

Biodegradable Synthetic Polyurethane Foam Nasal Packing After Septoplasty

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ABSTRACT

Objective: To determine the usefulness of biodegradable Synthetic Polyurethane Foam (SPF) nasal packing as an adjunct to day-case septoplasty.

Study Design: Comparative, observational case series.

Place and Duration of Study: Aberdeen Royal Infirmary, University of Aberdeen, Scotland, UK, in the year 2011.

Methodology: One-hundred consecutive patients who underwent septoplasty and received SPF packing in 2010 were prospectively audited while one-hundred consecutive patients undergoing septoplasty in the year 2000 were studied retrospectively. Data collected include demographics, type of operation and duration of hospital stay. Excel and SPSS were used for data collection and analysis.

Results: In the year 2000, the average age of the patients was 40.6 years. There were 37 females and 63 males. One patient returned home the same day, 22 stayed one night, 69 spent two nights and 8 stayed more than two nights in hospital for their operation. The average length of stay was 1.84 nights. In 2010, the average age of patients was 37.86 years, with 31 patients being female and 69 male. All patients in this cohort received SPF packing postoperatively. Seventy-three patients went home the same day, 24 patients stayed one night and 3 patients spent two nights in hospital for their operation. Average length of hospital stay was 0.3 nights. Results were statistically significant ($p < 0.001$).

Conclusion: SPF was a useful nasal packing option after septoplasty and inferior turbinate surgery, which enabled the surgeons to carry out this surgery safely as a day-case procedure.

Key Words: *Biodegradable polyurethane foam. Nasal packing. Septoplasty. Hospital stay.*

INTRODUCTION

Septoplasty is a commonly performed procedure by otolaryngologists and is usually indicated when the patient is symptomatic either as a direct result of the septal deviation, or for the purpose of surgical access.¹

Depending on the surgeon's preference patients undergoing septoplasty may receive some intranasal packing, which usually requires removal on post-operative day 1. The aim of intranasal packing is preventative in terms of haemorrhage, formation of septal haematomas and postoperative adhesions.² Its use and removal is, however, a source of major patient discomfort and complications in itself such as bleeding and excessive lacrimation.³

As some conflicting literature also exists, demonstrating no or only a small increase in postoperative complications when no packing is employed, some surgeons avoid nasal packing completely following nasal surgery.^{3,4} Nevertheless, with no nasal packing, postoperative bleeding can delay patients' discharge from the hospital and generate significant anxiety and distress for the patient as well as the surgeon.

A compromise, where the discomfort of pack removal is reduced yet maintaining an acceptable level of patient safety, was the introduction of biodegradable absorbable packing, such as SPF. It was first introduced in 2003.⁵ It is a fully biodegradable synthetic polyurethane foam, which is reabsorbed by the body within a few days.^{5,6} In theory, the use of such packing could be a contributing factor to the increasing incidence of septoplasty being performed as a day-case operation in the United Kingdom.⁷

The aim of this study was to evaluate if the biodegradable nasal packing synthetic polyurethane foam (SPF) would help us to carry out septoplasty as a day case.

METHODOLOGY

This study retrospectively compared 100 consecutive patients undergoing septoplasty in January 2000 to January 2001 at Aberdeen Royal Infirmary, a tertiary

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care facility, and 100 consecutive patients undergoing septoplasty from February 2010 to October 2011. The primary outcome measure employed was duration of hospital stay - total duration and duration of stay after the operation. As it was a practice audit, no formal ethical approval was required.

One hundred consecutive patients from both years undergoing a septoplasty with or without additional turbinate manipulation were included in the study. Exclusion criteria included any patient who simultaneously underwent other operations such as functional endoscopic sinus surgery, polypectomy or rhinoplasty combined with septoplasty. Additionally, for the 2010/2011 cohort, patients receiving no packing or nasal packing other than SPF were also excluded.

It was used to be the departmental policy to admit the patients to the hospital one night before the operation to carry out pre-operative assessment and to perform necessary investigations like routine blood tests and electrocardiogram (ECG). The patients were kept in the ward for at least 24 hours after the septoplasty because of their non-biodegradable nasal packing.

A change in this policy was introduced 3 years ago whereby majority of the patients were admitted to the ward on the morning of their operation and they were encouraged to go home 4-6 hours after the operation provided it was safe to do so. This change in practice was partly made possible because of the introduction of the pre-operative assessment in a nurse-led pre-assessment clinic where necessary investigations could be performed prior to admission of the patient for surgery.

