Guideline

Emergency Department Management of Epistaxis

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Applicable to	All CHQ staff involved in the care and emergency management of children with epistaxis				
Authorisation	Executive Director Clinical Services QCH				

Purpose

This guideline provides clinical practice guidelines to guide clinicians involved in the emergency management of children with epistaxis.

Scope

This work instruction applies to all staff involved in the care and management of children with epistaxis.

Related documents

Procedures, Guidelines, Protocols

- CHQ-PROC-02908 Massive Transfusion Protocol

Introduction

Epistaxis (nosebleed) is a common condition in children encountered both in the community and in the emergency department[1,2]. Bleeding from the anterior portion of the nasal cavity known as Kiesselbach's plexus accounts for 90-95% of all epistaxis,[1,3] and most episodes will resolve with direct compression of this area ie gentle pressure on the nasal alae for 5-10 minutes[4]. Whilst childhood epistaxis is common – up to 60% of children will have had at least one nose bleed by age 10 years – it is usually venous in origin and rarely severe.[5] Most episodes can be effectively treated in the emergency department and will not require nasal packing or hospital admission. [6] The cause remains obscure, although digital trauma is often blamed.[1,2,7] Incidence is highest in the winter months, occurrence being linked to the increased rate of upper respiratory tract infections.[8] Nosebleeds are only occasionally indicative of underlying pathology[9], which should be considered in certain circumstances for example severe bleeds, epistaxis resistant to standard

management or epistaxis occurring in certain age groups.[3] In addition, children with underlying systemic conditions that predispose them to epistaxis (eg bleeding disorder) will require an individualised approach to their management and specialist consultation.

Anatomy

The nose is a highly vascular structure with a large surface area; these qualities enable the nose to filter, humidify, and warm inhaled air, but also predispose it to bleeding.[3] The thin nasal mucosa provides little anatomic support or protection for the underlying blood vessels.

Anterior Nosebleeds

The vascular area of the anterior nasal septum - Kiesselbach's plexus or Little's area where all the chief blood supplies converge - is shown in Figure 1. Bleeding from this area tends to present as constant ooze from venous or capillary sites and this anterior source may be directly visualised on examination. [10]

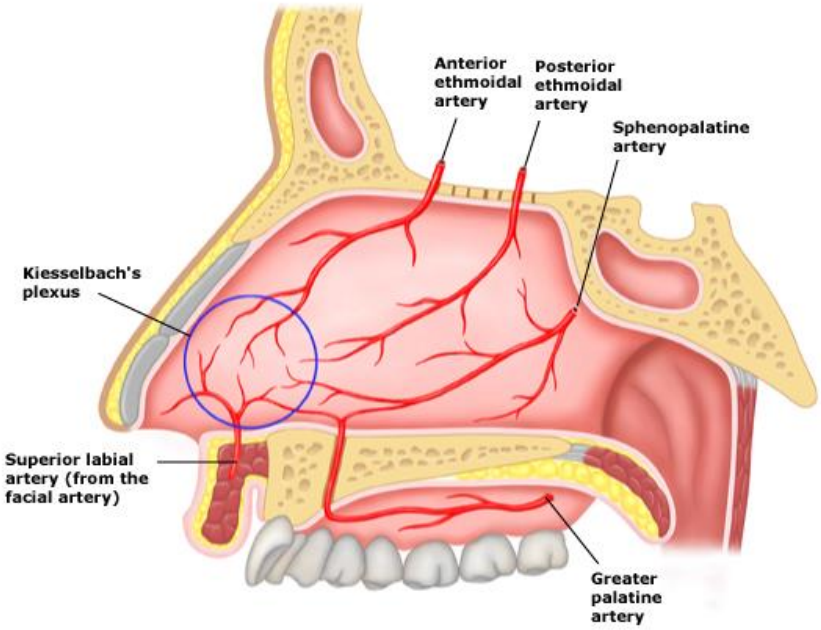


Figure 1:

Blood supply to the nasal septum, demonstrating Little's Area.

Little's Area is formed from the anastomosis of terminal vessels from the internal and external carotid arteries.

Posterior Nosebleeds

Posterior nosebleeds arise from deeper structures of the nose, are usually more profuse and are more likely to be arterial in origin, usually from branches of the sphenopalatine artery.[11] They are more likely to present as bilateral bleeding and are associated with greater risk in terms of potential for airway compromise, large volume bleeds and greater difficulty with haemorrhage control. Posterior bleeds are infrequently seen in children and are more common in older adults with underlying hypertension or vascular disease.[12] When posterior bleeds do occur, haemorrhage is often swallowed and the amount of blood lost can be difficult to accurately assess.[11]

Aetiology[13]

In the majority of cases bleeding arises from a normal vein without any obvious abnormality to account for it, although there may be contributing factors as described below.[9]

1. Idiopathic – most common; typically mild, recurrent nosebleeds
2. Trauma – digital, foreign body, direct trauma / facial trauma, iatrogenic
3. Inflammatory (friable nasal mucosa)
    a) Acute rhinosinusitis eg viral upper respiratory tract infection
    b) Allergic rhinitis and nasal polyposis - allergies, cystic fibrosis
    c) Chronic localised low grade inflammation
        - Colonisation with *Staphylococcus aureus* [14]
        - Contributing to irritation, crusting, increased vascularity and digital trauma
4. Prominent nasal vessels on the nasal septum[1]
        - Seen in about half the children presenting with epistaxis
        - One theory is that this can be due to prolonged inflammation and resultant neovascularisation
        - Targeted obliteration of these vessels by silver nitrate nasal cautery can produce significant benefit in these patients
5. Environmental (friable nasal mucosa)
    a) Dry conditions
    b) Rapid temperature alterations
    c) High altitude
6. Drug-induced
    a) Topical such as decongestants (rhinitis medicamentosa), cocaine, inhalants such as intranasal steroids, tobacco
    b) Systemic such as aspirin, anticoagulants, chloramphenicol, methotrexate, immunosuppression
7. Local neoplastic cause – benign polyps, haemangioma, malignancy eg lymphoma
8. Bleeding disorders
    a) Coagulopathies - Inherited eg Haemophilia A, B, von Willebrand's disease; Acquired eg liver disease, vitamin K deficiency, trauma or massive blood loss
        - Studies suggest that up to 5-10% of children with recurrent nose bleeds may have mild undiagnosed von Willebrand's disease[15,16]
    b) Platelet disorders – Thrombocytopenia eg marrow failure / aplasia, leukaemia, ITP, hypersplenism, trauma or massive blood loss; Platelet dysfunction eg platelet storage pool disorder, drugs
    c) Blood vessel disorders eg Hereditary Haemorrhagic Telangectasia
9. Systemic idiopathic – eg inflammatory disorders

A list of causes is only useful when considered in the individual clinical context; identifying patient characteristics associated with an increased risk of an underlying serious cause or a cause that needs specific treatment - ie the identification of 'Red Flags' that should prompt further investigation or referral – is a more useful goal of assessment.

