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# Comparative Evaluation of Gelfoam and Merocel Nasal Packing Following Septoplasty: A Prospective Randomized Comparative Study.

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## Abstract

***Background:*** Septoplasty is one of the most frequently performed procedures in otorhinolaryngology for the correction of symptomatic deviated nasal septum (DNS). Although advances in surgical techniques have improved postoperative outcomes, optimal postoperative management remains an important determinant of surgical success and patient comfort. Nasal packing continues to be widely used after septoplasty to provide hemostasis, stabilize the nasal septum, prevent septal hematoma, and support mucoperichondrial flap healing. However, conventional non-absorbable packing materials are often associated with significant postoperative pain, discomfort, and bleeding during pack removal. Absorbable materials such as Gelfoam have been introduced to overcome these limitations while maintaining adequate hemostatic efficacy. Previous studies comparing absorbable and non-absorbable nasal packing materials have reported inconsistent findings regarding postoperative pain, bleeding, healing, and patient satisfaction.[1-13] ***Objective:*** To compare the effectiveness of absorbable Gelfoam and non-absorbable Merocel nasal packing following septoplasty with respect to postoperative pain, bleeding, patient satisfaction, requirement for additional intervention, and overall clinical outcome. ***Methods:*** A prospective randomized comparative study was conducted in the Department of Otorhinolaryngology at KIMS Hospital involving 98 patients undergoing elective septoplasty. Participants were randomly allocated into two equal groups receiving either Gelfoam (n = 49) or Merocel (n = 49) nasal packing. Baseline demographic and clinical characteristics were comparable between groups. The primary outcome was postoperative pain measured using the Visual Analog Scale (VAS). Secondary outcomes included postoperative bleeding, requirement for repacking or additional medication, patient satisfaction, and overall clinical outcome. Statistical analysis was performed using IBM SPSS Statistics Version 21. Continuous variables were compared using the independent Student's t-test, while categorical variables were analyzed using the Chi-square test or Fisher's exact test where appropriate. A p value <0.05 was considered statistically significant. ***Results:*** Ninety-eight patients completed the study. Baseline demographic and clinical characteristics were comparable between the two groups. Patients receiving Gelfoam experienced significantly lower pain immediately after surgery compared with those receiving Merocel (VAS score: 4.22 ± 1.26 vs. 5.63 ± 1.80; p < 0.001). Pain scores during subsequent postoperative assessments were comparable. No statistically significant differences were observed in postoperative bleeding, although Merocel demonstrated a trend toward superior immediate hemostasis, whereas Gelfoam appeared to provide better bleeding control by postoperative Day 2. Patient satisfaction scores were similar between groups (6.29 ± 1.51 vs. 6.65 ± 1.59; p = 0.244). Good-to-excellent clinical outcomes were achieved in 83.7% of patients receiving Gelfoam and 89.5% receiving Merocel. ***Conclusion:*** Both Gelfoam and Merocel are effective nasal packing materials following septoplasty. Gelfoam significantly reduces immediate postoperative pain while providing hemostatic efficacy comparable to Merocel. Since overall clinical outcomes and patient satisfaction were similar, the choice of nasal packing material should be individualized according to patient characteristics, intraoperative findings, surgeon preference, and anticipated postoperative requirements.

**Keywords:** Septoplasty, Deviated Nasal Septum, Gelfoam, Merocel, Nasal Packing, Postoperative Pain, Hemostasis.

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## INTRODUCTION

Septoplasty is among the most commonly performed surgical procedures in otorhinolaryngology for the correction of symptomatic deviated nasal septum (DNS). The principal objectives of surgery are to restore nasal patency, improve airflow, relieve nasal obstruction, and enhance overall quality of life. Successful septoplasty not only corrects anatomical deformity but also improves sinonasal physiology and patient-reported functional outcomes.[14-16]

Postoperative management plays a critical role in determining the success of septoplasty. Despite refinements in surgical techniques, postoperative bleeding, septal hematoma, synechiae formation, and instability of the septal flaps remain important concerns. Consequently, nasal packing has traditionally been employed to provide mechanical support to the corrected septum, control postoperative hemorrhage, eliminate dead space between mucoperichondrial flaps, and reduce the risk of hematoma formation.[1,4,17,18]

Although nasal packing has long been considered standard practice, its routine use has become increasingly controversial. Several randomized controlled trials and systematic reviews have questioned whether routine packing is necessary after uncomplicated septoplasty, citing increased postoperative discomfort, impaired nasal breathing, sleep disturbance, anxiety, mucosal trauma, infection, and pain during pack removal.[1-6] Nevertheless, many surgeons continue to advocate selective nasal packing in patients with significant intraoperative bleeding, extensive septal reconstruction, or increased risk of postoperative hemorrhage.

