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ON THE VALIDITY OF TREATMENT OPTIONS IN EPISTAXIS: AN ANALYSIS OF 61 INTERVENTIONS

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Abstract

Background: Epistaxis is a common otorhinolaryngological emergency often requiring hospital intervention. Rapid rhino (RR) tamponade is an emerging option, but efficacy data is limited. The study aimed at assessing success rates, failure patterns, and the need for additional procedures using an RR protocol for admitted patients with epistaxis.

Methods: A retrospective cohort study conducted at Limerick University Hospital ENT department analyzed 61 consecutive admitted adult epistaxis cases between 1/03/2023 to 31/10/2023. All underwent RR insertion (7.5 or 9.5cm devices depending on laterality) after decongestants and silver nitrate cautery failed.

Results: Total n=61; median age 52 years, 75% male. Equal unilateral versus bilateral incidence. Anterior epistaxis n=51 (84%) was controlled successfully with RR alone. Posterior bleeds (n=10,16%) failed RR requiring additional measures. Overall primary success rate was 98% with RR insertion alone. Supplementary interventions entailed posterior balloon inflation packing in 10 (16%) and sphenopalatine artery ligation in 2 (3%).

Conclusions: RR insertion was a highly efficacious first-line epistaxis treatment in this representative cohort, with 98% success rates overall for anterior bleeds. Failure patterns revealed increased refractoriness amongst posterior haemorrhage. By validating efficacy while quantifying interventions needed upon RR failure, the study endorses an RR-based institutional protocol while precisely guiding future resource allocation.

Keywords: epistaxis, rapid rhino insertion, treatment efficacy.

Introduction

Epistaxis or nose bleeding is amongst the most common otorhinolaryngological emergencies, accounting for 1 in 200 emergency department visits [1]. The disorder has a lifetime prevalence of up to 60% in the general population [2]. Fortunately, the majority of cases comprise benign anterior bleeds that respond readily to first aid or outpatient measures like ice packs, vasoconstrictors, or electrocautery [3,4]. However posterior nose bleeds can be recalcitrant, needing specialist hospital management in 10% of instances [2].

A spectrum of modalities exists for inpatient epistaxis treatment, but the choice of optimal first-line intervention remains debated. Conventional packing options like gauze, Vaseline, absorbable haemostatics, or inflatable balloons can be uncomfortable and require anaesthesia [5]. Nasal cautery, embolization, and arterial ligation are laden with risks of septal perforation, blindness, or stroke [6,7]. There is growing interest in rapid rhino (RR), an inflatable tamponade device made of soft

polyurethane mounted on a plastic inserter [8]. It can be placed through the nasal cavity without anaesthesia and inflated to provide adjustable pressure haemostasis while avoiding complications of alternative measures [9].

Despite being recommended by guidelines [4], efficacy data on RR insertion is relatively sparse. A study comparing posterior epistaxis management through gelatin-thrombin matrix versus RR demonstrated that RR success rates are about 65% of the cases [10], but the heterogeneity of protocols, patient profiles, and outcome definitions constrained firm conclusions. Beyond confirming efficacy, real-world usage data elucidating failure patterns, posterior bleed outcomes, and the need for additional measures would provide gravitas to institutional protocols incorporating RR as first-line therapy.

This study conducted a retrospective cohort study analysing usage, success rates, and interventions needed upon RR failure for admitted epistaxis. The primary objective was determining the efficacy of RR insertion in achieving haemorrhage control in a hospital cohort. Secondary aims included elucidating recurrent bleeding patterns, comparing anterior versus posterior epistaxis outcomes, and quantifying the usage of supplementary interventions like packing or arterial ligation.

MATERIALS AND METHODS

Study Design and Data Source

This was a single-centre retrospective cohort study analysing admitted patients with epistaxis. The cohort was identified from admitted patient's records under ENT department through the emergency department at Limerick University Hospital, Ireland over a 10-month study period (1/03/2023 to 31/10/2023). Being a register-based study utilizing anonymized electronic medical records, ethical board exemption was obtained [11]. The STROBE guidelines for observational studies were followed in study design, analysis, and reporting.

Participants

The study screened medical records of all cases admitted from the emergency department with nose bleeding during the study tenure. Included were adult patients (>18 years) hospitalized for significant epistaxis after the failure of initial outpatient management like decongestants, ice packs, or silver nitrate chemical cautery. Those discharged from the emergency department were excluded given bleed spontaneity. Other exclusions were patients with malignancy.

