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TREATMENT OF EPISTAXIS: A NARRATIVE REVIEW OF CONSERVATIVE APPROACHES

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ABSTRACT

Background: Epistaxis is one of the most common emergencies in otolaryngology and can occur in patients of any age. Conservative management includes a variety of methods with differing effectiveness, such as topical agents, nasal tamponade, tranexamic acid (TXA), and hot water irrigation (HWI). The emergence of new studies evaluating the effectiveness of these methods requires a comprehensive analysis to update the current state of knowledge.

Aim:. The aim of this review is to present and critically analyze current information on the effectiveness of conservative methods for the treatment of epistaxis. This includes a comprehensive assessment of topical agents, nasal tamponade, TXA, HWI, as well as therapies used in patients with hereditary hemorrhagic telangiectasia (HHT).

Material and methods: A narrative review was conducted by searching PubMed and Google Scholar databases, while ResearchGate was used solely to obtain full-text publications. Studies published between 1999 and 2026 were included. The analysis considered RCTs, cohort studies, observational studies, and systematic reviews evaluating the effectiveness of conservative approaches to epistaxis management. Due to significant heterogeneity among studies, a qualitative synthesis of results was performed.

Results: Combination therapy based on topical agents and cauterization provided greater benefits than the use of topical preparations alone, particularly during longer follow-up. Nasal tamponade was effective in difficult cases, with the best results achieved when maintained for about 24 hours. HWI demonstrated similar efficacy to tamponade, but with less pain, shorter hospitalization, and less mucosal damage. TXA was associated with a shorter time to hemostasis, reduced risk of recurrence, limited the need for tamponade, and improved patient comfort, while maintaining a favorable safety profile. No clear advantage of timolol over placebo was demonstrated in the management of HHT.

Conclusions: Conservative treatment of epistaxis is effective, but the efficacy of individual methods depends on the type of intervention and patient characteristics. The strongest evidence supports the topical use of TXA, which is among the best-documented conservative treatments. Combination therapy with cauterization appears to be the most effective in preventing recurrences. HWI may be a beneficial alternative to nasal tamponade in selected patients. Large, multicenter RCTs with standardized endpoints and longer follow-up are needed to determine optimal treatment strategies.

KEYWORDS

Epistaxis, Conservative Treatment, Tranexamic Acid, Nasal Packing, Topical Therapy, Hereditary Hemorrhagic Telangiectasia

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1. Introduction

Epistaxis is defined as bleeding from the nasal cavity originating from the richly vascularized nasal mucosa [1]. Damage to vessels, which are branches of the internal and external carotid arteries, results in the unexpected outflow of blood [1, 2]. The most common site of bleeding is considered to be Kiesselbach's plexus (Little's area), located in the anterior part of the nasal septum, where five arteries anastomose directly beneath the thin mucosa [1, 2, 5-7]. The main blood supply to the nasal cavity is the sphenopalatine artery [6]. Structural changes in these blood vessels and increased fragility of their walls may be important mechanisms responsible for the development of epistaxis [8].

Studies suggest a seasonal pattern of nosebleeds; however, the highest incidence has been reported in various seasons and months [3-5, 7, 9, 10, 13, 15]. Epistaxis occurs at any age and is more common in men than women [3-5, 7-13, 15-18]. The etiological profile does not significantly differ between genders or age groups [12]. However, the frequency of hospitalization increases with age, and older adults are at risk for a more severe course of disease [9, 10, 14].

One of the most common causes of the condition is considered to be mechanical trauma [2, 8, 11, 12, 16, 17]. Other factors contributing to bleeding include nose picking, forceful nose blowing, dryness of the mucosa, and exposure to variable environmental conditions [2]. Less commonly, epistaxis is associated with hematological disorders, infections, or neoplasms [5, 13, 18]. Attention should also be paid to nasal hemangiomas, which mainly occur in younger patients and, when located in the Kiesselbach's plexus, may

predispose to epistaxis [2]. Common comorbidities observed with epistaxis include hypertension, diabetes, dyslipidemia, coronary artery disease, and obstructive airway diseases [3, 5, 9-11, 13]. Anticoagulant or antiplatelet therapy is also an important predictor of bleeding [3, 5, 9-11, 13, 16].

