The Journal of Laryngology & Otology

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Comparison of side effects and patient perceptions towards Rapid Rhino and Merocel packs in epistaxis

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Abstract

Objective. Non-dissolvable nasal packs (Rapid Rhino and Merocel) are widely used in secondary healthcare centres for the control of epistaxis, with some side effects.

Methods. A prospective, observational cohort study was conducted of adults who required Rapid Rhino or Merocel packing for acute epistaxis management in a large healthcare centre between March 2020 and 2021. A validated modified version of the 22-item Sino-Nasal Outcome Test was used.

Results. A total of 80 adults requiring non-dissolvable packs were recruited. Seventy per cent of patients had Rapid Rhino packs inserted. Embarrassment was greater in patients who used Rapid Rhino than Merocel. Merocel packs had a significantly higher mean pain score on removal compared to Rapid Rhino. There was no correlation between rebleed rate and type of nasal pack used.

Conclusion. Non-dissolvable Rapid Rhino and Merocel nasal packs have similar efficacy in controlling epistaxis. Rapid Rhino packs are more embarrassing for patients in comparison to Merocel packs, but are less painful to remove.

Main Article

Bassem Mettias takes responsibility for the integrity of the content of the paper

Cite this article: Mettias B, Karia CT, Irvine E, Conboy P. Comparison of side effects and patient perceptions towards Rapid Rhino and Merocel packs in epistaxis. *J Laryngol Otol* 2024;**138**:642–646. https://doi.org/10.1017/S0022215124000094

Received: 10 September 2023
Revised: 11 October 2023
Accepted: 17 October 2023
First published online: 17 January 2024

Keywords:
Epistaxis; tampons; surgical; patient outcome assessment; quality of life

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Introduction

Epistaxis is a very common problem in the population. Sixty per cent of people experience at least one episode of epistaxis during their lifetime; however, one-tenth require medical attention.[1] The stepladder approach for acute epistaxis includes direct pressure, nasal cautery, and nasal packs up until surgery and/or embolisation.[1,2] In the secondary care setting, nasal packing remains the mainstay of treatment. It is recommended by the National Institute for Health and Care Excellence and the British Rhinological Society when initial measures are ineffective.[1,2] The non-dissolvable packs vary, and include nasal tampons, alginate-covered nasal balloons and ribbon gauze impregnated with bismuth iodoform paraffin paste.[1] Patients with non-dissolvable nasal packing tend to be admitted to hospital, with an average in-patient stay for epistaxis of 29.5 hours.[3]

Two of the widely used non-dissolvable nasal tampons are Rapid Rhino® and Merocel®. Rapid Rhino consists of an inflatable cuff and a knitted carboxymethylcellulose matrix that compresses arterial bleeding and promotes platelet aggregation.[4] Merocel is a foam-like pack of a hydroxylated polyvinyl acetate. It is capable of absorbing fluid, and becomes softer and more elastic on moistening.[5] Previous studies have shown that Rapid Rhino packs are better tolerated by patients than Merocel packs, with less pain and easier insertion and removal.[4,5] Both packs have comparable efficacy in terms of controlling epistaxis, but Merocel packs are cheaper.[6,7] There is no previous validated feedback questionnaire that addresses any other side effects.

Materials and methods

Objectives

Merocel packs were widely used in epistaxis management in our centre before March 2020. During the coronavirus disease 2019 (Covid-19) pandemic, Rapid Rhino packs were introduced into epistaxis management to ensure dual resources during the pandemic.

This study was registered locally as a clinical audit (reference number: 10525) to evaluate the incidence and the severity of side effects for both nasal pack types in epistaxis management. The Health Research Authority tool was used to ensure that ethical approval was not required.

Design and setting

This prospective, observational cohort study was conducted, between March 2020 and 2021, in a hospital with approximately 1000 beds serving a mixed city and rural population of over 650 000 in central England.

