

Main Article

Ivy Drake takes responsibility for the integrity of the content of the paper

Presented at the ENT Scotland Summer Meeting, 11–12 May 2023, Dunblane, Scotland, UK.

Cite this article: Drake I, Fountain H, Kubba H. Managing recurrent nosebleeds in children: a retrospective review of 718 children attending a nurse-led epistaxis clinic. *J Laryngol Otol* 2024;**138**:431–435. <https://doi.org/10.1017/S0022215124000069>

Received: 25 June 2023

Revised: 15 October 2023

Accepted: 2 November 2023

First published online: 15 January 2024

Keywords:

Cautery; child; epistaxis; local anaesthetic; outpatients

Corresponding author:

Ivy Drake;

Email: ivy.drake@ggc.scot.nhs.uk

Abstract

Objective. This review assessed the effectiveness of the nurse-led children's epistaxis clinic in streamlining patient care and avoiding unnecessary general anaesthesia.

Methods. A retrospective case note review was conducted of children attending the nurse-led epistaxis clinic between 2019 and 2021.

Results. A total of 718 children were seen over three years. Twelve (1.7 per cent) had a known coagulopathy. Of the children, 590 (82 per cent) had visible vessels and 29 (4 per cent) had mucosal crusting. Silver nitrate cautery was attempted under topical anaesthesia in 481 children, with 463 (96 per cent) successful cauterisations. Fifteen (3 per cent) were cauterised under general anaesthesia. Of the children, 706 (99 per cent) were prescribed nasal antiseptic preparations; this was the sole treatment for 58 (8 per cent). Blood investigations were requested for eight children (1 per cent) and haematology referral for three (0.4 per cent).

Conclusion. This is the largest published series of children's nosebleeds. Given the short-lived benefit from cautery, it is suggested that general anaesthesia should not be offered routinely. However, improved haematology referral criteria are required to increase underlying diagnosis.

Introduction

Nosebleeds are common in children, affecting 30 per cent of children aged 0–5 years, 56 per cent aged 6–10 years and 64 per cent aged 11–15 years.¹ The nosebleeds are usually minor and self-limiting, and not all families seek medical attention, with many preferring simply to manage the bleeds when they occur and wait for the problem to settle with time. For some, however, the nosebleeds can be troublesome and a source of great concern.^{2,3} These children are often seen in hospital, where they make up a substantial proportion of the children requiring treatment in otolaryngology out-patient clinics and on operating lists.⁴

The aetiology of paediatric epistaxis is essentially unknown, but the most popular theory is that *Staphylococcus aureus* colonisation of the nose causes irritation and crusting of the nasal mucosa.^{5–7} This encourages digital trauma from nose-picking, which may cause bleeding. Longstanding inflammation causes the ingrowth of thin-walled, friable new arterioles that are visible on the mucosa of the anterior septum, and which then lead to further repeated bleeding.⁸

Two treatments have been shown in randomised controlled trials to be effective in reducing the frequency of nosebleeds in children in the short term: antiseptic cream and cautery of the septum with 75 per cent silver nitrate.^{9,10}

Childhood epistaxis is common and usually simple to manage according to a clear protocol. For this reason, the condition is ideal for management within a nurse-led out-patient clinic service. This study aimed to review our experience of a nurse-led paediatric epistaxis clinic, to determine if it is an effective use of resources and to identify areas for improvement.

Materials and methods

Nurse-led epistaxis clinic

Referrals for the management of recurrent epistaxis from general practitioners, the emergency department, and other hospital departments are vetted for appropriateness by a consultant otolaryngologist. If the information in the referral suggests uncomplicated recurrent epistaxis in an otherwise-well child, the referral is directed to the nurse-led epistaxis clinic.

Children in this clinic are seen by one experienced advanced nurse practitioner who has received specific training from the consultant otolaryngologists in the management of this condition.³ The nurse has access to the services of hospital play specialists to help manage children's anxiety, and to make the consultation as fun and non-threatening



Figure 1. Nurse specialist cauterising a child's nose with silver nitrate in the out-patient clinic.

as possible, as shown in [Figure 1](#). The nurse always has the option to call a consultant otolaryngologist to see the child if they have concerns.

The nurse takes the child's history, conducts a physical examination and provides treatment as required, and records all the information on a structured proforma for each child. This proforma is then uploaded to the child's electronic patient record.

Nasal cautery is performed using applicator sticks tipped with 75 per cent silver nitrate. Topical anaesthesia is provided by placing a cotton ball in the nose soaked in co-phenylcaine solution (lignocaine hydrochloride 5 per cent, phenylephrine hydrochloride 0.5 per cent).