The classification of epistaxis depends on the site of origin - anterior epistaxis and posterior epistaxis are distinguished [1, 3, 4]. Anterior bleeding occurs more often in young people and usually does not require hospitalization, whereas posterior bleeding tends to have a more severe course and an increased need for specialist treatment [1-3, 9, 10, 17, 18].

Diagnosis of epistaxis is primarily based on ENT examination, which allows for assessment of the nasal cavity and identification of the bleeding source [13, 17]. More advanced tests that help establish the cause and location of the bleeding source include computed tomography and endoscopy, which also enable therapeutic intervention [18, 19, 20]. In most cases, laboratory test results remain normal, suggesting that nosebleeds are usually local in nature and not the result of systemic disorders [7, 17].

Management of epistaxis should be escalatory, and the choice of treatment method should depend on the location of the bleeding source, its severity, and the response to previous measures [1]. Initial management involves a simple first aid method such as compression of the nasal alae, which is effective in most cases [1-3]. If unsuccessful, conservative treatment is used, including topical vasoconstrictors and cauterization, with anterior nasal tamponade being the most effective and commonly used method [1, 2, 4, 5, 7, 10, 11, 13, 18]. Less frequently, in refractory cases where the above measures are ineffective, posterior nasal tamponade, endoscopic surgery (ligation of the sphenopalatine artery), and embolization may be employed. These methods are highly effective with minimal risk of complications [1, 3, 4, 9, 10, 16]. Recent data also indicate the potential value of tranexamic acid in the treatment of epistaxis, though study results remain inconclusive [1].

The growing number of available treatment methods and the emergence of new data regarding the effectiveness of specific interventions justify the need for a comprehensive summary of the current state of knowledge. This paper aimed to present and critically summarize current data on the effectiveness of methods used in the treatment of epistaxis, with particular emphasis on conservative management, nasal tamponade, and tranexamic acid.

2. Materials and methods

This study was conducted as a narrative review with a structured literature search to summarize the current evidence regarding conservative treatment strategies for epistaxis. A comprehensive search of electronic databases was performed to identify relevant studies, including PubMed and Google Scholar. ResearchGate was used exclusively to obtain full-text versions of studies identified through database searching and was not considered a primary literature source.

The literature search was performed in July 2026 and included studies published between 1999 and 2026. The search strategy combined Medical Subject Headings (MeSH) and free-text terms related to epistaxis and conservative treatment. The following keywords were used: ("epistaxis" OR "nosebleed") AND ("topical therapy" OR "topical medication" OR "ointment" OR "chemical cauterization" OR "nasal packing" OR "tranexamic acid" OR "hot water irrigation" OR "timolol" OR "hereditary hemorrhagic telangiectasia").

Studies were eligible for inclusion if they comprised randomized controlled trials, non-randomized clinical trials, prospective or retrospective cohort studies, case-control studies, comparative observational studies, or systematic reviews; involved pediatric or adult patients with epistaxis or hereditary hemorrhagic telangiectasia; evaluated conservative treatment strategies, including topical medications, nasal packing, tranexamic acid, hot water irrigation, or topical therapies for HHT; and reported clinically relevant outcomes such as treatment effectiveness, time to hemostasis, recurrence of bleeding, patient satisfaction, quality of life, or treatment safety. Only studies published in English and available as full-text articles were included.

Studies focusing exclusively on surgical management, embolization, diagnostic techniques, anatomical aspects, or pathophysiological mechanisms without evaluation of treatment outcomes were excluded. Case reports, conference abstracts, letters, and editorials were also excluded because of their limited methodological value.

Study selection was based on screening titles and abstracts, followed by full-text assessment of potentially relevant publications. The evidence was synthesized narratively because substantial heterogeneity existed among the included studies with regard to patient populations, causes of epistaxis, treatment protocols, outcome measures, and follow-up duration. Owing to these differences, a qualitative synthesis was considered more appropriate than a quantitative comparison of the available evidence.

