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The initial assessment of adult epistaxis patients: A systematic review

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ABSTRACT

Background: The initial assessment of epistaxis patients commonly includes: first aid measures; observations; focused history taking; clinical examination and investigations. This systematic review aimed to identify evidence to inform us of how the initial assessment of these patients should be conducted.

Methods: Systematic review of the literature performed using a standardised methodology and search strategy.

Results: Seventeen articles were included. Factors identified were: comorbidity, intrinsic patient factors, coagulation screening and ice pack use. Hypertension and anticoagulant use are demonstrated to adversely affect outcomes. Coagulation screening is useful in patients on anticoagulant medication. Four studies could not be accessed. Retrospective methodology and insufficient statistical analysis limit several studies.

Conclusions: Sustained ambulatory hypertension, anticoagulant therapy and posterior bleeding may be associated with recurrent epistaxis, and should be recorded. Oral ice pack use may decrease severity and can be considered as first aid. Coagulation studies are appropriate for patients with history of anticoagulant use or bleeding diatheses.

INTRODUCTION

Epistaxis can be a life-threatening emergency and requires appropriate and structured initial assessment. In the absence of national guidance, however, it is currently unclear what this initial assessment should entail. Elements of initial assessment commonly include: the instigation of first aid measures; recording of physiological parameters; taking a focus history; clinical examination and requesting appropriate investigations. Within these elements it is important that any first aid measures undertaken are known to be effective either as a treatment of epistaxis or a method of limiting bleed severity. Physiological parameters should be used as measure of illness severity, if demonstrated to be valid in our patient group. When taking a focused history, whilst there are many established risk factors for epistaxis, it is key to know what factors affect the outcomes of epistaxis sufferers so that management can be tailored according. The clinical examination must be appropriate to guide relevant intervention, however, what should this examination include? At times of financial strain, investigations should be rationed to those known to affect our management, however, where should the threshold for requesting these test be?

Aims

This article aimed to systematically review the literature to inform a guideline generation process tasked with creating national consensus recommendations for the hospital management of epistaxis. This document will include recommendations on an evidence-based approach to the initial assessment of epistaxis patients. For the

purposes of the article this management domain was split into two distinct systematic reviews with the following research questions:

1. **Patient factors affecting outcome:** What patient factors affect the following outcomes in hospital treated epistaxis?
    - **a.** Length of hospital stay
    - **b.** Progression to surgery
    - **c.** Rate of transfusion of blood products
    - **d.** Rate of associated morbidity and mortality

2. **Initial management:** What represents optimum initial management in terms of?
    a. Where should initial assessment and management be conducted?
    b. Who should be undertaking the initial assessment and management?
    c. What first aid measures should be instigated?
    d. What observations should be undertaken within the initial assessment?
    e. What elements represent appropriate patient examination?
    f. What investigations should be performed in all patients?
    g. What investigations should be performed in selected patients?

METHOD

This work forms part of a set of systematic reviews designed to summarise the literature prior to the generation of a UK national management guideline for epistaxis. Following the generation of this and other systematic reviews, consensus recommendations on

the management of epistaxis were generated based on the evidence and expert opinion [reference consensus process, submitted to JLO]. The methodology set out below is common to this and four other reviews [reference other reviews submitted].

Generation of research questions: The management of epistaxis was divided into nine domains through discussion within a trainee project steering committee. The identified domains were: patient factors affecting outcome; initial assessment and first aid; cautery; dissolvable nasal packs; non-dissolvable nasal packs; management of anticoagulation; other haematological factors affecting outcome; surgical management and radiological intervention. Clinically relevant research questions were then generated via an iterative consensus process for each domain, to encompass all elements of the management of epistaxis. Systematic reviews relating to the nine domains have been published in five articles, and the research questions can be found within the relevant reviews[references]. Two primary authors led the review of each domain, working with centralised library and steering committee support.

Types of study included: Preliminary review of the literature suggested there was a limited quantity of high-level evidence in many of the domains. As a result, randomised controlled trials (RCTs), controlled and uncontrolled longitudinal studies, plus cross-sectional studies were all accepted for analysis. Case series, case reports and opinion-based articles were excluded. Restrictions were not placed on the outcomes used in identified studies at the search stage, in order to ensure capture of all relevant studies.

Types of participant: Relevant studies were included if they related to patients aged 16 and above treated for epistaxis within a hospital environment. Studies including paediatric cases or bleeding secondary to hereditary haemorrhagic telangiectasia were included in the analysis only if these patients formed less than 30% of the total case number.