Table 1. Hospital protocol for admission for epistaxis with nasal packing

Bilateral non-dissolvable nasal packs
Or unilateral with 1 other factor below:
– Living alone or with family where patient is main carer
– Live a long distance from hospital
– Significant drop in haemoglobin (>1 g/dl)
– Associated coagulopathy
All patients who required non-dissolvable nasal packs for >2 days had antibiotic cover

Participants

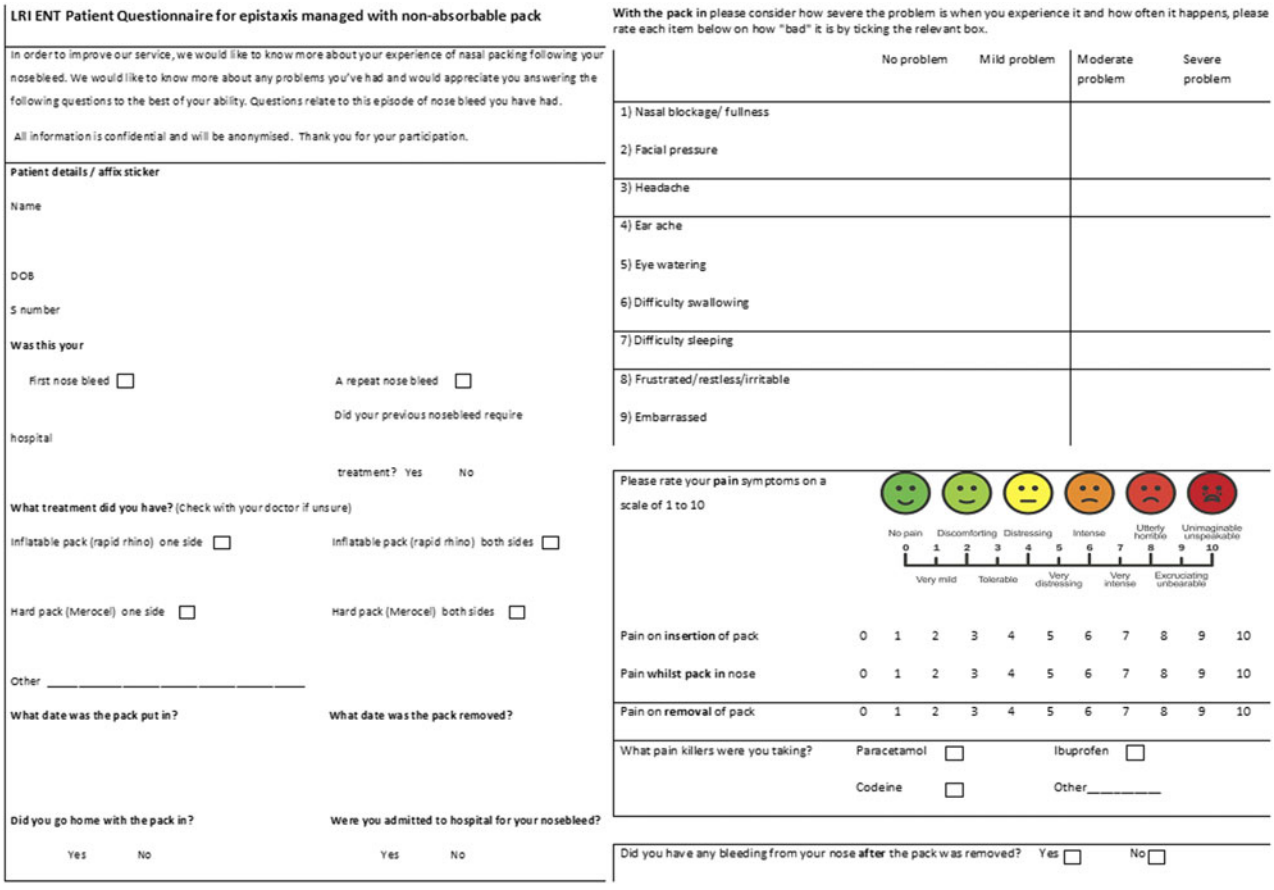
All adults attending the emergency department who required non-dissolvable intranasal packing (Rapid Rhino or Merocel) for successful control of anterior epistaxis were included in the study.