3. Results

3.1 Topical medications

One study compared the effectiveness of five methods of local treatment for recurrent anterior nosebleeds: topical antiseptic ointment, topical decongestant ointment, chemical cauterization, topical antiseptic ointment + chemical cauterization, and topical decongestant ointment + chemical cauterization [21]. The analysis included 137 patients with a mean age of 18.6 ± 14.9 years [21]. The overall effectiveness after 15 days of treatment was 62.0% (85/137), with no significant differences observed among the five groups ($p = 0.277$) [21]. However, after 30 days, the effectiveness of therapy increased to 80.3% (110/137), and in this case, the differences were statistically significant ($p = 0.026$) [21]. As shown in Table 1, the best results after 15 days of treatment were observed with the topical decongestant ointment + chemical cauterization approach, while the worst outcomes were found in patients using only topical antiseptic ointment [21]. After 30 days, significantly higher effectiveness was noted in the groups receiving combination therapy compared to those using ointments alone, whereas chemical cauterization by itself did not show significant differences compared to the other groups [21]. There were also no differences between the topical antiseptic ointment + chemical cauterization group and the topical decongestant ointment + chemical cauterization group [21].

Table 1. Comparison of five different therapeutic approaches after 15 and 30 days [21].

Type of treatment	Effectiveness after 15 days	Effectiveness after 30 days
Topical antiseptic ointment	50,0% (13/26)	65,4% (17/26)
Topical decongestant ointment	52,0% (13/25)	68,0% (17/25)
Chemical cauterization	61,5% (16/26)	80,8% (21/26)
Topical antiseptic ointment + chemical cauterization	70,0% (21/30)	93,3% (28/30)
Topical decongestant ointment + chemical cauterization treatment	73,3% (22/30)	90,0% (27/30)

More information regarding the effectiveness of specific topical preparations was provided by a study of 66 patients with a mean age of 34.4 ± 10.2 years, comparing Oxytetracycline ointment with Sodium Pentaborate Pentahydrate (SPP) [22]. Thirty-two patients were included in the SPP group and thirty-four in the Oxytetracycline group [22]. In both groups, a significant reduction in the bleeding area was observed ($p < 0.001$) with no significant difference between them ($p = 0.106$); however, the frequency of bleeding after treatment was significantly higher in patients using Oxytetracycline ointment ($p = 0.011$) [22]. Nevertheless, all patients reported significant improvement in the Sino-Nasal Outcome Test-22 (SNOT-22) questionnaire ($p < 0.001$), with no significant differences between Oxytetracycline and SPP treatment ($p = 0.856$) [22].

A study on the effectiveness of Achillea Millefolium ointment, which assessed a total of 50 patients equally assigned to the intervention and control groups with mean ages of 21.12 and 22.92 years, respectively, showed that after 10 days of therapy there was no significant difference between groups in the severity of epistaxis as assessed by the Epistaxis Severity Score (ESS) [23]. However, after one and three months, the ESS was significantly lower in patients treated with the ointment ($p < 0.001$ for time effect and $p < 0.001$ for time $\times$ treatment interaction) [23]. Therapy also affected the mean frequency of bleeding, which significantly decreased after one and three months compared to the control group ($p < 0.005$) [23]. The mean bleeding time in patients using the ointment decreased from 1.20 min to 0.20 min after one month, reaching 0.04 min after three months ($p < 0.001$) [23]. In the control group, it was 0.88 min before therapy, 0.88 min after one month, and 0.68 min after three months ($p < 0.001$) [23]. There were no significant differences in the frequency of severe bleedings or coagulation parameters, and no adverse effects related to the above therapy were reported [23].

3.2 Nasal tamponade

A single intervention, without the need for repeat tamponade, surgical procedure, or embolization, was effective in 87.5% (547/625) of patients [24]. A factor associated with the success of this treatment approach was cauterization performed after tamponade placement (OR = 2.45; 95% CI: 1.43–4.21; $p = 0.001$). The highest effectiveness (91.9%) was achieved when the tamponade was maintained for approximately 24 hours,

while a duration shorter than 21 hours was associated with a higher risk of treatment failure (OR = 2.30; 95% CI: 1.37–3.84; $p = 0.002$) [24]. The median pain score during tamponade placement was 8.5/10 and decreased to 5/10 after placement [24]. Ultimately, as many as 70% (14/20) of patients indicated that they preferred tamponade removal after approximately 24 hours rather than before 6 hours had passed [24].