Search restrictions: There were no publication year or publication status restrictions. Only English language articles were included.

Electronic searches: Initially two members of the steering committee (MS and RW) independently generated core MeSH and non-MeSH key words to identify relevant studies relating to epistaxis. These were then discussed to create a core list of key words that formed the basis for the individual domain searches. Domain review authors independently generated key words specific to each individual research question, and these were also discussed to reach an agreed list. The key word lists were submitted two librarians (University of Cambridge Medical Library and Exeter Health Library) who together used the core and specific key words to design a search strategy for each domain systematic review.

The following databases were searched from their inception for published, unpublished and ongoing studies: the Cochrane Ear, Nose and Throat Disorders Group Trials Register; the Cochrane Library, including the Cochrane Database of Systematic Reviews, DARE, and Cochrane Central Register of Controlled Trials; Medline; EMBASE; CINAHL and Web

of Science. Full search strategies can be accessed online as supplementary material. Additional studies were identified from the reference lists of full-text articles identified in searches, and from existing systematic reviews. All searches were performed in February 2016.

Validation of search strategy: To ensure the validity of the search strategy domain co-authors manually identified two articles relevant to each systematic review. The librarians used these to test the search strategy for each domain, adjusting the strategies if necessary. Finally the domain review authors were issued the search results (including abstracts) for all identified papers.

***Screening and eligibility assessment of studies*:** The two domain authors independently scrutinised the identified abstracts, and requested full text articles for any studies that appeared relevant to either authors. Records were kept of all excluded studies, including the reasons for their exclusion. When potentially relevant full-text articles could not be obtained through local sources the Defence Medical Services Library assisted via inter-library loan, and failing this articles that were still not obtainable were excluded from data extraction.

Data extraction and management: Continuing to work independently, the two domain authors extracted data from the identified studies into a standardised online form that was designed by the steering committee and librarians, and hosted on Google Drive. Meta-analysis was not routinely performed unless data were of sufficient quantity and

quality to make this relevant.

***Assessment of risk of bias*:** For the purposes of bias assessment studies were divided into RCT and non-randomised trials with or without comparator. The assessment of RCT risk of bias was performed using the Cochrane Collaboration's tool for assessing risk of bias[3]. This tool lists seven potential sources of bias that may affect the internal validity of a RCT, and each is assigned a risk of bias judgement (low, unclear or high). Non-randomised trials were assessed using the MINORS criteria[4]. The score is calculated by awarding 0, 1 or 2 pts to multiple criteria (e.g. clearly stated aims) before totalling these to achieve a final figure. The MINORS scores is calculated out of a possible 16, or 24 in the presence of a comparative group, with higher scores representing a lower risk of bias. Authors independently completed relevant bias assessment proformas for each included study.

Data synthesis: Following independent data extraction and assessment of bias, the co-authors for each domain reviewed the extracted information to reach a joint consensus. These data were used to populate a data synthesis table to summarise the findings of the systematic reviews, with the format standardised across the nine domains. If homogeneity permitted a meta-analysis of key outcomes was performed, with narrative review otherwise performed.

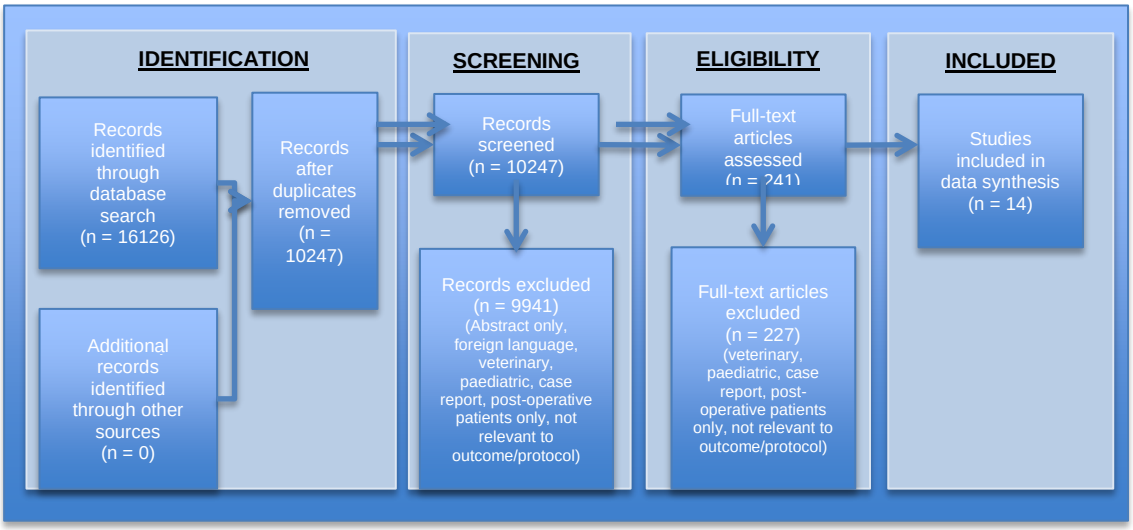

Figure 1: PRISMA diagram for the patient factors review, mapping the number of records identified, included and excluded during different review phases

