



Brief Report

Prophylactic systemic antibiotics for anterior epistaxis treated with nasal packing in the ED

Tiffany Murano, MD^{a,*}, Debbie Brucato-Duncan, DNP^b, Christine Ramdin, PhD^c, Steven Keller, PhD^c^a Department of Emergency Medicine, Rutgers New Jersey Medical School, 185 South Orange Avenue, E-level, Room C-643, Newark, NJ 07103, United States of America^b Department of Surgery, University Hospital, Newark, NJ, United States of America^c Department of Emergency Medicine, Rutgers New Jersey Medical School, United States of America

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ABSTRACT

Background: Emergency Department (ED) patients presenting with spontaneous epistaxis who have anterior nasal packing are routinely prescribed systemic prophylactic antibiotics in spite of the lack of supporting evidence-based literature. Although there is literature that discusses infection rates with nasal packing for epistaxis and prophylactic antibiotics prescribing practices of otolaryngologists, this is the first study to our knowledge that examines the practices of emergency physicians.

Objectives: The main objective of this study was to compare the infection rate between patients who were and were not prescribed prophylactic systemic antibiotics for anterior nasal packing in spontaneous epistaxis and to examine current management practices of antibiotic prescribing for these patients.

Methods: A retrospective review of ED patients ≥ 18 years old with the discharge diagnosis of epistaxis was performed over a 5-year period. Patients who had multiple visits to the ED for epistaxis or recent nasal or sinus surgery were excluded.

Results: Over half of the patients, 57/106 (53.7%), who had anterior packing were prescribed prophylactic systemic antibiotics. Of these patients, 69/106 (65%) returned for a follow-up visit. There were no documented infections for any of these patients regardless of whether or not they were prescribed antibiotics. There was no significant difference with respect to rate of infection found between these two groups (the p -value = 0.263).

Conclusion: The absence of infection supports previous findings and suggests that prophylactic antibiotic use for nasal packing in spontaneous epistaxis patients is not necessary. Further randomized controlled studies are necessary to definitively support this practice change.

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1. Introduction

Epistaxis is a common condition that can occur at any age, with an increase in the prevalence and severity in individuals 50 years of age and older [1]. There is an approximate 60% lifetime prevalence for having at least one episode of epistaxis and approximately 6% of these individuals seek medical attention accounting for 1 in 200 Emergency Department (ED) visits in the United States [1–8].

Bleeding originating from the anterior nasal septum (at the opening just inside the nares at the Kiesselbach plexus) is most common and accounts for 90% of all epistaxis cases [4,8]. Conversely, posterior epistaxis accounts for approximately 5% to 10% of all cases. The causes of epistaxis can be from something as simple as nose picking, nasal irritants, dry mucous membranes, or can occur from something more significant such as trauma, illicit drug use, anti-inflammatory agents, anti-

coagulants, hypertension, or other medical conditions such as cancerous lesions and bleeding disorders [1,4,8]. Treatment options for anterior epistaxis include cauterization with silver nitrate, nasal packing with devices such as foam polymer nasal tampons or various balloon-tamponade devices.

Historically, the use of systemic prophylactic antibiotics for patients who had nasal packing was deemed necessary to prevent bacterial infection, specifically Toxic Shock Syndrome (TSS) [1,4,6,8]. Although there are cases of TSS with the use of packing following nasal surgery reported in the literature, there is only one such case reported with spontaneous epistaxis [9,10]. Although there is little supporting literature for the use of prophylactic antibiotics, it is included in some of the current management protocols for epistaxis patients who have anterior nasal packing [11–14].

In 2009, the focus of epistaxis management algorithms started to shift towards creating better methods of controlling bleeding and decreasing the use of systemic prophylactic antibiotics [12]. There has also been recognition of the potential risks of unnecessary antibiotic use, including *Clostridium difficile* infection, Stevens-Johnson syndrome,

* Corresponding author.

E-mail addresses: muranote@njms.rutgers.edu (T. Murano), cramdin@njms.rutgers.edu (C. Ramdin), skeller@njms.rutgers.edu (S. Keller).

anaphylaxis and gastrointestinal disturbances [13]. Along with these potential risks, unnecessary administration of systemic antibiotics is also a cause of antibiotic resistance. In spite of the fact that more recent studies have demonstrated that there are no improved outcomes or decrease in infection rates with the use of systemic prophylactic antibiotics [11,12,15], the practice of prescribing antibiotics continues.

