Nasal Trauma (Broken Nose) and Epistaxis (Nosebleed) in Children — Causes and Treatment

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Epistaxis in children is a common presentation that can be caused by local nasal pathology, an underlying systemic pathology or an idiopathic etiology. In most cases, the humidity of the air and hot weather are to blame for the epistaxis episode. Adequate history taking and laboratory evaluation of the child with epistaxis is essential to exclude possible etiologies such as anemia, acquired coagulopathies, or congenital coagulopathies. Conservative treatment is usually successful in most children, but primary treatment with cauterization or medical therapy with a vasoconstrictor might be indicated in selected cases of severe epistaxis.

Overview

Epistaxis can be loosely defined as a **nosebleed**. Epistaxis can be an **anterior bleed** or a **posterior bleed** based on the site of the origin of the bleed. Nosebleeds in children are **usually benign** and are under-reported, but few cases can be related to **neoplastic disease**.

Epidemiology of Epistaxis in Children

Epistaxis is a **very common** presentation in children with an estimated lifetime occurrence of 50% within the first ten years of life. Epistaxis is rare in children younger than 2 years of age with an estimated incidence of 1 per 10,000.

An important distinction in nosebleeds between children and adults is the origin of the bleeding. **Anterior nosebleeds are more common in children,** while posterior nosebleeds are usually seen in adults who are older than 50 years. Nosebleeds in children younger than 2 years of age usually result from trauma and the possibility of **child abuse** should be excluded.

The estimated incidence of epistaxis in children who visit the emergency department is 2 per 1,000 per year. The median age at presentation was 10 years.

Boys have a slightly higher incidence of nosebleeds compared to girls, i.e. 3 males to 2 females.

The prognosis in children with epistaxis is excellent unless a neoplastic process is associated with the nosebleed. Children with nosebleeds due to congenital or acquired coagulopathies are at an increased risk of morbidity and mortality due to the coagulopathy disorder and not the epistaxis episode itself.

Etiology of Epistaxis in Children

Trauma to the nose due to repeated nasal picking is a common cause of epistaxis in toddlers and older children but is unlikely in infants or in adolescents. **Facial and nasal direct trauma** can also cause epistaxis in children but, in that scenario, it is usually obvious that the child has sustained a traumatic injury.

Children who undergo **nasal surgery** are also at risk of developing a nosebleed which correlates with the degree of injury to the nasal lining mucosa and the major nasal vessels.

Another common cause of nosebleeds in children is the **use of topical nasal drugs,** such as corticosteroids, or the **use of oral medications,** such as non-steroidal anti-inflammatory drugs (NSAIDs). The use of these medications as analgesics or anti-inflammatory drugs is common in children.

Children with repeated epistaxis especially in hot weather should be evaluated for possible **nasal septal deviation**. In this group of children, the most common site of bleeding is usually anterior.

Infants with **repeated gastroesophageal reflux disease** are at risk of developing **nasal mucosal inflammation** due to the repeated irritation of the nasal mucosa. Epistaxis secondary to nasal inflammation can happen in these infants.

Juvenile nasal angiofibroma is a rare cause of severe epistaxis that is usually seen in adolescent boys. Any child who presents with unilateral severe nasal bleeding should be evaluated for the possibility of a neoplastic condition such as a nasal angiofibroma.

Children with repeated severe nosebleeds after minor nasal trauma might have a **congenital or acquired form of coagulopathy**. **Hemophilia** and **Von-Willebrand disease** are two common causes of congenital coagulopathies that can be associated with recurrent epistaxis. Children who develop **thrombocytopenia** due to an

autoimmune or an idiopathic etiology are also at risk of developing epistaxis.

Hypertension and **migraine** are two possible risk factors for epistaxis in children but their association with nosebleeds is not strong enough to be considered as an etiology. Approximately, 10% of the cases of epistaxis are of **unknown cause**.

Pathophysiology of Epistaxis in Children

Nosebleeds in children usually arise from the **anterior nasal circulation**. The most commonly involved origin arises from **Little's area** where the **anterior and posterior ethmoidal arteries** communicate with the **sphenopalatine and internal maxillary arteries** to form the **Kiesselbach plexus**. This plexus can be injured from self-induced repeated nasal trauma, nasal or facial trauma, or can start oozing blood because of a bleeding disorder.