Results

Figure 1 documents the search and article selection process. Of the fourteen studies included, one is a randomised controlled trial.[1] Other studies consist of; five prospective controlled studies,[2-6] two retrospective controlled longitudinal studies,[7, 8] five retrospective uncontrolled longitudinal studies[9-13] and one prospective uncontrolled longitudinal study.[14] The studies varied significantly in sample size, ranging from 16 to 16,828. Subjects' ages ranged from 0 to 98 years (median 41.5 – 81.7 years, mean 34.2 – 84.3 years). In terms of sex distribution, 61.4% of participants were male and 38.6% female overall.

Quality of the evidence as assessed by risk of bias was variable, but overall poor to fair with a mean MINORS score of 16.29±3.25 (range 10-20/24) for the controlled non-RCTs,[2-8] and a mean MINORS score of 10.50±1.38/16 (range 8-12/16) for the uncontrolled non-RCTs.[9-14] The RCT which compared rebleeding rates between inpatients with epistaxis who were mobilised with those who were rested, was biased

regarding ambiguous concealment of the alternate rather than random allocation to groups, and not all outcomes were reported. Due to the study setting on a busy ward, there was the potential for outcomes to be missed and blinding uncovered.[1] None of the studies stated that a sample size calculation had been performed.

Summary of Evidence

1a. Comorbidity

i. Hypertension: Hypertension appears to be associated with persistent and recurrent epistaxis, as demonstrated by six studies (Table 1).[2, 5, 7, 8, 12, 13] Terakura *et al.* compared blood pressures in patients with controlled and persistent bleeding following application of an intranasal dressing with adrenaline and lignocaine. Both a diagnosis of hypertension and elevated systolic blood pressure at presentation were associated with ongoing epistaxis.[13] Five studies assessed the relationship between hypertension and recurrent epistaxis, of which four were controlled[2, 5, 7, 8] and one uncontrolled.[12] These were larger and of a higher quality as compared with the included studies overall (mean participants 1124 +/- 861; mean MINORS scores 17/24 a 12/16). Three studies (including the uncontrolled study[12]) demonstrated that recurrent epistaxis was associated with a medical history of hypertension. One of these studies, the only prospective study, also found that sustained hypertension was a significant predictor of recurrent epistaxis with these patients experiencing a mean of five episodes, as compared with one episode in patients with non-sustained hypertension.[5]

Conversely, two studies found no association between hypertension and recurrent epistaxis. Though Beran *et al* (1986)[2] stated no significant difference in blood pressures of patients with recurrent epistaxis as compared with the general population, the

authors did not report the results which this statement was based on. In addition, the definition of hypertension in this study could be considered less reliable, with blood pressure measured on a single occasion only. This was then compared with existing data from a much larger population sample dataset (23,794 subjects) rather than a direct cohort. Ando *et al.* (2014) found no significant difference in past medical history of hypertension between patients with single and recurrent episodes of epistaxis. However, there were large differences between group sizes as the single incident group was 8.3 times larger than the recurrent bleeding group, and follow-up period and attrition were not clearly stated.[8]

Atherosclerosis associated with cardiovascular disease has been proposed as a risk factor in epistaxis.[20] Cardiovascular risk factors including sustained ambulatory hypertension, anticoagulant and antiplatelet use appear to be associated with persistent, recurrent or heavier epistaxis.[2-9, 12, 13] This is of particular relevance as treating an ageing population with increasing comorbidity is associated with increasing health and social care responsibility and cost.[21] However, evidence regarding the influence of demographic features and other comorbidities on the outcome in patients with epistaxis is limited in both quality and number of studies.

