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SHORT COMMUNICATION

# Bilateral nasal septal chemical cautery: a safe and effective outpatient procedure for control of recurrent epistaxis, our experience in 134 patients

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## Abstract

**Purpose** To assess the effectiveness and complications of bilateral nasal septal cautery using silver nitrate in anterior nasal epistaxis.

**Methods** This prospective study was carried out on 180 consecutive patients presenting with epistaxis to a general ENT clinic. Local anaesthetic cautery was performed using 5% lidocaine hydrochloride and 0.5% phenylephrine hydrochloride spray in all the patients except eight children that were 4 years or younger that were done under general anaesthetic. Visible vessels in Little's areas were cauterised using two silver nitrate sticks each side. Patients were prescribed naseptin cream and followed-up. We classified re-bleeds as follow: 0–1 episodes: significant improvement, 2–3 episodes: moderate improvement, 4 + episodes: no improvement.

**Results** We analysed 134 (74%) patients who were seen at follow-up. Age range was 5–88 years (mean 25, median 15), there were 89 (67%) males. Children made up 60% (81) of the study population (aged 16 years and under), of these 56 (69%) were male. Significant improvement was seen in 93% (124) of the study population, but there were relapses in two children (1.5%) and only moderate improvement in eight patients (6%). There was no significant complication in the study population, but 11 patients had crusting at the sites of cautery at follow-up.

**Conclusions** Bilateral silver nitrate cauterisation is an effective method of treating recurrent epistaxis with low risk of complications.

**Keywords** Epistaxis · Bilateral cautery · Silver nitrate · Little's area

## Introduction

Epistaxis is one of the commonest reasons of patient presentation to ENT services. Most cases seen in a general ENT outpatient clinic are idiopathic and this is frequently bilateral.

Epistaxis in children is a common presentation affecting over 50% of children over the age of 5 years (whilst being uncommon before the age of 2 years) [1].

Bleeding usually arises from the Little's area, where arterial supply to the nose anastomoses in what is known as Kiesselbach's plexus in the anterior third of the nasal septum. The vessels forming this plexus are branches of the external and internal carotid arteries. The internal carotid artery supplies this region superiorly via the anterior and posterior ethmoidal arteries, which supply the lateral nasal walls and the septum. They are branches of the ophthalmic artery and enter the nasal cavity via the cribriform plate [2–4].

The external carotid artery's supply is via the maxillary and facial arteries. Inferiorly the superior labial artery branching from the facial artery and ascending from the anterior floor of the nose [2–4]. Posteriorly to this and arising from the floor of the nose is the greater palatine artery (a branch of the maxillary artery). The maxillary artery also gives off the sphenopalatine artery, which supplies a significant proportion of the blood supply to the nasal cavity and septum. It exits the sphenopalatine foramen giving off major septal branches which form part of Kiesselbach's plexus [2–4]. The sphenopalatine

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artery (lateral and posterior branches) supplies the inferior and middle turbinates [3].

The Little's area is the most exposed part of the nasal mucosa and therefore exposed to the effect of humidity in the air. It is also the most accessible part of the nasal septum and therefore susceptible to trauma by nose picking especially in children [1].

Silver nitrate cautery is a widely available and routinely used method for stopping epistaxis. It comes coated on the tips of plastic sticks, fused with potassium nitrate [5]. Upon contact to the desired mucosal area to undergo cautery the silver nitrate acts as an oxidising agent. When in an aqueous solution, the silver cation from the salt releases free radicals as it is reduced to neutral silver metal. This reaction oxidises the tissue in contact, leading to the 'singeing effect' on the mucosa [4, 5].

A histological study of nasal cartilage by Lloyd et al. [6] showed that deposits of silver nitrate are found on cartilage following cautery to septum but the duration of exposure did not show any significant difference in the depth of penetration. There was also no demonstrable damage to cartilage from silver nitrate in their series.

There are several side-effects that can occur with silver nitrate cautery, including failure/recurrent epistaxis, pain and more rarely septal perforation can occur, crusting, adhesions and discolouration of nasal mucosa [4, 5].

To carry out effective nasal cautery two things need to be achieved: anaesthesia of the area locally and decongestion. This is carried out with application of 5% lidocaine hydrochloride and 0.5% phenylephrine hydrochloride in spray form or on a cotton wool ball applied to the area of interest. This makes the process of cautery more tolerable for the patient and easier for the specialist, with a high level of decongestion noted at 6 min post application and maximum anaesthesia after 9 min [7].

### Aim of study

This present study sets out to assess the efficacy of silver nitrate cautery in the control of epistaxis, and to assess for any complications following bilateral septal cautery.

### Ethical clearance

The department of Clinical Effectiveness gave approval for the study and confirmed that ethical clearance was not required.

## Methods

Consecutive patients attending a general ENT clinic with the complaint of recurrent nose bleeds were prospectively recruited for the study. Inclusion criteria: patients with epistaxis where there were visible vessels on the septum were included. Patients with unilateral epistaxis requiring treatment of only one side of the septum, although included in the audit database, were excluded from analysis.

Clinical history including history of nasal allergy, nasal trauma, coagulopathy, use of anticoagulants, previous nasal cautery was solicited. A thorough ENT examination was conducted on all patients including nasal endoscopy in adult patients.