An ideal nasal packing material should provide effective hemostasis while minimizing patient discomfort, tissue trauma, infection, and postoperative complications. It should also maintain septal stability without interfering with mucosal healing or nasal ventilation.[4,17,9,20] Numerous packing materials have therefore been developed, broadly classified into absorbable and non-absorbable materials.

Merocel, a compressed polyvinyl acetate sponge, remains one of the most widely used non-absorbable nasal packing materials because of its excellent mechanical tamponade and ability to provide firm septal support. Following hydration, the sponge expands uniformly, producing sustained pressure against the nasal mucosa and effectively controlling postoperative bleeding. However, the expansion of the material and the requirement for pack removal frequently result in significant postoperative pain, mucosal trauma, anxiety, and secondary bleeding.[4,7-13,19,20]

Gelfoam is an absorbable porous gelatin sponge that acts by promoting platelet aggregation and stabilization of the fibrin clot while gradually undergoing enzymatic absorption. Because it does not require removal, Gelfoam minimizes mucosal manipulation during the postoperative period and has the potential to improve patient comfort without compromising hemostatic efficacy.[10,21]

Several randomized studies have compared absorbable and non-absorbable nasal packing materials following septoplasty. Although most investigators have reported lower postoperative pain with absorbable materials, findings regarding postoperative bleeding, patient satisfaction, wound healing, and overall clinical outcomes remain inconsistent.[7-13,22,23] Furthermore, differences in study design, outcome measures, follow-up duration, and packing techniques have limited the generalizability of previous findings.

Given these inconsistencies, the present prospective randomized comparative study was undertaken to compare Gelfoam and Merocel as postoperative nasal packing materials following septoplasty. The study aimed to evaluate postoperative pain, bleeding, patient satisfaction, need for additional intervention, and overall clinical outcomes in order to provide evidence-based guidance for selecting the most appropriate nasal packing material in routine clinical practice.

## MATERIALS AND METHODS

### Study Design and Setting

This prospective, parallel-group, randomized comparative study was conducted in the Department of Otorhinolaryngology, KIMS Hospital, after obtaining approval from the Institutional Ethics Committee. The study adhered to the ethical principles outlined in the Declaration of Helsinki and Good Clinical Practice guidelines. All eligible patients provided written informed consent before enrolment.

The study was carried out over the designated study period and included patients undergoing elective septoplasty for symptomatic deviated nasal septum (DNS).

### Study Population

A total of 98 consecutive patients diagnosed with symptomatic DNS and scheduled for elective septoplasty were enrolled in the study. Patients were randomly allocated in a 1:1 ratio into two equal treatment groups:

- Group A (n = 49): Gelfoam nasal packing
- Group B (n = 49): Merocel nasal packing

**Sample Size Calculation**

The sample size was calculated for comparison of two independent means using postoperative Visual Analog Scale (VAS) pain score as the primary outcome measure. Based on previously published studies comparing absorbable and non-absorbable nasal packing materials after septoplasty, an expected mean difference of 0.6 VAS units, a pooled standard deviation of 1.0, a 95% confidence level ($\alpha = 0.05$), and 80% statistical power ($\beta = 0.20$) were assumed.[12-18]
The required sample size was calculated using the following formula:

$$n=(2(Z_{(\alpha/2)}+Z_{\beta})^2 \sigma^2)/d^2$$

Where

- $Z\alpha/2 = 1.96$
- $Z\beta = 0.84$
- $\sigma = 1.0$
- $d = 0.6$

The calculated sample size was 44 participants per group. To compensate for an anticipated 10% loss to follow-up, the sample size was increased to 49 patients per group, giving a total sample size of 98 participants.

**Inclusion Criteria**

Patients fulfilling all of the following criteria were included:

- Age ≥18 years.
- Symptomatic deviated nasal septum requiring elective septoplasty.
- Ability to provide written informed consent.
- Willingness to comply with postoperative follow-up.

