Published in final edited form as:

Auris Nasus Larynx. 2018 August ; 45(4): 760–764. doi:10.1016/j.anl.2017.11.010.

Factors influencing recurrent emergency department visits for epistaxis in the elderly

Mohamad R. Chaaban^{a,*}, Dong Zhang^b, Vicente Resto^a, and James S. Goodwin^{b,c}

^aDepartment of Otolaryngology, University of Texas Medical Branch, Galveston, TX, United States

^bSealy Center on Aging, Galveston, TX, United States

^cDepartment of Internal Medicine, University of Texas Medical Branch, Galveston, TX, United States

Abstract

Objective—Our objective is to determine the risk factors associated with recurrent epistaxis requiring emergency department (ED) visits in the elderly.

Methods—We used a 5% national sample of Medicare data from January 2012 through December 2013. Our cohort included patients with a new diagnosis of epistaxis in the ED, defined as no epistaxis in the prior 12 months. We assessed the rates of ED visits for recurrent epistaxis in the 12 months following the incident visit. Our variables included demographics, geographic location, procedures performed during the incident visit and comorbidities.

Results—Out of the 4120 patients with incident epistaxis, 775 were readmitted with recurrent epistaxis within 12 months. 60% presented in the first 30 days and 75% within 90 days. There was a significant increase in ED visits for patients over 75 years of age and in men compared to women. Recurrent ED visits for epistaxis was higher in patients with congestive heart failure, diabetes mellitus, and obstructive sleep apnea compared to those without these comorbidities.

Conclusion—Additional ED visits for epistaxis are more common in the elderly and in males. Congestive heart failure, diabetes mellitus and obstructive sleep apnea were found to be independent risk factors.

Keywords

Epistaxis; Medicare; Elderly; Otolaryngic emergency; Recurrent epistaxis; Emergency department; Health care; Congestive heart failure; Diabetes mellitus; Obstructive sleep apnea

1. Introduction

Epistaxis is a common problem, affecting up to 60% of the U.S. population that rarely requires an emergency room (ED) visit [1–3]. Recurrent epistaxis requiring an ED visit results in increased morbidity particularly in the elderly, and is associated with high health care costs. It is unclear what risk factors are associated with increased incidence of ED visits

*Corresponding author at: University of Texas Medical Branch, 301 University Blvd, Galveston, TX 77555, United States. mrchaaba@utmb.edu (M.R. Chaaban).

in the elderly. ED visits for epistaxis were found to be the most common reason patients stop taking their antithrombotic agents (aspirin and clopidogrel), resulting in an increased risk of in-stent thrombosis and myocardial infarction [4]. Older adults can be particularly vulnerable to the complications of recurrent epistaxis that include aspiration, angina, hypovolemia, myocardial infarction and aspiration [5].

In a prior study [6], we identified several risk factors associated with increased rates of ED visits for new-onset epistaxis, including older age, male gender, winter season and living in the northern U.S. Presumed risk factors for initial epistaxis include facial trauma, hypertension, dryness of the nasal mucosa, physical and chemical irritation [7]. In addition, systemic risk factors include bleeding diathesis, the intake of antiplatelet or anticoagulant medications. Controversy still exists on whether these traditional risk factors for initial epistaxis are risk factors for recurrent epistaxis. Personal history of trauma and nasal dryness are clear risk factors for initial ED visits for epistaxis, however, following their definitive management, these risks should not technically lead to recurrent ED visits. Risks factors for recurrent admissions to the ED with epistaxis most likely are a result of conditions that affect the nasal vasculature. It is unclear what patient comorbidities lead to recurrent admissions to the ED with epistaxis. In this study, our goal is to identify the rate and risk factors associated with recurrent admissions to the ED with recurrent epistaxis in the elderly.

2. Methods

2.1. Data source and study cohort

The study was exempt from UTMB IRB review. We used a 5% sample of Medicare claims data that included the Medicare Denominator File for demographic and enrollment information, the Carrier File for physician claims, the Outpatient Statistical Analysis File (OUTSAF) for outpatient claims, and the Medicare Provider Analysis and Review (MEDPAR) File for the inpatient claims.

We identified Medicare claims listing a primary diagnosis of epistaxis (International Classification of Diseases, Ninth Revision, Clinical Modification [ICD-9] diagnosis code of 784.7 from January 1, 2012, through December 31, 2012). We chose only those records with ED visits for epistaxis and patients who had full coverage of Part A, Part B without enrollment in any health maintenance organization (HMO). We used our study cohort that in our previous study on incident epistaxis [6] which included 4120 patients. The cohort was then followed for an additional 12 months for recurrent epistaxis requiring another ED visit.

