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An update on management of pediatric epistaxis

Neel Patel [a,b], John Maddalozzo [a,c], Kathleen R. Billings [a,c,*]

[a] Ann and Robert H. Lurie Children's Hospital of Chicago, Division of Otolaryngology – Head and Neck Surgery, 225 East Chicago Ave, Box #25, Chicago, IL 60611, USA

[b] University of Illinois Hospital and Health Sciences System, Department of Otolaryngology – Head and Neck Surgery, 1855 West Taylor St, Suite 2.42, Chicago, IL 60612, USA

[c] Northwestern University Feinberg School of Medicine, Chicago, IL, USA

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ABSTRACT

Objective: To evaluate the work-up and treatment of pediatric epistaxis in an outpatient clinical setting, with a focus on the diagnostic utility and associated costs of nasal endoscopy and adjunctive laboratory data.

Study design: Retrospective, case series.

Methods: Children under 18 years of age seen in an outpatient clinical setting at a tertiary care hospital between 2004 and 2012 for the primary diagnosis of epistaxis were identified. Patient characteristics were analyzed from a statistical and cost perspective.

Results: A total of 175 patients with epistaxis were included. One hundred twenty-two (69.7%) were male, with a mean overall age of 9.1 years (range 5 months to 17.9 years). The duration of bleeding ranged from 0.25 to 84 months (mean 11.5 months). Nasal endoscopy was performed in 123 (70.2%) patients. Three (2.4%) had nasal polyps, and 1 (0.8%) a juvenile nasopharyngeal angiofibroma. The average age of patients with nasal masses was significantly older (16.2 years versus 10.4 years, $p = 0.008$). Of 131 patients with available blood work, laboratory values demonstrated anemia in 27 (20.6%) patients, elevated partial thromboplastin time in 5 (3.8%), and an abnormal platelet function analysis in 1 (0.8%) patient. Those with anemia were statistically younger ($p = 0.001$), than those with either normal labs or abnormal coagulation studies. Epistaxis resolved in 88/135 (65.2%) who had follow-up visits.

Conclusion: The majority of pediatric epistaxis cases resolved with nasal mucosa hydration. Nasal endoscopy can be reserved for teenaged patients with epistaxis, and routine laboratory screening may be useful in select cases based on the clinical judgment.

1. Introduction

Epistaxis (nosebleed) is a common pediatric problem, although it is rare before 2 years of age. It is reported to affect 30% of children aged 0–5 years, and over 50% of children 5 years and older [1] and is a common reason for parents to seek medical attention for their children. Most nosebleeds arise from the anterior septum in a richly vascular region called the Kiesselbach's plexus. When this area is exposed to drying or minor trauma, bleeding can arise. Most children can be managed with nasal ointments and saline solution with some requiring additional intervention such as cautery.

No consensus exists on the standard work-up and treatment for pediatric epistaxis. A previous review of pediatric epistaxis by one of the co-authors provided a general approach including a history and physical exam, including anterior rhinoscopy, complete blood count, coagulation profile and computed tomography (CT) of the sinuses. The study showed that CT imaging is not indicated in the initial work up of pediatric epistaxis [2]. Laboratory testing for anemia and coagulation disorders and flexible nasal endoscopy (FNE) continues to be part of the practice paradigm for some otolaryngologists when assessing patients with epistaxis. Recurrent epistaxis may be the first sign of coagulopathy and may lead to anemia [3–5]. Epistaxis raises an additional concern of a nasal cavity or nasopharyngeal mass, such as a juvenile nasopharyngeal angiofibroma (JNA) in an adolescent male [6]. Identifying those patient characteristics suggestive of an increased risk for these hematologic concerns and/or nasal masses becomes important to the otolaryngologist when assessing the average patient with epistaxis. The goal of this study was to assess our current trends in

* Corresponding author at: Ann and Robert H. Lurie Children's Hospital, Division of Otolaryngology – Head and Neck Surgery, 225 East Chicago Ave, Box #25, Chicago, IL 60611, USA. Tel.: +1 312 227 6230; fax: +1 312 227 9414.
E-mail addresses: npatel10@uic.edu (N. Patel), Jpmaddal@luriechildrens.org (J. Maddalozzo), kbillings@luriechildrens.org (K.R. Billings).

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working up pediatric epistaxis, emphasizing patient characteristics associated with abnormal laboratory and FNE data.

2. Material and methods

Approval was obtained from the Institutional Review Board at Ann and Robert H. Lurie Children's Hospital of Chicago. This is a retrospective case series of consecutive patients below 18 years of age seen for the primary diagnosis of epistaxis by the two senior authors in an outpatient clinical setting between January 2004 and December 2012. The patients were identified using a database filter with "epistaxis" (ICD-9 code 784.7) as the primary diagnosis or reason for visit. Three hundred fifty-nine patients with this diagnosis were identified. Exclusion criteria included patients seen initially in the emergency department [3], initially as inpatients [2], with a known coagulopathy [7], and significant medical histories [6]. There were 178 patients seen for a single visit who did not undergo nasal endoscopy or laboratory testing, and who were not included for further analysis. The remaining 175 patients, who had follow-up, nasal endoscopy, or laboratory work up were included in the study. The frequency and duration of epistaxis, medical history, family history, associated symptoms, physical exam findings, nasal endoscopy findings, laboratory values, treatment instituted, and treatment outcomes were recorded.