**Exclusion Criteria**

Patients meeting any of the following criteria were excluded:

- Previous nasal or septal surgery.
- Acute rhinosinusitis or active nasal infection.
- Coagulation disorders or ongoing anticoagulant therapy.
- Bleeding diathesis.
- Nasal polyposis or sinonasal malignancy.
- Pregnancy.
- Immunocompromised status.
- Inability to complete postoperative assessment.
- Refusal to participate.

Randomization and Allocation Concealment

Eligible patients were randomized using a computer-generated randomization sequence prepared before initiation of the study. Allocation concealment was maintained using sequentially numbered, opaque, sealed envelopes, which were opened only after completion of septoplasty and achievement of satisfactory intraoperative hemostasis. This ensured that allocation remained concealed throughout patient enrolment, thereby minimizing selection bias.

**Blinding**

Because of the obvious physical differences between Gelfoam and Merocel, blinding of the operating surgeon was not feasible. However, postoperative outcome assessment was performed according to standardized protocols to reduce observer bias wherever possible.

**Preoperative Assessment**

All enrolled patients underwent a comprehensive preoperative evaluation before surgical intervention. A detailed medical history was obtained, followed by a thorough general physical examination and complete otorhinolaryngological assessment. Diagnostic nasal endoscopy was performed in all patients to evaluate the nasal cavity, identify the type and extent of septal deviation, and assess associated intranasal pathology. Routine haematological and biochemical investigations were carried out as part of the preoperative workup. All patients underwent a pre-anaesthetic evaluation to determine surgical fitness and assess perioperative risk. Baseline demographic and clinical variables were recorded, including age, sex, body mass index (BMI), duration of symptoms, type of septal deviation, and associated nasal

complaints. These parameters were documented for baseline comparison between the study groups and to assess their potential influence on postoperative outcomes.

**Surgical Technique**

All septoplasty procedures were performed under standardized operative conditions by experienced otorhinolaryngologists using a conventional septoplasty technique. Following administration of anesthesia, infiltration with local anesthetic containing adrenaline was performed to reduce intraoperative bleeding. A hemitransfixion or Killian incision was made according to the surgeon's preference. Bilateral mucoperichondrial flaps were elevated carefully while preserving mucosal integrity. Deviated cartilaginous and bony portions of the septum were corrected, preserving adequate dorsal and caudal struts to maintain structural support. Hemostasis was achieved meticulously before insertion of the allocated nasal packing material.[4,18,24]

**Intervention**

**Group A (Gelfoam)**

Patients randomized to Group A received absorbable Gelfoam® gelatin sponge placed gently along the septal mucosa without excessive compression. The material was left in situ and allowed to undergo spontaneous absorption without routine removal.[10,21]

**Group B (Merocel)**

Patients randomized to Group B received Merocel® polyvinyl acetate nasal packs inserted according to the manufacturer's recommendations to provide mechanical septal support and effective postoperative tamponade. Packs were removed according to the institutional postoperative protocol, usually after 24–48 hours.[4,7-13]

**Postoperative Management**

All patients received standardized postoperative care irrespective of their treatment allocation to ensure uniformity in postoperative management and outcome assessment. The postoperative protocol included administration of intravenous antibiotics, followed by oral antibiotics whenever clinically indicated. Analgesia was provided using non-steroidal anti-inflammatory drugs (NSAIDs) or paracetamol for effective pain control. After removal of the nasal pack, patients were advised to perform saline nasal irrigation to maintain nasal hygiene and promote healing. Standard postoperative instructions were provided, including avoidance of nose blowing, heavy lifting, and nasal trauma during the recovery period. All patients were scheduled for regular outpatient follow-up visits for clinical evaluation, assessment of healing, and monitoring of postoperative outcomes.

**Outcome Measures**

The primary outcome of the study was postoperative pain intensity, which was assessed using a 10-cm Visual Analog Scale (VAS), where a score of 0 indicated no pain and a score of 10 represented the worst imaginable pain. Pain assessment was performed at predefined time points, including postoperative Day 0, postoperative Day 1, postoperative Day 2, during nasal pack removal, and immediately after pack removal.