Patients who required bilateral or posterior nasal packs were excluded, as were those who required surgery after unsuccessful non-absorbable pack use. Patients who required revision packs during the same epistaxis event were invited to complete the questionnaire on both occasions; this was used only as a test–retest to validate the Sino-Nasal Outcome Test (SNOT) in epistaxis patients. However, these patients were excluded from statistical outcome of the study to avoid reporting bias associated with traumatised nasal mucosa during the second insertion.

The was no specific pre-insertion nasal examination that might confound one pack over the other. During insertion, the packs were lubricated with OptiLube™ gel by junior clinicians trained in nasal emergencies. At pack removal, either in clinic or on a ward, the patients were offered a feedback questionnaire form to assess their experience. Pack removal was performed as an out-patient procedure if none of the admission criteria were present (Table 1). The rebleeding rate after immediate pack removal was graded as mild (stopped with pressure or a haemostatic agent), moderate (stopped with cautery and a haemostatic agent) or severe (required repacking with or without surgery or blood transfusion). The haemostatic agent used was NasoPore®.

The questionnaire

The questionnaire (Figure 1) had three sections. The first section related to patients' demographic details and past medical history. The second section had nine Likert-type scale questions to assess the type and severity of each side effect. Six of the items related to side effects were adapted from the SNOT-22 questionnaire.[8] The remaining three items – headache, difficult swallowing and eye watering – were added after a Pubmed database search for any other side effects of non-absorbable nasal packs reported in any level I evidence[4–6] or systematic reviews or meta-analyses.[7,9,10] The third section of the questionnaire was an assessment of pain experienced during pack insertion, while the packs were in situ and during pack removal, using Wong–Baker Faces® scale.[11] The Integrated Clinical Environment platform (CliniSys, Woking, UK) was used for the collection of data on each hospital epistaxis event.



LRI ENT Patient Questionnaire for epistaxis managed with non-absorbable pack

In order to improve our service, we would like to know more about your experience of nasal packing following your nosebleed. We would like to know more about any problems you've had and would appreciate you answering the following questions to the best of your ability. Questions relate to this episode of nose bleed you have had.

All information is confidential and will be anonymised. Thank you for your participation.

Patient details / affix sticker

Name

DOB

S number

Was this your

First nose bleed ☐ A repeat nose bleed ☐

hospital Did your previous nosebleed require treatment? Yes No

What treatment did you have? (Check with your doctor if unsure)

Inflatable pack (rapid rhino) one side ☐ Inflatable pack (rapid rhino) both sides ☐

Hard pack (Merocel) one side ☐ Hard pack (Merocel) both sides ☐

Other _____

What date was the pack put in? **What date was the pack removed?**

Did you go home with the pack in? Yes No **Were you admitted to hospital for your nosebleed?** Yes No

With the pack in please consider how severe the problem is when you experience it and how often it happens, please rate each item below on how "bad" it is by ticking the relevant box.

	No problem	Mild problem	Moderate problem	Severe problem
1) Nasal blockage/ fullness				
2) Facial pressure				
3) Headache				
4) Ear ache				
5) Eye watering				
6) Difficulty swallowing				
7) Difficulty sleeping				
8) Frustrated/restless/irritable				
9) Embarrassed				

Please rate your **pain** symptoms on a scale of 1 to 10

No pain Discomforting Distressing Intense Utterly horrible Unimaginable unspeakable

0 1 2 3 4 5 6 7 8 9 10

Very mild Tolerable Very distressing Very intense Excruciating unbearable

Pain on **insertion** of pack	0	1	2	3	4	5	6	7	8	9	10
Pain **whilst pack in** nose	0	1	2	3	4	5	6	7	8	9	10
Pain on **removal** of pack	0	1	2	3	4	5	6	7	8	9	10

What pain killers were you taking? Paracetamol ☐ Ibuprofen ☐ Codeine ☐ Other_____

Did you have any bleeding from your nose **after** the pack was removed? Yes ☐ No ☐

Figure 1. Patient questionnaire.