The revised discharge criteria were as follows: all patients after septoplasty were eligible for same day discharge provided there was some family member available to take the patient home; there was some one at home to look after the patient for the next 24 hours; the patient was feeling comfortable at the time of discharge; there were no concerns by the doctors or nurses by the time the patient was ready for discharge from the ward and the patient was not living on a island.

Patients from the year 2000 (Group A) and 2010/2011 (Group B) who had undergone the operation in question were identified from theatre log books in the relevant ENT-theatres at Aberdeen Royal Infirmary. Additional information was then collected from electronic hospital databases and included: gender, age, area of residence, type of operation like septoplasty alone versus septoplasty with inferior turbinate intervention and duration of stay was recorded in days.

The data was collected using Microsoft Excel and SPSS version 17 for Windows for descriptive statistics. The mean values were calculated for age along with standard deviation. The duration of stay were presented

as median and interquartile range. The duration of stay between the two groups were compared by using Mann-Whitney test and a p-value < 0.05 was regarded as significant.

RESULTS

For group A, in the year 2000, the average age of the patients was 40.6 ± 14.903 years (range = 15 - 78 years, 95% CI 37.64 to 43.56). There were 37 females versus 63 males. Only one patient in that group returned home the same day, 22 stayed one night, 69 spent two nights and the remaining 8 stayed more than two nights in hospital for their operation. The average length of stay was 1.84 nights (range = 0 - 3 days, 95% CI 1.73 to 1.95).

Two factors led to increase in length of hospital stay: non-degradable nasal packing and geographical reasons, islanders stayed the longest in the hospital for obvious reasons. In this group, 54 patients had septoplasty alone and 46 had simultaneous reduction (mainly trimming) of the inferior turbinates. Patients received a variety of nasal packs including Meroceel, Telfa and Glove finger packs which needed removal at least 24 hours after the operation (Table I).

For group B, in the year 2010/2011, the average age of the patients was 37.86 ± 15.159 years (range = 15 - 86 years, 95% CI 34.85 to 40.87). There were 31 females versus 69 male patients. All patients in this cohort had SPF packing postoperatively. Seventy three (73%) patients went home the same day, 24 patients stayed one night and 3 patients spent two nights in hospital for their operation. No patients stayed longer than two nights. The average length of stay was three nights (range = 0 - 2 days, 95% CI 0.20 to 0.40) in hospital. In group B, 4 patients had septoplasty alone and 96 patients had some additional reduction of the inferior turbinate, mainly outfracture of the inferior turbinate (80 patients).

Table I: Demographics and duration of stay.

	Cohort A (year 2000)	Cohort B (year 2010)
Total number of patients	100	100
Males	63 (63%)	69 (69%)
Females	37 (37%)	31 (31%)
Average age (years)	40.6 (SD 14.903)	37.86 (SD 15.159)
Total stay (nights)		
0	1 (1%)	73 (73%)
1	22 (22%)	24 (24%)
2	69 (69%)	3 (3%)
2+	8 (8%)	0 (0%)
Median (IQR)*	2 (0)	0 (1)
Postoperative stay (nights)		
0	3 (3%)	76 (76%)
1	90 (90%)	24 (24%)
2	7 (7%)	0

* p-value was = 0.000 < 0.05 as calculated by the Mann-Whitney U test.

In group A, patients were usually admitted a night before the operation and the nasal packs inserted intra-operatively were removed 24 hours after the operation. Once the nasal packing was removed, the patients were observed in the ward for few hours before being discharged from the hospital. In group A, 7 patients stayed two nights and 90 patients stayed one night in hospital after the operation. Only 3 patients went home the same day after the operation but 2 of them had been admitted the night before the operation. Therefore, only one patient was managed as a day-case for all practical purposes.

In group B, none of the patients stayed for two nights after the operation but 24 patients stayed for one night postsurgery. Out of 24, 3 patients were admitted a night before the operation because they came from another town. The most common reasons for keeping the patient in the ward included: long-journey to get home after the operation; operation carried out in the late afternoon and or patient living alone at home. Seventy six patients (76%) were allowed to go home 5-6 hours after the operation under general anaesthetic. Out of 76, 3 patients were admitted a day before the operation because of geographical reasons.

The duration of stay (expressed as median and interquartile range) between the two groups was compared by using Mann-Whitney test and a p-value < 0.05 was regarded as significant (Table I).

DISCUSSION

Intranasal dressings are increasingly used following endonasal procedures in an attempt to minimise postoperative complications such as haemorrhage, which can delay patient discharge. There is, however, much debate about intra-nasal packing following septal surgery.⁶ The concept of absorbable dressings has emerged attempting to shorten hospital stay yet maintain the reduced risk of primary haemorrhage that traditional intranasal packing offers.