Secondary outcome measures included assessment of postoperative bleeding, requirement for repacking, need for additional medications, patient satisfaction, and overall clinical outcome. Postoperative bleeding was evaluated using a standardized clinical grading system at postoperative Day 0, Day 1, Day 2, during pack removal, and immediately after pack removal. The requirement for repacking was documented in patients who developed persistent postoperative bleeding requiring additional nasal packing. The need for additional medication was assessed based on the requirement for supplementary analgesics, hemostatic agents, or any other supportive medications beyond the standard postoperative treatment protocol.

Patient satisfaction was evaluated using a 10-point numerical rating scale, with higher scores indicating greater satisfaction with the postoperative experience and treatment outcome. Overall clinical outcome was assessed based on symptom improvement, postoperative recovery, bleeding control, wound healing, and the requirement for additional interventions. The final postoperative outcome was categorized as poor, fair, good, or excellent according to the predefined clinical assessment criteria.

**Statistical Analysis**

Data were entered into Microsoft Excel and analyzed using IBM SPSS Statistics Version 28.0. Continuous variables were tested for normality using the Shapiro–Wilk test. Normally distributed variables were expressed as mean ± standard deviation (SD), whereas categorical variables were summarized as frequency and percentage. Between-group comparisons of continuous variables were performed using the independent Student's t-test. Categorical variables were analyzed using the Chi-square test or Fisher's exact test whenever expected cell counts were less than five. All statistical tests were two-

tailed. A p-value <0.05 was considered statistically significant. Statistical reporting followed recommendations for randomized comparative clinical studies.

## RESULTS

### Study Population

A total of 98 patients with symptomatic deviated nasal septum who underwent elective septoplasty were enrolled in this prospective randomized comparative study. All enrolled participants completed the study and were included in the final analysis. Patients were randomly allocated into two equal groups comprising 49 patients each. Group A received absorbable Gelfoam nasal packing, whereas Group B received conventional Merocel nasal packing. No participant was lost to follow-up, and no protocol deviations occurred during the study.

### Baseline Characteristics

Baseline demographic and clinical characteristics of the two groups are summarized in Table 1. There were no statistically significant differences between the Gelfoam and Merocel groups with respect to age distribution, sex, body mass index (BMI), duration of symptoms, or type of septal deviation (all $p > 0.05$). These findings indicate that randomization resulted in two comparable groups, thereby minimizing baseline confounding and allowing reliable comparison of postoperative outcomes.

**Table 1. Baseline Characteristics of Study Participants**

| Variable | Gelfoam (n=49) | Merocel (n=49) | p value |
|---|---|---|---|
| Age distribution | Comparable | Comparable | 0.18 |
| Male sex | 51.0% | 49.0% | 1.00 |
| Normal BMI | 46.9% | 44.9% | 0.393 |
| Duration of symptoms | Comparable | Comparable | 0.425 |
| Type of septal deviation | Comparable | Comparable | 0.228 |

### Postoperative Pain

Postoperative pain was assessed using the Visual Analog Scale (VAS) at predefined postoperative intervals. The findings are presented in Table 2. Patients in the Gelfoam group experienced significantly lower pain immediately after surgery than those in the Merocel group. On postoperative Day 0, the mean VAS score was $4.22 \pm 1.26$ in the Gelfoam group compared with $5.63 \pm 1.80$ in the Merocel group, representing a statistically significant reduction in pain ($p < 0.001$). During subsequent postoperative assessments, pain scores progressively decreased in both groups. However, no statistically significant differences were observed on postoperative Day 1, postoperative Day 2, during pack removal, or immediately after pack removal ($p > 0.05$ for all comparisons). These findings suggest that the analgesic advantage of Gelfoam was confined primarily to the immediate postoperative period.

**Table 2. Comparison of Postoperative Pain Scores**

| Assessment | Gelfoam | Merocel | p value |
|---|---|---|---|
| Day 0 | $4.22 \pm 1.26$ | $5.63 \pm 1.80$ | <0.001* |
| Day 1 | Comparable | Comparable | 0.668 |
| Day 2 | Comparable | Comparable | 0.118 |
| During pack removal | Comparable | Comparable | 0.267 |
| After pack removal | Comparable | Comparable | >0.05 |
| * Statistically significant | | | |

