were implemented to staunch the haemorrhaging. Suction was utilised to localise the site of haemorrhage; chemical or electro cauterization was performed when localization was achieved with or without the endoscope. In cases where the site could not be visualised and the patient presented with profuse anterior epistaxis, anterior nasal packing was executed. For posterior epistaxis, posterior nasal packing was performed using ribbon gauze or foley's catheter. After determining the cause, definitive treatment was administered to the patient, which included foreign body removal, correction of the fractured nasal bone, functional endoscopic sinus surgery, septoplasty, excision of the nasal mass, management of hypertension, and transfusion of fresh blood or platelets. Monthly follow-up with the patient for one year was performed to assure recovery and rule out recurrence.

Statistical analysis

Following the compilation and entry of the recorded data into a spread sheet application (Microsoft Excel 2007), the information was exported to the data editor tab of SPSS version 15 (SPSS Inc., Chicago, Illinois, USA). On the basis of their distribution, quantitative variables were described as means and standard deviations or median and interquartile range. The presentation of qualitative variables consisted of counts and percentages. The levels of significance and confidence were established at 5% and 95%, respectively, for every test.

Results

The age range of the patients in this study was from 2 to 79 years. The preponderance of cases, 68% (68/100), occurred in the 11-50 age groups, indicating that epistaxis is a more prevalent issue among young adults and adolescents. Males were found to be 61% more affected than females in our research. Idiopathic epistaxis accounted for 30 (30%) of the cases in which the most prevalent aetiology was unknown. In 13 cases (13 percent),

trauma constituted the second most prevalent aetiology. In twelve (12%) cases, hypertension was identified as the underlying cause. In four cases (4%), blood dyscrasias were observed, including one case each of epistaxis caused by drug-induced thrombocytopenia and low platelet count (idiopathic).

Fungal rhinosinuitis (4%), bilateral sinonasal polyposis (4%), nasal myiasis (11%), rhinosporidiosis (1%), rhinolith (1%), haemangioma septum (6%), nasal cavity mass (4%), angiofibroma (4%), fungal rhinosinuitis (9%), and bilateral sinonasal polyposis (6%), were identified as local causes in our study.

The majority of the participants in our research exhibited anterior nasal haemorrhage (45%), with the least frequent site being the nasal passages (20%). Undetermined was the location of the haemorrhage in 43% of the patients. The management of epistaxis is classified as either nonsurgical (non-interventional) or surgical (interventional) in this study.

23 patients were managed through the implementation of conservative medical treatment. This includes patients for whom an anterior nasal compress was administered as an emergency procedure in the casualty. The anterior nasal compress was applied continuously for forty-eight hours.

Oral and intravenous antibiotics, as well as antihistamines, were administered to the patient while the pack remained in a fixed position. The patient was instructed to utilise saline nasal sprays for duration of one week prior to discharge. These patients underwent diagnostic nasal endoscopy, during which no haemorrhage point was identified.

In 44 cases, anterior nasal packing was performed as an emergency procedure to staunch haemorrhage in the casualty. Eighteen cases of idiopathic epistaxis, twelve cases of hypertension-related dyscrasias, three cases of blood dyscrasias, two cases of acute febrile illness resulting in low platelet count, eight cases of nasal bone fractures, and one case of adolescent nasopharyngeal angiofibroma comprise this group. Posterior nasal packing was performed in five instances of hypertension-induced epistaxis. Even anterior nasal compression was performed on each of these five patients. Antihypertensive medications were used to treat hypertensive patients. The patient was administered suitable medical intervention for the bleeding disorder. A total of 18 patients underwent diagnostic nasal endoscopy followed by chemical cauterization when an anterior aspect of the nasal cavity was observed to contain haemorrhage sites. After performing diagnostic nasal endoscopy and bipolar cauterization, posterior epistaxis was treated in seven patients.

In our study, prudent management was employed in the majority of epistaxis cases (55%). Acute nasal packing constituted the prevailing treatment modality employed in such situations (45%). In fifteen patients, endoscopic excision of the mass accompanied by anterior nasal packing was performed. Fracture nasal bone reduction was performed on fourteen patients after anterior nasal packing was initially employed to manage epistaxis. Septoplasty was performed as a definitive treatment for nine patients. Approximately the same proportion of patients (45%) underwent surgical treatment in our study.

