Challenge Journal of PERIOPERATIVE MEDICINE

Research Article

The effect of hemovac drain use on postoperative pain and patient satisfaction in primary aesthetic breast augmentation: A retrospective comparative study

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ABSTRACT

Background: This study aimed to evaluate the effect of hemovac drain use on postoperative pain and patient satisfaction in patients undergoing primary aesthetic breast augmentation.

Materials and Methods: This retrospective single-centre study included 53 patients who underwent bilateral primary aesthetic breast augmentation between January 2024 and May 2026. Patients were divided into non-drain (n=41) and hemovac drain (n=12) groups. Postoperative pain was assessed using the Numeric Rating Scale (NRS). Long-term outcomes were analysed using the Utrecht Questionnaire (UQ), adapted for breast augmentation patients, and overall satisfaction scores.

Results: The groups were comparable in terms of age, implant volume, body weight, and body mass index (all p>0.05). On postoperative day 1, right- and left-sided NRS scores were significantly higher in the hemovac drain group [right: 8.5 (8–9) vs 5 (4.5–7); left: 8 (8–9) vs 5 (5–7); both p<0.001]. However, no significant differences were observed between the groups regarding postoperative week 1 and month 1 NRS scores. UQ scores were similar between the groups at postoperative months 1 and 6 (p=0.225 and p=0.909, respectively). Although the overall satisfaction score was numerically higher in the non-drain group, the difference did not reach statistical significance [8 (7–9) vs 7 (7–8); p=0.087].

Conclusion: Patients with hemovac drains demonstrated higher early postoperative pain scores; however, this difference did not persist during subsequent follow-up evaluations. No significant differences were observed between the groups regarding long-term pain outcomes, UQ scores, or overall patient satisfaction. These findings support a selective rather than routine use of drains in primary aesthetic breast augmentation.

ARTICLE INFO

Article history:
Received – May 14, 2026
Revision requested – June 6, 2026
Revision received – June 11, 2026
Accepted – June 17, 2026

Keywords:
Breast augmentation
Hemovac drain
Numeric rating scale
Postoperative pain
Patient satisfaction
Utrecht questionnaire

Citation: Sönmez A, Ocak M, Kökten AC, Aykaç C, Tanal SE, Karamüdüroğlu ŞN, Düzköylü G, Tuncel U. The effect of hemovac drain use on postoperative pain and patient satisfaction in primary aesthetic breast augmentation: A retrospective comparative study. *Chall J Perioper Med.* **2026**;4(2):53–58.

1. Introduction

Breast augmentation is one of the most commonly performed aesthetic surgical procedures worldwide. Despite significant advancements in surgical techniques and implant technology, early postoperative pain management, prevention of seroma/hematoma formation, and optimisation of patient satisfaction remain among the primary clinical objectives [1].

Although the incidence of hematoma and seroma remains relatively low, ranging from 1–3% in most series, hematomas developing particularly within the first 24

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ISSN: 2980-292X / DOI: https://doi.org/10.20528/cjpm.2026.02.002

hours postoperatively may negatively affect infection risk, capsular contracture rates, and final cosmetic outcomes [2]. To prevent these complications, hemovac drains have been widely used to drain fluid from the implant pocket. However, the clinical benefit of routine drain use in primary breast augmentation remains controversial in the literature [3]. Systematic reviews have emphasised the limited availability of high-quality evidence on augmentation-specific procedures and reported no clear superiority of routine drain use, even in other areas of breast surgery [3].

The value of routine drain placement following primary aesthetic breast augmentation continues to be debated in contemporary practice. Supporters of drain use suggest that evacuation of postoperative fluid collections may help minimise hematoma and seroma formation while also allowing earlier recognition of bleeding-related complications (1,2). In contrast, concerns have been raised regarding patient discomfort, drain-related pain, infection risk, and the uncertain benefit of drains in otherwise uncomplicated augmentation procedures [1,4]. Despite numerous publications addressing this topic, augmentation-specific evidence remains limited and available studies have produced inconsistent conclusions, making it difficult to formulate universally accepted recommendations [1,4]. As a result, the role of routine drain use in primary breast augmentation surgery remains unresolved.