Study details	Groups	HTN definition	Outcome measure	BP (mmHg)	Comment	*P* value
Terakura *et al.* Retrospective longitudinal uncontrolled	History of HTN 72/133; persistent epistaxis 26/72 (29%); no history of HTN 61/133; persistent epistaxis 8/61 (13%)	History of HTN Elevated SBP at presentation	Persistent bleeding after removal of intranasal dressing with adrenaline and lignocaine for 30 minutes	NR Persistent bleeding group mean 181.3+26.9 No bleeding group mean 156.6+26.1		<0.002 <0.001
Abrich *et al.* Retrospective longitudinal controlled	HTN in recurrent epistaxis group – 310/461 (67.2%) HTN in single episode group – 608/912 (66.7%)	History of HTN	Recurrent epistaxis – at least 2 episodes separated by minimum of 3 months within a 36-month period (controls – 1 episode only)	NR		0.04
Herkner *et al.* Prospective controlled	Epistaxis group – 213 Recurrent epistaxis subgroups – NS Control group - 213	Elevated BP on admission – SBP >140 or DBP >90 Sustained arterial HTN 24-hour mean SBP > 130mmHg, or DBP > 85mmHg or both, OR receiving long-term anti HTN treatment	Recurrent epistaxis	Epistaxis group – median SBP 161 (IQR 139-180); DBP 84 (IQR 70-96) Control group – median SBP 144 (IQR 130-157); DBP 75 (IQR 64-81) Recurrent epistaxis group NS	Sustained arterial HTN subgroup - mean of 5 episodes Non-sustained arterial HTN– mean of 1 episode	0.004
Beran *et al.* Prospective controlled	Epistaxis – 121 patients; HTN 15/121 Control group – 121 BP population sample 23,794	Elevated BP on a single occasion	Recurrent epistaxis >3 episodes per year for 2 consecutive years	NS (represented graphically within the paper)		NR
Ando *et al.* Retrospective longitudinal controlled	Single episode epistaxis – 267; HTN in 51.7% Recurrent epistaxis – 32; HTN in 50%	Established diagnosis of HTN	Recurrent epistaxis after treatment of first episode	NR	Single episode group 8.3 times larger than recurrent group	NR
Purkey *et al.* Retrospective longitudinal uncontrolled	2405 patients with epistaxis – 41.37% (995) HTN 3666 cases of epistaxis – 39.47% (1447) HTN	ICD-9 coded HTN (401.X)	Recurrent epistaxis - number of presentations per patient	NR	1.45 episodes per patient with HTN. HTN was considered significant predictor for recurrent epistaxis	<0.0001

Table 1 – Hypertension and recurrent epistaxis - Abbreviations: HTN – hypertension, BP – blood pressure, SBP – systolic blood pressure, DBP – diastolic blood pressure; NR – Not reported

ii. Anticoagulation: Six studies (four controlled [3, 4, 6, 7] and two uncontrolled studies[9, 14]) suggest that anticoagulant use adversely affects the outcome in epistaxis, causing recurrent and heavier bleeding and an increased incidence of blood transfusion. The quality of these studies is similar to that of the studies overall (mean MINORS scores 16/24 and 11/16). Both the largest[9] and some of the smallest studies[4, 14] are represented (range 40-16828, mean 3105 ±6742).

More frequent and heavier bleeding is associated with anticoagulant use in three studies (Table 1).[3, 7, 14] The anticoagulant medications used varied between the studies (Table 2). In one study recurrent bleeding was higher in individuals using warfarin, or a combination of warfarin and aspirin. Recurrent bleeding rates were not higher in those using other individual or combination anticoagulants, though sample sizes were too small to draw reliable conclusions.[7] Two prospective studies evaluated the severity of bleeding[3, 14] A controlled study demonstrated a higher incidence of blood transfusion amongst admitted epistaxis patients taking dabigatran or acenocoumarol as compared with those taking no anticoagulant.[3] One uncontrolled study found that patients who had taken any medication associated with increased bleeding risk (anticoagulant or non-anticoagulant) were more likely to present with heavier bleeding as compared with patients not taking these medications.[14]

Three prospective controlled studies found that anticoagulant use was associated with a longer admission.[3, 4, 6] This was significant in two of these studies, both of which attributed this finding to the routine inpatient management of anticoagulation, alongside social and medical conditions.[4, 6] Contemporary practice favours outpatient

anticoagulation management and these results may now be of limited relevance. In the third of these studies, patients with persistent bleeding following removal of nasal packing required a period of observation which contributed to increased length of stay in patients taking dabigatran (5.9±1.9 days) and acenocoumarol (4.3±1.1 days) as compared with patients not taking any anticoagulant medication (3.6±2.4 days) but this did not achieve significance.[3]