2.2. Variables and study outcomes

Demographics included age, gender, race/ethnicity (white, black, Hispanic, and other), and geographic location. We assessed comorbidities that were found to be associated with epistaxis to determine whether they would represent risk factors for recurrence requiring readmission to the ED. Comorbidities included: chronic hypertension (ICD-9 401.x-405.x), congestive heart failure (CHF) (ICD-9 428.0-428.9) and diabetes mellitus (ICD-9 250.0-250.9), pulmonary embolism (ICD-9 415.x), mechanical heart valve (ICD-9 V43.3); and atrial fibrillation (ICD-9 472.0, 472.1, 472.2, 472.3), obstructive pulmonary disease

(COPD) (ICD-9 491.0, 491.1, 491.20, 491.21), anxiety (ICD-9 300.00, 300.02, 300.09); and obstructive sleep apnea (OSA) (ICD-9 327.23). We also included all procedures that were performed to patients with epistaxis during the incident ED visit. These included anterior packing or cautery not requiring endoscopic guidance (CPT 30901, 30903, ICD-9-PCS 21.01), posterior packing or cautery not requiring endoscopic guidance (CPT 30905, 30906, ICD-9-PCS 21.02), diagnostic nasal endoscopy (CPT 31231, 92511, 31575), nasal endoscopy with control of bleed (CPT 31238), surgical ligation (30915, 30920, ICD-9-PCS 21.04, 21.05, 21.06, 21.09), and arterial embolization (CPT 61626 with 75894, 75798, 75774). The outcome of the study was to identify factors associated with readmission to the ED with epistaxis.

2.3. Statistical analyses

Readmissions were defined as those visits to the ED with recurrent epistaxis occurring in the 12 month period following the incident epistaxis visits. We excluded patients that had an ED visit claims within 1 day of their initial visit as this may represent the same admission. The differences in rates by various demographic variables were analyzed utilizing Chi-square with a 0.05 level of significance. Multivariate logistic regression analysis using the backward method was conducted to generate the odds ratio (OR) for patient characteristics independently associated with epistaxis with 95% confidence intervals (CI).

3. Results

In 2012, 4120 patients in the 5% sample of Medicare beneficiaries presented to EDs with new-onset epistaxis. Within 12 months of the initial visit, 775 patients (~19%) had recurrent epistaxis that required an ED visit. Fig. 1 presents the cumulative percentage of the first revisit to the ED from the initial epistaxis visit. Most patients (~60%) presented within the first 30 days and 75% within 90 days. Table 1 presents the baseline characteristics and rate of ED readmissions by each characteristic. Readmission rates were higher in older patients and in men ($p = 0.020$). There were also no significant differences in readmission rates with regards to race/ethnicities. Table 2 presents the bivariate analysis by comorbidity and procedures. In an effort to capture patients who might be on anticoagulants, we grouped the following comorbidities into one “anticoagulant” group: history of pulmonary embolism, mechanical heart valve, and atrial fibrillation. Patients in the “anticoagulant” group, those with congestive heart failure, diabetes mellitus, and chronic obstructive pulmonary disease were significantly likely to revisit the ED for epistaxis ($p < 0.005$). Patients who had anterior nasal packing/cautery were significantly more likely to be readmitted to the ED within a year of their initial visit ($P < 0.005$). There were no differences in the readmission rates between patients who had posterior nasal packing/cautery or any other procedure. Table 3 presents a multivariate logistic regression model using the backward method using the variables from Tables 1 and 2. In this regression analysis, we started with all variables and eventually eliminated those that were not significant to obtain the best fit model. Our results revealed that men were 1.32 (95% CI, 1.16–1.56) times more likely to present to the ED with recurrent epistaxis compared to women. Compared to patients who had no baseline procedure at their initial visits, patients with anterior nasal packing/cautery were 1.61 (95% CI, 1.37–1.90) times more likely to present with recurrent epistaxis. Patient with CHF were

1.49 (95% CI, 1.251–1.77) times more likely to present with recurrent epistaxis compared to patients with no CHF. Patients with DM were 1.18 (95% CI, 1.00–1.40, $p = 0.047$) more likely to present with recurrent epistaxis compared to non-diabetics. Patients with obstructive sleep apnea (OSA) were also 1.32 times (95% CI, 1.02–1.40) more likely to present with recurrent epistaxis compared to patients with no OSA. Patients with hypertension, atrial fibrillation, pulmonary embolism or mechanical heart valve were not found to significantly affect readmission rates.