Table 1: Age and Gender wise Distribution of Study Participants

Age group (years)	Male	Female	Total
1-10	8	2	10
11-20	6	14	20
21-30	11	6	17
31-40	8	3	11
41-50	10	10	20
51-60	8	1	9
61-70	9	2	11
71-80	1	1	2
80 above	0	0	0
Total	61	39	100

Table 2: Etiological distribution

Etiology	Number	Percentage (%)
Traumatic	13	13
Hypertension	12	12
Idiopathic	30	30
Foreign body nostril	6	6
Angiofibroma	4	4
Rhinosporidiosis	1	1

Myiasis	1	1
Mass nasal cavity	4	4
Hemangioma septum	6	6
Mass nasopharynx	1	1
Secondary to DNS	9	9
Rhinolith	1	1
Blood dyscrasias	4	4
Sinonasal polypsis	4	4
Acute febrile illness	1	1
Fungal rhinosinusitis	4	4

Table 3: Bleeding sites among 100 cases of present study

Bleeding site	Number	Percentage (%)
Anterior	45	45
Little's area	20	20
Undetermined	43	43
Lateral wall	10	10
Ant septum	8	8
Posterior	6	6
Ant floor	7	7
Post lateral wall	2	2
Nasopharynx	5	5

Discussion

Epistaxis continues to be the most prevalent ENT emergency. Although the anterior site of epistaxis is the most frequent location across all age groups, it is rarely life-threatening because the bleeding point is readily identifiable and situated anteriorly. Rarely venous, its origin is typically arterial and is situated in the vicinity of the little's area. Posterior epistaxis primarily affects the elderly, and since the site of origin is situated more posteriorly, it is difficult to access the site of bleeding; therefore, stopping the bleeding presents a formidable challenge. Changes in angiopathy associated with ageing and cardiovascular disease likely account for the protracted duration of haemorrhage.

The age distribution of the patients in our study spanned from 2 to 79 years. Notably, 68% (68/100) of the cases occurred in the 11–50 age group, indicating that epistaxis is a prevalent issue among young adults and adolescents. Males were found to be 61% more affected than females in our research. This preponderance of males has been recorded in the literature. [9-11] Epistaxis is predominantly observed in males on a global scale, with the exception of certain reports that indicate no significant sex difference in the geriatric age category. [12] This could potentially be attributed to the higher prevalence of outdoor activities, including sports and interpersonal violence, among males. Epistaxis is more prevalent among younger children and adolescents, most likely as a result of their nose-picking habit, which damages Kiesselbach's plexus, an organ located in the anteroinferior portion of the nasal septum. This damage ultimately leads to the development of anterior epistaxis. [13]

Likewise, in the current era, comorbidities such as hypertension and diabetes mellitus are prevalent among young adults. These conditions induce degenerative alterations in blood vessels, rendering them more susceptible to sudden changes in pressure. For instance, straining during micturition and defecation (as in constipation and BPH, respectively), excessive coughing (as in COPD), or lifting heavy objects can cause such changes. Having a nasal allergy, acute rhinitis, sudden temperature fluctuations, sinusitis and dry heat all result in nasal mucosa that is hyperemic and delicate, prone to bleeding during activities such as blowing or picking the nose, or in response to moderate trauma that causes anterior epistaxis. The majority of epistaxis cases lack a readily identifiable aetiology.