### Postoperative Bleeding

Postoperative bleeding was evaluated at five predefined time points, including postoperative Days 0, 1, and 2, during pack removal, and immediately following pack removal. The results are summarized in Table 3. No statistically significant differences were observed between the two groups at any assessment point. During the first postoperative day, patients receiving Merocel demonstrated a trend toward better immediate hemostasis compared with those receiving Gelfoam. Conversely, by postoperative Day 2, patients in the Gelfoam group exhibited a tendency toward improved bleeding control, although the difference did not reach statistical significance ($p = 0.06$). Severe bleeding during pack removal occurred in three patients (6.1%) in the Gelfoam group, whereas no cases of severe bleeding were observed in the Merocel group. However, this difference was not statistically significant ($p = 0.18$). Following pack removal, bleeding severity was comparable between both groups. Overall, both nasal packing materials provided satisfactory postoperative haemostasis.

**Table 3. Comparison of Postoperative Bleeding**

| Assessment | Gelfoam | Merocel | p value |
|---|---|---|---|
| Day 0 | Mildly higher bleeding | Better hemostasis | NS |
| Day 1 | Comparable | Comparable | NS |
| Day 2 | Trend toward better control | Comparable | 0.06 |
| During pack removal | Severe bleeding 6.1% | Severe bleeding 0% | 0.18 |
| After pack removal | Comparable | Comparable | NS |
| **NS = Not statistically significant** | | | |

**Requirement for Additional Intervention**

The need for additional postoperative intervention was low in both treatment groups and is summarized in Table 4. Repacking because of postoperative bleeding was required in three patients (6.1%) in the Gelfoam group compared with one patient (2.0%) in the Merocel group. The difference was not statistically significant (p = 0.61). Similarly, additional postoperative medication beyond the standard treatment protocol was required in 18.4% of patients receiving Gelfoam and 10.2% of patients receiving Merocel. This difference also failed to reach statistical significance (p = 0.38). These findings indicate that both nasal packing materials provided satisfactory postoperative stability with only a small proportion of patients requiring additional intervention.

**Table 4. Requirement for Additional Intervention**

| Variable | Gelfoam (n=49) | Merocel (n=49) | p value |
|---|---|---|---|
| Repacking required | 6.1% | 2.0% | 0.61 |
| Additional medication | 18.4% | 10.2% | 0.38 |

**Patient Satisfaction**

Overall patient satisfaction scores are shown in **Table 5**.

The mean satisfaction score was 6.29 ± 1.51 in the Gelfoam group and 6.65 ± 1.59 in the Merocel group. The observed difference was not statistically significant (p = 0.244).

Although patients treated with Gelfoam reported less immediate postoperative pain, this benefit did not translate into significantly higher overall satisfaction.

**Table 5. Patient Satisfaction**

| Variable | Gelfoam | Merocel | p value |
|---|---|---|---|
| Satisfaction score | 6.29 ± 1.51 | 6.65 ± 1.59 | 0.244 |

**Overall Clinical Outcome**

Overall clinical outcomes following septoplasty are presented in Table 6.

Most patients in both treatment groups achieved good or excellent postoperative outcomes. Favorable outcomes were observed in 83.7% of patients receiving Gelfoam and 89.5% of those receiving Merocel.

The difference between groups was not statistically significant (p = 0.61), indicating comparable overall effectiveness of both absorbable and non-absorbable nasal packing materials following septoplasty.

**Table 6. Overall Clinical Outcome**

| Outcome | Gelfoam | Merocel | p value |
|---|---|---|---|
| Good/Excellent | 83.7% | 89.5% | 0.61 |

**Summary of Results**

Among 98 patients undergoing septoplasty, both Gelfoam and Merocel demonstrated comparable efficacy in terms of postoperative bleeding, need for additional intervention, patient satisfaction, and overall clinical outcome. The principal difference between the two interventions was a significant reduction in immediate postoperative pain among patients receiving Gelfoam, whereas Merocel demonstrated a non-significant trend toward superior immediate mechanical hemostasis. Overall, both packing materials proved safe and effective for routine postoperative management following septoplasty.

## DISCUSSION

The present prospective randomized comparative study evaluated the clinical performance of absorbable Gelfoam and non-absorbable Merocel nasal packing following septoplasty. The principal findings of the study were that Gelfoam significantly reduced immediate postoperative pain while providing postoperative bleeding control, patient satisfaction,

and overall clinical outcomes comparable to those achieved with Merocel. These findings suggest that both packing materials are clinically effective, with the main difference being improved early postoperative comfort associated with absorbable packing. Successful randomization produced two well-balanced treatment groups with no statistically significant differences in baseline characteristics, including age, sex, body mass index, duration of symptoms, and type of septal deviation. This comparability minimizes the influence of baseline confounding and strengthens the internal validity of the study.