Red Flags

RED FLAGS OF PAEDIATRIC EPISTAXIS
• Young age
• Adolescent male
• Suggestion of underlying bleeding disorder
• Suspicion of malignancy – local or systemic
• Severe bleed
• Bleed recalcitrant to treatment
• Recurrent ED presentations

1. Young age
    - Little known regarding incidence and aetiology of epistaxis in infants[17]
    - Existing literature suggests epistaxis is a rare cause of emergency department presentation in children under the age of 2 years[17,18]
    - Concerns include previous significant association demonstrated between presence of epistaxis in infants presenting with ALTE and an underlying aetiology of deliberate suffocation,[19] with other studies suggesting similar concerns, or links with SIDS[20-22]
    - Previous case series have also suggested hereditary haemorrhagic telangiectasia[23] and allergic rhinitis[24] as causes
    - A 2008 study[17] which attempted to address the incidence and aetiology of epistaxis in the <1 year old age group identified 36 cases presenting over a 6 year period –
        i. Approx 1/3 had no cause identified and were considered benign based on negative bloods and / or history and examination
        ii. Approx 1/3 had coryza or acute rhinitis as cause
        iii. Approx 10% had underlying coagulation disorder diagnosed - Age group had increased rate of routine screening for underlying bleeding disorder particularly in the infants without coryza / rhinitis symptoms or other obvious cause
        iv. One child suffered NAI (deliberate suffocation)
        v. Remainder had identifiable cause such as fall / minor trauma or post-operative

2. Adolescent male
    - Consider risk of juvenile nasopharyngeal angiofibroma (JNA)
    - Benign very vascular tumour that can be locally invasive and can cause severe or recurrent epistaxis[25,26]
    - 'Classic triad' = unilateral nasal obstruction, epistaxis, nasal discharge [15] (in an adolescent male)[27]
    - Suggestive features = concomitant history of nasal obstruction (approx. 90% will also have this) and mucopurulent secretions in nasal cavity; may see mass in nasopharynx, soft palate displaced inferiorly, serous otitis media and diminished hearing loss[27-29]
    - Median age of occurrence = 15 years[25,28]
    - New onset epistaxis in adolescent male with no obvious bleeding source on anterior rhinoscopy or absence of other obvious cause should be referred to ENT for follow up
    - JNA generally diagnosed on CT or MRI
3. Suggestion of underlying bleeding disorder
    - Easy bruising
    - Evidence of other bleeding - petechiae, purpura, ecchymoses, menorrhagia, GI bleeding, past history of prolonged bleeding after surgical challenges eg dental extractions, tonsillectomy, circumcision, minor trauma
    - Evidence or presence of liver disease
    - Family history of known bleeding disorder
    - Family history of recurrent epistaxis, menorrhagia, bleeding after surgical challenges
4. Suspicion of local malignancy / nasopharyngeal mass
5. Suspicion of systemic malignancy
    - Easy or abnormal bruising, petechiae, purpura
    - Bleeding gums
    - Pallor
    - Lethargy
    - Generalised lymphadenopathy
    - Hepatosplenomegaly
6. Severe bleed
    - Need for resuscitation is rare in children with epistaxis and indicates unusual / more complex case[30]
7. Bleed recalcitrant to treatment
    - Consider systemic underlying cause (<10% of presentations)
    - Consider mechanical /anatomic causes (foreign body, mass)
8. Recurrent Emergency Department presentations with epistaxis

- Failed medical management may be associated with higher risk of underlying bleeding diathesis; a 2012 study[31] found 10% of children with recurrent nosebleeds who failed medical management had an underlying bleeding diathesis (most commonly von Willebrands disease)

Assessment

The aim of the assessment should be to –

1. Rapidly identify the child with serious bleeding who requires emergent management – in this instance proceed with resuscitation and haemorrhage control and return to detailed assessment once clinical situation allows
2. Identify the small group of patients who require further investigation or referral
3. Identify a cause / bleeding site where possible; tailor management options to findings
4. Identify which children can be safely discharged from the emergency department

History

- Bleeding history – see **Table 1**
- Any evidence of anaemia or significant blood loss– pallor, lethargy, reduced exercise tolerance, pale conjunctiva or palmar creases, dizziness, syncope
- Specific questions about the nature of the epistaxis –
    - Severity, frequency, duration, laterality
    - Triggers eg trauma, URTI, coughing, exercise / heat, Winter / dry weather
    - Previous ED visits with epistaxis
    - Previous treatments including first aid measures undertaken at home
    - History of digital exploration of nasal passages
    - History of nasal foreign body or unilateral purulent discharge (note that intra-nasal button battery requires urgent removal)
- History of migraine
    - Children with migraine have increased incidence of recurrent epistaxis[32]
- Presence of any historical features that suggest more serious underlying cause – see 'Red Flags'

Table 1: Bleeding History

Question	
History of epistaxis?	• Location, duration, frequency, trigger (eg trauma) • Need for emergent evaluation • Previous treatment
Medication history	Use of topical nasal medications eg decongestant

	sprays/inhaled medications, as well as systemic medications such as NSAIDs, aspirin Consider what medications are available in the home – accidental or enforced ingestion
Easy bruising or petechiae?	• Unusual sites – back, buttocks, abdomen, arm • Persistent palpable raised bruising
Prolonged bleeding after surgical challenge? • Post-op bleeding • Bleeding after circumcision • Bleeding after dental extraction • Bleeding after minor trauma / lacerations	• Return to OT to stop bleeding or requirement for blood transfusion • Note lack of bleeding after circumcision does not rule out a bleeding disorder • Removal of permanent teeth is greater haemostatic challenge than removal of primary teeth
Menorrhagia?	Menses > 7 days, changing of soaked product every 1-2 hours, passage of large clots (>2.5cm), development of iron deficiency
Other bleeding?	GI bleeding, haematuria, intracranial, intramuscular or intra-articular bleeds
Family history of bleeding?	Known disorder or presence of abnormal bleeding tendencies as above

Adapted from: Elden L, Reinders M, Witmer C. Predictors of bleeding disorders in children with epistaxis: Value of preoperative tests and clinical screening. *Int J Ped Otorhinlaryngol* 76 (2012) 767-77

Examination

Generalised –

- Haemodynamic status
- Clinical evidence of anaemia
- Signs of underlying disorder – presence of examination findings that suggest more serious underlying disorder – see 'Red Flags'