In a study comparing nasal tamponade with no tamponade, 948 patients were analyzed (570 with tamponade and 378 without), with a median age of 69 years [25]. Re-presentation to the emergency department after inverse probability of treatment weighting (IPTW) occurred less frequently in patients with tamponade compared to those without (5.1% vs 7.9%; OR = 0.63; 95% CI: 0.39–1.00) [25]. A lower risk of re-presentation was observed in patients with active bleeding and in those with anterior (3.4% vs 9.7%; OR = 0.32; 95% CI 0.13–0.79) and posterior bleeding (9.0% vs 24.3%; OR = 0.31; 95% CI 0.11–0.85) who received tamponade [25]. No significant differences were observed in patients in whom hemostasis was achieved by other methods (6.8% vs 8.3%; OR = 1.20; 95% CI: 0.42–3.62), nor in those taking antiplatelet or anticoagulant medications (4.6% vs 1.9%; OR = 2.50; 95% CI: 0.74–8.55) [25]. Sensitivity analysis using propensity score matching (PSM) confirmed the main findings, showing a lower probability of re-presentation after tamponade placement (5.1% vs 9.0%) [25].

An analysis of 203 patients with non-traumatic anterior epistaxis, comparing 107 patients treated with Traumastem and 96 with standard nasal tamponade, found no significant differences in time to bleeding cessation ($p = 0.764$) or risk of rebleeding within 24 hours ($p = 0.591$) [26]. Analysis of patients who achieved hemostasis in less than 5 minutes also showed no superiority of either method [26]. However, a shorter time to effective hemostasis was significantly associated with greater patient satisfaction ($R = 0.356$; $p < 0.001$), and satisfaction levels were significantly higher in the Traumastem group [26]. Five patients using Traumastem experienced sneezing after application, which prevented continuation of therapy and required the use of standard tamponade [26].

One study compared hot water irrigation (HWI) with nasal tamponade in 122 patients with posterior epistaxis (56 in the HWI group and 66 in the tamponade group) [27]. Table 2 shows that there were no significant differences in effective hemostasis or treatment failure/early recurrence [27]. The mean time to achieve hemostasis was 3 minutes shorter in the tamponade group [27].

Table 2. Comparison of the effectiveness of hot water irrigation (HWI) with nasal tamponade in patients with posterior epistaxis [27].

	Hot water irrigation (HWI)	Nasal tamponade
Effective control of bleeding	63% (35/56) patients	64% (42/66) patients
Mean time to achieve hemostasis	5 min (range 1-35 min)	2 min (range 1-30 min)
Treatment failure or early rebleeding	37% (21/56 patients)	36% (24/66 patients)

In contrast, HWI was associated with less pain compared to all types of tamponade (VAS 4.7 vs 7.5; $p < 0.001$) and with a shorter hospital stay (2.9 vs 4.0 days; $p < 0.05$) [27]. A normal appearance of the nasal mucosa on rhinoscopy was observed more frequently in patients treated with HWI than in those who underwent tamponade (86% vs 33%), and after one week, in 95% and 17% of patients, respectively [27]. No cases of mucosal necrosis were noted in the HWI group, whereas in the tamponade group, necrosis was observed in 16% of patients at discharge and in 40% after one week [27].

3.3 Tranexamic acid (TXA)

The present analysis included 4 studies comparing tranexamic acid (TXA) with conventional anterior nasal tamponade, with a total of 762 patients evaluated [28, 29, 30, 31]. Three of these studies, as shown in Table 3, demonstrated the possibility of faster control of bleeding in patients treated with TXA [28, 29, 30].

Table 3. Comparison of the time to effective bleeding control in patients treated with TXA and nasal tamponade.