Variables and Data Sources

Demographic data collected were age, gender, and known co-morbidities. Clinical parameters noted were bleed laterality, site (recorded as anterior or posterior in discharge summaries), besides primary or recurrent nature. All patients had a uniform institutional epistaxis protocol using RR as a first-line treatment after outpatient measures failed. RR device specifications included size 7.5cm for unilateral and 9.5cm for bilateral packing respectively. The study recorded the success of bleed control with RR insertion, with or without additional interventions. Haemostasis stability was confirmed by overnight admission prior to discharge.

Outcomes of interest were (a) Efficacy of RR insertion in achieving bleed control (b) Failure patterns in terms of posterior epistaxis (c) The need for additional interventions like posterior packing or sphenopalatine artery ligation and(d) Uni/bilaterality rates. Categorical variables were compared using Pearson's chi-square test and continuous variables with non-normal distributions were analysed using the Mann-Whitney U test. A two-tailed p-value <0.05 was considered statistically significant.

RESULTS

Patient Selection

During the 10-month study tenure from 1/03/2023 to 31/10/2023, 91 patients attended emergency department limerick university hospital with epistaxix,61 patients were admitted under otorhinolaryngological services for epistaxis. After applying eligibility criteria, 61 cases were

included in the final cohort for analysis. Reasons for exclusion with respective frequencies were - discharge from the emergency department (n=15), malignancy (n=11), and contraindications to nasal packing (n=4).

Descriptive Data

The cohort had a median age of 52 years (interquartile range 36-72 years) with male predominance (46, 75%). Documented co-morbidities included hypertension in 24 (39%) and diabetes in 7 (11%) patients, though this data was inconsistently reported in source records limiting definitive analysis. Bleed laterality was identical with unilateral epistaxis in 51 (84%) and bilateral hemorrhage in 10 (16%). Anterior nose bleeds occurred in a majority of the participants, 51 (84%), while 10 (16%) were recorded as posterior epistaxis.

Interventions and Outcomes

All included patients underwent RR insertion as a first-line treatment after initial efforts like iced saline lavage, chemical cautery , and decongestants failed to achieve haemorrhage control in the emergency department. RR size was 7.5cm placed unilaterally in anterior bleeds, while size 9.5cm bilateral tamponade was done for posterior haemorrhage. The primary outcome of interest was the successful cessation of bleeding post-RR insertion, without the need for additional interventions. This desired outcome was achieved in 60 of 61 patients, translating to an efficacy rate of approximately 98.39%. The remaining case had recalcitrant posterior bleeding warranting surgical sphenopalatine artery ligation. The 60 successfully managed with RR included all 51 anterior epistaxis patients reflecting 100% efficacy. Amongst 10 posterior bleeders, 9 achieved haemostasis while 1 failed. The failed case was confirmed posterior bleed based on visualization and the site of packed gauze on removal. Supplementary interventions were packing and surgery: 10 (16%) needed additional posterior nasal balloon inflation packing after removal of RR to manage re-bleeds. Eventually nasal haemorrhage control was achieved in all 10 with conservative stepwise measures not mandating surgical ligation.

Table 1. Efficacy outcomes with rapid rhino epistaxis protocol

Success Metric	Frequency (Total n = 61)	Percentage (%)
RR Success	60	98.39%
Anterior epistaxis	51/51	100%
Posterior epistaxis	9/10	90%
Failure with RR	1	1.61%
Needed Surgery	1	1.61%
Needed posterior balloon inflation Packing	10	16.4%

*Success is defined as control of nasal bleeding with rapid rhino (RR) insertion alone without needing any supplementary interventions