In a multicentre retrospective longitudinal study, the largest included in this review, Goljo *et al*. (2015) found that the 20.8% of 16828 patients admitted with epistaxis who were taking anticoagulant medication had a significantly lower cost and length of stay (LOS) following multiple linear regression analysis, as compared with the sample in general. Amongst the studied population the most common comorbidities were cardiovascular disease (78.5%), type II diabetes (25.4%) and anticoagulant use (20.8%). Factors associated with increased cost and length of stay were an increasing number of chronic comorbidities, necessity for operative intervention, Asian/Pacific islander (cost) or black race (LOS), top income quartile (cost), private insurance (cost), Medicaid insurance (LOS), teaching hospital admission (cost) and certain geographical features. Subgroup analyses of patients using anticoagulant medication were not performed to determine whether any of these confounding factors contributed to the lower cost and length of stay amongst these patients. Furthermore, this study represented patients in the United States where practices and pricing of care may differ from those in the United Kingdom.[9]

NICE key therapeutic topic information indicates the use of Novel Oral Anticoagulants (NOACs) in the prevention of a number of serious and common medical conditions, including stroke, some adverse outcomes associated with acute coronary syndromes and in the treatment and secondary prevention of venous thromboembolism and its complications.[22] The MHRA issued a warning of risk of serious haemorrhage against three of these drugs which were licensed at the time (apixaban, rivaroxaban, dabigatran),[23] however the evidence represented in this review concerns primarily the oral anticoagulant warfarin, with only one study evaluating adverse outcomes in the epistaxis patient using NOACs.[3]

Study details	**Adverse outcome measure**	**Outcome definition**	**Medication groups**	**Adverse outcome**	***P* value**
Abrich *et al.* Retrospective longitudinal controlled – 17/24	Recurrent bleeding	At least 2 episodes requiring medical care, separated by a minimum of 3 months within a 36-month period	Warfarin 127/461 cases 179/912 controls Warfarin & aspirin 51/461 cases 78/912 controls	27.0% cases vs 19.6% controls 11.1% cases vs 7.7% controls	0.001 0.01
Callejo *et al.* Prospective controlled – 10/24	Severity of bleeding	Blood transfusion	Dabigatran 5 patients Acenocoumarol 17 patients No anticoagulant 18 patients	4/5; 80% 10/17; 59% 7/18; 38%	<0.01
Klossek *et al.* Prospective longitudinal uncontrolled – 12/16	Severity of bleeding	>250ml blood loss	Medication with associated bleeding risk* No medication with associated bleeding risk	67% 33%	0.02

Table 2 – Anticoagulation and adverse outcomes - *antiplatelet medication, non-steroidal anti-inflammatory drugs, salicylate derivatives, vitamin K antagonists, beta-lactams, antidepressants, long-term corticosteroid therapy

iii. Rhinological Comorbidity: Nasal mucosal congestion in rhinitis and rhinosinusitis has been implicated in the aetiology of epistaxis, but there is insufficient evidence to support an association between this and patient outcomes. Only one controlled study considered this relationship. When rhinological factors associated with recurrent epistaxis as compared with single episode bleeding were reviewed, no significant differences in the incidence of rhinitis (2.6% case vs 1.3% control), sinusitis (1.1% vs 1.3%) or upper respiratory tract infection (1.5% vs 1.5%) were found.[7]

iv. Other Comorbidity: The relationship between other comorbidities and patient outcomes in epistaxis was considered in one controlled[7] and one uncontrolled retrospective study.[9] Abrich *et al.* (2014)[7] found recurrent epistaxis was associated with congestive heart failure ($p<0.001$) and diabetes ($p=0.04$). In a longitudinal uncontrolled study of 16,828 patients by Goljo *et al.* (2015), an increasing number of comorbidities was associated with a longer hospital stay in patients admitted with epistaxis due to the management of co-existing medical conditions ($p<0.001$).[9] This study examined patients admitted to multiple centres in the United States where practices may differ from those in the United Kingdom.

1b. Intrinsic risk factors

i. Bleeding site: Two retrospective longitudinal studies l studies looked at the relationship between anterior and posterior bleeding site and patient outcome. Both studies demonstrated that posterior site epistaxis is more frequently associated with recurrent bleeding.[8, 11] In one of these studies, Ando *et al*. (2014) found anterior

bleeding was significantly associated with non-recurrent epistaxis (191/198 patients). Each non-anterior bleeding site was analysed independently rather than as posterior epistaxis in general, and failure to identify the bleeding point (14/267 single episode vs 17/32 recurrent, p=0.000) was also associated with recurrent epistaxis. Bleeding from either the olfactory cleft, middle or inferior meati, or other non-anterior site did not achieve significance, though numbers in these subgroups are much smaller than the anterior bleeding group.[8]