The Utrecht Questionnaire (UQ) was initially introduced in 2009 and later underwent validation studies in 2013. Previous research has primarily employed this instrument to evaluate patient-reported outcomes following rhinoplasty procedures [5]. To our knowledge, its application in aesthetic breast augmentation has not been previously reported. Therefore, in the present study, the questionnaire was modified for use in breast augmentation patients and incorporated into the postoperative assessment process. In addition, postoperative pain intensity was evaluated using the Numeric Rating Scale (NRS), a practical and widely accepted instrument for quantifying subjective pain severity [6]. Owing to its simplicity, reliability, and ease of administration, the NRS has become one of the most frequently utilised tools for pain assessment in both clinical practice and research settings [7].

This study aimed to compare postoperative pain levels using the NRS between patients undergoing primary aesthetic breast augmentation with and without intraoperative hemovac drain placement, and to analyse overall postoperative patient satisfaction, together with outcomes from the breast augmentation-adapted UQ.

2. Materials and Methods

This retrospective, single-centre clinical study reviewed the medical records of patients who underwent bilateral primary aesthetic breast augmentation at our institution between January 2024 and May 2026. This study was approved by the ethics committee of Samsun University Clinical Research Ethics Committee (Approval Number: 2026/8/32; Date: May 06, 2026). This study was conducted in accordance with the ethical principles of the Declaration of Helsinki and its 2013 revision.

2.1. Study design and patient selection

The study population consisted of female patients who underwent bilateral silicone breast implant placement for aesthetic purposes at our clinic. In our institution, hemovac drain placement represents one of the postoperative approaches routinely utilised following breast augmentation surgery. The decision to use a drain was based on intraoperative assessments performed according to standard clinical procedures and the surgeon's clinical judgment. Patient data were retrospectively obtained from medical records and the FONET hospital information management system (FONET Information Technologies inc., Türkiye). All patients meeting the study criteria within the specified study period were included, and no randomisation was performed.

2.2. Inclusion criteria

- Female patients aged between 18 and 65 years
- Undergoing primary breast augmentation surgery for aesthetic purposes
- Sufficient clinical documentation to allow evaluation of perioperative and follow-up outcomes
- Availability of complete NRS and Utrecht Questionnaire assessment records
- Compliance with the routine postoperative follow-up schedule established by the institution

2.3. Exclusion criteria

- Known coagulation abnormalities or significant systemic illness
- Current immunosuppressive treatment, chronic corticosteroid use, immunodeficiency, or active malignancy
- Absence of essential clinical information or inability to verify follow-up assessments
- Reoperation required because of postoperative complications such as hematoma
- Previous breast surgery or revision augmentation procedures
- Additional surgical interventions performed during the same operative session
- Chronic pain disorders or regular use of analgesic medication

2.4. Data collection and measurements

As part of the study, postoperative pain levels were assessed using the NRS, 0–10 at postoperative day 1, week 1, and month 1 follow-up visits. To evaluate long-term patient satisfaction, the UQ, adapted for breast augmentation patients, was administered at postoperative months 1 and 6. The NRS is a widely used instrument for postoperative pain assessment and provides a quantitative evaluation of subjective pain intensity. The World Health Organisation has also recommended it as one of the guiding tools for assessing analgesic treatment strategies [8]. Patients rate their pain intensity on a scale from 0 to 10, where 0 indicates "no pain" and 10 represents "unbearable/worst possible pain." All NRS and UQ assessments were routinely performed and documented

as part of our institution's standard postoperative follow-up protocol. The outcome data used in this study were retrospectively retrieved from patients' medical records and the hospital information management system. No additional patient contact was required for data collection [9].

UQ is a patient-reported outcome measure used to assess patient satisfaction regarding surgical outcomes. This questionnaire aims to evaluate individuals' subjective perceptions of surgical outcomes systematically and enable comparisons of patient satisfaction across different groups. Patients assess their satisfaction with surgical outcomes using a standardised question format. UQ has been predominantly used in rhinoplasty studies [6]. In the present study, the questionnaire was adapted and applied to patients undergoing breast augmentation surgery. An example of the UQ used in this study is presented in Fig. 1. Lower UQ indicate higher patient satisfaction and fewer breast-related complaints. Overall patient satisfaction was additionally assessed at the postoperative 6-month follow-up visit using a 10-point NRS, where 0 represented complete dissatisfaction, and 10 represented complete satisfaction with the surgical outcome.