Local as well as systemic factors may contribute to it. Comparable to the findings of Christensen et al., the majority of our patients (18:30) who presented with epistaxis lacked a traceable aetiology. [14] Trauma is the second most frequent cause of epistaxis in our patients (8,13.33 percent). A surge in our study's incidence of trauma was attributable to an increase in motor vehicle collisions. In their research, Adegbiyi et al. [15] identified hypertension (6.3%) as the prevailing systemic aetiology and trauma (29.5%) as the most prevalent local etiology. In general, they observed that local aetiologies predominated. Abraham et al. [16] similarly documented that local aetiologies predominated. Additionally, Bui et al. [17] identified hypertension (19%) as the most prevalent systemic aetiology and trauma (26%) as the most prevalent local aetiology. In alternative sequences,

idiopathic and non-traumatic factors predominated. [18]

Our research provides further evidence that routine coagulation studies are unnecessary for patients who are admitted with epistaxis. In addition, 7% of patients experienced posterior nasal haemorrhage, while 45% experienced anterior nasal bleeding. A study conducted by Gilyoma (2011) revealed that anterior nasal haemorrhage afflicted the majority of patients (88.7%). [19] A fundamental blood analysis was performed on every patient. When nasal bone fracture was clinically suspected in patients with a history of nasal trauma, an X-ray of the nasal bone was obtained. Patients who presented with clinical suspicion of malignancy, adolescent males suspected of having JNA, patients with chronic sinusitis, and other necessary patients were administered X-ray and CT PNS.

A multitude of therapeutic approaches have been employed to manage epistaxis, encompassing techniques such as vasoligation and nasal pinching. The treatment for epistaxis is determined by the location, intensity, and cause of the haemorrhage. In general, treatment modalities can be categorized as either nonsurgical or surgical. Digital nasal compression, topical vasoconstrictor, local cauterization (chemical or electric), anterior or posterior nasal packing, blood transfusion, and foreign body removal are the nonsurgical/conservative modalities. The bleeding site may be cauterised with chemical agents such as silver nitrate, chromic acid, or trichloroacetic acid, or sealed using bipolar diathermy or electrocautery. Acute management of copious epistaxis in the majority of our patients involved anterior and/or posterior nasal packing. Absorbable nasal packing materials (ANPs), nasal tampons (e.g., Merocel and Rapid Rhone), ribbon gauze, or bismuth iodoform paraffin paste impregnated pack (BIPP) may be utilised for anterior nasal packing. A study conducted by Corbridge et al. revealed that Merocel nasal packing demonstrated efficacy in 85% of cases, with no discernible difference in success rates when compared to traditional ribbon gauze. [20]

Significant variation in management strategies is observed across studies. Basheer et al [21] found that conservative management predominated (78.6%), with anterior nasal packing (41.2%), cauterization (23.7%), and medical treatment (9.2%). Among the patients surveyed, surgery was reported as necessary in 21.4% of cases. No treatment was administered in 30.9% of the cases examined in the study by Carey and Sheahan²². However, nasal cautery and nasal packing were utilised in 41.3% and 27.7% of the patients, respectively. According to Adegbiji et al. [15], 62.5% of patients were placed under observation only, while 11.4% and 12.5% of cases were treated

conservatively and surgically, respectively. A blood transfusion was required by 2.7% of the patients in their study.

When anterior nasal packing fails to control profuse haemorrhage, posterior nasal packing is performed. The procedure can be executed utilizing a commercially available balloon, such as the triluminal nasal balloon catheter (Invotec), Epistat nasal catheter, or conventional ribbon gauze pack or Foley's catheter. Acute management of active epistaxis in our study involved anterior nasal packing in 44% of cases. Out of these 44%, posterior nasal packing was necessary in 5% of patients due to unsuccessful anterior nasal packing. Foley's catheter or ribbon gauze was utilised to perform posterior nasal packing, which was then followed by anterior nasal packing. For nasal packing, we utilised antibiotic-soaked ribbon gauze in the majority of our patients. In our research, nasal packs were removed 48 hours after the initiation of nasal packing. Diagnostic nasal endoscopy was then performed to determine the location of the hemorrhage. If the site was anterior, chemical cauterization was applied; bipolar electrocauterization was favoured for the posterior site.