https://doi.org/10.1017/S0022215124000094 Published online by Cambridge University Press

Table 2. Baseline characteristics of patients with Rapid Rhino compared to Merocel packs

Baseline characteristic	Rapid Rhino	Merocel	*P*-value
Recurrent epistaxis prior to packing (% (*n*))	63 (35)	29 (7)	0.06
Mean duration of packing (days)	2.46	2.25	0.588
Anticoagulation (% (*n*))	30 (17)	33 (8)	0.792
Current smoker (% (*n*))	11 (6)	8 (2)	0.745
Mean units of alcohol consumed	8.31	6.25	0.353
Living alone (% (*n*))	34 (19)	38 (9)	0.759

Statistical analysis

Chi-square tests were used to assess differences in the frequency of side effects, rebleed rates and baseline characteristics between the Rapid Rhino and Merocel groups. Independent samples *t*-tests were used to assess differences in mean packing duration, from pack insertion to removal, between both groups. Confidence intervals were used to assess the severity of side effects. The Likert-type scale questions on side effect severity were converted into numbers, ranging from 0 representing 'no problem' to 3 representing 'a severe problem'. The Mann–Whitney U test was used to assess the differences in pain related to nasal packing and side effect severity. All statistical analysis was performed using IBM SPSS® for Mac, version 26.0.

Results

During the study period, 687 episodes of acute epistaxis were seen in our hospital. Most episodes ($n = 412$, 60 per cent) were either spontaneously settled or managed with external compression, cautery, or dissolvable packing. Of the remaining 275 cases, 107 were excluded because of either previous non-dissolvable packs (72 patients) or repeated packing during the same acute episode (35 cases, used for test–retest validation of the questionnaire). There were 168 patients who were eligible for inclusion in the study, but only 80 patients completed the feedback questionnaire.

Fifty-six patients (70 per cent) had a Rapid Rhino pack inserted and 24 patients (30 per cent) had a Merocel pack inserted. Most patients (95 per cent, $n = 76$) were packed unilaterally. The mean duration of packing was 2.40 days (standard deviation (SD) ± 1.46). There were no recognised complications from any of the packs.

Demographic risk factors of epistaxis

There was 47 males and 33 females. Patients' mean ± SD age was 72 ± 15.2 years. Hypertension was the commonest co-morbidity (26 per cent, $n = 21$), and over a third of patients were on anticoagulant medication (31 per cent, $n = 25$). One-tenth of patients (10 per cent, $n = 8$) were smokers and 34 per cent ($n = 27$) were ex-smokers. The mean alcohol consumption across the cohort was 7.28 units per week. Thirty-five per cent ($n = 28$) of patients declared that they lived alone. No significant differences were found in the baseline characteristics between patients with Rapid Rhino packs and those with Merocel packs (Table 2).

The epistaxis was the first episode in 47 per cent ($n = 38$) of patients. Of the patients, 52.5 per cent ($n = 42$) had experienced a previous nosebleed; of these, 52 per cent ($n = 22$) were managed conservatively, while 48 per cent ($n = 20$) required non-dissolvable packing. Over half of the patients (52.5 per cent, $n = 42$) required in-patient care, of which 64 per cent ($n = 27$) had presented with their first epistaxis episode, compared to 35 per cent ($n = 15$) of recurrent epistaxis cases ($p = 0.655$). The remaining patients (47.5 per cent, $n = 38$) were deemed suitable for out-patient management.

Comparison of side effects

A comparison of the frequency of side effects (Table 3) revealed that patients packed with Rapid Rhino had an increased incidence of embarrassment (30 per cent, $n = 17$) compared to the ones packed with Merocel (8 per cent, $n = 2$) ($p = 0.034$). Additionally, epiphora, insomnia and facial