The Utrecht Questionnaire for Outcome Assessment in Aesthetic Breast Augmentation

I give the following score to the way I like the appearance of my breast:

0 1 2 3 4 5 6 7 8 9 10

0 (Very ugly) *10 (Very nice)*

Questions	Not at all (1)	A little (2)	Moderate (3)	Much/often (4)	Very much (5)
1. Are you concerned about the appearance of your breast?	[ ]	[ ]	[ ]	[ ]	[ ]
2. Does this concern bother you often?	[ ]	[ ]	[ ]	[ ]	[ ]
3. Does this concern affect your daily life (e.g., your work)?	[ ]	[ ]	[ ]	[ ]	[ ]
4. Does this concern affect your relationships with others?	[ ]	[ ]	[ ]	[ ]	[ ]
5. Do you feel stressed by the appearance of your breast?	[ ]	[ ]	[ ]	[ ]	[ ]

Fig. 1. The revised UQ for breast augmentation patients [10].

2.5. Statistical analysis

Statistical analyses were performed using IBM SPSS Statistics for Windows, Version 25.0 (IBM Corp., Armonk, NY, USA). The normality of continuous variables was assessed using the Shapiro–Wilk test. Variables with normal distribution were analysed using parametric methods, whereas non-normally distributed variables were analysed using non-parametric methods. Continuous variables were expressed as mean ± standard deviation or median (interquartile range [IQR]), whereas categorical variables were presented as frequency and percentage [n (%)]. Group comparisons were performed using the independent-samples *t*-test or the Mann–Whitney *U* test, depending on the data distribution. Categorical variables were analysed using the Pearson chi-square test or Fisher's exact test when appropriate. A two-sided *p*-value of <0.05 was considered statistically significant.

3. Results

A total of 55 patients were initially included in the study, of whom 43 were assigned to the non-drain group and 12 to the hemovac drain group. During the early postoperative period, one patient from each group (3.7%) underwent reoperation due to suspected hematoma formation. Surgical exploration revealed no evidence of a massive hematoma, and the existing implants were preserved following irrigation of the implant pockets. However, these patients were excluded from the final analysis because postoperative pain assessments deviated from the standard follow-up protocol. Consequently, the study was completed with 53 patients: 41 in the non-drain group and 12 in the hemovac drain group. No statistically significant differences were observed between the groups regarding age, implant volume, body weight, or BMI ($p > 0.05$) (Table 1).

On postoperative day 1, right- and left-sided NRS pain scores were significantly higher in the hemovac drain group compared with the non-drain group (right side: 8.5 [8–9] vs 5 [4.5–7], $p < 0.001$; left side: 8 [8–9] vs. 5 [5–7], $p < 0.001$). However, no statistically significant differences were observed between the groups regarding right- and left-sided NRS pain scores at postoperative week 1 and month 1 (all $p > 0.05$). Although higher left-sided NRS pain scores were observed in the hemovac drain group at postoperative week 1, this difference did not reach statistical significance ($p = 0.053$) (Table 1).

Table 1. Baseline demographic characteristics and postoperative pain score comparisons between the drain and non-drain groups.

Variables	No-drain group	Drain group	p value
Age, years*	32.3 ± 6.9	34.6 ± 12.8	0.536
Implant volume, cc*	342.4 ± 29.6	345.8 ± 65.5	0.798
Body weight, kg*	75.9 ± 4.3	76.7 ± 4.4	0.571
Body mass index, kg/m^2*	21.8 ± 1.6	21.1 ± 1.5	0.207
Time point/side			
Postoperative day 1 NRS pain score (0–10) (right)**	5 (4.5–7)	8.5 (8–9)	<0.001
Postoperative day 1 NRS pain score (0–10) (left)**	5 (5–7)	8 (8–9)	<0.001
Postoperative week 1 NRS pain score (0–10) (right)**	2 (1–3)	2 (2–3)	0.782
Postoperative week 1 NRS pain score (0–10) (left)**	2 (1–3)	2 (2–3)	0.053
Postoperative month 1 NRS pain score (0–10) (right)**	0 (0–1)	1 (0–1)	0.279
Postoperative month 1 NRS pain score (0–10) (left)**	0 (0–1)	1 (0–1)	0.253

* median ± standard deviation; ** Median (interquartile range); ***Abbreviations: NRS:Numeric rating scale.