Localised examination of the nasopharynx –

- Simple inspection can be achieved with an otoscope – lighting + magnification
- Inspect anterior septum and nares for bleeding point, prominent vessels, abnormal vessels / telangiectasia, crusting, polyps / mass
- Crusting is the most common finding (two-thirds of children with nosebleeds)[33]
- Visible vessels on the anterior septum are present in 40-50% of children with epistaxis, are almost always on the side bleeding occurs when symptoms are unilateral, and are uncommon on the other side[33,34]

- Nasal polyps are rare in children except in the presence of cystic fibrosis, and even when present rarely cause bleeding[33]

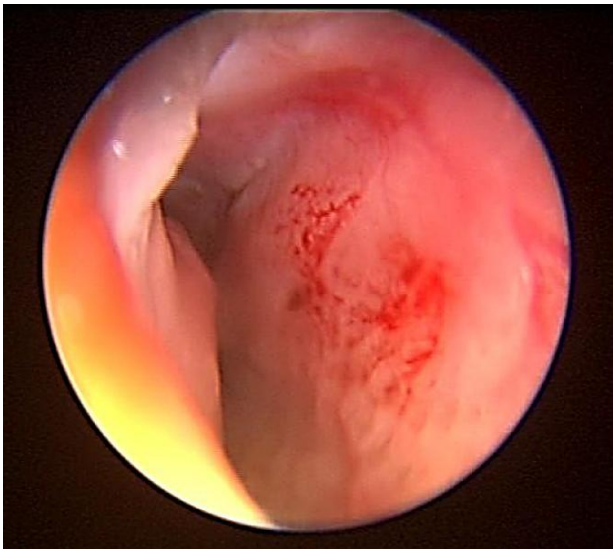
Use of topical vasoconstrictor and anaesthetic spray eg cophenylcaine forte can reduce bleeding and optimise view

- Will be more effective after clot removal[35]

If clot is present and obscuring view remove manually or have patient blow nose[35]

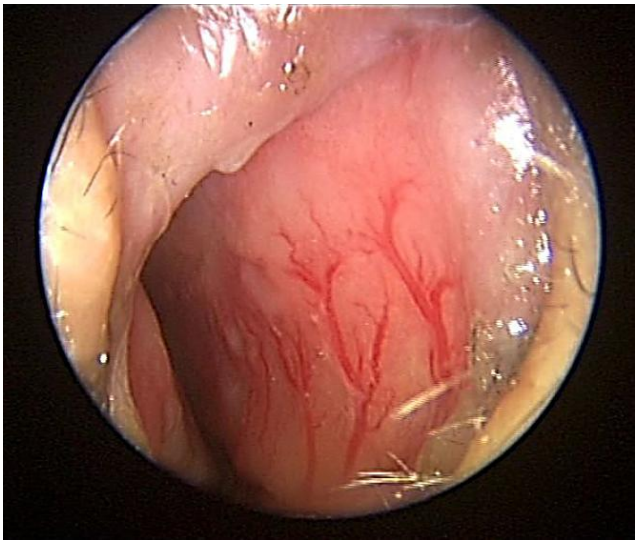
- Clot removal may help stop bleeding by reducing fibrinolytic agents in clot that keep vessels open[35]

Figure 2:[36]



Ulceration of the right anterior nasal septum causing epistaxis

Figure 3:[36]



Prominent vessels located on the right anterior cartilaginous septum in Kiesselbach's plexus/Little's area

Tips for examination of the nasopharynx in children

- Optimise cooperation
  - May be able to examine young child sitting in parent's lap
  - Explain procedure in age appropriate language
  - Analgesia if indicated
  - Utilise assistant for distraction purposes or to otherwise assist with procedure
  - Ensure parents understand procedure & what you want from them
- Adequate lighting
  - Headlamp or use of otoscope with large specula can be useful
- Optimise positioning
  - Child in sitting position, chin up
  - Push nasal tip superiorly with thumb
- Prepare all equipment prior to the examination including remove all packaging and have all necessary topical medications and assessment aids such as nasal speculum, otoscope, suction at hand

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Who needs routine laboratory investigation?

A small subset of patients with epistaxis will have an underlying bleeding disorder but there is no consensus on how severe or frequent nosebleeds need to be to warrant further investigation or management[9]. It is clear that the medical literature does not support routine clotting screening for patients presenting with epistaxis [37-41] it is less clear who should undergo testing. In terms of investigation in the ED, the presence of the following risk factors should prompt consideration of laboratory testing.

1. Younger age at presentation
   - <1-2 years old
   - Trend towards increased occurrence of underlying bleeding disorder[31]
   - Consider non-accidental injury particularly in young infants
   - Recognise that benign or identifiable causes still form significant portion of most likely diagnosis (eg rhinitis / coryza, minor trauma) however in absence of identifiable cause suggest screening bloods for underlying disorder
2. Historical or examination features that suggest increased risk of underlying bleeding disorder or systemic condition – see Table 1
3. Severe bleed – requirement for resuscitation or nasal packing
4. Persistent lower volume bleed or bleed recalcitrant to treatment
5. Repeated ED presentations for epistaxis[31]

Note that the **vast majority of children who present to the ED with epistaxis will not require any blood tests**. These are children with –

- Low volume minor nosebleeds
- Typical age group (peak occurrence 2-10 years)
- Respond to nasal alae compression or simple measures

- Absence of historical risk factors for underlying disorder
- Absence of examination features suggestive of underlying disorder
- Absence of multiple ED presentations with epistaxis
- Presence of suggestive cause eg coryza, rhinitis

Consideration should also be given to the most appropriate timing and follow up of the laboratory investigations. Children with large volume severe bleeds will require investigation in the emergency department whilst those children with recurrent presentations of mild bleeds or positive bleeding history may be optimally investigated in the outpatient setting. The identification of mild bleeding disorders can require sophisticated testing that is not indicated in the emergency setting, and may be best organised via the patient's General Practitioner in consultation with a Paediatric Haematologist. Table 2 outlines potential laboratory evaluation for epistaxis.

- **Table 2:** Laboratory Evaluation of Epistaxis*****

Group & Hold / X-match • For severe bleeding (X-match) or those requiring hospital admission	• 1x EDTA tube	• Purple top
Full blood count	• 1x EDTA tube	• Purple top
Coagulation profile • Check INR in patients on warfarin	• 1x Citrate tube	• Blue top
Von Willebrand screen	Ideally – 2x Adult Citrate tubes ie 4ml total If have 2ml –use single adult citrate tube; if <2ml use paediatric citrate tube – an adequately filled paediatric tube is preferable to an underfilled adult tube Cannot be done on the same tube as the coagulation profile; ie requires 2 additional citrate tubes	• Blue top • Adult tube 2ml, Paed tube 1ml
E/LFT • Suspected liver disease or unwell patient	• 1x Serum tube	• Red top (Adult tube) • Yellow top (Paed tube)

***Refer to text for when to perform blood tests**

Emergency Treatment

General Management

Most children with epistaxis have spontaneous anterior nasal bleeding without airway compromise or hemodynamic instability. Rapid assessment of general appearance, vital signs, airway stability, breathing, circulation and mental status are still necessary to identify children who require airway intervention and/or fluid resuscitation. Reference to the Massive Transfusion Protocol, Airway Management and Resuscitation Guidelines should be undertaken as required for the shocked bleeding patient with potential airway compromise.

