

Tranexamic acid soaked NasoPore® to improve the management of epistaxis

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Abstract

Objectives The aim of this study was to assess the efficacy of a new emergency department intervention for the management of epistaxis, aiming to reduce epistaxis admissions. **Design** Tranexamic acid (TXA) (500mg/ml) soaked NasoPore® packing was in the pathway for epistaxis which did not terminate following 10 minutes of simple first aid. The pathway was utilised for adult patients presenting with non-traumatic, anterior epistaxis. Pre- and post-implementation admission rates and re-attendance rates were recorded by retrospective audit at a large central London hospital. **Results** Epistaxis admissions were reduced by 51.7% ($p < 0.05$) following the implementation of the TXA-soaked NasoPore® pathway. **Conclusions** The significant reduction in epistaxis admissions demonstrates that this intervention is beneficial for patient outcomes. This has the potential to be introduced in other A&E departments and also pre-hospital settings.

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Pre- and post-implementation admission rates and re-attendance rates were recorded by retrospective audit at a large central London hospital.

Results

Epistaxis admissions reduced by 51.7% ($p < 0.05$) following implementation of the TXA-soaked NasoPore® pathway.

Conclusions

The significant reduction in epistaxis admissions demonstrates that this intervention is beneficial for patient outcomes. This has the potential to be introduced in other A&E departments and also pre-hospital settings.

Key words: epistaxis, pathway, admissions, quality improvement, tranexamic acid

Key points

1. Non-dissolvable intranasal packs in the management of epistaxis typically result in patients being admitted to hospital
2. Non-dissolvable packs are frequently used in A&E, prior to review by the ENT team
3. Alternatives to these packs have the potential to reduce epistaxis admissions
4. Introduction of tranexamic acid-soaked dissolvable packing reduced epistaxis admissions in our department
5. This intervention has the potential to be introduced more widely and in pre-hospital settings

The authors declare that there are no conflicts of interest associated with this work.

Data is available on reasonable request from the corresponding author.

Introduction

Epistaxis is the most common otolaryngological presentation to accident and emergency (A&E) in the UK¹. The incidence of patients attending UK emergency departments with epistaxis is reported as 108 per 100 000 local population annually². In 2017, NHS hospital statistics reported 25 000 A&E attendance with epistaxis³. Of the total attendances, approximately 25% require admission or specialist treatment². In our local centre, we noted that patients presenting with epistaxis were frequently treated with non-dissolvable nasal packs in A&E, necessitating admission under the Ear, Nose & Throat (ENT) team.

Current National Institute for Health and Care Excellence (NICE) guidelines for the management of acute epistaxis suggest 15 minutes of first aid, followed by silver nitrate cautery if possible and then non-dissolvable packs such as nasal tampons (e.g. Merocel[®]) or inflatable packs (e.g. Rapid-Rhino[®]) if bleeding continues⁴. A 2020 nationwide epistaxis audit found that 54.4% of patients attending with epistaxis were packed with non-dissolvable packing in A&E, and a further 18.9% by an ENT specialist doctor⁵.

Non-dissolvable packing is classically associated with hospital admission¹, whereas British Rhinological Society (BRS) guidelines advocate discharge for patients with dissolvable packing³ (e.g. NasoPore[®]). In March 2020, in light of covid-19, ENT-UK published new guidelines for epistaxis management which introduced the use of dissolvable packing in the treatment algorithm⁶. Reasons for this were two-fold. Firstly, to reduce exposure to the upper aerodigestive tract by healthcare professionals, and secondly to reduce admissions, both preserving bed capacity and reducing patient exposure to covid-19 in hospital¹.

Despite the above BRS guidance, subsequent national audit of epistaxis management found A&E utilisation of dissolvable packing to be only 2%¹. On call ENT doctors reported that non-dissolvable packs were already inserted by A&E in 45% of cases, prior to their attendance, necessitating admission¹.

A 2017 systematic review of intranasal packing for epistaxis noted no complications related to the use of dissolvable packing in the management of epistaxis⁷. Strategies to reduce A&E use of non-dissolvable nasal packs, in favour of dissolvable packing, could reduce epistaxis admissions in UK hospitals whilst maintaining patient safety.

As well as reducing admission rates, it is important to consider length of admission and risk of re-bleeding. Systematic review has demonstrated reduced re-bleeding rates and shorter admissions in epistaxis patients treated with topical tranexamic acid (TXA), without increased complication rates⁸. A 2018 Cochrane review of TXA use in epistaxis found a 23% reduction in risk of re-bleeding within 10 days when topical TXA was utilised, however noted a small number of studies specifically investigating this⁹.