The most important finding of the present study was the significantly lower postoperative pain experienced by patients in the Gelfoam group immediately after surgery. Patients receiving Gelfoam reported significantly lower Visual Analog Scale (VAS) scores on postoperative Day 0 than those receiving Merocel. This finding is consistent with several previous randomized studies demonstrating that absorbable nasal packing materials are associated with reduced postoperative discomfort compared with conventional polyvinyl acetate packs.[7-13,2,23] The improved comfort is likely attributable to the soft, absorbable nature of gelatin sponge, which conforms to the nasal cavity without exerting prolonged mechanical pressure and does not require traumatic removal. Comparable observations have been reported in prospective randomized studies evaluating gelatin-based hemostatic sponges, which demonstrated significantly lower pain scores and greater patient comfort than Merocel while maintaining satisfactory hemostatic efficacy.

Although Gelfoam significantly reduced immediate postoperative pain, this advantage did not persist during subsequent follow-up. Pain scores became comparable from postoperative Day 1 onward, suggesting that factors such as tissue edema, local inflammatory response, wound healing, and individual pain perception become more influential after the immediate postoperative period. Similar temporal patterns have been reported in previous comparative studies evaluating absorbable nasal packing materials, where early pain reduction did not necessarily translate into sustained long-term differences.[8-13,22,23]

Postoperative bleeding remains one of the principal concerns following septoplasty because inadequate hemostasis may result in septal hematoma, airway obstruction, delayed recovery, and the need for additional intervention. In the present study, no statistically significant difference in postoperative bleeding was observed between the two groups. Although Merocel demonstrated a trend toward better immediate mechanical tamponade during the first postoperative day, Gelfoam appeared to provide slightly better bleeding control by postoperative Day 2. Overall, both materials achieved satisfactory postoperative hemostasis. These findings are in agreement with randomized clinical trials and systematic reviews reporting that absorbable gelatin sponges provide hemostatic efficacy comparable with conventional Merocel while improving patient comfort.[1,2,7-13,22,23]. The requirement for additional intervention was low in both treatment groups. Repacking and the need for additional postoperative medication occurred infrequently and did not differ significantly between groups. These observations indicate that both Gelfoam and Merocel provide adequate postoperative stability after routine septoplasty. Similar findings have been reported in comparative studies demonstrating low rates of postoperative hemorrhage, septal hematoma, and revision intervention regardless of the packing material used.[7-13]

Patient satisfaction represents an important patient-reported outcome following septoplasty because it reflects the overall surgical experience rather than a single postoperative symptom. Despite significantly lower immediate pain scores in the Gelfoam group, overall satisfaction scores were comparable between the two groups. This observation suggests that patient satisfaction following septoplasty is influenced by multiple factors, including relief of nasal obstruction, postoperative breathing, wound healing, communication with the treating surgeon, and overall expectations, rather than postoperative pain alone. Similar findings have been reported by previous investigators evaluating absorbable nasal packing materials.[9-13,22,23]. Overall clinical outcomes were favorable in both groups, with more than four-fifths of patients achieving good-to-excellent postoperative results. No statistically significant difference was observed between Gelfoam and Merocel with respect to overall clinical success. These findings indicate that both absorbable and non-absorbable nasal packing materials can be safely used following septoplasty without compromising surgical outcomes. Contemporary reviews similarly conclude that no single packing material has demonstrated universal superiority across all clinically relevant outcomes, and that selection should be individualized according to the clinical scenario and surgeon preference.[1,2,18,25,26]

From a clinical perspective, the present findings support the selective use of absorbable nasal packing in patients where postoperative comfort is a priority, particularly in ambulatory or day-care septoplasty. Avoidance of painful pack removal may improve the immediate postoperative experience without adversely affecting hemostasis or surgical success. Conversely, Merocel remains an appropriate option in patients in whom firm mechanical tamponade is considered desirable because of extensive mucosal dissection or increased intraoperative bleeding. Current evidence therefore supports an individualized rather than routine approach to postoperative nasal packing.[1,2,18,25,26]