ii. Severity of bleeding: Patients with more severe bleeding appear more likely to undergo surgical intervention. In a single small retrospective longitudinal study the severity of bleeding in patients who underwent sphenopalatine artery (SPA) ligation (n=27) was compared with those who did not (n=71). Four measures of severity were significant predictors for surgery:

a. persistent uncontrolled epistaxis despite anterior and posterior packing (21/27 vs 1/71, p<0.0001)
b. three or more episodes of recurrent bleeding (17/27 vs 0/71, p<0.0001)
c. blood transfusion or haemoglobin decrease of greater than 4g/dL (9/27 vs 4/71, p<0.0001,)
d. three admissions for ipsilateral bleeding in three months (4/27 vs 0/71, p<0.0001).[10]

iii. Demographic and social history: Patient age was found not to be associated with recurrent bleeding in one retrospective controlled study[7]. Age also appears to have no relationship with continued bleeding after pack removal.[13]

iv. Alcohol intake: Excess alcohol consumption and alcohol-induced platelet dysfunction has been implicated as a risk factor for epistaxis.[15, 16] Evidence relating history of alcohol intake to patient outcome in epistaxis was very limited. Looking at US admission data, Goljo *et al.* (2015) found that a history of alcohol abuse in epistaxis patients (5.8%; 972/16828) was associated with a significantly increased length of stay (p=0.004).[9] In a retrospective longitudinal controlled trial, Abrich et al found no difference in alcohol consumption between 426 patients with recurrent epistaxis and 912 matched controls.[7] Though the latter study also compared independent history of portal hypertension and gastrointestinal bleeding between the two groups (neither was significant), neither study considered the influence of any hepatic impairment nor complications of alcohol abuse on the patient outcome.

1c. Patient Mobilisation

It does not appear that patient mobilisation during the hospital stay has any effect on rebleeding rate. The only included RCT found no significant difference between inpatients who were mobilised (21/50) and those confined to bed rest (24/50).[1] The mean age for the adult patient with epistaxis in the presented data was 65.4, meaning many patients are above the age of 60 and therefore at higher risk for the development of venous thromboembolism[24]. Patient mobility plays a key role in the prevention of

venous thromboembolism[24] and on the basis of limited evidence it would appear sensible for the epistaxis patient to mobilise lightly without increased risk of rebleeding.[1]

Limitations

The primary limitations were low quality evidence and poor study design as demonstrated by applying the MINORS criteria to assess methodological quality of non-randomised surgical studies. There were a lack of prospective controlled trials, with only one RCT could be included[1], and six of the fourteen included studies uncontrolled[9-14]. The remaining seven studies were retrospective in their methodology.[7, 9-13] Within and between studies there were fundamental differences in baseline demographic characteristics and comorbidities between the participant groups compared. Furthermore, heterogeneity of study design and poorly defined outcomes meant that meta-analysis was not possible. Of particular note, definitions of hypertension were inconsistent [2, 5, 7, 8, 12, 13] and variation was seen among the anticoagulant medications used in different studies.[3, 4, 6, 7, 9]