In the UK, there has been an increasing trend to perform most of the otolaryngology surgery as a day-case procedure. At the study centre, the implementation of this approach has been slow because of geographical reasons and because of concerns over patient safety in the early postoperative period. However, the availability of biodegradable nasal packing has encouraged us to send the patient home few hours after they underwent septoplasty. In the study department, it used to be the standard of care to pack the nose with some non-biodegradable nasal packing like Merocel to prevent postoperative bleeding and haematoma formation after septoplasty. This permanent nasal packing was removed after 24 hours and the patients were kept in the hospital for the same duration because of this nasal packing. With increasing pressures to carry out

septoplasty as a day-case surgery, the nose was packed bilaterally with SPF and because of its biodegradable nature, the patient did not require to be kept in the hospital for its removal. Once the patients recovered from the general anaesthetic, provided there were no other contraindications, they were allowed to go home.

This study found that use of SPF facilitates day-case septoplasty surgery. This is supported by the fact that 73% of patients in the 2010/2011-cohort (Group B), all receiving the bioabsorbable dressing, were discharged home the same day, compared to 1% in Group A, where patients did not receive SPF. Additionally, 8% of patients in Group A stayed in hospital for more than two nights, i.e. three nights whereas no one in Group B stayed longer than two nights. The 3 patients who stayed for two nights in Group B were all from Orkney (Island) and were admitted one night before the procedure and stayed one night following the operation. However, this was due to geographical reasons rather than medical. Out of the remaining 24 patients spending one night in hospital, 21 out of 24 were admitted on the same day as their operation and stayed the following night, mainly because of geographical reasons or because surgery was performed late on the operating list and they were not ready to be discharged the same evening.

It should, however, be noted that the intention with which the patients were operated upon was different in both cohorts. The patients in Group A were electively admitted and kept longer in the hospital compared to the patients in Group B who underwent surgery with a day-case intention. However, the message is that the patients in Group A were kept in the hospital for at least 24 hours after the operation because of their non-degradable nasal packing which needed to be removed before the patients were discharged home. It has never been the authors' practice to send the patients home with nasal packing and to bring them back to the hospital in 24 - 48 hours only for the removal of the same.

Only four papers had been published on the topic at the time of literature search for this discussion.⁸⁻¹¹ Of those four papers, three applied to human subjects and none addressed patients undergoing septoplasty. Three papers assessed this biodegradable nasal packing in patients undergoing endoscopic sinus surgery. None used duration of hospital stay as an outcome measure making inter-study comparison difficult. However, over the last one year there have been a number of publications assessing the effectiveness and patients comfort with SPF nasal dressing comparing it with other available nasal packing materials.¹²⁻¹⁷

A study by Côté and Wright concluded that, in their 19 subjects,⁹ SPF achieved statistically significant better healing results in the early postoperative stages in terms of crusting, secretions and scarring. Conflicting evidence provided by Shoman *et al.*,¹⁰ comprising 30 patients,

suggested that when compared to traditional non-degradable packing, such as Merocel, patients did not report a significant reduction in bleeding or discomfort. Wound healing was also at a slight disadvantage in the SPF cohort for the first 3 months following the intervention. Both these findings must, however, be interpreted with caution as the population samples are very small. Another study retrospectively audited 626 patients and compared vaseline gauze dressing with Merocel and SPF in terms of synechia formation and excessive granulation tissue formation following endoscopic sinus surgery.⁸ No significant intergroup differences on the formation of synechia in the middle meatus and postoperative haemorrhage were noted.

The strengths of this study are its objective outcome measures and the fact that it is the first to address the use of SPF in combination with septoplasty. An outcome measure of hospital stay also allows for additional data to be extrapolated, including cost-effectiveness and cost-saving measures, which in the current economic climate, is essential. The study sample of 200 patients is one of the larger numbers to-date in a similar study.

The limitations of the study include only considering duration of stay as a measure of effectiveness and not comparing patient discomfort or taking long-term effects of the packing into account.

Areas where research is lacking include the need for more extensive randomised controlled trials with larger population samples and defining long-term consequences of SPF use compared to other techniques of haemostasis.

CONCLUSION

Biodegradable synthetic polyurethane foam (SPF) is a useful intranasal dressing and has successfully demonstrated its efficacy in terms of postoperative haemostasis. Using SPF, we were able to carry out septoplasty safely as a day-case procedure which helped to minimize the patients stay in hospital. Most importantly, the patients avoided the trauma of nasal pack removal. However, further research is required to clarify any long-term effects of its use.

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