Objectives

Our rationale for introducing TXA-soaked NasoPore[®] to the A&E epistaxis management pathway was to achieve the following aims. Firstly, to reduce local epistaxis admissions, and secondly, to achieve this in a manner which is evidence-based and maintains patient safety.

Methods

Design

A new stepwise pathway was introduced for the management of non-traumatic, anterior epistaxis in A&E (figure 1). This intervention involved the collaboration between A&E and ENT teams. Dissolvable nasal packing was introduced for epistaxis which did not terminate following 10 minutes of simple first aid. The packing used was TXA (500mg/ml) soaked NasoPore[®].

Patients were discharged if there was no further bleeding one hour after insertion of TXA-soaked NasoPore[®]. Awareness of this pathway was raised with an educational campaign to aid implementation.

Prior to this intervention, if conservative measures were ineffective, non-dissolvable packs were inserted (typically Rapid-Rhino[®]).

A retrospective audit of all epistaxis presenting to A&E was conducted pre- and post- implementation of the TXA-soaked NasoPore[®] pathway (n=245).

Setting

A large central London hospital.

Participants

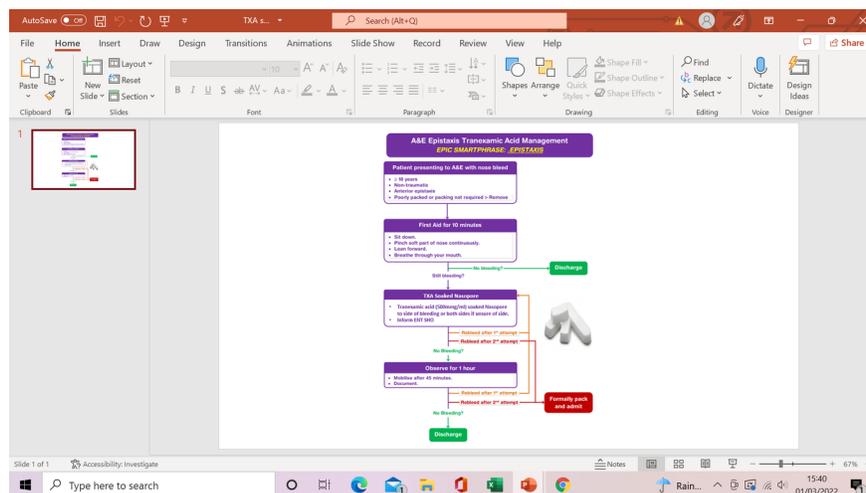
All patients aged over 18 presenting to A&E with spontaneous epistaxis during the study period. Verbal consent was obtained from patients prior to pack insertion.

Main outcome measures

Management of epistaxis, admission rates and re-presentation rates were recorded over seven months pre-implementation, from 01/08/2019-29/02/2020 (n=159), and eight months post-implementation, from 01/08/2020-31/03/2021 (n=86). Data was not collected during the height of the covid-19 pandemic (March 2020 to July 2020), due to the confounding effect on admission rates.

Statistical analysis was performed using the two-proportion z-test, with a significance level $p < 0.05$.

Reporting is in line with the SQUIRE 2.0 framework for quality improvement.



Results

159 patients presented with epistaxis in the pre-implementation period (22.7 per month), and 86 in the post-implementation period (10.8 per month).

In the pre-implementation period, epistaxis terminated with conservative measures only in 83.0% of patients. The remaining 17.0% were packed with non-dissolvable packs in A&E, all of whom were admitted to hospital. In the post-implementation period, 66.3% terminated with conservative measures, 5.8% received non-dissolvable packs, and were admitted, and 27.9% received dissolvable packing (TXA-soaked NasoPore[®]). 29.2% of those receiving NasoPore[®] required further packing with non-dissolvable packs and were subsequently admitted. 2 patients packed with NasoPore[®] re-attended with epistaxis (8.3%), and 3 patients who were discharged following conservative measures re-attended (5.3%). See table 1.

27/159 patients in the pre-implementation group required more than conservative measures (17%), all of these required admission (100%). 29/86 patients in the post-implementation group required more than conservative measures (33.7%). Of these, 12 patients were admitted (41.0%). Therefore, there was a statistically significant ($p < 0.0001$) reduction of 59.0% in admissions, after discounting those patients managed with conservative measures only.

After including the 2 patients who re-attended and were admitted following NasoPore[®] with TXA administration, the proportion admitted post-intervention rises to 48.3%. This results in a decrease in admissions of 51.7% in admissions, still statistically significant ($p < 0.0001$).

