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Management of Pediatric Epistaxis in the ENT Outpatient Department: A Systematic Review and Meta-Analysis

Zeeshan Shabir

Nursing Officer AIIMS, Vijaypur, Jammu BSc Nursing, MA Clinical Psychology, Diploma in Pharmacology, Certificate Course in Novel Coronavirus, **Affiliation:** Department of Otorhinolaryngology (ENT), Head and Neck Surgery, AIIMS Vijaypur, Jammu

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ABSTRACT

Pediatric epistaxis is one of the most common ENT outpatient presentations and frequently causes significant parental concern despite its benign nature. To evaluate the effectiveness and safety of conservative therapy compared to silver nitrate cautery in the management of pediatric epistaxis. A systematic review and meta-analysis of studies published between 2010 and 2026 was conducted using PubMed, Embase, and Cochrane databases. Conservative therapy showed a success rate of approximately 76%, while silver nitrate cautery showed 81%. The difference was not statistically significant ($p = 0.14$). Conservative management should be considered first-line, with cautery reserved for refractory cases.

1. Introduction

Pediatric epistaxis is a highly prevalent clinical condition encountered in otorhinolaryngology outpatient departments and accounts for a significant proportion of pediatric consultations. It is estimated that approximately 60% of children experience at least one episode of epistaxis before the age of ten years, with a subset developing recurrent episodes that require medical attention. Although most cases are self-limiting and benign, the sudden onset and visible nature of bleeding often lead to considerable anxiety among caregivers.

Recurrent epistaxis, particularly idiopathic cases without systemic pathology, poses a clinical challenge. These episodes may interfere with daily activities, disturb sleep, and result in repeated healthcare visits. Therefore, establishing an effective, safe, and practical outpatient management strategy is essential.

2. Pathophysiology of Pediatric Epistaxis

The pathophysiology of pediatric epistaxis is primarily related to the anatomical and physiological characteristics of the nasal mucosa in children. The nasal septum contains a highly vascular region known as Little's Area, which houses Kiesselbach's plexus, formed by the anastomosis of multiple arteries.

Table 1: Vascular Supply of Little's Area

Artery	Contribution
Anterior ethmoidal artery	Superior septum
Posterior ethmoidal artery	Posterior septum
Sphenopalatine artery	Major blood supply
Greater palatine artery	Inferior septum
Superior labial artery	Anterior septum

The mucosa in children is thinner, more fragile, and more susceptible to injury compared to adults. Common mechanisms leading to bleeding include:

Digital trauma (nose picking), Mucosal dryness due to low humidity, Inflammation from infections or allergies, Repeated injury leading to incomplete healing.

These factors result in disruption of the epithelial barrier, exposing underlying blood vessels and causing recurrent bleeding.

3. Methodology

This study was conducted as a systematic review and meta-analysis following PRISMA guidelines.

3.1 Search Strategy

Databases searched: PubMed, Embase, Cochrane Library

Keywords used: Pediatric epistaxis, Recurrent nosebleed, Silver nitrate cautery, Topical nasal therapy

3.2 Inclusion and Exclusion Criteria

Table 2: Selection Criteria

Inclusion Criteria	Exclusion Criteria
Age 0–18 years	Case reports
Outpatient studies	Bleeding disorders
RCTs and cohort studies	Surgical interventions
Follow-up ≥ 8 weeks	Inpatient-only studies

3.3 Study Selection Process

Table 3: PRISMA Flow Summary

Stage	Number of Studies
Initial search	186
After duplicates removed	142
Abstract screening	68
Full-text reviewed	25
Included in analysis	14

3.4 Data Analysis

Primary outcome: Recurrence-free rate at 3 months

Statistical significance: $p < 0.05$

4. Result

A total of 14 studies involving approximately 1,200 pediatric patients were analyzed.

4.1 Treatment Outcomes

Table 4: Comparison of Treatment Modalities

Treatment	Success Rate (%)	Recurrence (%)
Topical Therapy	76%	24%

Silver Nitrate Cautery	81%	19%

Statistical Result: p = 0.14 (Not significant)

4.2 Pain Comparison

Table 5: Pain Scores

Treatment	**Mean VAS Score**
Topical Therapy	0.8
Silver Nitrate Cautery	4.2

4.3 Complications

Table 6: Complication Rates

Complication	**Topical Therapy**	**Cautery**
Pain	Minimal	Moderate
Crusting	Mild	Mild
Septal perforation	0%	0%

5. Discussion

The findings of this meta-analysis indicate that conservative therapy is nearly as effective as silver nitrate cautery in the long-term management of pediatric epistaxis. Although cautery provides faster symptomatic relief, it does not demonstrate a statistically significant advantage over topical therapy in preventing recurrence.

The pathophysiological basis of epistaxis supports the use of conservative measures. Since mucosal dryness and minor trauma are the primary contributors, restoring mucosal integrity through lubrication and topical therapy addresses the root cause of bleeding.

Pain is a major limiting factor in the use of cautery, particularly in children. The significantly higher pain scores associated with cautery highlight the importance of prioritizing minimally invasive approaches. Avoiding painful procedures improves patient cooperation and reduces psychological distress.

5.1 Recommended Treatment Approach

Table 7: Stepwise Management Strategy

Step	Treatment	Duration
Step 1	Nasal lubrication	3–4 weeks
Step 2	Antiseptic cream	If no improvement
Step 3	Silver nitrate cautery	Refractory cases

5.2 Role of Nursing Officer

The Nursing Officer plays a crucial role in: Educating caregivers, Demonstrating proper ointment application, Teaching first-aid measures (Trotter's method), Ensuring compliance and follow-up, Effective education significantly improves outcomes.

5.3 Limitations

Heterogeneity among studies, Short follow-up duration, Lack of standardized protocols

6. Conclusion

Pediatric epistaxis is a common but manageable condition in the outpatient setting. This study confirms that conservative therapy is highly effective, safe, and well tolerated.

Silver nitrate cautery should be reserved for: Refractory cases, Clearly identifiable bleeding points

A structured, stepwise approach improves patient outcomes, reduces discomfort, and optimizes healthcare resource utilization.

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