ALERT

Signs of shock or airway compromise in the presence of epistaxis constitute an

ENT EMERGENCY

- Resuscitation and haemorrhage control
  - Reference to Airway Management and Resuscitation Guidelines
  - Insert Rapid Rhino
- Utilise the Massive Transfusion Protocol
- Ensure emergent notification of ED Consultant, ENT and Anaesthetic teams

Acute Management

Acute management can commence once the patient has undergone rapid assessment of ABCD. Management of epistaxis in children entails control of acute haemorrhage and prevention of recurrence by controlling underlying local or systemic disease processes [10]. The majority of epistaxis in children is acute, sporadic and self-limited and usually responds to simple compression, but may require cautery, nasal packing or more aggressive measures [3,10].

Direct compression:

If the patient is actively bleeding, seat them upright and ask them to lean forward (to minimise the swallowing of blood) and apply pressure onto the soft cartilaginous part of the nose (NOT the bridge of the nose) for 10 minutes by squeezing the nose between thumb and side of the index finger [5,6,7]. Persistent bleeding is often due to inadequate treatment / pressure.

Use of Vasoconstrictors:

To help determine the site of bleeding the use of vasoconstrictors applied via spray (co-phenylcaine forte ® spray) or cotton wool to Little's area may help. If bleeding remains uncontrolled, cautery or packing may be required.

Topical Antiseptic / Emollient:[10]

A Cochrane review found insufficient evidence to recommend one treatment over another when comparing topical ointments amongst themselves as well as comparing topical ointments to nasal cautery i.e. optimal treatment is not established. If Staph colonisation is not suspected simply use a topical lubricant such as paraffin as first line treatment for dry friable nasal mucosa; apply to the nasal vestibule with the tip of the little finger in the evening regularly for 2-3 months; unclear gain but may

be useful and is low risk. If Staph colonisation is suspected (evidence of yellow crusting), options include topical antiseptic ointments or oral antibiotics. As Mupirocin (Bactroban®) resistance is becoming increasingly common, staph colonisation and susceptibilities should ideally be documented by swabbing the affected area; local recommendation is for a course of oral antibiotics – flucloxacillin or cephalexin or trimethoprim/sulfamethoxazole- rather than topical treatment when localised Staph infection is suspected.

Cautery:

Nasal cautery is a commonly used treatment for recurrent idiopathic epistaxis. Chemical cautery involves the use of silver nitrate sticks directly applied to dilated vessels on Little's area, causing a chemical burn which scleroses the vessel. It is preferable to use the 75% preparation of silver nitrate - compared to the 95% concentration - as the higher concentration is associated with greater tissue damage and potential for complications including pain [42].

At QCH ED, this procedure must be performed by or under the supervision of experienced senior staff.

Method

1. Choose an appropriate patient
    - Cooperative
    - Minor bleed with visible culprit vessel on anterior nasal septum
    - Unlikely to be appropriate in pre-schoolers
2. Wash hands and wear gloves
3. Establish haemostasis prior to use of silver nitrate stick; achieve with direct pressure, +/- suction to remove any clot
4. Anaesthetise the area to be cauterised with co-phenylcaine spray
    - Can spray directly onto septum
    - May be more effective to wet a cotton ball with the co-phenylcaine spray and apply this to the nasal septum (one side only) for 1-2 minutes
    - Then remove and gently pat dry to maximise effectiveness of silver nitrate application
5. Apply a paraffin barrier to enclose the area of treatment prior to performance of the cautery ie at entrance to nares.
    - Moisture can cause the silver nitrate to drip and cause grey or black staining of the skin around the nares or upper lip; this can be cosmetically troubling for patients.
    - If staining does occur, the stain will fade as the skin naturally exfoliates (1-2 weeks); gentle rubbing with some aqueous cream on a cue tip may hasten removal of the stain if used early (for use on intact skin not the area of cauterised septum; do not rub or apply friction to the area of treatment).
6. Wet just the tip of the silver nitrate stick with some sterile water
    - If it is too wet the risk of dripping and staining is increased
    - If there is a pinpoint of active bleeding, the tip will not need to be moistened
    - **Note** there is no role for silver nitrate cautery in the emergency management of brisk, moderate or severe bleeding
7. Gently roll the applicator tip over the mucosa or at the pinpoint bleeding site until a grey eschar forms or for a maximum of 5 seconds [43]
    - Do not perform prolonged, extensive or bilateral septal cautery as there is an associated risk of necrosis and perforation
    - Do not extend cautery to normal nasal mucosa[10]
8. Check that bleeding has ceased and give post-cautery care advice

Care Post-Cautery

- Use a nasal antiseptic moisturiser such as Kenacomb® (Gramicidin; Neomycin sulfate; Nystatin; Triamcinolone acetonide) applied to area of cautery on nasal septum twice a day for 1 week
- Advise the use of simple analgesia (paracetamol) for discomfort
- Advise to avoid rubbing or blowing nose for a week after the cautery
- No boisterous play / contact sports / heavy lifting for 1 week
- Patients who have been treated with nasal cautery should be referred for follow up to their General Practitioner; they do not necessarily require ENT follow up.

Nasal packing:
If local therapy fails, the easiest form of controlling the bleeding can be achieved by tamponade through the use of anterior nasal packing with nasal balloons (e.g. rapid rhino balloon pack with a self-lubricating hydrocolloid fabric covering). Nasal packing should be avoided in patients less then 1 year of age because of the risk of aspiration. However, serious epistaxis warranting nasal packing in this age is rare [10]. Patients who require nasal packing will also require early discussion or review by ENT.

Whilst there are other forms of anterior nasal packing (eg traditional Vaseline gauze packing, expandable nasal tampon), Rapid Rhino is recommended for its ease of insertion and removal including less patient discomfort compared to other anterior packs, and at least equivalent effectiveness. The outer carboxycellulose layer promotes platelet aggregation and is activated by soaking in WATER; the balloon is inflated with AIR and conforms to the shape of the nasal cavity, promoting haemostasis by tamponade.

There are some cases when it may be preferential to try an absorbable haemostatic packing agent such as kaltostat / calcium alginate dressings that will not require removal, for example in oncology patients with non-life threatening epistaxis.

