

## Outcome of Endoscopic Sphenopalatine Artery Cauterization for Posterior Epistaxis

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### ABSTRACT

#### Introduction

Epistaxis is a common otorhinolaryngology emergency condition. Majority of it is anterior epistaxis which usually improves with conservative management. However, for posterior epistaxis, apart from posterior nasal packing, endoscopic sphenopalatine artery cauterization (ESPAC) is considered an effective measure for its control. Hence, this study was conducted to evaluate the outcome of endoscopic sphenopalatine artery cauterization for posterior epistaxis.

#### Methods

Retrospective medical chart review of patients who underwent endoscopic sphenopalatine artery cauterization for posterior epistaxis from January to December 2018 at Ganesh Man Singh Memorial Academy of ENT-Head & Neck Surgery, Tribhuvan University Teaching Hospital, Kathmandu, Nepal.

#### Results

A total of 31 patients (21 males and 10 females) underwent ESPAC during the one-year period. Twenty-seven of them were unilateral whilst four were bilateral. Four of them rebled, of which two bled within 48 hours and the remaining two after two months. The overall success rate of ESPAC was 87.1% (27/31).

#### Conclusion

Endoscopic sphenopalatine artery cauterization is an effective measure to control posterior epistaxis.

**Keywords:** *Endoscopy, epistaxis, nasal packing, sphenopalatine artery cauterization*

### INTRODUCTION

Epistaxis is a common otorhinolaryngology emergency that may require hospital admission. Its prevalence is estimated to be 10–12%, of which 10% seek medical attention and 1% will require surgical intervention.<sup>1</sup> Up to 90% of epistaxis arises from Little's area (Kiesselbach plexus) which are easily accessible and can be controlled with chemical cautery, packing or other conservative methods. However, in 10% of epistaxis, bleeding occurs from the posterior nasal cavity which is difficult to access and may require

more aggressive interventions.<sup>2</sup> About 5 to 15% of these patients require some form of surgical treatment either interruption or occlusion of the main feeding vessel if the bleeding continues despite repeated packing.<sup>3,4,5</sup> Risk factors such as hypertension, arteriosclerosis, diabetes, NSAIDs have unfavorable outcome like rebleed inspite of the surgical treatment.<sup>6</sup> The significant predictors for surgical treatment are persistent posterior bleed, low hemoglobin and hematocrit less than 38% and the need for blood transfusion.<sup>6,7</sup>

Sphenopalatine artery, the terminal branch

of the maxillary artery, is also the main blood supply to the posterior nasal cavity.<sup>7</sup> Endoscopic sphenopalatine artery cauterization (ESPAC) has emerged as the surgical procedure of choice as compared to conventional external carotid and maxillary artery ligation for refractory epistaxis because it addresses the most distal blood supply to the nasal cavity and also has excellent efficacy with minimal morbidity.<sup>3,8</sup>

This study primarily aimed to evaluate the effectiveness of ESPAC in controlling posterior epistaxis. It further investigated the risk factors associated with the epistaxis and the need for additional procedure such as septoplasty, anterior ethmoidal artery ligation, postoperative nasal packing in addition to ESPAC.

## METHODS

This was a retrospective chart review of posterior epistaxis patients who underwent ESPAC either under general or local anesthesia from 1st January to 31st December 2018 at Ganeshman Man Singh Memorial Academy of ENT- Head and Neck Studies, Tribhuvan University Teaching Hospital (TUTH), Kathmandu, Nepal. Patients' demographics, co-morbidities, type and duration of nasal packing, surgical procedure - unilateral or bilateral, the anesthesia type, the operator grade, any additional procedures and rebleed events were noted. Patients with missing clinical notes on rebleed events were contacted via telephone regarding any rebleed events.

The data were entered in Microsoft Excel (16 version). The frequencies and mean were calculated.

## RESULTS

A total of 31 patients (21 male:10 female) underwent ESPAC for epistaxis management during the one year period. The age ranged from 20 to 79 years with the mean being 53.25 years. There were 26 (83.87 %) unilateral nasal bleeding and 5 (16.12%) bilateral nasal bleeding.

Hypertension was found to be the most common comorbid condition amounting to 41.9% (13/31) of the cases. It was found as a single comorbidity in 8/31 (25.8%). Amongst the five who had other associated co-morbidities along with hypertension, two had diabetes mellitus (DM), one each had DM with previous cardiac surgery, DM with seizure disorder, currently on aspirin due to stroke in the past. Two patients had DM as single co-morbidity. None of them had preceding trauma for epistaxis except for 1 rebleed case who had repeated nose pricking.

Table 1. Various type of nasal pack used for packing

Type of nasal pack	Cases (n)
Rapid Rhino® (Applied Therapeutics, UK)	15
Bismuth Iodoform paraffin paste pack	4
Merocele® (Medtronic Xomed, FL, USA)	2
Invotec® (Invotec International Inc., USA)	2
Foleys (in referred case)	2
None	6

There were no identifiable co-morbidities in 16/31 (51.6%) cases.

Fifteen out of 31 (48.4%) cases were packed with Rapid Rhino® inflatable balloon catheter. Ten had other packing materials were used (Table 1). The two cases who had Foley's catheter placed were referred from other centers.

The duration of nasal packing varied from 3 days to maximum of 9 days. In 9/31 (29.03%) cases surgical intervention was done within 3 days of packing. 22/31 (70.96%) patients had nasal packing more than 3 days.

Twenty-seven out of 31 (87.09%) had unilateral whilst 4/31 (12.91%) had bilateral ESPAC.

There were 28 cases performed under GA and 3 cases under LA.

Twenty out of 31 cases (64.51%) were operated by faculty/consultant whilst the remaining 11 (35.48%) were performed by residents under supervision of faculty/consultant.