The strengths of the present study include its prospective randomized design, balanced treatment allocation, standardized operative technique, and comprehensive evaluation of clinically relevant postoperative outcomes. Nevertheless, several

limitations should be acknowledged. The study was conducted at a single tertiary care center with a relatively modest sample size, which may have limited the statistical power to detect small differences in secondary outcomes. Follow-up was confined to the early postoperative period, precluding evaluation of long-term functional outcomes, adhesion formation, or quality-of-life measures. Furthermore, postoperative pain and satisfaction were assessed using subjective rating scales, and objective assessments such as rhinomanometry or acoustic rhinometry were not performed. In summary, the findings of the present study indicate that both Gelfoam and Merocel are effective nasal packing materials following septoplasty. Gelfoam offers a clinically meaningful reduction in immediate postoperative pain while maintaining postoperative bleeding control and overall surgical outcomes comparable with those of Merocel. Therefore, the choice of nasal packing material should be guided by patient-specific factors, intraoperative findings, surgeon experience, and institutional protocols rather than by any single outcome measure alone.

**Clinical Implications**

The results of this study support an individualized approach to postoperative nasal packing following septoplasty. Gelfoam may be advantageous in patients where postoperative comfort is prioritized because of significantly lower immediate postoperative pain. Merocel remains an effective option for achieving immediate mechanical haemostasis and maintaining septal support. Both materials demonstrated comparable patient satisfaction and overall clinical outcomes, indicating that either can be safely incorporated into routine clinical practice. Future multicentre randomized controlled trials with larger sample sizes, longer follow-up periods, objective nasal airflow assessment, validated quality-of-life instruments, and cost-effectiveness analyses would further strengthen the evidence regarding optimal postoperative nasal packing strategies.

**Strengths of the Study**

The present study has several important strengths. It was designed as a prospective randomized comparative study, thereby minimizing selection bias and improving the reliability of the findings. Equal allocation of participants into the Gelfoam and Merocel groups ensured balanced comparison between the two interventions. All septoplasty procedures were performed using a standardized surgical technique by experienced otorhinolaryngologists, and postoperative care and assessment protocols were uniform across both groups, reducing procedural variability. Furthermore, the study comprehensively evaluated multiple clinically relevant postoperative outcomes, including pain intensity, postoperative bleeding, need for repacking, additional analgesic requirements, patient satisfaction, and overall clinical outcome. The direct comparison between an absorbable nasal packing material (Gelfoam) and a conventional non-absorbable packing material (Merocel) enhances the clinical applicability of the findings and provides evidence to guide routine postoperative management following septoplasty.

**Limitations**

Despite its strengths, the study has certain limitations. Being a single-center study, the findings may not be fully generalizable to other healthcare settings or patient populations. The sample size, although adequately powered for the primary outcome, was relatively moderate and may have limited the ability to detect smaller differences in secondary outcomes. The postoperative follow-up was confined to the early recovery period, precluding assessment of long-term functional outcomes and delayed complications. In addition, postoperative pain and patient satisfaction were assessed using subjective measures, which may be influenced by individual pain thresholds and personal perceptions. Finally, objective assessments of nasal airflow, such as rhinomanometry or acoustic rhinometry, and long-term evaluation of nasal function and quality of life were not included, limiting the comprehensive assessment of postoperative functional outcomes.

## CONCLUSION

This prospective randomized comparative study demonstrated that both Gelfoam and Merocel are effective nasal packing materials following septoplasty. Gelfoam was associated with significantly lower immediate postoperative pain, whereas Merocel showed a trend toward improved early mechanical hemostasis. However, postoperative bleeding, patient satisfaction, additional intervention, and overall clinical outcomes were comparable between the two groups. These findings suggest that the choice of nasal packing material should be individualized according to patient characteristics, intraoperative findings, surgeon preference, and institutional protocols rather than based on a single outcome measure. Further multicenter studies with larger cohorts and long-term follow-up are recommended to establish evidence-based guidelines for postoperative nasal packing after septoplasty.

**Ethics Approval**

The study was approved by the Institutional Ethics Committee of KIMS Hospital prior to commencement. All procedures were performed in accordance with the ethical standards of the institutional committee and the Declaration of Helsinki.

**Informed Consent**

Written informed consent was obtained from all participants before enrolment in the study.

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**Conflict of Interest**

The authors declare that they have no competing interests.

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