The objective of this study was to compare the infection rate between patients who were and were not prescribed prophylactic systemic antibiotics for anterior nasal packing in spontaneous epistaxis and to examine current management practices of prophylactic antibiotic prescribing for these patients.

Although there is literature that discusses infection rates with nasal packing for epistaxis and prophylactic antibiotics prescribing practices of otolaryngologists, this is the first study to our knowledge that examines the practices of emergency physicians.

2. Methods

This study was conducted at a level-1 trauma center in an academic institution in an urban setting with an annual Emergency Department (ED) volume of approximately 90,000 visits. A retrospective chart review of Emergency Department patients over a 5-year period between January 1, 2012 and December 31, 2016 was performed. A search of the electronic medical record (EMR) database for patients with a diagnosis of epistaxis was conducted. Inclusion criteria included patients who were ≥ 18 years of age with a discharge diagnosis of epistaxis via ICD-9 code 784.7 or ICD-10 R04.0. The following data were extracted from each EMR: age, gender, past medical history (specifically history of immunocompromised state defined as having a diabetes or HIV, recent otolaryngologic surgery, anticoagulant/antiplatelet therapy), packing (whether packing was performed, length of time packing was present, packing removal), mechanism (spontaneous versus traumatic epistaxis), antibiotics prescribed (topical and/or parenteral), follow-up (compliance with prescribed medications, infection at the time of follow-up), recurrence of epistaxis, admission, and infection (defined as documented purulent nasal drainage, fever, erythema, abscess or cellulitis of the mid-face or nares). Patients who were under the age of 18 years old, had multiple visits for epistaxis within 72 h of the original visit, traumatic mechanism, and recent otolaryngologic surgery were excluded. For patients who had multiple encounters or revisits for epistaxis within 72 h of the first visit, only data from their first ED visit was included in the study (see Fig. 1).

All data were input into an Excel spreadsheet with all patient identifiers removed. The data collected were imported into Statistical Package for Social Sciences (SPSS) version 25 and analyzed using descriptive statistics to summarize the proportions of all categorical study variables.

The Pearson Chi-Square test was used to compare the outcomes between antibiotic versus withholding antibiotics when treated with nasal packing.

This study was considered exempt by the Rutgers University Institutional Review Board.

3. Results

During the 5-year period, there were a total of 1270 patient encounters in the ED that had a discharge diagnosis of epistaxis. Of those 1270 patients, 443 were excluded because they were under the age of 18 years old. Of the remaining 827 adult patient encounters, 131 patients had trauma as a cause of epistaxis and therefore were excluded. There were 120 encounters excluded because the patients either left without being seen or they were seen multiple times within 72 h of the original visit for epistaxis. There were 93 patients excluded who had recent otolaryngologic surgery and an additional 10 patients were excluded because of incomplete data in the EMR. Therefore 473 patient encounters were included in this study.

The majority of patients were male (254/473, 53.7%) and the mean age was 52.5 years old with a range of 18–91 years old.

Of the 473 patient encounters for epistaxis, 106 received anterior packing in the ED (22.4%), while the remaining 364 (77%) received no packing. The most common method of anterior packing was the use of intranasal balloon devices (74/106, 69.8%) followed by foam polymer nasal tampon use (29/106, 27.3%). Oral antibiotics were prescribed for 57/106 (53.7%) patients who received anterior packing while there were no systemic antibiotics prescribed for 49/106 (46.2%) patients, see Table 1.

Of all of the patients who had anterior packing, 69/106 (65.1%) returned for a follow-up visit. There were 45/57 (78.9%) patients who had packing and were prescribed antibiotics who returned for a follow-up visit. Those who had packing and were not prescribed oral antibiotics had a lower percentage of follow-up visits (24/49, 49%). No patients who had anterior nasal packing and returned for a follow-up visit had infection regardless of whether or not they were prescribed oral antibiotics ($X^2 = 1.252, p = 0.263$).

4. Discussion

Prophylactic antibiotics for anterior nasal packing in spontaneous epistaxis were prescribed in 53% of patients in our ED. This percentage reflects the controversy and perhaps the lack of compelling evidence that exists to support prophylactic antibiotic use in this clinical scenario. The current use of prophylactic systemic antibiotics in the management of patients with anterior nasal packing for epistaxis assumes that such patients are at greater risk of developing TSS, recurrent epistaxis, readmissions and other nasal symptomatology when systemic prophylactic antibiotics are withheld. Although there are studies that have demonstrated no difference in infection rates when antibiotics are not prescribed, those studies have been criticized for being underpowered to detect a clinically meaningful difference [12,14,15] [16].