Data collection

All children (aged 0–16 years) seen in the nurse-led epistaxis clinic between January 2019 and December 2021 were identified from the hospital's out-patient clinic management system. The electronic medical record for each child was examined to identify clinical and demographic data, including all the information collected prospectively on the epistaxis clinic proforma.

Ethical considerations

As a retrospective and anonymised audit of routine clinical practice, no specific ethical committee permissions are required for this study in our institution. All data were handled in accordance with Caldicott principles.

Results

Demographics

We identified 718 children over the three-year study period, a mean of 239 per year. They were aged 0.3–16.5 years (median, 9.3 years). Fewer children were seen during the coronavirus disease 2019 pandemic, such that the number of children seen was 293 in 2019, 172 in 2020 and 254 in 2021.

Of the 718 children, 440 (61 per cent) were male and 278 (39 per cent) were female. Thirty-five (4.9 per cent) had a diagnosis of an autistic spectrum disorder. Twelve (1.7 per cent) were already known to have a coagulopathy at presentation to the clinic, as shown in [Table 1](#).

Table 1. Known coagulation disorders observed in the cohort

Coagulopathy	Children affected (n)
Von Willebrand's disease	2
Haemophilia A	2
Prolonged activated partial thromboplastin time	2
Aplastic anaemia	1
Angiodysplasia	1
Dysfibrinogenaemia	1
Factor XI deficiency	1
Familial thrombocytopenia	1
Unspecified diagnosis with a platelet bleeding pattern	1

Epistaxis history

The reported duration of epistaxis episodes ranged from two months to seven years at the time of the clinic appointment. Ninety-six children (13 per cent) had symptoms for less than a year; 198 (28 per cent) had symptoms for between one and two years, and 421 (59 per cent) had symptoms for two years or more. The epistaxis was bilateral in 384 children (53 per cent), left-sided in 172 (24 per cent), right-sided in 136 (24 per cent) and of unknown side in 26 (4 per cent). The frequency of episodes was reported as: every day in 205 children (29 per cent), between weekly and fortnightly in 179 children (25 per cent), every month in 52 children (7 per cent), in a cluster pattern in 41 (6 per cent) and too variable to describe in 222 children (31 per cent).

Symptoms suggesting coagulopathy

In children without a known coagulation disorder, 345 (49 per cent) reported recurrent epistaxis or menorrhagia in a first- or second-degree relative, and 2 children (0.3 per cent) had a history of prolonged bleeding or easy bruising. Pre-existing diagnoses of a coagulopathy were seen in 13 children (1.8 per cent).

Seven children (2 per cent) reported a family history of a diagnosed coagulopathy. Three of these families (43 per cent) had a history of haemophilia A, and four further distinct families had histories of dysfibrinogenaemia, idiopathic thrombocytopenia with purpura, myelodysplasia, and von Willebrand's disease. Of these seven families, two children (29 per cent) had inherited that coagulopathy.

Of the children, 218 (30 per cent) had undergone nasal cautery at some point prior to this clinic attendance; once in 154 children (21 per cent), twice in 45 children (6 per cent) and three times or more in 19 children (3 per cent).

Findings on examination

Examination of the nose was not tolerated by eight children (1 per cent). Of the remaining 710 children, 590 (82 per cent) had at least one visible vessel on the nasal septum. Vessels were bilateral in 244 children (41 per cent), right-sided in 161 children (27 per cent) and left-sided in 185 children (31 per cent). In 565 children (79 per cent), there were vessels on the side of the reported bleeding. Eleven children (2 per cent) had visible vessels only on the contralateral side to the reported bleeding.

Fourteen children (2 per cent) had visible vessels, but the laterality of the bleeding was unknown.

Nasal mucosal crusting was present in 32 children (4 per cent), of which 17 (53 per cent) had bilateral crusting, 10 (31 per cent) had right-sided crusting and 5 (16 per cent) had left-sided crusting. In 29 children (91 per cent), there was crusting on the side of the reported bleeding. Two children (6 per cent) had crusting only on the contralateral side to the reported bleeding. One child (3 per cent) had crusting but the laterality of the bleeding was unknown.

Nasal cautery

Of the 590 children with visible vessels on the nasal septum, 481 (82 per cent) had undergone an attempt at silver nitrate cautery under topical anaesthesia. Eighteen children (4 per cent) did not tolerate attempts to carry out cautery in clinic. Cautery was not attempted at all in 102 children (17 per cent) because: the parents refused (48 children, 47 per cent), the child's symptoms were improving with use of antiseptic cream (40 children, 39 per cent), or it was the clinician's preference (14 children, 14 per cent), often because of the lack of a target amenable to cautery.