When comparing the total median UQ scores between the groups, the median score at postoperative month 1 was 1 (1–1.5) in the non-drain group and 1.2 (1.0–1.8) in the hemovac drain group (p = 0.225). Similarly, UQ scores at postoperative month 6 were comparable between the groups (1 [1–1] vs 1 [1–1.5], p = 0.909). These findings suggest that the use of hemovac drains did not provide an additional clinical benefit for long-term patient satisfaction or aesthetic outcomes (Table 2).

Analysis of overall patient satisfaction scores demonstrated numerically higher satisfaction levels in the non-drain group; however, the difference did not reach statistical significance (8 [7–9] vs 7 [7–8], p = 0.087) (Table 2).

Table 2. Comparison of Utrecht questionnaire mean scores and overall satisfaction between the drain and non-drain groups.

Variables	No-drain group	Drain group	p value
Median Utrecht questionnaire score at month 1 (1–5)	1 (1–1.5)	1.2 (1.0–1.8)	0.225
Median Utrecht questionnaire score at month 6 (1–5)	1 (1–1)	1 (1–1.5)	0.909
Overall satisfaction score (0–10)	8 (7–9)	7 (7–8)	0.087

Median (interquartile range). Abbreviations: UQ, Utrecht Questionnaire.
Lower UQ scores indicate higher patient satisfaction and fewer breast-related complaints.
Overall satisfaction was assessed at postoperative month 6 using a 10-point Numeric Rating Scale (0 = completely dissatisfied; 10 = completely satisfied).

According to the UQ results, no statistically significant differences were observed between the hemovac drain and non-drain groups regarding questionnaire parameters at postoperative months 1 and 6 (all $p > 0.05$). Although the p-values for Question 2 at postoperative month 1 and Question 1 at postoperative month 6 were close to the threshold of statistical significance, these findings did not reach statistical significance (p = 0.053 and p = 0.051, respectively).

Evaluation of the UQ results at postoperative month 6 demonstrated that the response "none" was reported in the non-drain group by 34 patients (82.9%) for Question 1, 36 patients (87.8%) for Question 2, 37 patients (90.2%) for Question 3, 32 patients (78.0%) for Question 4, and 34 patients (82.9%) for Question 5. In the hemovac drain group, the corresponding numbers were 9 (75.0%), 8 (66.7%), 10 (83.3%), 7 (58.3%), and 10 patients (83.3%), respectively. These findings indicate low complaint levels in both groups, as assessed by the UQ at postoperative month 6.

4. Discussion

In this study, we evaluated the effects of hemovac drain use on early postoperative pain, suspected complications, and patient satisfaction in patients undergoing primary aesthetic breast augmentation. The absence of significant differences between the groups regarding age, implant volume, body weight, and BMI suggests that postoperative outcomes were assessed in comparable patient populations. The most important finding of this study was that NRS pain scores on postoperative day 1 were significantly higher bilaterally in the hemovac drain group. In contrast, no significant differences were observed between the groups in pain scores at postoperative weeks 1 and 1 month. These findings indicate that pain associated with hemovac drain use becomes particularly apparent during the early postoperative period, while this difference gradually diminishes during subsequent follow-up.

Postoperative discomfort associated with drainage systems has previously been described in the breast surgery literature. Woo et al. reported that drain-related symptoms were among the most common sources of postoperative discomfort during recovery following implant-based breast reconstruction procedures [11]. The findings of the present study demonstrate a similar pattern, with significantly greater pain scores observed during the early postoperative period in patients managed with hemovac drains.

Several mechanisms may account for the increased pain observed in the drain group during the first postoperative day. The presence of a drain may create local tissue irritation at the insertion site, contribute to discomfort during upper body movement, and increase awareness of a foreign body during the early healing process. These factors may collectively augment pain perception independent of the surgical procedure itself.

Previous studies have demonstrated that pain following breast augmentation is particularly prominent during the early postoperative period and gradually decreases over time [12]. It should also be noted that postoperative day 1 pain scores were relatively high in both groups. All patients received the same institutional postoperative analgesic regimen; therefore, differences in pain management are unlikely to explain the observed findings. Rather, the higher pain scores observed in the drain group may be attributable to additional mechanical irritation and discomfort associated with drain placement during the early postoperative period. A recent study published in 2025 also reported that patients undergoing breast augmentation with drainage experienced greater pain during the first three postoperative days compared with patients without drainage. In contrast, pain levels significantly decreased during subsequent follow-up [2]. Our findings are consistent with these previous reports.