One such study was by Derkay et al. who investigated the practice of prescribing systemic prophylactic antibiotics when posterior nasal packing for spontaneous epistaxis was initiated [17]. Twenty patients were prospectively randomized to receive either placebo or cefazolin and both groups received antibiotic impregnated nasal packing. This study found no difference in infection rates however the packing in the placebo group was foul smelling and was colonized with gram negative bacteria. The authors concluded that antibiotic prophylaxis may have some use but further research was necessary due to the small sample size.

In 1999 Gupta et al. studied the necessity for systemic antibiotics for the treatment of epistaxis of various etiologies. All 30 patients in the study received oral ampicillin but patients varied in the use of local antibiotics with the packing—either plain (no local antibiotics), antibiotic-impregnated packing or topical antibiotic use with the packing. They found that when the packing was removed, the antibiotic-impregnated packing was not foul smelling and was in fact sterile while all of the other packing grew out bacteria and the plain packing had copious foul-smelling discharge. This study concluded that the type of packing as well as the length of time that the packing was in place were determinants of local infection and systemic antibiotics did not play a role [18]. Additional studies also concluded that the use of systemic antibiotics could not be completely justified based on the culture data for bacterial growth post packing removal [12,14,15].

More recently, studies have been conducted to address this same issue. Biswas et al. prospectively studied this topic with spontaneous epistaxis patients in whom Merocel or Rapid-rhino packing was used [12]. Patients were prescribed systemic oral antibiotics only when the packing was left in-situ for >24 h [12]. They found no clinical signs of infection in either group and there was no difference in bacterial growth. The authors concluded that the value of prophylactic antibiotic use in this scenario was not apparent but also noted that the study was limited by its small sample size. In another study, Pepper et al. conducted a