Table 3. Incidence and mean severity of side effects

	Incidence			Severity		
Side effect	Rapid Rhino packing (*n* (%))	Merocel packing (*n* (%))	*P*-value	Rapid Rhino packing symptom severity score (± SEM)	Merocel packing symptoms severity score (± SEM)	*P*-value
Nasal congestion	41 (73)	16 (67)	0.553	1.43 (± 0.15)	1.08 (± 0.20)	0.191
Facial pressure	36 (64)	11 (46)	0.124	1.29 (± 0.15)	0.79 (± 0.19)	0.071
Headache	33 (59)	11 (46)	0.281	1.13 (± 0.15)	1.04 (± 0.25)	0.644
Otalgia	15 (27)	5 (21)	0.573	0.45 (± 0.11)	0.25 (± 0.11)	0.476
Epiphora	39 (70)	12 (50)	0.094	1.20 (± 0.14)	0.92 (± 0.22)	0.236
Dysphagia	25 (45)	8 (33)	0.346	0.79 (± 0.14)	0.67 (± 0.22)	0.471
Insomnia	38 (68)	11 (46)	0.064	1.32 (± 0.15)	0.92 (± 0.24)	0.122
Frustration	28 (50)	11 (46)	0.733	0.88 (± 0.15)	0.79 (± 0.21)	0.775
Embarrassment	17 (30)	2 (8)	0.034*	0.46 (± 0.11)	0.13 (± 0.09)	0.038*

Fifty-six patients (70 per cent) had a Rapid Rhino pack inserted and 24 patients (30 per cent) had a Merocel pack inserted. Incidence of side effects is expressed as a proportion of the number of patients with the same pack type. Mean severity of side effects is expressed as a numerical value based on the 22-item Sino-Nasal Outcome Test (SNOT-22) instrument, with a maximum possible score of 3. *Indicates significant difference. SEM = standard error of the mean

https://doi.org/10.1017/S0022215124000094 Published online by Cambridge University Press

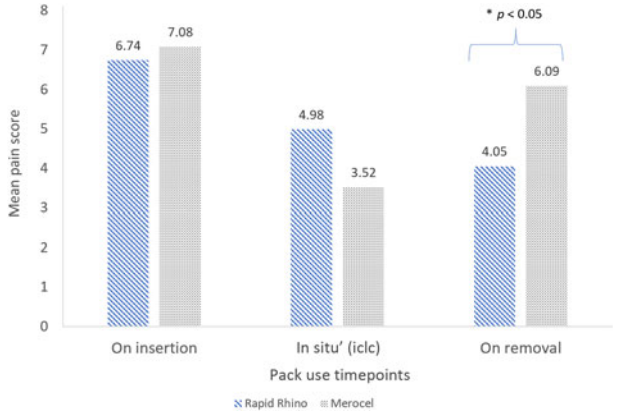


Figure 2. Mean pain scores for Rapid Rhino versus Merocel nasal pack use.

pressure were worse in those packed with Rapid Rhino compared to Merocel, but the differences were not statistically significant.

A comparison of the severity scores for each side effect showed that patients packed with Rapid Rhino had significantly greater severe embarrassment compared to those packed with Merocel ($p = 0.038$).

No significant difference was noted in the pain scores during pack insertion or while in situ. However, Merocel packs had a higher mean pain score on removal (6.09 ± 0.73) compared to Rapid Rhino (4.05 ± 0.43) ($p = 0.019$) (Figure 2). There was no correlation between rebleeding rate and the type of nasal pack used ($p = 0.342$).

Comparison of nasal pack efficiency

Sixteen out of 80 patients (20 per cent) re-bled after pack removal (13 had Rapid Rhino and 3 had Merocel packs). Six out of 16 patients (37.5 per cent) were on anticoagulants. Ten out of 16 patients (12.5 per cent) had mild bleeding. Three patients (3.7 per cent) had severe bleeding; none of these patients were on anticoagulants. The three patients required re-insertion of non-dissolvable packs (two of the patients initially had a Rapid Rhino pack while the third patient had a Merocel pack; there was no statistical difference). None of the patients required surgery. Two patients were re-admitted following Rapid Rhino repacking (one with high blood pressure and the other because of a drop in haemoglobin level).