Cautery was arranged to be carried out under general anaesthesia in 15 children (3 per cent of children with visible nasal vessels). Of these 15 children, 12 (80 per cent) were noted to have more than one reason to undergo general anaesthesia. Eight children (53 per cent) had cautery performed under general anaesthesia rather than local anaesthesia because their epistaxis was felt to be particularly severe or had recurred after multiple previous cautery attempts under local anaesthesia. Five children (46 per cent) with autism underwent nasal cautery under general anaesthesia because attempts at cauterisation under local anaesthesia had failed. Five children (33 per cent of children cauterised under general anaesthesia) were already scheduled to have a surgical procedure under general anaesthesia and cautery could be performed at the same time. Where cautery was attempted under topical anaesthesia, this was successfully performed in 463 children (96 per cent). These values are succinctly illustrated in Figure 2.

Medical management

Topical nasal antiseptic preparations were prescribed for 706 children (99 per cent). Of these children, this was the sole treatment for 58 (8 per cent), who either had mucosal crusting but no visible vessels (17 children, 29 per cent), or visible

vessels but cautery was not thought necessary, for example if their symptoms were improving (41 children, 71 per cent). The preparations used were neomycin sulphate 0.5 per cent/chlorhexidine dihydrochloride 0.1 per cent in aqueous cream (Naseptin; Alliance Pharma, Chippenham, UK) in 662 children (94 per cent) and mupirocin 2 per cent nasal ointment (Bactroban; GlaxoSmithKline, Brentford, UK) in 44 children (6 per cent), all of whom had an allergy to peanuts.

Investigation of potential coagulation disorders

Eight children (1 per cent) had blood testing for platelet count and a coagulation screen (assessing activated partial thromboplastin time and prothrombin time). Of these, one child had a mildly elevated activated partial thromboplastin time at 38 seconds (normal upper limit of 36 seconds), and one had a mild elevation of both activated partial thromboplastin time at 49 seconds and prothrombin time at 14 seconds (normal upper limit of 13 seconds). No child had an abnormal platelet count. Three children (0.4 per cent) were referred to the haematology service because of the severe and refractory nature of their epistaxis, but no child was diagnosed with any coagulopathy because of investigation findings or referral from the epistaxis clinic.

Onward referral to otolaryngology

Twenty-six children (4 per cent) were referred to an ENT consultant after their clinic appointment for the management of conditions unrelated to their epistaxis, such as sleep-disordered breathing (11 children, 39 per cent of those referred). It is important to note that some children were referred to an ENT consultant for multiple conditions. One child (4 per cent) was urgently referred to an ENT consultant specifically for endoscopic examination of the nose because of a family history of nasal cancer, with epistaxis being the presenting feature. One child was found to have a nasal mass.

Recurrence of epistaxis

Over the three years of the study, 389 children (54 per cent) only required a single episode of care to achieve resolution of their epistaxis. Of the children, 202 (28 per cent) had two nurse-led clinic appointments and 127 (18 per cent) had more than two. Not all of these visits involved nasal cautery procedures. Nasal cautery was performed once in 218 children (30 per cent), twice in 154 (21 per cent) and more than twice in 19 (3 per cent). Patient-initiated follow up is not used in the

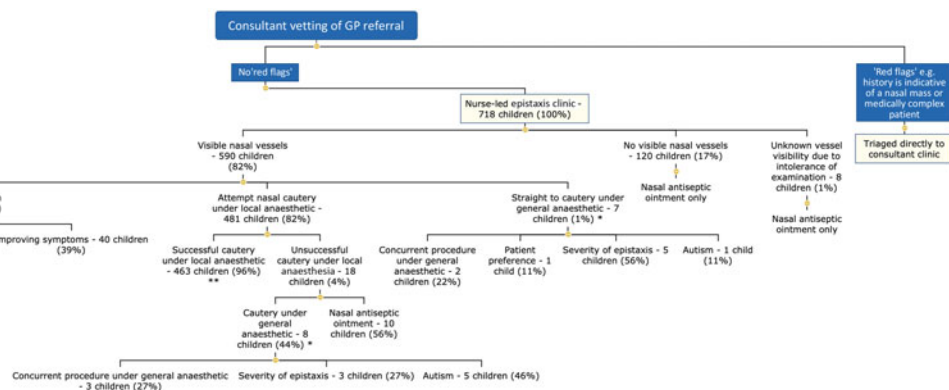


Figure 2. A flow chart succinctly illustrating our results and the pathway of patient flow from referral to treatment.

nurse-led clinic. If the child's epistaxis recurs, they need to be re-referred to the clinic by their general practitioner.