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Discussion

The introduction of dissolvable nasal packing in the A&E epistaxis treatment algorithm was successful in reducing epistaxis admissions locally. The main strengths of this project were ease of use by the A&E team, the initial collaboration between A&E and ENT teams in the planning of the project and the capacity to continue the intervention over time.

The utilisation of dissolvable nasal packs in A&E departments has been demonstrated to be drastically lower than the use by otolaryngology doctors in both the UK and the USA^{1,10}. The average length of stay for an epistaxis admission is reported as 3.2 days^{11,12}. In the United States of America (USA), the estimated cost per epistaxis admission is almost \$7000¹².

Not only are hospital admissions costly, they can also be detrimental to the patient. Patients in hospital are at risk of venous thromboembolism, falls, physical and cognitive deconditioning and contraction of nosocomial infections^{13–16}. In addition, during the covid-19 pandemic, admissions to hospital increased patient risk of contracting covid-19. In December 2020, 1 in 4 new covid-19 cases were estimated to have been contracted in hospitals¹⁷. As such, it is of the utmost importance that medical specialties consider methods to reduce the number of hospital admissions in their patients.

Considerations of introducing NasoPore[®] to the epistaxis treatment pathway include cost and availability of NasoPore[®]. There is a paucity of research comparing cost-effectiveness of NasoPore[®] with non-dissolvable packs, this analysis would be useful to help emergency departments decide whether to include NasoPore[®] in their epistaxis pathway.

NasoPore[®] has been found to be superior to non-dissolvable Merocel[®] nasal packs with regard to in-situ pain, pain of removal and re-bleeding rate¹⁸. However, there is limited evidence comparing Rapid-Rhino[®] to NasoPore[®], although Rapid-Rhino[®] is typically better tolerated than Merocel[®]¹⁹.

There were several limitations to this study. Firstly, it is noted that 33.7% of epistaxis patients were packed with dissolvable or non-dissolvable packs post-intervention vs 17% pre-intervention. It is possible that A&E

clinicians are more comfortable inserting NasoPore[®] than non-dissolvable packs, thereby reducing the threshold to pack. It is also possible that conservative measures were applied less effectively (e.g. pinching nose for a shorter period) as NasoPore[®] could be used, without requiring admission as non-dissolvable packing does.

Secondly, the rate of attendance to A&E with epistaxis was much lower in the post-implementation period, with a reduction seen of almost 12 per month. The post-implementation period was during the second wave of the covid-19 pandemic, when reductions in non-covid A&E attendances were seen across the world, for example in the UK, Italy and the USA²⁰⁻²². It is possible that fear of attending A&E meant that patients only attended when epistaxis was severe. This could offer further explanation as to the increase in the percentage of patients in the post-implementation group requiring more than conservative measures. If this is the case, the use of TXA-soaked NasoPore[®] is further supported as we saw an decrease in epistaxis admissions, despite the potentially increased severity presenting to A&E.

The covid-19 pandemic in itself may have skewed the admission rates seen in the study compared to non-covid times, due to enhanced admission avoidance during this time period. It would be helpful to repeat data collection in a time period with low covid-19 hospital attendance rates, in order to confirm long term validity of the intervention.

Increasing use of dissolvable nasal packs in A&E can reduce the number of admissions to hospital. Introduction of a formal pathway is a helpful way to encourage this. This intervention is sustainable if the pathway is taught to incoming A&E clinicians and if the stock of NasoPore[®] is maintained. There is scope to trial this pathway across multiple centres and assess whether admissions are reduced on a larger scale. In addition, TXA-soaked NasoPore[®] could be introduced in pre-hospital settings, for example by paramedics, to reduce the number of initial A&E attendances with epistaxis in the first place.

Conclusion

Our study has demonstrated the potential to reduce epistaxis admissions by including a TXA-soaked dissolvable pack step in the A&E epistaxis treatment algorithm. In order to achieve this reduction in admissions, education of A&E clinicians was required and it is important that this is repeated on a regular basis in order to maintain the results observed.

The implementation of this treatment algorithm across the UK requires A&E departments to be well stocked with supplies of NasoPore[®] and TXA, and for clinicians to be comfortable using these. Larger scale studies would be helpful to determine the feasibility of introducing this pathway in both A&E and pre-hospital settings, and also to assess patient experience and satisfaction with dissolvable versus non-dissolvable nasal packing. Next steps include re-assessment to assess long term adherence and the post-covid validity.

Tables & figures

Figure 1: TXA-soaked NasoPore[®] pathway for emergency clinicians

Table 1: A&E management and outcome

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