Rapid Rhino Sizes Stocked at QCH

Rapid Rhino 550
- 5.5 cm anterior tamponade
- Most commonly used mid-size device all ages

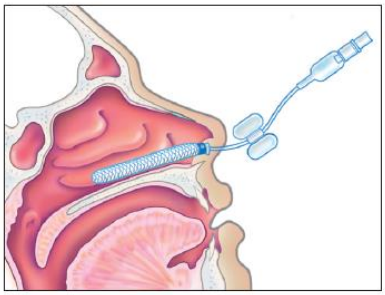
Rapid Rhino 450
- 4.5 cm anterior inflatable
- Successfully implemented in paediatric epistaxis cases; suggest use in <8 year old children
- Also for use in patients with small nasal anatomy

Rapid Rhino 750
- 7.5 cm device which may be useful in controlling posterior as well as anterior bleeding

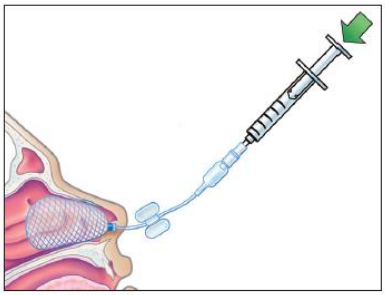
Source: Smith & Nephew. (2015). Rapid Rhino Nasal Pac.

RAPID RHINO product usage directions

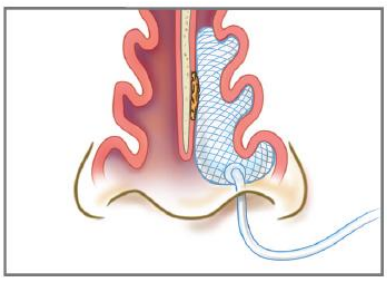
1 Soak in sterile water for a FULL 30 seconds.



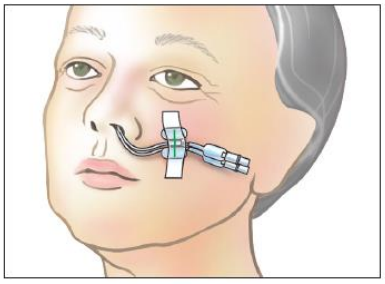
2 Insert along superior aspect of the hard palate until the blue indicator is past the nares.



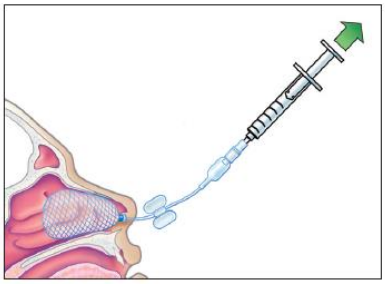
3 Using a 20ml syringe, inflate the Rapid Rhino device with AIR only. Monitor the pilot cuff for direct tactile feedback; Stop inflation when the pilot cuff becomes rounded and feels firm when squeezed.



4 Inflate the cuff to provide a gentle, low-pressure tamponade delivering the CMC fabric directly to the bleed site.



5 Reassess after 15-20 minutes; reinflate to ensure proper pressure (if necessary) and tape to patient's cheek away from the upper lip.



6 Removal should occur 24-72 hours after treatment.

http://www.smithnephew.com/global/ent/rr_epistaxis_solutions_brochure_rr117lpdf

Posterior Nasal Packing:
If anterior packing fails or bleeding is catastrophic, or there is a known history of posterior bleeding, insert a posterior nasal pack. A Foley's catheter is commonly used as a posterior nasal packing device.

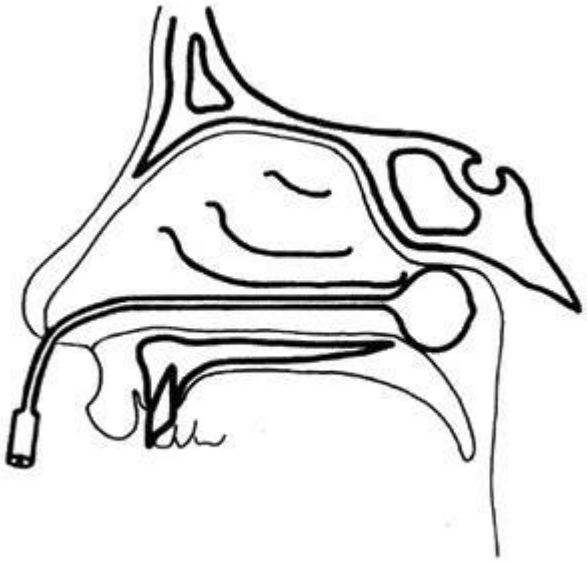
Large double balloon catheters which consist of an anterior and a posterior balloon in a single device exist but are not stocked at QCH. Where a posterior bleed is suspected, using a larger than usual size of Rapid Rhino (ie using the 7.5cm device) may be successful in controlling a posterior bleed, particularly where the use of a Foley's catheter is problematic eg in concomitant head trauma.

Note that posterior bleeds are very uncommon in paediatrics and the use of posterior packing is not routine for minor ongoing bleeding, but is preserved for serious haemorrhage not controlled with anterior packing, or when a posterior bleed is suspected (ongoing severe posterior oropharyngeal blood flow). Obviously call ENT.

<u>Insertion of Foley's balloon catheter as posterior pack</u>

1. Arrange light source and preferably have patient sitting up / upright position
2. Have suction available, with an assistant continuing to apply suction as you pack the nose
3. Spray nasal passage with co-phenylcaine spray
4. Apply sterile white soft paraffin as lubricant to the tip of the Foley's Catheter (10-14 French in adolescents / adults)
5. Insert device into the side of bleeding, directing horizontally along the floor of the mouth towards the ipsilateral earlobe

6. Ask the patient to keep their mouth open and visualise the tip of the catheter in the back of the throat; younger / unco-operative children use a tongue depressor
7. Inflate the balloon with a small amount (eg 3ml) of air and pull the catheter forward until it 'catches' in the back of the nose
8. In an awake co-operative patient, aim to inflate with up to 10ml of air (recommendation for adults / adolescents), stopping when it becomes too uncomfortable; there are no available recommendations of volumes to use in young children; it seems reasonable to slowly inflate with air in young patients stopping when the patient is no longer able to tolerate it (or ideally just before then); expect this to be a painful procedure
9. Have an assistant maintain firm traction while you pack the anterior nasal cavity with a Rapid Rhino
10. Secure the Foley catheter with an umbilical clip or tubing clamp at the nostril to prevent it slipping backwards
11. Place a wad of gauze between the clamp and the patient's nose to prevent pressure necrosis
12. Secure the catheter to the patient's face with tape[44]
13. Ongoing monitoring; balloon may require reinflation



Posterior packing with 10F Foley catheter[45]

NOTE: insertion of a nasal pack in the presence of significant bleeding can be a messy business; wear **eye protection and a facial shield** in addition to an apron and gloves.