Discussion

Sino-Nasal Outcome Test and epistaxis

National epistaxis audits carried out in 2016 and 2020 showed similar efficiency between non-absorbable nasal packs.[3,12] The rebleeding rate increased to 19.5 per cent within 10 days of epistaxis management during the Covid-19 pandemic in April 2020,[12] compared to 13.9 per cent within 30 days of treatment in 2016.[3] There are limited studies focusing on the side effects other than facial pressure and the pain experienced when using non-dissolvable packs in epistaxis.[4,5] The SNOT-22 is a validated tool widely used to assess the outcome of sinus surgery.[8] Patients with nasal packs have experienced most of the symptoms recorded in the SNOT-22.[5,13]

Comparison of Rapid Rhino and Merocel

In this study, embarrassment was significantly greater with Rapid Rhino pack use. This could be related to the inflation port being visualised externally, compared to the discrete nature of the Merocel black thread. This should be clearly elucidated with verbal consent during the selection of nasal packs.

- Non-dissolvable packing is an important component of epistaxis management in secondary care
- The Sino-Nasal Outcome Test 22 is a valuable feedback questionnaire that can elaborate on sequalae experienced by patients undergoing epistaxis management
- Merocel packs are significantly more painful to remove than Rapid Rhino packs
- Rapid Rhino packs are more embarrassing to use than Merocel packs
- Both non-dissolvable pack types showed a comparable success rate in epistaxis cases

Our study did not identify a significant difference in mean pain score on insertion of both packs, which is incongruent with a previous report.[7] The lack of agreement could be explained by an unequal sample size, or the variation in (gel) lubricant used in our study, compared to (Naseptin® nasal cream) in the previous one. Furthermore, the previous study used the term 'discomfort',[7] which has a different interpretation to the 'pain' domain in our study. We have identified that Merocel was significantly painful on removal, as reported in other studies.[5,7] This could be related to the expandable nature of Merocel, which sticks to the nasal mucosa; in comparison, Rapid Rhino packs are easily deflated and less sticky on removal.[6,7] It is generally advised to wet the pack with saline or water before removal. However, the gentle insertion and removal were hard to standardise. Altered anatomy such as a deviated septum might affect the pain score during the insertion or removal of nasal packs. There was no reported backward slippage into the nasopharynx from any patients using a Rapid Rhino pack in this study, in comparison with a previously highlighted risk.[6]

Out-patient nasal pack removal service

This study showed the safe use of non-absorbable nasal packs as an out-patient measure. We have integrated a clear electronic emergency clinic pathway for patients with nasal packs before discharge from the hospital, to ensure a tracked follow-up removal plan.

The measurement of rebleeding rate after pack removal in this study was based on two factors: the severity of the bleed and the method used to control it. This was a more efficient measure than the grading score used in another study.[6] In addition, it is consistent with British Rhinological Society consensus.[2] The lack of correlation between the type of nasal pack used and the rate of rebleed is similar to the observations in two national audits.[3,12]

Study advantages and limitations

This is the first focused and comprehensive study to address the frequency and severity of all side effects associated with Rapid Rhino and Merocel nasal pack use. The large sample size compared to other studies[4–6] provides consistency on the feedback. The combined use of a qualitative measure (the questionnaire) and a quantitative measure (epistaxis control) for the two groups should improve patients' confidence during counselling. The sample bias is a limitation in the study, as only half of the eligible patients were recruited. Service constraints, limited hospital visits and social distancing rules during the pandemic have affected how clinicians pursue

https://doi.org/10.1017/S0022215124000094 Published online by Cambridge University Press

and engage patients. Another limitation was the unequal size of the groups. Of interest, 75 per cent of reported nasal packs in the 2016 national audit were inflatable,[3] which reflects the growing change in practice in many centres, and is congruent with the unequal groups in our study.

Conclusion

The non-dissolvable Rapid Rhino and Merocel nasal packs have similar scores for pain during insertion in epistaxis cases. Rapid Rhino packs are more embarrassing to use compared to Merocel packs but are less painful to remove. A modified SNOT-22 is an efficient, validated tool for assessing nasal pack use in epistaxis management.

Data availability statement. Data to support the findings of this study are available from the corresponding author upon reasonable request.

Competing interests. None declared

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