Topical anaesthesia (sprayed in adults and older children, and cotton wool ball soaked in anaesthetic agent in younger children) using a combination of 5% lidocaine hydrochloride and 0.5% phenylephrine hydrochloride was applied to all patients. Very young children who were unable to tolerate this had the procedure carried out under general anaesthesia. Patients were asked to wait for 10–15 min before undergoing nasal cautery. Vessels in the anterior part of the nasal septum were cauterised using 75% silver nitrate caustic applicators. Cautery was applied to apposing sides of the septum at the same seating if indicated. Silver nitrate caustic sticks are applied until the mucosa turned dark grey; usually requiring the application of two sticks for 30–45 s each side. Patients were prescribed antiseptic ointment or a suitable alternative, to use for at least 2 weeks following cautery. A 3 months' review appointment was arranged for all patients.

A contingency table alongside Fisher's exact *T* test was used to analyse results.

### Outcome measure

Significantly reduced or complete cessation of epistaxis was considered successful treatment. For this study re-bleeds are classified as follow in Tables 1 and 2.

## Results

A total of 180 patients were prospectively treated for epistaxis. 46 patients who failed to attend for review were excluded from analysis.

134 patients that underwent bilateral cauterisation to apposing Little's areas were thus analysed for this study. There were 89 (67%) males and 45 (33%) females. Most of

**Table 1** Result of treatment classification

| Number of post treatment epistaxis episodes | Classification of improvement |
|---|---|
| 0–1 | Significant |
| 2–3 | Moderate |
| ≥ 4 | None |

**Table 2** Contingency table comparing outcomes in adults and children

| | Moderate or no improvement | Significant improvement | Total |
|---|---|---|---|
| Adults | 4 | 49 | 53 |
| Children | 6 | 75 | 81 |
| | 10 (7%) | 124 (93%) | 134 |

the patient population were children ($n = 81$, 60%) with an age range of 2–89 years (median 14, mean 28).

The patients were followed-up for between 2 and 22 months (mean 4, median 3 months).

24 patients gave positive history of hay fever, and of these 22 (92%) had significant improvement in the frequency of nosebleeds and two (8%) had moderate improvement. None of these patients required further cautery.

45 patients had clinically significant deviated nasal septum, and of these six had moderate improvement in the frequency of epistaxis but one patient did not experience any improvement and therefore required further cauterisation.

### Outcome

124 (92.5%) patients had significant improvement in their symptoms, eight (6%) had moderate improvement but two (1.5%) cases had no improvement. 11 patients had noticeable crusting at the site of cautery but no septal perforation was observed in this study population.

Our results were not found to be statistically significant using fishers exact $T$ test when comparing results between adults and children ($P$ value = 1.000).

## Discussion

Results from our study show a large reduction in the frequency and severity of epistaxis in the study population. The use of local anaesthetic or general anaesthetic in all the patients in this series allowed for adequate cauterisation of the nasal septum and this may have contributed to the success rate. 49 (92%) adults in the study had a significant improvement as did 93% of children.

In many cases epistaxis is aggravated by trauma such as nose picking and it may be that in cases where symptoms relapsed that this practice was still ongoing, not allowing mucosal healing and therefore cessation of symptoms.

Due to the blood supply of the nasal septum being provided by the mucoperichondrium, it is postulated that interruption of this on both sides of the septum can lead to ischaemic necrosis and subsequent perforation of the nasal septum, it is postulated that this can be caused by bilateral nasal cautery, or surgery to the septum [4, 6, 8, 9]. Some studies recommend leaving up to 6 weeks between cautery episodes if bilateral cautery is required [4].

In a study of 100 paediatric patients who underwent silver nitrate cautery (including 24 patients treated bilaterally), there were no cases of septal perforation [5]. Another study revealed that there were no cases of septal perforation with the use of 75% silver nitrate cautery bilaterally with a 2 month follow-up period [10].

Our study provides further evidence of the safety and efficacy of performing bilateral nasal cautery during a single episode (using 75% silver nitrate). Our extensive patient follow-up revealed no perforations of the nasal septum in any of the cases, with only 8% of patients experiencing any crusting. Treating patients in a single episode saves on healthcare costs, patient inconvenience and frees up clinic appointments for more patients to be seen.

There was a high rate of study withdrawal, with 26% of patients not attending follow-up. We presume that in most of these cases no further problems were encountered and the patient's epistaxis had been resolved. We therefore suspect that the rate of successful treatment (significant improvement) could be even higher than our overall reported rate of 93%.

## Conclusion

Our study suggests that bilateral silver nitrate nasal cautery in adults and children are safe and efficacious methods of treating epistaxis.

Only 8% of patients developed any site crusting and there were no cases of perforation, with 92.5% of patients reporting significant symptom improvement.

### Compliance with ethical standards

**Conflict of interest** The authors declare that they have no conflict of interest.

**Ethical approval** All procedures performed in studies involving human participants were in accordance with the ethicalstandards of the institutional research committee and with the 1964 Helsinki declaration and its lateramendments or comparable ethical standards.

**Informed consent** Informed consent was obtained from all individual participants included in the study.

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