Use of Antibiotics & Nasal Packing

Traditional teaching is that prophylactic antibiotics should be used when a nasal pack is inserted to prevent infective complications such as sinusitis, otitis media and toxic shock syndrome, however there is limited evidence in the literature to support their use. [46]

Current practice at QCH is to prescribe antibiotics in the following circumstances –

- Pack remains in-situ for >24 hours
- Immunosuppressed patients
- Patients with structural heart disease
- Posterior nasal pack in-situ

Antibiotic Choice

- Oral Amoxycillin/clavulanic acid (Augmentin®) 22.5mg/kg/dose (amoxicillin component) orally twice daily (Max 875mg amoxicillin component per dose)
- If immediate type penicillin allergy (anaphylaxis) – trimethoprim/sulfamethoxazole (Bactrim®) orally 4mg/kg/dose (trimethoprim component) twice daily (Max 160mg trimethoprim component per dose)
- If delayed type penicillin allergy (rash) – cephalexin orally 30mg/kg (max 1g/dose) three times a day
- For a 5 day course

Prophylactic antibiotics can be considered for use in any patient with a nasal pack in situ.

Consideration can also be given to using regular paraffin or other topical lubricant at night whilst the packs are in-situ.

Special Cases

1. **Severe bleeding in the context of facial trauma / head injury**
    - Can result in catastrophic bleeding from nasopharynx which is difficult to control
    - Complicated by co-existing head injury and the real risk of intracranial insertion of nasally inserted packing material [47,48]
    - Despite this risk, severe / life-threatening bleeding will still need to be addressed by local measures – case by case risk / benefit analysis
    - If decision is made to pack the nose, first use a single balloon Rapid Rhino to provide anterior tamponade
    - Ongoing bleeding – pack contralateral nares
    - Ongoing bleeding (from mouth) – pack pharynx of the intubated patient with gauze
    - Ongoing bleeding – options are a dual balloon nasal packing device, a longer than usual nasal packing device(Rapid Rhino) or a Foleys catheter
        - Rapid rhino with anterior and posterior balloon are available in 9cm size but are <u>not</u> stocked at QCH
        - Using a larger than normal Rapid Rhino may provide some posterior tamponade, and may be preferential to inserting a Foley's catheter in these instances; see box above for usual sizing of Rapid Rhino device
        - Presumably less risky than using a Foley's catheter as a posterior pack due to the stiffness of the device; may be easier to guide insertion straight back
        - Consider use of a Foley's catheter as a posterior packing device in the event of life – threatening bleeding where there is a delay to theatre and the above steps have been unsuccessful; the tip of the catheter **<u>must</u>** be visualised in the nasopharynx prior to balloon inflation
    - Other tips to reduce the risk of intra-cranial insertion include

- Using a large sized Foley's catheter, [48]
- Inserting in a straight direction parallel to the floor of the nasal cavity with direct visualisation along the inferior meatus[48]
- Using portable XR to identify the passage of the tube after an initial segment has been passed; recommendation is after 10cm in adults;[49] suggest measure half way point between nasal septum and tragus and use that as maximum point at which to take first film
- It has also been suggested to fill the catheter with contrast medium;[50] potential increased risk of airway soiling

- Correct trauma coagulopathy
- Airway protection
- The obtunded patient is at risk of inhaling the nasal packing material

2. Patients on warfarin

- Adult consensus guidelines regarding bleeding in the warfarinised patient, and warfarin reversal, exist; [51] partly reproduced as Appendix 1
- There are no consensus guidelines for paediatrics, with variability in the route, dose and indications for vitamin K, and the use of Activated Prothrombin Complex Concentrate (Prothrombinex-VF) found on perusal of the literature[52-56]
- The underlying principles of management remain -
  - Early liaison with haematologist / treating team
  - Weigh up the risk of bleeding versus the risk of thrombosis
  - Address the following questions –
    - Is there active bleeding? Of what severity?
    - What is the reason for anti-coagulation?
    - What is the patient's INR?
- The options for warfarin reversal are

1. Withhold the dose and monitor INR – for those patients with no bleeding, no high risk of bleeding** and INR <4.5
   - If INR ≥4.5 discuss with haematologist; patient may benefit from a small dose of vitamin K to reduce the risk of rebleeding
2. Vitamin K to reverse the anticoagulant effect of warfarin
   - Delayed onset
   - Oral and IV routes can be used; onset is faster with the IV (6-8 hours) than the oral (24 hours) route[57]
   - Intra-muscular injection of Vitamin K should be avoided
   - If all other routes are unavailable it can be administered subcutaneously, although it will take longer to work

- Dose = 30mcg/kg IV given over 10-20 minutes[58]
- Higher doses may be required in some cases, balanced against thrombotic risk and indication for warfarinisation
- 30mcg/kg is a reasonable starting dose; liaise with appropriate subspecialists re need for higher dosing
- Note that patients with deranged LFTs may need repeat doses; recheck INR at 4-6 hours

3. For immediate reversal, the options are FFP or prothrombin complex concentrates (PCC)
   - PCC is the preferred agent over FFP
   - Prothrombin-VF is the only PCC routinely used for warfarin reversal in Australia and New Zealand; it contains factors II, IX, X and low levels of factor VII[51]
   - It completely reverses a high INR within 15 minutes[51]
   - Add FFP if the bleeding is life threatening
   - Use FFP if Prothrombin-VF is unavailable
   - Vitamin K should still be given to sustain the reversal effect

Management of Patients on Warfarin with Active Bleeding.

CLINICAL SETTING **NOTE:** In all cases, seek senior advice from Haematology	**RECOMMENDATION**
INR≥1.5 with life threatening (critical organ) bleeding	Cease warfarin therapy and administer- • Vitamin K* 30mcg/kg IV over 10-20 minutes; adult dose = 5 -10mg **AND** • Prothrombinex-VF 50iu/kg **AND** • FFP 15ml/kg IV
INR≥2.0 with clinically significant bleeding (not life-threatening)	Cease warfarin therapy and administer- • Vitamin K* 30mcg/kg IV over 10-20 minutes; adult dose = 5-10mg **AND** • Prothrombinex-VF 25-50iu/kg **OR** • FFP 15ml/kg IV
Any INR with minor bleeding	Omit warfarin Repeat INR the next day and adjust dose

	to maintain INR in the therapeutic range If the bleeding risk is high** or the INR is ≥4.5, consider an oral dose of vitamin K

Source: Adapted from Tran et al 2013

* Not for intramuscular injection; Konakion MM®, the intravenous preparation of vitamin K (phytomenadione), may be given orally.
** Major bleed in previous four weeks, major surgery in previous two weeks, thrombocytopenia with platelets less than 50 x 109/L, known liver disease or concurrent antiplatelet therapy.