4. Discussion

Epistaxis is a common condition that rarely requires an ED visit [2]. A subset of patients that initially present with epistaxis to the ED develop recurrent epistaxis requiring readmission. Several demographic and comorbid risk factors for single epistaxis events have been identified in the literature [8–10]; however, it remains unclear whether the same risk factors are involved in recurrent epistaxis. Two retrospective studies, Abrisch et al. [11] and Ando et al. [12] that included 461 and 299 patients, respectively, found that that accepted risk factors for initial epistaxis were not associated with recurrent epistaxis. In our previous study, we looked at risk factors associated with ED visits for new-onset epistaxis and found that older age, male gender, winter season and living in the northern U.S. were associated with an increased risk of an ED admission [6]. In this study, we found that most (~60%) of patients present to the ED with recurrent epistaxis within 30 days of their initial epistaxis event. Similarly, in this study we found a significant association between age and readmissions; with higher rates in patients 76 years and older. The elderly may be susceptible to initial episodes of epistaxis due to diminished elasticity of their nasal vessels [13]. However, an association between age and recurrent epistaxis requiring an ED readmission has not been previously reported [11,12]. Men were also significantly more likely to present with recurrent epistaxis compared to women. Other studies have shown that recurrent epistaxis was more common in men than women up to the age of 49, with equivalent rates in patients over age of 50 [14,15]; that led the authors speculate that estrogen could have a protective role in women younger than 50. However, in our study, men were more likely to present to the ED with recurrent epistaxis independent of their age group. It is unclear if this is a result of higher comorbidities in men or if it is due to larger or more friable nasal vessels.

Identifying the source of bleeding in epistaxis is crucial in avoiding recurrent epistaxis. Patients presenting to the ED with an unidentified source of bleeding may receive packing or cautery that may not adequately tamponade the bleed. Patients in our study that received an anterior pack/cautery were more likely to present to the ED with recurrent epistaxis. We believe that patients that require packing may represent a more severe form of epistaxis and hence require an additional visit to the ED for definitive management. It is also possible the patients that received anterior nasal packing or cautery may have had an unidentified septal bleed or posterior epistaxis that was not adequately treated in the initial ED visit. Our study was not able to detect differences between patients that received posterior packing/cautery and those that did not. We believe that this is due to the low number of patients receiving posterior packing/cautery ($n = 194$) compared to those that received anterior packing/cautery (2301).

When assessing the effects of comorbidities, our results showed an increase in the risk of readmission to the ED with epistaxis in patients with diabetes and congestive heart failure which is consistent with the findings reported by Abrisch et al. [11]. Evidence regarding the association between hypertension and epistaxis have been mostly limited to initial episodes of epistaxis requiring ED admission [16,17]. In our study, patients with hypertension had no increase in rates of readmission with epistaxis which contradict the findings by Abrisch et al. [11] that included patients exclusively in the state of Wisconsin. Out of all non cardiovascular risk factors, we found that patients with obstructive sleep apnea were significantly more likely to present with recurrent epistaxis to the ED. Recurrent epistaxis in patients with sleep apnea may either be a result of the use of continuous positive airway pressure (CPAP) that may cause nasal dryness or due to venous hypertension as a result of decreased venous return in obese patients.

Our study has several limitations. First, it included fee-for-service Medicare beneficiaries and our data may not be extrapolated to patients in the Veteran Affairs, HMOs or commercially insured patients. Second, we did not include patient visits to an urgent care or office visits. Third, our study was limited to Medicare enrollees, and hence, the patients younger than 65, do not represent the general population in that age group. Fourth, we did not include medications in our analysis since this would limit our sample size. That being said, our study is unique in including a large sample representative of the U.S. and describing the risk factors associated with recurrent epistaxis readmissions. Studies have mostly addressed risk factors for initial ED visits.

5. Conclusions

There is an increase in readmission to the ED with recurrent epistaxis with age and male gender. Congestive heart failure, diabetes and obstructive sleep apnea are independent risk factors for readmission. Further studies are needed to understand the actual mechanistic effects of these comorbidities on the nasal vasculature.

Acknowledgments

Disclosure statement

Dr. James Goodwin has Grant Support from AHRQ R24 HS022134-04 and NCI K05 CA134923-06A1.

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cumulative percentage of day of first ED visit after initital ED discharge

Fig. 1.

The cumulative percentage of patients revisiting the ED with recurrent epistaxis following the initial ED visit. Most patients (~60%) present within the first 30 days, and 70% present within 60 days.

Table 1

Demographic characteristics for patients with readmission visits to the ED with epistaxis.