The general work up included a thorough history, physical examination, FNE and laboratory screening including a complete blood count, prothrombin time (PT), and activated partial thromboplastin time (PTT) with reference to the international normalized ratio (INR). Some patients also underwent a platelet function analysis (PFA). Anemia was defined as a hemoglobin $<$11.5 mg/dL or hematocrit $<$35%. An abnormal PT was defined as >15.5 s, an abnormal PTT as >38.4 s, and an abnormal PFA as >200 s. Patient characteristics associated with abnormal laboratory results and abnormal FNE were analyzed statistically. A cost analysis of the expenditure associated with laboratory and endoscopic assessments was performed.

All the categorical data was expressed in frequencies and percentages. Chi-square analysis was used to look at comparisons between categorical data and the frequency of FNE and laboratory testing. Continuous data was described using mean and standard deviation for normally distributed data, and median and interquartile range for non-normally distributed data. If continuous variables were normally distributed a *t*-test was used to compare patients who had or did not have FNE, and an analysis of variance was used to compare the laboratory data (normal versus anemia and/or coagulation abnormalities). If the data was not normally distributed, Mann–Whitney was used to compare those who had or did not have FNE, and Kruskal–Wallis was used to compare the laboratory data. A p value of <0.05 was considered statistically significant. All the analysis was performed in SPSS.

3. Results

3.1. Participants

Of the 359 patients initially identified with epistaxis, 175 patients who had either follow-up, FNE, or laboratory work up were analyzed. Regarding follow up, 59 patients had 1 follow up visit, 110 had 2–4 follow up visits, and 6 had >4 follow up visits. Initial follow up appointments were 2–4 weeks after the first visit. The longest follow up time was 5 years and 10 months. There were 122 (69.7%) males and 53 (30.3%) females with a mean age of 9.1 years (range 0.42–17.9 years, standard deviation 4.4 years), and median age of 8.2 years. The median age of male patients was 7.0 years, and females 10.9 years, which was statistically significant ($p=0.002$). Nasal trauma, 8 blunt and 9 digital, was reported in 17 (9.7%) patients, with no statistical difference in age ($p=0.58$) or duration of bleeding ($p=0.92$) (Table 1). The most common associated symptom (Fig. 1) was nasal obstruction in 82 (46.9%) patients. Bleeding duration was reported in 121 (69.1%) patients, with a mean of 12.0 months (range 0.25–84 months), and a median of 6.0 months (standard deviation 15.2 months). The duration of bleeding when divided by gender was not statistically significant ($p=0.752$) (Table 1). Eighty-five (70.2%) patients reported a duration less than or equal to 12 months duration, 22 (18.1%) for 12–24 months, and 14 (11.5%) patients reported nosebleeds for greater than 24 months.

Otitis media, allergic rhinitis, sinusitis, and asthma were the most common medical conditions reported (Fig. 2). There was a reported family history of bleeding tendencies or coagulopathy in 9 (5.1%) patients. Twelve (12.6%) patients had family members with recurrent epistaxis. A maternal history of hereditary hemorrhagic telangiectasia (Osler–Weber–Rendu) was reported in 1 (0.6%). The difference in median age with or without a family history of epistaxis was not significant ($p=0.77$), although the duration of bleeding was significantly longer for those with a family history compared to those without (12 versus 5 months, $p=0.015$) (Table 1). None of the children with a family history of bleeding disorders were found to have a coagulopathy, although 3 were anemic.

A total of 135 (77.1%) patients had at least one follow-up visit (Table 2). Of these, 88 (65.2%) patients reported resolution of epistaxis at the first follow-up visit. All the patients were started on varying methods of nasal mucosal hydration (emollient, saline spray, and/or humidity). Recommended emollients included nasal

Table 1
Pediatric epistaxis variables analyzed by age and duration of bleeding.

Variable	Median diagnosis age (years)	Epistaxis duration (months)
Male	7.02	6.00
Female	10.85	5.00
p-value	0.002*	0.752
Negative family history	8.15	5.00
Positive family history	9.16	12.00
p-value	0.773	0.015*
No trauma	8.2	6.00
Trauma	6.62	6.00
p-value	0.576	0.920
No mass on endoscopy	10.38	4.00
Nasal mass on endoscopy	16.21	9.00
p-value	0.008*	0.976
No cautery	7.41	3.00
Cautery	10.65	12.00
p-value	0.005*	0.009*
Normal labs	9.79	5.50
Anemia	5.86	6.00
Coagulopathy	10.22	6.00
p-value	0.004*	0.734
Normal labs	9.79	
Anemia	5.86	
p-value	0.001*	
Normal labs	9.79	
Coagulopathy	10.22	
p-value	0.727	
Anemia	5.86	
Coagulopathy	10.22	
p-value	0.040*	

* Significant value.