PROTHROMBINEX DOSING

- Recommended dose or prothrombinex in 2005 was 25- 50 IU/kg[59]
- This has been replaced in 2013 by doses according to initial INR and the target INR[60]
- These recommendations are based on panel consensus rather than gradable evidence
- These doses could be used if the initial INR and the target INR are known at the time of the presentation

	Initial INR			
Target INR	**1.5-2.5**	**2.6-3.5**	**3.6-10.0**	**>10.0**
0.9-1.3	30 IU/kg	35 IU/kg	50 IU/kg	50 IU/kg
1.4-2.0	15 IU/kg	25 IU/kg	30 IU/kg	40 IU/kg

3. **Known bleeding disorder**
    - Follow patient's usual treatment plan and/or consult with haematology
4. **Hypertension**[61]
    - In the first instance the focus should be on haemorrhage control rather than reduction of blood pressure
    - Hypertension may prolong epistaxis but does not cause it
    - Analgesia and providing comfort and reassurance are preferable to anti-hypertensive therapy in the acute phase
5. **Leukaemia**
    - Associated thrombocytopenia can cause refractory epistaxis
    - Cautery generally ineffective and may worsen bleeding [40]
    - Packs can be effective acutely but rebleeding often occurs on their removal[40]
    - Also potential for infection in immunocompromised patient with nasal pack
    - Preferentially pack nose gently with a haemostatic agent that does not require removal eg Kaltostat[40]

- Rapid rhino nasal pack may still be required in the emergency situation with severe bleeding
- Consultation with oncology team and use of platelet transfusion in presence of active bleeding and platelet count < 20; refer to *onc guideline*

6. Hereditary haemorrhagic telangiectasia

- Inherited vascular disorder
- Associated with arteriovenous malformations (AVMs) and telangiectasia (small dilated blood vessel in skin or mucous membranes)
- Common clinical manifestations = epistaxis, iron deficiency anaemia, GI bleeding and the presence of mucocutaneous telangiectasia (lips, fingertips, oral mucosa, nose)
- AVMs occur mainly in the pulmonary (>50% of patients), cerebral (approx. 10% of patients) and hepatic (>30%) circulations
- Manifestations develop with increasing age
- Epistaxis is usually the earliest sign and occurs in childhood; average age of onset is 12 years
- Pattern of epistaxis is variable – can be occasional mild nuisance bleeds only although studies suggest the majority of patients have very frequent bleeds (daily to weekly) [62,63]
- Nosebleeds are generally spontaneous although may be associated with changes in posture (bending forward), exercise, certain foods eg spices or minimal trauma
- Epistaxis can predate the appearance of telangiectasia by years
- Significance is that epistaxis is the index symptom of the disease; suspicion of the diagnosis may allow screening for and treatment of visceral AVMs before the person becomes symptomatic

Who needs referral to ENT?

1. Inpatient Referral

a) Emergent referral of severe bleed or ongoing bleeding in the ED despite treatment

b) Any patient who requires nasal packing will require referral to ENT for admission

2. Outpatient Referral

a) Minor recurrent bleeds that are frequent enough to be troubling to the patient / family – discharge with request for referral to ENT OPD by the patient's GP

b) Bleeding of uncertain cause with a 'red flag' that does not require emergent intervention but needs specialist review eg young age, adolescent male; discuss with ENT if uncertain

Discharge Instruction / Patient Handout

Under development

Key stakeholders who reviewed this version:

- SMO QCH Emergency
- Director of ENT QCH
- Director of Haematology QCH
- Pharmacist Antimicrobial Stewardship, QCH

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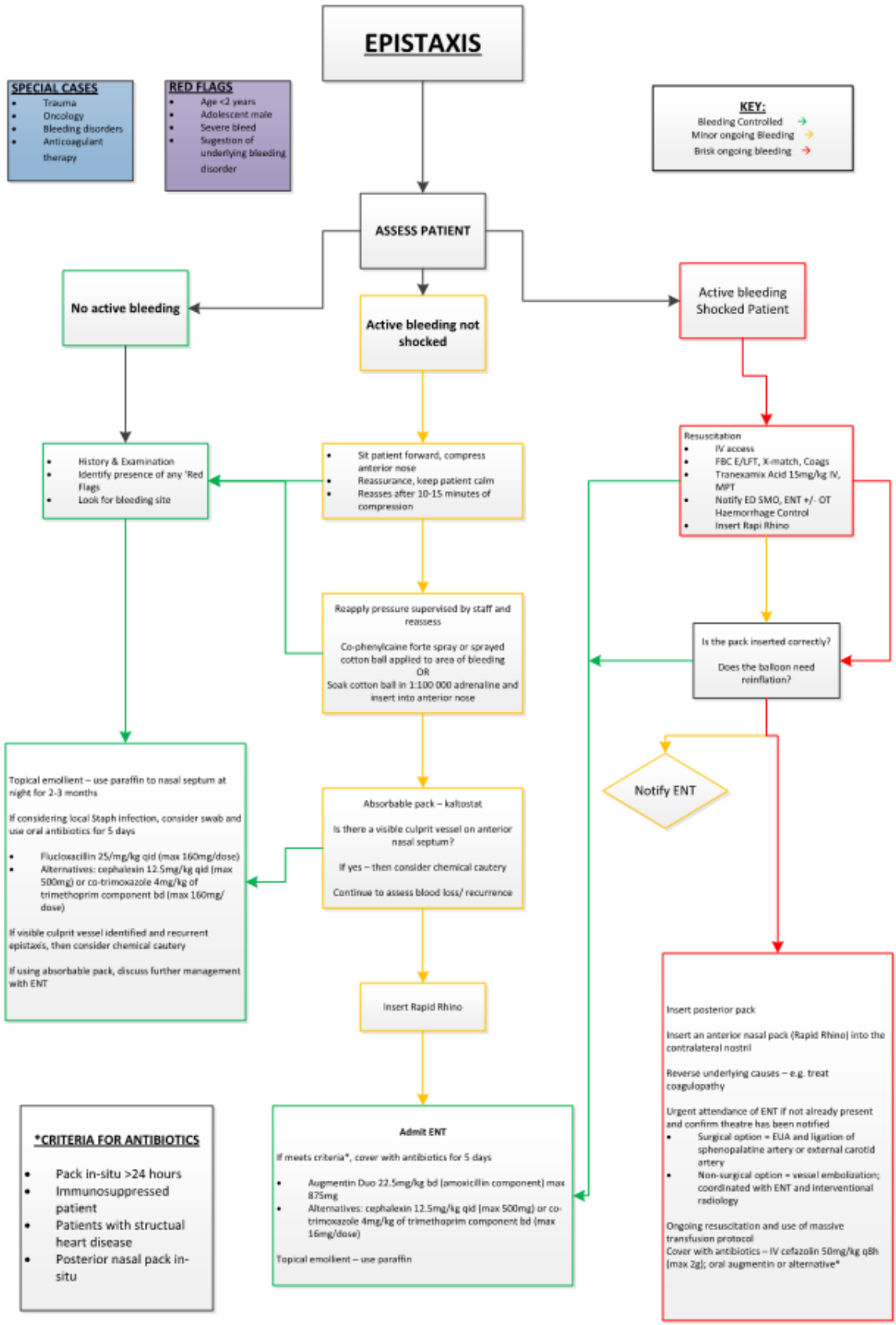
Guideline revision and approval history