From a complication standpoint, the necessity of routine drain use in primary breast augmentation remains controversial. Scomacao et al. stated that currently available evidence is insufficient to establish definitive recommendations and emphasised the need for more standardised studies [13]. Similarly, Torresetti et al. and Montemurro et al. highlighted the lack of strong evidence supporting routine use of drains [4]. In our study, one patient in each group underwent reoperation because of suspected hematoma formation; however, no massive hematoma was identified during surgical exploration.

To date, no previous study has evaluated the use of the UQ following breast augmentation surgery. UQ was originally developed to assess aesthetic outcomes and patient perceptions following rhinoplasty [12]. This brief and practical patient-reported outcome measure was adapted in our study to assess patient satisfaction and symptom perception after breast augmentation surgery. In this respect, our study demonstrates a novel aspect. However, the lack of specific validation of the UQ for breast augmentation surgery represents an important methodological limitation. Although the UQ was adapted for use in breast augmentation patients in the present study, it should be noted that the questionnaire was originally developed and validated for rhinoplasty outcomes. Therefore, the psychometric properties, validity, and reliability of this adaptation have not yet been formally established in the breast augmentation population. Future prospective studies are needed to validate this modified version and determine its suitability for assessing patient-reported outcomes following aesthetic breast augmentation.

Although overall satisfaction scores were numerically higher in the non-drain group, this difference did not reach statistical significance. Similarly, no significant differences were observed between the groups regarding UQ scores at postoperative months 1 and 6. Previous studies have reported that scars at the drain insertion site may cause aesthetic concerns in certain patients [14]. However, our findings suggest that drain use does not have a significant impact on long-term patient satisfaction.

Overall, the present results indicate that routine drain placement offers limited advantages with respect to long-term pain outcomes and patient-reported satisfaction. Clinical decisions regarding drain use may therefore be guided by operative findings, anticipated bleeding risk, and surgeon judgment on a case-by-case basis. Therefore, rather than routine use, decisions regarding hemovac drain placement may be more appropriately individualised based on intraoperative bleeding, the extent of tissue dissection, the surgeon's assessment of complication risk, and patient-specific risk factors.

Several considerations should be taken into account when interpreting the present results. The study was based on retrospectively collected data from a single institution, which may limit external applicability. In addition, the unequal distribution of patients between the groups and the relatively small number of individuals receiving drains may have reduced the ability to detect differences in uncommon outcomes. Furthermore, drain placement was determined according to intraoperative assessment and surgeon preference rather than random allocation. Although this approach reflects everyday clinical practice, a degree of selection bias cannot be completely excluded. Finally, while a standardized postoperative analgesic protocol was applied to all patients, individual differences in pain perception may have influenced the reported pain scores.

5. Conclusions

Although higher early postoperative pain scores were observed in patients undergoing primary aesthetic breast augmentation with hemovac drain placement, this difference did not persist at postoperative week 1 and month 1 follow-up evaluations. No significant differences were observed between the drain and non-drain groups regarding long-term patient-reported outcomes or overall patient satisfaction. The findings of this study suggest that drain use should be tailored to individual operative circumstances and patient characteristics instead of being adopted as a routine component of every primary augmentation procedure.

Acknowledgements

None declared.

Funding

The authors received no financial support for the research, authorship, and/or publication of this manuscript.

Conflict of Interest

The authors declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this manuscript.

Data Availability

The datasets generated and/or analyzed during the current study are not publicly available but are available from the corresponding author upon reasonable request.

AI Assistance

AI-based tools, including ChatGPT (OpenAI), were used solely for text refinement and to improve the readability of the manuscript. Grammarly was used for grammar and language checking. No AI-based tool contributed to the study design, data collection, data analysis, interpretation of the results, or scientific conclusions. All scientific content, interpretations, and conclusions remain the sole responsibility of the authors.

Ethics Approval and Consent to Participate

This study was approved by the ethics committee of Samsun University Clinical Research Ethics Committee (Approval Number: 2026/8/32; Date: May 06, 2026). Due to the retrospective design of the study, the requirement for informed consent was waived by the ethics committee. All procedures were conducted in accordance with the Declaration of Helsinki.

Author Contributions

Ayhan Sönmez: *conceptualization, methodology, project administration, supervision, validation, resources, writing – review & editing.*
Metin Ocak: *formal analysis, visualization, writing – original draft, writing – review & editing.*
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Umut Tuncel: *supervision, validation, project administration.*

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