Additional procedures were done in 13 cases which consisted of middle meatal antrostomy in 5, septoplasty in 4, septoplasty with bilateral flap elevation in 2, endoscopic sinus surgery (ESS) and inferior turbinate reduction in one each.

The overall success rate of ESPAC was 87.1 % (27/31) with 4 rebleed cases. Out of the 4, 2 rebled within 48 hours and were managed conservatively with medical management without nasal packing. In one of the two cases, there was both hypertension and diabetes as risk factor along with use of aspirin 3 days prior to surgery.

Remaining two bled after 2 months, one due to excessive crusting and the other due to upper respiratory tract infection. Both of them were admitted and managed medically without any further packing or surgical intervention. No comorbidities were found in either cases. However, an additional procedure namely maxillary antrostomy was done in 1 case that resulted in crusting and infection and subsequent rebleed.

Table 2. Success rate with complications in other studies

Study	Patients (n)	Effectiveness	Complication
Holzman et al <sup>4</sup>	75	96%	16%
Gandomi et al <sup>6</sup>	27	87%	0
Snyderman et al <sup>17</sup>	42	88%	53%
O'flynn et al <sup>10</sup>	12	88%	0
Wormald et al <sup>18</sup>	13	92%	0
Agreda et al <sup>11</sup>	50	95%	-

## DISCUSSION

Recurrent epistaxis remains a significant cause of morbidity posing as a challenge to an otorhinolaryngologist. Risk factors for recurrent epistaxis are elderly patients with co-morbidities such as hypertension, arteriosclerosis, diabetes, coagulopathy, alcohol and tobacco use, patients on anticoagulants and non-steroidal anti-inflammatory drugs (NSAIDs).<sup>6</sup> Such risk factors have unfavorable outcomes in both surgical and non-surgical treatment.<sup>9</sup> The occurrence of co-morbidities ranges from 30 to 50 % in different studies.<sup>3,7,10</sup> This is similar to our study where 15/31 (48.38%) had co-morbidities with hypertension being the commonest.

In our study, 22/31 (70.96%) patients had nasal packing more than 3 days. The departmental policy is to keep double balloon catheter for 72 hours. The cuff is deflated for an hour with the pack still in situ. If bleeding persists, the cuff is re-inflated and the similar procedure repeated on a daily basis till patient has no bleed when the cuff is deflated or when the patient can be listed for ESPAC at the earliest. Since we have limited operative slot for the procedure, this has resulted in patients having nasal packing more than 3 days. All patient needing nasal packing were kept under antibiotics.

Nasal packing is the conventional management for posterior epistaxis, however, it can be associated with extreme pain, discomfort, skin and mucosal necrosis, breathing difficulties, syncope, hypoxia and toxic shock syndrome.<sup>4,11</sup> Its failure rate in controlling the posterior epistaxis ranges from 26% to 52%.<sup>4</sup> So, in the recent years, the preference has shifted to endoscopic sphenopalatine artery ligation or cauterization as first line treatment for posterior epistaxis.<sup>3,11,12</sup>

Endoscopic endonasal ligation of the SPA was first described by Budrovich et al in 1992.<sup>13</sup> Over the years, it has replaced the traditional approaches namely internal maxillary artery and external carotid artery ligation. ESPAC has been shown to be associated with a shorter hospital stay and is cost effective compared to other surgical

modalities.<sup>1,7</sup> There are no contraindications for SPA cauterization.<sup>4</sup> It can be used for the control of posterior epistaxis as an immediate second-line management when conservative treatment as first line fails as it is safe, effective and well tolerated.<sup>3,5,12</sup> Some authors even consider this as a first line of management instead of packing.<sup>3,11,12,14,15</sup>

Endoscopic sphenopalatine artery ligation or cauterization is effective with success rate ranging from 84-100%.<sup>3,7,10,11,12,16,17,18</sup> Our result was similar with 87.1% success rate. Published data shows no difference in outcome among the ligation, monopolar or bipolar group.<sup>3,9,12</sup> However, many authors advocate coagulation diathermy over ligation only to avoid early bleeding due to inaccurate clipping or slippage of ligature.<sup>3,11</sup>

ESPAC failure ranges from 0-16%.<sup>4,6,10,11,16,17,18</sup> The reasons as listed by Thakkar et al., include cross anastomosis, dominant contralateral internal maxillary artery and failure to identify and ligate all branches.<sup>19</sup> As per O Flynn et al., multiple branching of the SPA and the variations in the anatomical landmarks could contribute to failure.<sup>10</sup> Use of aspirin or warfarin, low platelet count on admission also might lead to early failure.<sup>3</sup>

In our study, 4 rebled of which 2 bled within 48 hours. These patients probably had multiple branches of SPA however SPA branches were not made note of in this study. One rebleed case had middle meatal antrostomy additionally which lead to crusting and infection subsequently leading to rebleed. Bilateral ESPAC probably prevented cross anastomosis hence none of them rebled.

There are some likely minor complications after ESPAC including increased nasal crusting, palatal numbness, facial paresthesia and sinusitis ranging from 16 to 53% (Table 2).<sup>4,6,9,11,17</sup> As per Snyderman et al., these early complications are mild, transient and self limiting.<sup>17</sup>

This study has some limitations. These include the retrospective nature of the study, the limited sample size and the procedure being performed by multiple surgeons. A prospective study involving a larger sample size and longer follow

up is recommended to assess the effectiveness of ESPAC in posterior epistaxis.

## CONCLUSION

Endoscopic sphenopalatine artery cauterization can be used as an alternative effective measure to control posterior epistaxis when other methods fail.

## CONFLICT OF INTEREST

None declared.

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