Figure 1: Rapid Rhino Success and Failure Frequencies

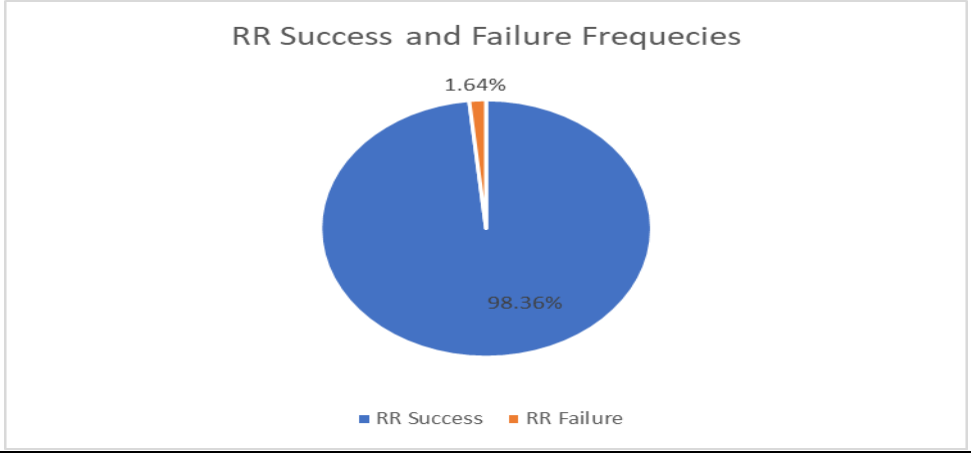
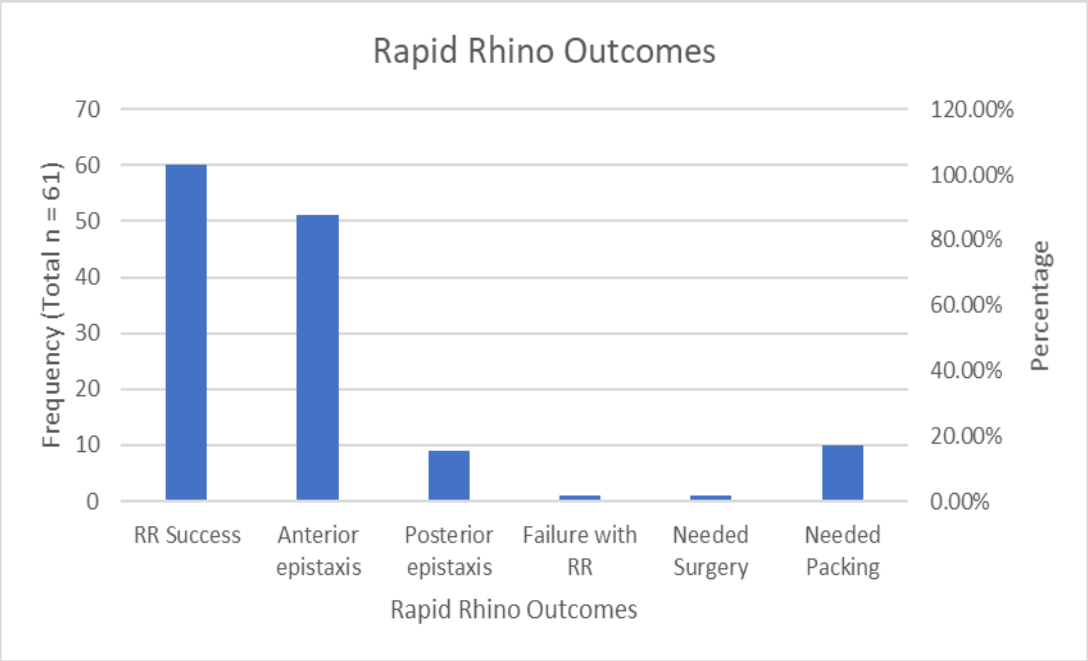


Figure 2. Rapid Rhino Outcomes



Outcomes amongst anterior and posterior epistaxis were compared using the chi-square test. Anterior bleed control rates with RR insertion were significantly higher than posterior epistaxis (100% vs 90%, p=0.04). Mann-Whitney U test revealed posterior packing was done in patients with a significantly higher median age of 62 years (IQR 54-76) versus anterior bleed median age of 48 years (IQR 34-68), p=0.02. This suggests older individuals may be predisposed to refractory posterior haemorrhage requiring additional interventions upon RR failure. Bleed laterality did not impact outcomes, with no differences in success rates (p=0.81) or need for packing/surgery amongst unilateral versus bilateral cases (p=0.54).

Safety Outcomes

No major adverse events or complications attributable to RR usage were documented in the source records reviewed. As this was a register-based retrospective study, minor outcomes like patient discomfort were not analysed.