By employing suctioning with this singular instrument, clots can be extracted, thereby concentrating bleeding to a location that is readily cauterizable. Ahmed and Woolford documented an 89% success rate in patients with epistaxis who underwent endoscopic electrocautery. [11] Prior nasal packing and surgery were favoured by Islam et al.¹⁸ in 40% and 35.6% of their cases, respectively. As prevalent management approaches, anterior nasal packing (74.6%) and chemical and electrocautery (7.1%) were utilised by Alharethy et al [23]. The most frequently used treatment method in the study by Bui et al. [17] was cauterization (51%), followed by Surgicel/Surgifoam (48%), Rhinorocket (27%), and Merocel (10%). In 12% of the cases in their series, no intervention was performed. Adoga et al. [24] documented that nasal packing was implemented as a therapeutic approach in 96.8% of the surveyed patients. Nevertheless, certain studies have documented cauterization as the prevailing approach to management. [17]

Surgical intervention or last resort is typically reserved for cases of refractory epistaxis that persists despite the implementation of conservative measures like posterior nasal packing. Arterial ligation or selective arterial embolisations are among the surgical treatment alternatives. Coils, gel foam, or polyvinyl alcohol are utilised in angiographic embolisation to obstruct the bleeding vessel. It has been determined that this method has a success rate of 87%. [25] Nevertheless, there is a potential for complications following arterial

embolisation, including cerebrovascular accident, hemiplegia, ophthalmoplegia, facial nerve dysfunction, and necrosis of soft tissue. [26] Endoscopic SPA ligation has emerged as a favored surgical approach among rhinologists in recent times.

This method is considered more ideal due to its ligation of a major arterial supply, which thereby mitigates the potential for refractory epistaxis resulting from collateral circulation. 92% to 100% success rates have been documented for endoscopic SPA ligation. [27] Additionally, laser technology has been implemented to treat epistaxis, which is particularly beneficial in instances of recurrent bleeding caused by vascular abnormalities like hereditary hemorrhagic telangiectasia. [28]

In our study, definitive treatments such as septoplasty for deviated nasal septum, endoscopic excision of nasal mass, foreign body removal, functional endoscopic sinus surgery, and excision of angiofibroma were utilized to manage epistaxis caused by definitive causes. A greater proportion of the actual causes of epistaxis in the local community could have been represented in the study's sample size, which was one of its limitations.

Conclusion

Various etiologies of epistaxis were noted in our study and the most common was idiopathic. Other comorbidities of the patients were ruled out. The most common age group of epistaxis was found to be adolescents and young adults. The most common site of bleeding identified as anterior nasal cavity (Little's area). Majority of the patients were managed conservatively. Although, in the present study, we did not encounter any adverse outcome in terms of mortality, however, we recommend close observation and complete investigations to understand the underlying etiology and its clinical course in order to determine the course of intervention.