Demographic	Initial ED visit N = 4120	ED readmission (%) N = 775	No readmission (%) N = 3345	P-value
Age				
<65	533	85 (16.0%)	448 (84.0%)	
66–75	1257	208 (16.6%)	1049 (83.4%)	
76–85	1434	310 (21.6%)	1127 (78.4%)	
>86	896	172 (19.2%)	724 (80.8%)	0.0020
Gender				
Male	1816	371 (20.4%)	1445 (79.6%)	
Female	2304	404 (17.5%)	1900 (82.5%)	0.018
Race				
Non-Hispanic White	3454	669 (19.4%)	2785 (80.6%)	
African black	398	57 (14.3%)	341 (85.7%)	
Asian/Pacific	33	5 (15.2%)	28 (84.8%)	
Hispanic	170	31 (18.2%)	139 (81.8%)	
Am Indian/Alaska	27	5 (18.5%)	22 (81.5%)	
Other	26	7 (26.9%)	33 (73.1%)	
Unknown	12	1 (8.3%)	11 (91.7%)	0.22
Division				
New England	266	55 (20.7%)	211 (79.3%)	
Middle Atlantic	580	109 (18.8%)	471 (81.2%)	
East North Central	811	166 (20.5%)	645 (79.5%)	
West North Central	333	66 (19.8%)	267 (80.2%)	
South Atlantic	730	110 (15.1%)	620 (84.9%)	
East South Central	250	48 (19.2%)	202 (80.8%)	
West South Central	374	57 (15.2%)	15.2(84.8%)	
Mountain	357	87 (24.4%)	270 (75.6%)	
Pacific	134	22 (16.4%)	112 (83.6%)	
California	270	55 (20.4%)	215 (79.6%)	
Alaska	13	0 (0%)	13 (100.0%)	
Puerto Rico	2	0 (0%)	2 (100.0%)	0.014

P-value results that are bold have reached statistical significance.

Table 2

Analysis of variables associated with epistaxis readmission.

Variable	Initial ED visit N = 4120	ED readmission (%) N = 775	No readmission (%) N = 3345	P-value
Baseline procedures				
Any procedure	2392	529 (22.1%)	1863 (77.9%)	
None	1728	246 (14.2%)	1482 (85.8%)	<0.0001
Anterior packing/cautery	2301	508 (22.1%)	1793 (77.9%)	
None	1819	267 (14.7%)	1552 (114.7%)	<0.0001
Posterior packing/cautery	194	42 (21.7%)	152 (78.3%)	
None	3926	733 (18.7%)	3193 (81.3%)	0.3
Diagnostic endoscopy	16	2 (12.5%)	14 (87.5%)	
None	4104	773 (18.8%)	3331 (81.2%)	0.52
Other procedure	30	3 (10.0%)	27 (90.0%)	
None	4090	772 (18.9%)	3318 (81.1%)	0.22
Comorbidity				
HTN	3616	694 (23.3%)	2922 (76.7%)	
None	504	81 (18.1%)	423 (81.9%)	0.093
Atrial fibrillation/pulmonary embolism/mechanical heart valve	498	116 (23.3%)	382 (76.7%)	
None	3622	659 (18.2%)	2963 (81.8%)	0.006
CHF	1130	279 (24.7%)	851 (75.3%)	
None	2990	496 (16.6%)	2494 (83.4%)	<0.0001
DM	1518	319 (21.0%)	1199 (79.0%)	
None	2602	456 (17.5%)	2146 (82.5%)	0.0057
OSA	381	95 (24.9%)	286 (75.1%)	
None	3739	680 (18.2%)	3059 (81.8%)	0.0013
Anxiety	576	103 (17.9%)	473 (82.1%)	
None	3544	672 (19.0%)	2872 (81.0%)	0.54
COPD	377	87 (23.1%)	290 (76.9%)	
None	3743	688 (18.4%)	3055 (81.6%)	0.026

P-value results that are bold have reached statistical significance.

Table 3

Multivariate analysis of the variables associated with epistaxis readmission.

Variable	Odds ratio	95% confidence interval (CI)		P-value
Age				
>75 vs ≤75	1.32	1.12	1.56	0.0011
Gender				
Male vs female	1.19	1.07	1.40	0.034
Baseline procedures				
Anterior packing/cautery vs other	1.61	1.37	1.90	<0.0001
Comorbidity				
CHF	1.49	1.25	1.77	<0.0001
DM	1.18	1.00	1.40	0.047
OSA	1.32	1.02	1.71	0.034

P-value results that are bold have reached statistical significance.