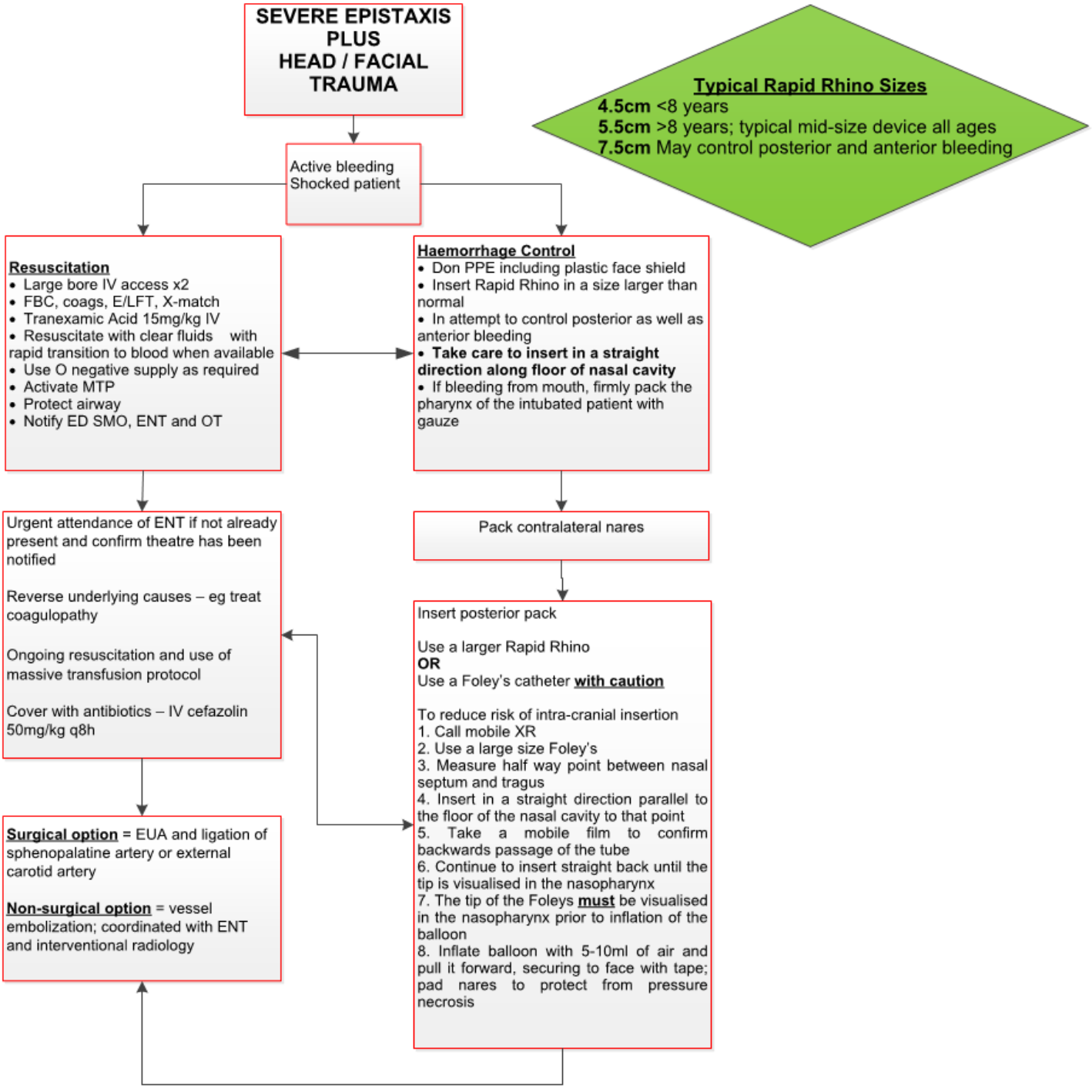
Version No.	Modified by	Amendments authorised by	Approved by
1.0	Director Paediatric Emergency Department	Divisional Director, Critical care	Executive Director Medical services

Keywords	Epistaxis, nose bleed, 07450
Accreditation references	NSQHS Standard: 1, 3, 4, 7, 9

Appendix 1:



Appendix 2:



Appendix 3:

Recommendations for reversal of warfarin in adults - Seek early advice if any bleeding occurs

Clinical setting		Recommendation
Bleeding **SEEK SENIOR ADVICE**	INR greater than or equal to 1.5 with life-threatening (critical organ) bleeding	Cease warfarin and give- • Vitamin K* 5-10 mg IV and • ProthrombinexTM-VF 50 units/kg and • FFP 150-300 mL. If ProthrombinexTM-VF is unavailable, increase FFP dose to 15 mL/kg. Assess INR frequently until clinically stable
	INR greater than or equal to 2 with clinically significant bleeding (not life-threatening)	Cease warfarin and give- • Vitamin K* 5-10 mg IV and • ProthrombinexTM-VF 35-50 units/kg. If ProthrombinexTM-VF is unavailable, give FFP 15 mL/kg. Assess INR frequently until clinically stable.
	Any INR with minor bleeding	Omit warfarin Repeat INR the following day and adjust warfarin dose to maintain INR in target therapeutic range. If bleeding risk is high** or INR greater than 4.5, consider vitamin K1-2 mg orally or 0.5-1 mg IV.

Source: adapted from Tran et al. 2013
* Not for intramuscular injection; Konakion MM®, the intravenous preparation of vitamin K (phytomenadione), may be given orally.
** Major bleed in previous four weeks, major surgery in previous two weeks, thrombocytopenia with platelets less than 50 x 10^9/L, known liver disease or concurrent antiplatelet therapy.

Note: For patients that have been treated for warfarin reversal, reassess the patient for suitability of warfarin therapy.