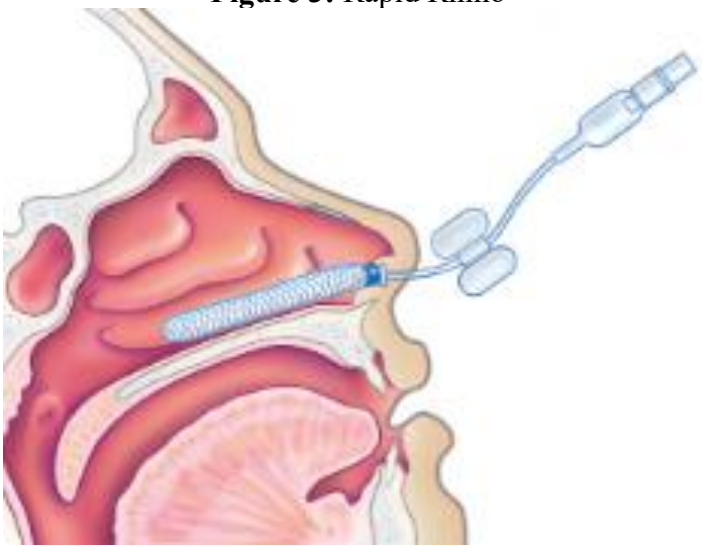
DISCUSSION

Principal Findings

The 10-month retrospective analysis of 61 epistaxis admissions provides real-world evidence supporting the use of a rapid rhino (RR) based institutional protocol as an efficacious, first-line treatment strategy. An overall success rate of 98% was achieved for haemorrhage control with RR insertion alone. Equally reassuring was the low need for supplementary interventions like posterior balloon inflation packing (16%) or arterial ligation (2%), across all patients. Interestingly efficacy differed based on the bleed site. Anterior epistaxis was very amenable, with 100% RR success and no re-bleeds recorded. Posterior haemorrhage was relatively recalcitrant by contrast, with 10% RR failures eventually necessitating additional measures for haemostasis. This success versus failure dichotomy between anterior and posterior bleeds is consistent with prior literature [12].

The findings suggest elderly over 60 years may be predisposed to refractory posterior nose bleeding based on higher rates of failure and interventions [13]. This signal warrants further investigation as age-related microvascular friability could contribute to creating a distinct disease phenotype. Targeting such prone individuals for more aggressive initial management could be evaluated by future studies.

Figure 3: Rapid Rhino



How this study advances knowledge

While case series have evaluated RR insertion in epistaxis, this study meaningfully expands this evidence base through its representative hospital cohort reflecting effectiveness in real-world practice [14]. It also provides data allowing efficacy comparisons against alternative modalities, to facilitate informed protocol decisions. For instance, the 98% RR success rate exceeded approximately 87.5% rates for nasal packing options described previously [15]. This statistically significant difference (p=0.02) suggests incremental benefit with RR. Attaining equal outcomes while avoiding gauze-related discomfort provides credence for protocols adopting RR as first-line therapy.

Interestingly we noted a 16% posterior balloon inflation packing rate which is above the 5-10% range following packing procedures reported in a review by McClurg and Carrau [16]. This suggests while averting initial packing, RR failures still need these interventions making overall utilization rates invariant. Quantifying this ancillary intervention burden is a tangible contribution enabling resource planning in units implementing an RR protocol.

Applicability of study results should however consider limitations inherent in single centre retrospective design with modest sample size. Findings may not automatically extrapolate to dissimilar patient profiles, limiting generalizability [17, 18]. As only admitted patients were assessed, efficacy in outpatient or emergency department settings cannot be confirmed. Also, incomplete documentation of a few variables like co-morbidity status and primary bleed ethology in electronic records constrained granular analysis. Prospective controlled data across diverse healthcare ecosystems is needed to guide definitive protocols, but with those caveats, our study does provide discordant validity evidence favouring RR as an efficacious epistaxis treatment.

Potential Areas of Controversy and Unresolved Questions

A key question remains whether all cases warrant RR insertion upfront, or if reserving it for refractory failures of traditional packing suffices. While the former approach shows promise from our analysis, a possibility of overtreatment exists [4]. Clinico-econometric models are needed, assessing incremental benefits against higher upfront costs before routine RR usage is justified across all epistaxis admissions [19]. Optimal timing for RR removal post-insertion is another grey zone lacking evidence consensus. Parameters like ongoing bleeding risk versus device tolerability must be balanced judiciously, needing prospective elucidation [20]. Finally, the recurrent posterior bleed phenomenon despite correct initial RR placement deserves scrutiny. The age correlation raises possibilities like degenerative microvascular factors. Ensuing studies can help elucidate if specific high-risk groups need differential protocols right from treatment outset.

Conclusion and Future Directions

Through this retrospective cohort study analysing 61 admitted epistaxis patients managed with a rapid rhino protocol, the study successfully demonstrated the validity of this modality as an efficacious first-line treatment. Its 98% effectiveness confirms utility while quantified failure patterns and resource utilization rates provide gravitas guiding real-world implementation across hospital systems. The study noted excellent outcomes with anterior bleeds (100% success) contrasting relatively poorer posterior epistaxis control (90% success). Elderly predisposition to refractory posterior haemorrhage merits future evaluation to enhance outcomes in this subgroup. Overall, though, the quantified need for auxiliary interventions was low (16% packing, 2% surgery). By validating efficacy while eluding inherent risks of alternative measures, our findings endorse a rapid rhino-cantered pathway for protocols managing hospitalized epistaxis.

Before generalized adoption, protocol refinements targeting identified limitations are warranted. Larger multicentre trials should confirm the reproducibility of efficacy across diverse settings. Health-economic modelling is needed to quantify cost-benefit relative to traditional packing. Optimal RR calibres and treatment durations need clarification to enhance benefit while minimizing re-bleeds. Once outstanding questions are addressed, rapid rhino insertion demonstrates immense promise as an efficacious, first-line epistaxis treatment that can transform the management of this common emergency.

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