Study	Intervention	Endpoint	TXA	Nasal tamponade	Outcome
A New and Rapid Method for Epistaxis Treatment Using Injectable Form of Tranexamic Acid Topically: A Randomized Controlled Trial [28]	TXA vs anterior nasal tamponade	Achievement of hemostasis ≤ 10 min	71,0% (76/107)	31,2% (34/109)	TXA significantly more effective (OR 2.27; 95% CI 1.68–3.06; $p < 0.001$)
Topical Tranexamic Acid Compared with Anterior Nasal Packing for Treatment of Anterior Epistaxis in Adults: A Randomized Controlled Trial [29]	TXA vs anterior nasal tamponade	Mean time to achieve hemostasis	$7,74 \pm 3,28$ min	$9,28 \pm 3,69$ min	TXA shortened the time to achieve hemostasis ($p = 0.004$)
Comparative Study of Topical Application of Injection Tranexamic Acid and Anterior Nasal Packing in the Management of Epistaxis [30]	TXA vs Gelfoam tamponade	Median time to achieve hemostasis	10 min (IQR 10–15)	15 min (IQR 10–20)	TXA shortened the time to achieve hemostasis ($p < 0.001$)

An analysis of 240 patients showed that those treated with TXA had a lower need for anterior nasal tamponade (50.0% vs 64.2%; OR = 0.56) [31]. The frequency of rebleeding within 24 hours after TXA administration was lower in three studies, as presented in Table 4.

Table 4. Risk of rebleeding within 24 hours after treatment with TXA and conventional anterior nasal tamponade.

Study	Number of patients	TXA	Anterior nasal tamponade	Difference
A New and Rapid Method for Epistaxis Treatment Using Injectable Form of Tranexamic Acid Topically: A Randomized Controlled Trial [28]	216 (107 vs 109)	4,7% (5/107)	14/109 (12,8%)	TXA reduced the risk of recurrence ($p = 0.034$)
Topical Tranexamic Acid Compared with Anterior Nasal Packing for Treatment of Anterior Epistaxis in Adults: A Randomized Controlled Trial [29]	206 (102 vs 104)	5,9% (6/102)	16/104 (15,4%)	TXA reduced the risk of recurrence ($p = 0.045$)
Intranasal Topical Application of Tranexamic Acid in Atraumatic Anterior Epistaxis: A Double-Blind Randomized Clinical Trial [31]	240 (120 vs 120)	15,0% (18/120)	36/120 (30,0%)	TXA reduced the risk of recurrence (OR = 0.41)

In two studies, a lower number of recurrences was also observed after 1–7 days [28, 29]. However, the largest study with 240 patients did not demonstrate a significant difference in this regard [31]. TXA was also associated with a shorter stay in the emergency department or hospital [29, 31]. A discharge time from the emergency department of less than 2 hours was achieved in 95.3% of patients receiving TXA, compared to 6.4% of those treated with nasal tamponade [28]. Patients treated with TXA also reported higher satisfaction with therapy [28]. TXA-treated patients achieved better results in treatment comfort as well as on the NOSE and VAS scales [29]. None of the studies showed an increased risk of adverse events associated with topical TXA use [28, 29, 30, 31].

Additionally, four RCTs were selected comparing TXA with other topical treatments (not conventional nasal tamponade), including a total of 438 patients [32, 33, 34, 35]. In one analysis, TXA was more effective than placebo (saline-soaked gauze), but did not differ from Merocel tamponade [32]. Effective hemostasis within 15 minutes was achieved in 91.1% of patients treated with TXA, compared to 93.3% for Merocel and 71.1% for saline-soaked gauze [32]. In the same study, absence of rebleeding within 24 hours was observed in 86.7% after TXA, 73.3% after tamponade, and 60.0% after placebo [32]. TXA did not cause pain or require discontinuation of the procedure, unlike nasal tamponade, where 15.6% of patients reported pain and one patient had to discontinue treatment [32]. In a study comparing TXA to oxymetazoline, effective hemostasis was achieved in 77.8% of the TXA group and only 35.5% of the oxymetazoline group [33]. Rebleeding within 48 hours occurred in 5.6% of TXA-treated patients and 10.0% of those treated with oxymetazoline [33]. No significant differences were found in two studies comparing TXA with adrenaline [34, 35]. The effectiveness of hemostasis and mean time to achieve it were similar in the TXA and adrenaline groups: 82.5% vs 90.0% ($p > 0.05$) and 8.9 min vs 10.3 min ($p > 0.05$), respectively [34, 35]. In the analysis comparing TXA with adrenaline, there were no signs of recurrent bleeding during the 60-minute observation after achieving hemostasis [35]. None of the studies reported any serious adverse events or complications related to TXA treatment [32, 33, 34, 35].