Discussion

Study strengths

This retrospective study appears to be the largest review of paediatric epistaxis managed in the out-patient setting. The largest previous study was of 178 children.¹¹ Although this is a retrospective review, all our patients undergo a structured history and examination, and outcomes are prospectively recorded in a dedicated proforma; therefore, the data are as close to complete as possible.

Study weaknesses

Some children (we estimate around 1 per cent) are given appointments in general otolaryngology consultant clinics if the waiting time for the nurse-led clinic is too long. However, the children reported here comprise the vast majority of those referred to our service, and there is no reason why they would not be representative.

Advantages of nurse-led clinic

A significant advantage of the nurse-led clinic is that it frees up space in consultant clinics for children with other pathologies. Our nurse practitioner has access to a play specialist during every clinic, which, combined with their excellent rapport with children, leads to a very high success rate for nasal cautery under local anaesthesia.

- Recurrent epistaxis is a common reason for referral to the paediatric ENT clinic
- Nasal antiseptic ointments and silver nitrate cautery are the mainstay of epistaxis management
- The majority of patients at the Royal Hospital for Children, Glasgow, with recurrent epistaxis are successfully and cost-effectively managed in the nurse-led clinic
- With good communication skills and a reassuring manner, nasal cautery can be achieved without general anaesthesia or sedation in around 96 per cent of children
- A robust referral pathway between the epistaxis clinic and haematology service should be developed

Our clinic achieved successful nasal cautery under local anaesthesia in 463 children (96 per cent) in whom it was attempted. This is comparable to other studies; for instance, Makura and colleagues reported a 98 per cent success rate for cautery under local anaesthesia in their series of 64 children.¹² However, in many hospitals, it is common for nasal cautery in children to be performed under general anaesthesia. A recent population-based study from Scotland showed that large numbers of paediatric nasal cautery procedures are being carried out under general anaesthesia (3331 cases across Scotland between 2000 and 2019, equating to approximately 0.17 per 1000 children per year).⁴ Routine nasal cautery under general anaesthesia also seems to be common or even routine in other parts of the world.^{13,14} Clearly, this raises the question of whether general anaesthesia is necessary or justifiable for such a large number of children.

It is widely known that nasal cautery does not provide a long-term cure for epistaxis, but provides a period of

symptomatic relief. Reintroduction of *Staphylococcus aureus* to the nose leads to a recurrence of nosebleeds in many children. One study showed that 65 per cent of children had recurrent epistaxis five years after their initial successful treatment.¹⁵ Given that we can achieve cautery in almost all of our children under local anaesthesia, is it reasonable or even ethical to subject children to general anaesthesia for what is essentially a self-limiting condition and a procedure that provides such short-term benefit?

We should also consider the potential cost savings. Indicative costs for our hospital are £52 for a nurse-led clinic appointment, £146 for a consultant clinic appointment, and £3022 for a day-case surgical procedure such as nasal cautery under general anaesthesia.¹⁶

Areas for improvement

Epistaxis in children is a common condition, and it is suitable for a protocolised care pathway. However, it is vital that we acknowledge 'red flag' features for serious pathology, such as nasal tumours and coagulopathies.

Having reviewed our results, we are now concerned that too few children are being referred for haematology assessment. Our discussions with colleagues in haematology suggest that routine blood tests (platelet count, prothrombin time and activated partial thromboplastin time) are of little value in this context and that normal results from these tests offer little reassurance. The most common coagulation disorders in children with epistaxis are von Willebrand's disease, platelet function abnormalities and specific factor deficiencies, none of which can be reliably diagnosed without specialist referral and testing. Given that von Willebrand's disease has a prevalence of approximately 1 per cent in the UK, and this study saw 2 out of 718 children (0.3 per cent) with the condition, this only increases our suspicions that too few children with recurrent epistaxis are being referred to haematology.¹⁷

As a result of this study, we have identified the need to develop a better set of referral criteria for haematological investigation. This will require careful discussion if we are to avoid overwhelming the haematology service with referrals. Only 0.28 per cent of children have a history of abnormal or prolonged bleeding, but the number of children requiring more than two visits for epistaxis treatment is 18 per cent of the total.