REVIEW 1: INITIAL MANAGEMENT

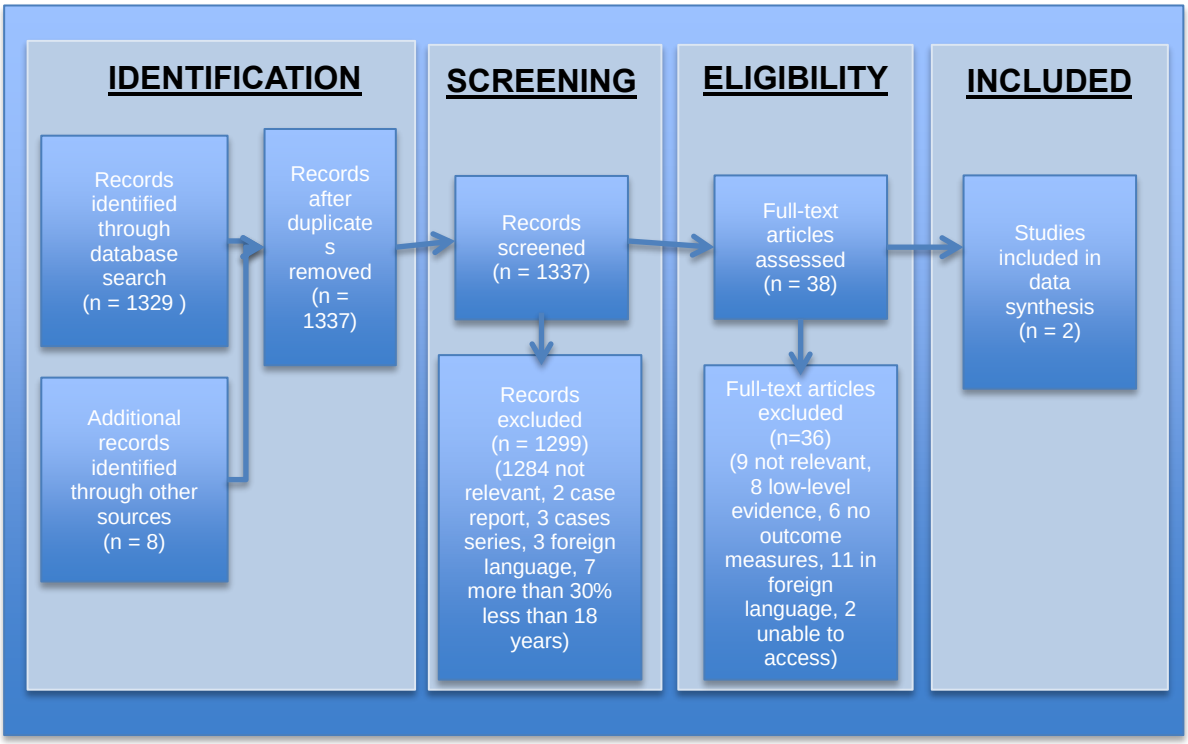

Figure 2: PRISMA diagram – First Aid

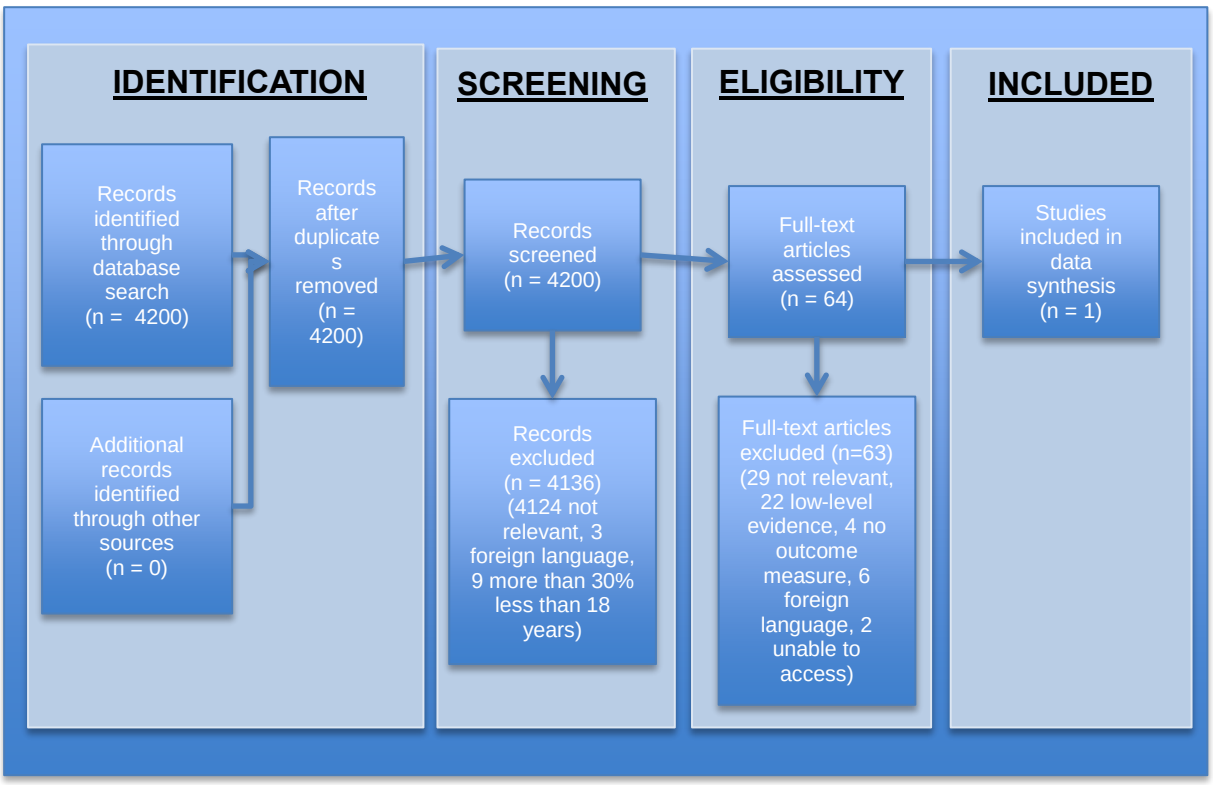

Figure 3: PRISMA diagram – Initial Assessment

Results

Figures 2 and 3 document the search and article selection process for the First aid and initial assessment parts of this review. Three stiudies were included of which none were RCTs. Two were prospective controlled studies regarding to 'First Aid' measures, with a total number of 72 participants (16-56). Both papers assessed the effect of topical ice packs on nasal mucosal blood flow in healthy volunteers as measured by laser Doppler flowmetry at Kiesselbach's plexus[17] or the inferior turbinate[18]. The studies were of a fair quality overall, both demonstrating a MINORS score of 17/24, with robust, simple and reproducible methodology. A single retrospective uncontrolled longitudinal study relevant to 'Initial Assessment' of the patient with epistaxis was of fair quality (MINORS 8/16) and reviewed the use of coagulation studies in 183 cases.[19]

Summary of Evidence

2a. First Aid

Various first aid measures have been adopted for the treatment of epistaxis despite a lack of evidence. The only first aid measure described in included studies was the use of an ice pack. Application of an intraoral ice pack has the potential to decrease nasal blood flow, and this may in turn decrease the severity of epistaxis, although this has yet to be demonstrated. In one study intraoral ice significantly reduced the nasal blood flow at the inferior turbinate (23%) as compared with a control pack (-5%, $p<0.05$)[18]. An ice pack placed on the forehead failed to achieve a significance reduction in nasal blood flow.[17, 18] In one of these studies, the standard deviations in mean blood flow following forehead application in both participant groups were very large which suggested

heterogeneity amongst individual results within a small study (1368.8±927.9 before vs. 1130.5±792.2 after, p=0.11).[17]]

2b. Initial assessment:

Coagulation screening is seen to be of benefit only in epistaxis patients on anticoagulant therapy or with a history of bleeding diatheses, as results are otherwise likely to be normal and not add to the management process. An abnormal result is of clinical value and can guide overall management. In a retrospective longitudinal study over one year, Thaha *et al.* (1999) found that all 10/121 (8.3%) of patients with epistaxis who had abnormal coagulation studies were using the oral anticoagulant warfarin, and no other coagulation abnormalities were identified in the studied population.[19] This is the only included study the relevant to the role of coagulation screening.