One study also evaluated the optimal dose of TXA [36]. A total of 152 patients were assigned to three groups: 51 received 1000 mg, 50 received 500 mg, and the control group with saline included 51 patients [36]. Effective hemostasis after 5 minutes was achieved in 64.7% of those receiving 1000 mg TXA, 52.0% receiving 500 mg, and 29.4% in the control group ($p < 0.001$) [36]. After 10 minutes, nasal bleeding was controlled in 82.4%, 72.0%, and 54.9% of patients, respectively ($p = 0.01$) [36]. Recurrence occurred in 5.9% of the 1000 mg group, 10.0% of the 500 mg group, and 29.4% of controls ($p = 0.002$) [36]. No significant differences were found between groups regarding the frequency of adverse events or the need for ENT consultation ($p = 0.854$) [36].

3.4 Treatment of hereditary hemorrhagic telangiectasia (HHT)

A study of 58 patients, evenly assigned to timolol and placebo groups, showed that in 27.6% (8/29) of patients with HHT, timolol reduced the mean bleeding time by $\geq 30\%$, although this result was not statistically significant ($p = 0.54$) [37]. No significant differences were also found in the analysis of the mean number of nosebleeds over 3 months, total bleeding time, transfusion requirements, or hemoglobin and ferritin levels [37]. The drug also did not improve quality of life, as assessed by the SF-36 questionnaire [37]. The treatment was generally well tolerated, but in the timolol group there were 2 cases of bradycardia and 1 case of hypotension related to therapy [37].

Another HHT analysis, which randomized a total of 27 patients (14 in the timolol group and 13 in the placebo group), showed a significant improvement in ESS score in all patients (mean change 2.4 points; 95% CI 1.54–3.30), but no advantage of timolol over placebo was demonstrated [38]. Clinically significant improvement in the ESS was achieved in 82% of timolol-treated patients and 75% of those receiving placebo [38]. No significant differences were found in the results based on the Nasal Outcome Score for Epistaxis in Hereditary Hemorrhagic Telangiectasia (NOSE HHT), in quality of life assessed by the Short Form Health Survey (SF-36), or in hemoglobin levels [38]. Treatment tolerance was acceptable; 2 patients treated with timolol decided to discontinue therapy due to dyspnea and dizziness, but no serious adverse events or persistent complications were noted [38].

A study involving 18 patients with HHT showed a significantly greater improvement in ESS ($p = 0.010$) and subjective assessment of epistaxis (NRS; $p = 0.005$) in the timolol group [39]. However, after 3 months, no statistically significant advantage of timolol over placebo was achieved in terms of ESS reduction ($\Delta = 0.39$; 95% CI -0.06 to 0.84; $p = 0.084$), although patients receiving timolol achieved clinically meaningful improvement (MID) [39]. No differences were noted in hemoglobin level or overall quality of life assessed by the EQ-5D-3L questionnaire, although HHT-related quality of life was rated better in the timolol group [39]. Good treatment tolerance was also observed [39]. Patients did not report fluctuations in blood pressure or heart rate, and the number of adverse events did not differ between groups [39].

4. Discussion

4.1 Clinical Implications of Topical Therapies

In the local treatment of epistaxis, the use of ointments combined with cauterization appears to provide greater effectiveness than the use of topical preparations alone. The largest differences for combination therapy became apparent only after 30 days of treatment, while after 15 days, no significant differences were observed between the analyzed methods. This may indicate that an adequately long duration of therapy plays an important role in achieving the full clinical effect. The more favorable long-term outcome of combination therapy may result from the fact that cauterization directly eliminates the source of bleeding, while ointments only support the regeneration of the damaged mucosa and protect it from further injury. In practice, this may mean that choosing cauterization in combination with another local treatment allows not only for more effective control of bleeding, but also provides greater durability of the therapeutic effect, reducing the likelihood of epistaxis recurrence.