Conclusion

This series is the largest retrospective review of the management of children's nosebleeds. It is clear that if the time is taken to reassure the child and their parent(s) with the procedure, there is a very high success rate of nasal cautery performed under local anaesthesia in this population. Given the short duration of benefit from cautery, combined with the costs, risks and availability of operating theatre space, maybe cautery performed under general anaesthesia is not worthwhile and should not routinely be offered. The paediatric nurse-led clinic represents efficient use of our limited resources in healthcare, and frees up space in consultant clinics for more complex and specialised clinic problems. However, we believe we need better referral criteria for haematology investigation, as it is possible that many underlying coagulopathies are going undiagnosed given the prevalence of common coagulopathies such as von Willebrand's disease.

Competing interests. None declared

References

- 1 Petruson B. Epistaxis in childhood. *Rhinology* 1979;**17**:83–90
- 2 Ata N, Bülbül T, Gökçen C, Demirkan A, Çiftçi MA. Depression and anxiety levels in mothers of children with epistaxis: a controlled study. *Acta Otorrinolaringol Esp (Engl Ed)* 2019;**70**:286–9
- 3 Davies K, Batra K, Mehanna R, Keogh I. Pediatric epistaxis: epidemiology, management & impact on quality of life. *Int J Pediatr Otorhinolaryngol* 2014;**78**:1294–7
- 4 Downie L, Kubba H. Why is there such variation in nasal cauterization rates for childhood epistaxis: deprivation or clinician behaviour? National data from Scotland 2000–2019. *Rhinology* 2022;**60**:152–4
- 5 Whymark AD, Crampsey DP, Fraser L, Moore P, Williams C, Kubba H. Childhood epistaxis and nasal colonization with *Staphylococcus aureus*. *Otolaryngol Head Neck Surg* 2008;**138**:307–10
- 6 Saafan ME, Ibrahim WS. Role of bacterial biofilms in idiopathic childhood epistaxis. *Eur Arch Otorhinolaryngol* 2013;**270**:909–14
- 7 Kamble P, Saxena S, Kumar S. Nasal bacterial colonization in cases of idiopathic epistaxis in children. *Int J Pediatr Otorhinolaryngol* 2015;**79**:1901–4
- 8 Montague M-L, Whymark A, Howatson A, Kubba H. The pathology of visible blood vessels on the nasal septum in children with epistaxis. *Int J Pediatr Otorhinolaryngol* 2011;**75**:1032–4
- 9 Kubba H, MacAndie C, Botma M, Robison J, O'Donnell M, Robertson G *et al*. A prospective, single-blind, randomized controlled trial of antiseptic cream for recurrent epistaxis in childhood. *Clin Otolaryngol Allied Sci* 2001;**26**:465–8
- 10 Calder N, Kang S, Fraser L, Kunanandam T, Montgomery J, Kubba H. A double-blind randomized controlled trial of management of recurrent nosebleeds in children. *Otolaryngol Head Neck Surg* 2009;**140**:670–4
- 11 Sandoval C, Dong S, Visintainer P, Ozkaynak MF, Jayabose S. Clinical and laboratory features of 178 children with recurrent epistaxis. *J Pediatr Hematol Oncol* 2002;**24**:47–9
- 12 Makura ZG, Porter GC, McCormick MS. Paediatric epistaxis: Alder Hey experience. *J Laryngol Otol* 2002;**116**:903–6
- 13 Elden L, Reinders M, Witmer C. Predictors of bleeding disorders in children with epistaxis: value of preoperative tests and clinical screening. *Int J Pediatr Otorhinolaryngol* 2012;**76**:767–71
- 14 Limbrick J, Takwoingi YM. Bilateral nasal septal chemical cauterization: a safe and effective outpatient procedure for control of recurrent epistaxis, our experience in 134 patients. *Eur Arch Otorhinolaryngol* 2019;**276**:1845–8
- 15 Robertson S, Kubba H. Long-term effectiveness of antiseptic cream for recurrent epistaxis in childhood: five-year follow up of a randomised, controlled trial. *J Laryngol Otol* 2008;**122**:1084–7
- 16 Public Health Scotland. Reports for Financial Year 2019 to 2020. In: <https://publichealthscotland.scot/publications/scottish-health-service-costs/scottish-health-service-costs-costsbook-2020-april-2019-to-march-2020/files-listing-2019-to-2020/> [10 February 2023]
- 17 GOSH Hospital Site. Von Willebrand disease. In: <https://www.gosh.nhs.uk/conditions-and-treatments/conditions-we-treat/von-willebrand-disease/> [19 September 2023]