A single uncontrolled retrospective study set in a large Scottish teaching hospital is included in the 'initial assessment' section of the review. Of all patients with epistaxis who had coagulation studies performed only 8.3% were abnormal, and furthermore these were exclusive to patients using the oral anticoagulant warfarin.[19] Though at the time of this review there is an absence of data representing the frequency and cost of coagulation screening in epistaxis patients in the United Kingdom, considerable cost savings could likely be achieved with more judicious use of the tests.

Limitations

Despite a potentially extensive theme, only two topics were represented within the First Aid and Initial Assessment review.[17-19] due to a lack of published studies. The primary limitations with identified studies were low quality evidence and study design. The controlled studies did not declare adequate power[17, 18]. Both controlled studies within the 'first aid' section studied the effect of ice pack application on nasal blood flow in young, healthy volunteers with a median age of 31 years between the studies.[17, 18] This healthy, young group is not representative of that seen clinically, with a median age of patients within the 'patient factors' review of 66 years[1, 3-11, 13, 14] and comorbidities were present in 58.6% of these patients overall (where stated).[1, 3, 6-9, 11, 14]

Conclusions

Cardiovascular risk factors, particularly sustained ambulatory hypertension, and anticoagulant or antiplatelet use appear to be associated with persistent, recurrent or heavier epistaxis. When assessing a patient with epistaxis a history of cardiovascular disease and medications should be sought, and where possible, the site of bleeding should be identified and recorded, as posterior or unidentified site bleeding can be associated with recurrent or recalcitrant epistaxis.

Application of an intraoral ice pack is a simple first aid measure which has the potential to decrease the severity of bleeding and should be considered from the onset of epistaxis to point of hospital care. Evidence supporting the efficacy of other topical ice packs is insufficient. There is limited evidence to suggest that coagulation studies should

be reserved for patients taking anticoagulant medication or with a history of bleeding diatheses, as they do not add to the management process in other individuals.

In order for robust recommendations to be made, based on the findings of this review future adequately powered randomised controlled studies should address effective methods of first aid, initial assessment and investigation protocols, and how to best manage comorbidities in patients with epistaxis via a multidisciplinary approach.

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