Clinical Presentation of Epistaxis in Children

History taking and **physical examination** of a child with epistaxis should focus on the **assessment of the hemodynamic stability** of the child and the characteristics of the nosebleed. When the child is hemodynamically stable, a detailed history of the nosebleed should be obtained.

The severity of the nosebleed, its duration and whether it is unilateral or bilateral should be sought. **Nasal tumors** usually cause unilateral profuse nosebleeds, while benign causes of nosebleeds usually result in oozing and self-limited epistaxis. **Nose picking** or **nasal or facial trauma** should be excluded at this stage of the history-taking process.

Children with recurrent epistaxis should be evaluated for the possibility of a **systemic cause of epistaxis** such as **congenital or acquired coagulopathy**. Children might insert batteries into their nose which can cause severe trauma to the nasal mucosa.

History of **hypertension** or **migraine headaches** should be inquired about in a child with recurrent epistaxis. **Family history of recurrent epistaxis**, **history of an underlying coagulopathy** and the presence of **anemia** can be associated with severe nasal bleeding that might require **cauterization**.

In addition to epistaxis, children usually complain of **mouth breathing** and the presence of a **headache** during the nosebleed episode. History of **sinusitis** and **allergic rhinitis** can be elicited in a significant number of patients.

Medication usage history should be sought in children with epistaxis due to the association with NSAIDs, antihistamines, and corticosteroids.

Diagnostic Workup for Epistaxis in Children

Children with mild epistaxis who are otherwise healthy usually do not need any specific imaging studies except for a **complete blood count** to exclude **anemia**. Children with repeated and severe nosebleeds should be evaluated for the possibility of **congenital or acquired coagulopathies**. **Prothrombin** and **partial thrombin time**, **factor IX**, **factor XII** and **thrombocyte counts** should be determined.

Children with a positive history of a **facial trauma** should undergo a **computed tomography scan** which usually reveals an abnormality in up to 87% of the cases. The most common abnormalities include **disruption of the nasal septum or the sinuses**.

Computed tomography scans of the nasal cavity are also helpful in excluding **benign or malignant neoplasms**.

Treatment of Epistaxis in Children

Children with a self-limited epistaxis episode who do not have any serious etiology and who are otherwise healthy can be managed conservatively, whereas children with **severe bleeding** are better off with primary treatment.

The first step in the management of an active nosebleed is to **squeeze the nostrils together for 5 to 30 minutes** without any interruption. The child should be instructed to breathe from his or her mouth. Unfortunately, many young children might not be co-operative enough to do this.

Head elevation without hyperextension should be attempted as another approach to stop the bleeding. This approach is usually successful in up to 90% of the cases. Hyperextension of the head can put the child at an increased risk of aspiration.

Non-cooperative children who cannot apply direct pressure to the nostrils might benefit from the placement of a **gauze that is moistened with epinephrine solution** of the ratio of 1:10,000.

Children with **severe nose bleeding**, family history of **bleeding disorders** or previous medical history of **coagulopathy** should receive **nasal cauterization therapy** to stop the bleeding.

Children with **repeated epistaxis** who have a **nasal septal deviation** should be offered **septoplasty**. Additionally, children who have recurrent epistaxis after primary treatment should be offered **endoscopic nasal cauterization therapy** regardless of the severity of the recurrent bleed.

Children with **recurrent epistaxis due to dry and hot weather** might benefit from **humidifying the air** with a cool-mist vaporizer or another method to increase the humidity of the air. During the active period of epistaxis, **nasal oxymetazoline** might be used to stop the bleeding. Oxymetazoline should not be used more than 5 days during an active episode of epistaxis.

Children with acute severe epistaxis that is not responsive to cauterization can be treated with **nasal packing**. Anterior nasal packing with a **petroleum jelly gauze** or **merocel sponges** can be attempted.

It is recommended to cover the used material for packing with an **antibiotic ointment**. The drawback of using nasal packing in children is the fact that they need to be placed and left for three to four days which might be intolerable by the child.

Some children might have severe uncontrolled nasal bleeding despite the previously mentioned therapeutic options. In that scenario, **ligation of the external carotid artery, the internal maxillary artery, or the ethmoidal artery** might be attempted. Inexperienced hands, arterial **embolization** of the previously mentioned potential bleeders might be a less invasive option than ligation.

References

Nguyen Q. Epistaxis: Background, Anatomy, Pathophysiology. 2017. Available at: http://emedicine.medscape.com/article/863220. Accessed April 12, 2017.

Notes