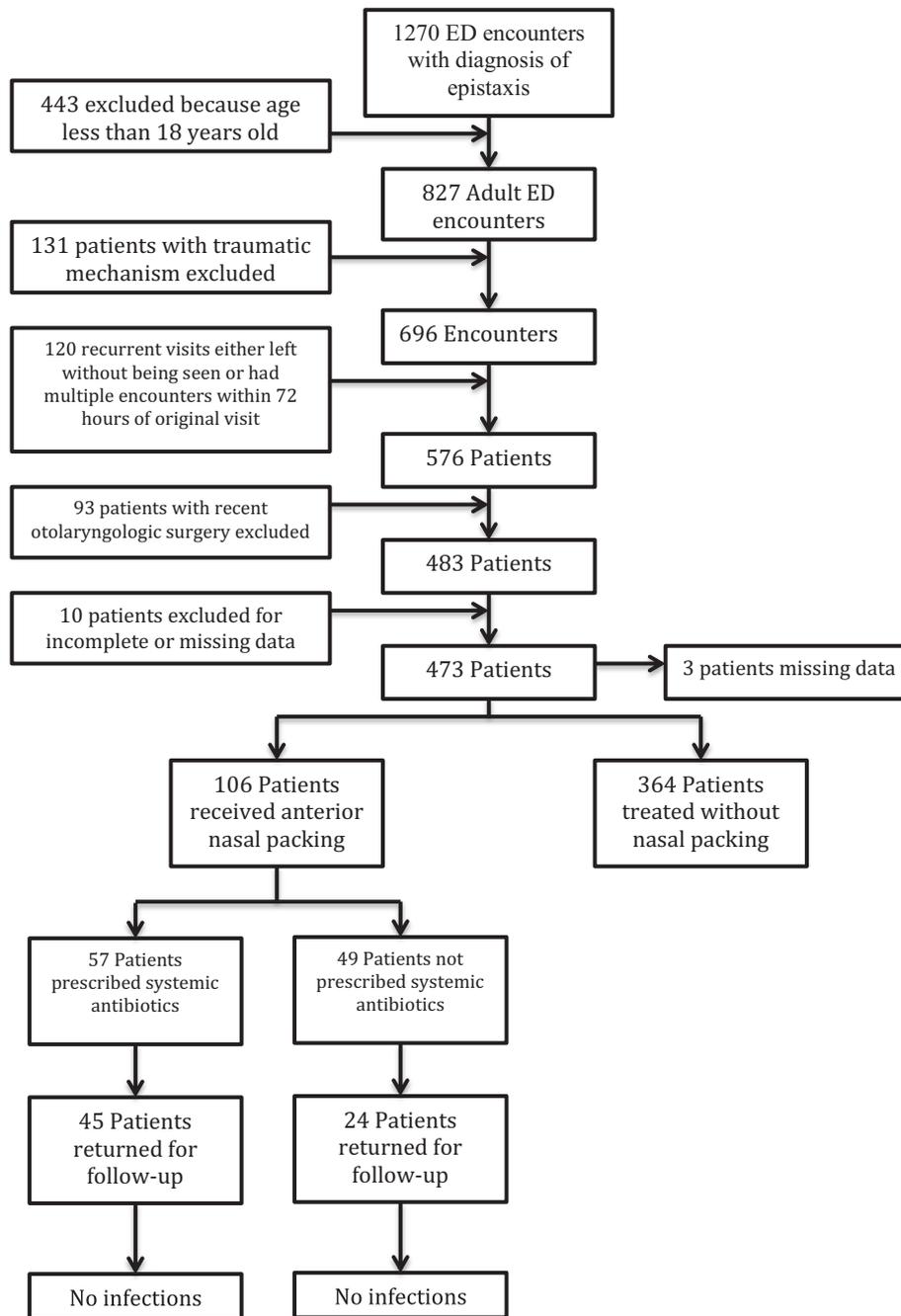


Fig. 1. Patient selection based on inclusion and exclusion criteria.

Table 1
Data for patients who had anterior packing

	Anterior packing (n = 106)		
	Total patients	Antibiotics prescribed (n = 57)	No antibiotics prescribed (n = 49)
Gender, male	58	33	25
Female	48	24	24
Also prescribed local antibiotics	10	5	5
Anticoagulant/anti-platelet use	41	22	19
Returned for follow-up	69	45	24
Immunocompromised	16	12	4
Infection	0	0	0

prospective case series in London, England of antibiotic prophylaxis use in patients with spontaneous epistaxis [14]. For three consecutive months, all patients admitted as an inpatient with nasal packing for epistaxis were treated with amoxicillin with clavulanic acid or clarithromycin if allergic to penicillin. In the following 3-month period, no patients were prescribed antibiotics. None of the patients in either of the study groups developed sinusitis, otitis media, TSS or any other complication [14].

There has been recognition among the otolaryngologists regarding the variation in practice management related to prescribing practices of prophylactic systemic antibiotics in epistaxis patients requiring anterior nasal packing [15,19,20]. In a survey of prophylactic systemic antibiotic prescribing practices for packing in anterior epistaxis by otolaryngologists in England, Biswas et al. found that 22% of the respondents did not routinely prescribe antibiotics, 37% prescribed antibiotics

if packing is left in situ for >24 h, 28% prescribed antibiotics if packing was left in situ for >48 h, 8% had varied practice, and 5% prescribed antibiotics for all patients [19]. In addition, 78% of respondents believed that antibiotic prophylaxis reduced the incidence of TSS, sinonasal or middle ear infection [19]. With that, there have been attempts to implement treatment algorithms in an effort to standardize treatment [19]. Biggs et al. sought to examine their own antibiotic prescribing practices before and after the implementation of a treatment algorithm that included antibiotics prophylaxis for anterior nasal packing only if the packing was left in-situ for greater than or equal to 48 h [15]. Both groups were prescribed a 14-day course of Naseptin antibiotic ointment post pack removal and a six-week post discharge survey was completed. The authors found that there was no statistically significant increase in infective nasal symptoms, re-admission, or re-bleeding rates between the two groups [15]. The authors also found that there was a significant reduction in the antibiotic prescribing practices (58.2%) after the treatment algorithm was introduced [15].

Similar to the findings of the abovementioned studies, our study also demonstrated that there were no signs of infection in any of the patients regardless of whether or not they were prescribed oral antibiotics. The practice variance with respect to systemic antibiotic prescribing practices seen in our ED may be due to the paucity of supportive data for prescribing guidelines and the variance in otolaryngologists' prescribing practices and recommendations.

This study is limited by the fact that it is a retrospective chart review and data may have been inadvertently missed, lost or inaccurate. There were patients who were lost to follow-up and may have had subsequent infections that were not made known to our institution. This study was also limited by its sample size.

5. Conclusions

Approximately half of the physicians in our ED continue to prescribe prophylactic antibiotics for anterior packing in patients with spontaneous epistaxis. This is likely due to the fact that there is a paucity of adequately powered studies to demonstrate the lack of benefit of this practice. Implementation of treatment algorithms may be helpful in standardizing the prescribing practices and risk stratifying those patients who would benefit most from prophylactic antibiotics. The current study suggests that antibiotic treatment in patients with anterior nasal packing due to spontaneous epistaxis is unnecessary.

Declaration of interest

None.

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