At the same time, it can be observed that not all topical preparations have the same effect. For example, *Achillea millefolium* ointment helps reduce the frequency of episodes and duration of bleeding, but this effect is gradual, with clear benefits seen only after at least a month of treatment. This suggests that this agent may be more advantageous for long-term prophylaxis than as a preparation for immediate bleeding control. In the case of Oxytetracycline ointment and SPP, the benefits in terms of quality of life improvement were similar, but for recurrence prevention, SPP performed better. This indicates that the choice of a specific preparation should consider not only its ability to alleviate symptoms, but also its effectiveness in preventing epistaxis recurrence.

4.2 Role of Nasal Packing

It is worth noting, however, that nasal packing remains an important method in the treatment of epistaxis. This technique is particularly effective in patients with active, difficult-to-control bleeding. However, the benefits of its use depend largely on how it is applied. The best results are achieved when the tamponade is maintained for about 24 hours, whereas a shorter duration is associated with a higher risk of treatment failure. An important element of management also appears to be performing subsequent cauterization after removal of the tamponade, which is associated with increased treatment effectiveness. Its use is also linked to a lower probability of re-presentation to the emergency department. However, in contrast to other local methods, nasal tamponade is associated with greater discomfort and pain, which can significantly limit patient comfort. Given the existence of other conservative treatments for epistaxis that may provide comparable effectiveness with greater patient comfort, nasal tamponade seems particularly justified in cases where bleeding cannot be controlled by less invasive methods.

4.3 Hot Water Irrigation as an Alternative to Nasal Packing

HWI also appears to be a good alternative to nasal tamponade, due to its similar effectiveness in achieving hemostasis. At the same time, this intervention provides greater patient comfort, as it is associated with less pain during the procedure. Additionally, HWI contributes to a shorter hospital stay. Another important advantage of HWI is that it causes less damage to the nasal mucosa compared to conventional tamponade. Therefore, owing to these factors, HWI can be considered a favorable alternative to conventional nasal tamponade in selected patients with posterior epistaxis, especially in those with a low pain threshold or when minimizing nasal mucosal injury is important.

4.4 Current Evidence on Tranexamic Acid

Among all the conservative methods analyzed, TXA therapy appears to offer the strongest and best-documented scientific evidence. In most of the studies reviewed, a faster time to bleeding control was observed. There was also a noticeable reduction in the number of epistaxis recurrences, as well as a decreased need for nasal tamponade in patients treated with TXA. This may translate into fewer repeat medical interventions and a reduced burden on emergency departments. An important factor favoring TXA over other methods is the greater comfort it provides for patients during treatment. Additionally, patients treated with TXA had a shorter emergency department stay compared to those managed with other methods for epistaxis. Importantly, no increased risk of adverse events was noted, suggesting that TXA may provide a favorable balance between

efficacy and safety. The results presented therefore suggest that TXA appears to be a promising alternative to other conservative methods for the treatment of epistaxis.

However, it should be noted that TXA has not always proven superior to other options, as the effectiveness of Merocel and adrenaline was found to be similar in some studies. This suggests that TXA should not be unequivocally presented as the single best method for epistaxis therapy, but rather as one of the best-documented conservative treatment options.

When selecting the dose of TXA, it was observed that a higher amount (1000 mg) achieved more favorable therapeutic outcomes; however, the number of studies on this topic remains limited. Further research is therefore needed to determine the optimal dosing regimen.

4.5 Conservative Management of HHT

In patients with HHT, the choice of optimal treatment method remains unresolved. In most studies, no superiority of timolol over placebo was demonstrated. While some individual studies observed improvements in certain parameters, the overall results lack consistency. This may be due to the limited number of available studies, small patient groups, and differences in the endpoints assessed. In clinical practice, this means there is currently no basis to introduce timolol for the routine management of nosebleeds. Furthermore, additional randomized controlled trials involving larger patient groups are necessary. These studies will help to clearly determine the efficacy of timolol as a potential therapy for epistaxis in patients with HHT. This is particularly important, as nosebleeds are considered the most common and burdensome symptom of HHT, significantly impacting patients' quality of life.