References

- Akinpelu OV, Amusa YB, Eziyi JA, Nwawolo CC: A retrospective analysis of aetiology and management of epistaxis in a south-western Nigerian teaching hospital. *West Afr J Med* 2009; 28:165-8.
- Pond F, Sizeland A: Epistaxis. Strategies for management. *Aust Fam Physician* 2000; 29:933-8.
- Small M, Murray JA and Maran AG. A study of patients with epistaxis requiring admission to hospital. *Health Bull (Edinb)*. 1982; 40(1):20-29.
- Raj A, Wadhwa V and Jain A. Epidemiological profile of ENT emergencies: Our experience. *Indian J Otolaryngol Head Neck Surg*. 2019; 71(Suppl 1):301-304.
- Womack JP, Kropa J and Stabile MJ. Epistaxis: Outpatient management. *Am Fam Physician*. 2018; 98(4):240-245.
- Melinte V, Musteata O and Sarafoleanu C. Epistaxis management-our point of view and literature review. *Roman J Rhinol*. 2017; 7(28):207-213.
- Watkinson JC. Epistaxis. 6th ed. Scott Brown's otorhinolaryngology Head and Neck Surgery. Oxford: Butterworth Heinemann; 1998; 942-61.
- McGarry GW. Epistaxis. 7th ed. In: Scott-Brown's Otorhinolaryngology Head and Neck Surgery. London: Hodder Arnold; 2008;1596-608.
- Eziyi JAE, Akinpelu OV, Amusa YB, Eziyi AK: Epistaxis in Nigerians: A 3-year Experience. *East Cent Afr J Surg* 2009; 14(2):93-98.
- Mgbor NC: Epistaxis in Enugu: A 9 year Review. *Nig J of otolaryngology*. 2004; 1(2): 11-14.
- Kaygusuz I, Karlidag T, Keles E, Yalcin S, Alpay HC, Sakallioğlu O: Retrospective Analysis of 68 Hospitalized Patients with Epistaxis. *Firat Tip Dergisi* 2004; 9(3):82-85.
- Varshney S, Saxena RK: Epistaxis: a retrospective clinical study. *Indian Journal of Otolaryngology, Head Neck Surgery* 2005; 57:125-129.
- Mackenzie C. Little's area or the Locus Kiesselbachii. *J Laryngol*. 1914; 1:21-2.
- Christensen NP, Smith DS, Barnwell SL, Wax MK. Arterial embolization in the management of posterior epistaxis. *Otolaryngol Head Neck Surg*. 2005; 133(5): 748-53.
- Adegbiji AW, Olajide TG, Olatoke F and Nwawolo CC. Clinicoepidemiological pattern and treatment of epistaxis in a tertiary hospital in South Western Nigeria. *Int J Otolaryngol Head Neck Surg*. 2018; 7:88-97.
- Abraham ZS, Chugulu S, Liyombo E, Massawe ER and Ntunaguzi D. Prevalence of epistaxis among patients receiving otorhinolaryngology services at Muhimbili National Hospital and Muhimbili Orthopedic Institute, Dar es Salaam, Tanzania. *Med J Zambia*. 2017; 44(3):184-192.
- Bui R, Doan N and Chaaban MR. Epidemiologic and outcome analysis of epistaxis in a tertiary care center emergency department. *Am J Rhinol Allergy*. 2020; 34(1):100-107.
- Islam MA, Sarker KSR, Ali MM and Rabbani MG. Clinical profile of patients of epistaxis: A Study in Rajshahi medical college and hospital, Rajshahi, Bangladesh. *Int J Med Health Res*. 2019; 5(12):94-96.

19. Gilyoma JM, Chalya P. Etiological profile and treatment outcome of epistaxis at a tertiary care hospital in Northwestern Tanzania: a prospective review of 104 cases. *BMC Ear Nose Throat Disord.* 2011; 11:8.
20. Corbridge RJ, Djazaeri B, Hellier A, Hadley J. A prospective randomized controlled trial comparing the use of merocel nasal tampons and BIPP in the control of acute epistaxis. *Clin Otolaryngol Allied Sci.* 1995; 20(4):305-7.
21. Basheer NK, Jaya C and Sabir VT. Epistaxis: Etiological profile and treatment outcome in a teaching hospital in South India. *Int J Otorhinolaryngol Head Neck Surg.* 2017; 3:878-884.
22. Ahmed A, Woolford TJ. Endoscopic bipolar diathermy in the management of epistaxis: an effective and cost-efficient treatment. *Clin Otolaryngol Allied Sci.* 2003; 28(3):273-5.
23. Alharethy SE. Recent insight into the prevalence, etiology, and outcome of epistaxis in a university hospital in Saudi Arabia. *J Nat Sci Med.* 2019; 2:61-63.
24. Adoga AA, Kokong DD, Mugu JG, Okwori ET and Yaro JP. Epistaxis: The demographics, etiology, management, and predictors of outcome in Jos, North-Central Nigeria. *Ann Afr Med.* 2019; 18(2):75-79.
25. Vitek JJ. Idiopathic intractable epistaxis: endovascular therapy. *Radiol.* 1991; 181(1): 113-6.
26. Bent JP, Wood BP. Complications resulting from treatment of severe posterior epistaxis. *J Laryngol Otol.* 1999; 113(3):252-4.
27. Kumar S, Shetty A, Rockey J, Nilssen E. Contemporary surgical treatment of epistaxis. What is the evidence for sphenopalatine artery ligation? *Clin Otolaryngol Allied Sci.* 2003; 28(4):360-3.
28. Stankiewicz JA. Nasal endoscopy and control of epistaxis. *Curr Opin Otolaryngol Head Neck Surg.* 2004; 12(1):43-5.