4.6 Safety of Conservative Therapies

Acceptable treatment tolerance was demonstrated in most of the studies analyzed, and serious or hospitalization-requiring adverse events were rare. Topical TXA was associated with a favorable safety profile and generally did not increase the risk of side effects. Importantly, it did not lead to an increased risk of thrombotic complications. Other topical preparations, such as *Achillea millefolium*, SPP, or oxytetracycline, also did not show significant therapy-related complications. In the case of timolol, although it was well tolerated in most cases, isolated instances of bradycardia, hypotension, dyspnea, and dizziness were observed. These adverse events suggest that some caution may be necessary when using timolol. Nevertheless, the favorable safety profile demonstrated for most of the tested agents supports their usefulness as conservative treatment options.

4.7 Limitations of Available Evidence

The analyzed studies revealed several limitations, the main one being significant heterogeneity among the available research. In many cases, the patient groups assessed were small in size, which was particularly evident in the HHT cohort comparing the effectiveness of timolol and placebo. Many studies were also single-center analyses, which substantially reduced their evidentiary value. Another limitation was that the scientific papers often evaluated different patient populations, which varied in their clinical characteristics. The analysis included, among others, patients with anterior nosebleeds, HHT, and idiopathic epistaxis. Additionally, these patients often required different interventions, leading to differences in treatment protocols between groups. Other important limitations included varying follow-up periods, which prevented direct comparison of effectiveness between the analyzed methods. Numerous endpoints were assessed across the studies, further complicating the collective analysis of the utility of individual topical therapies. All these factors made comparing the benefits of various local treatment methods in patients with epistaxis challenging and significantly limited the ability to draw definitive conclusions.

4.8 Future Research Directions

In order to clearly identify the most effective therapeutic approach, additional analyses are needed. Large, multicenter randomized controlled trials (RCTs) should be conducted to enable more detailed comparative analyses. It is also necessary to create larger patient groups, particularly among those with HHT, as there is still a lack of valuable studies on effective drugs in this cohort. A key element to increase the usefulness of research is the standardization of endpoints, which will also allow for the development of a consistent definition for assessing treatment effectiveness. Consideration should also be given to conducting analyses comparing different follow-up periods, including longer-term follow-up, to more effectively evaluate the durability of therapeutic effects. Additionally, more studies comparing the most commonly used treatment

methods would be beneficial, as this would allow for direct evaluation of the effectiveness of individual approaches. Further analyses are needed to determine the optimal dose not only for TXA but also for other topical preparations. Another important aspect is the broader inclusion of quality of life assessment scales for patients with epistaxis in future studies. Furthermore, future research directions should focus on identifying patient groups who could benefit most from specific therapies.

5. Conclusions

This narrative review demonstrates that conservative treatment of epistaxis appears effective, though the benefits of individual methods vary depending on the type of therapy and patient population studied. Topical agents can be used to reduce the frequency and severity of recurrent bleeding; however, the best outcomes have been shown with combination treatment involving cauterization, especially during longer follow-up periods. Nasal tamponade remains an important method for managing difficult cases of nosebleeds, but it is associated with increased discomfort. Additionally, the best results are observed with a sufficiently long duration of tamponade placement. HWI may represent a promising alternative in selected patient groups. Among the conservative treatment methods analyzed, the strongest and best-documented evidence was found for TXA. TXA shortens the time to achieve hemostasis, reduces the recurrence rate, and decreases the need for tamponade, while maintaining a favorable safety profile. In the management of HHT, current data do not demonstrate a clear advantage of timolol over placebo, limiting its usefulness for routine clinical practice. Almost all therapies demonstrated a good safety profile, with life-threatening adverse events being rare. However, the available data are characterized by substantial heterogeneity, limiting the ability to make direct comparisons between results. Therefore, there is a need for large, multicenter RCTs with standardized endpoints and longer follow-up to help determine the optimal treatment approach. This would also allow for the identification of patient groups who benefit most from specific therapeutic methods.

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