

Operative and Patient-Related Factors Associated with Postoperative Wound Dehiscence Following Umbilical Hernioplasty: A Retrospective Observational Study

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Abstract: Background: Postoperative wound dehiscence is an important complication after umbilical hernioplasty. This study evaluated operative and patient-related factors associated with wound dehiscence within 30 days. Methods: A retrospective observational study was conducted in the Department of General Surgery, Mallareddy Narayana Multispeciality Hospital, Suraram, Hyderabad. Fifteen adults undergoing elective umbilical hernioplasty were included. All patients underwent onlay mesh repair. Data on operative duration, drain duration, closure technique, diabetes mellitus, hypertension, and postoperative wound status were recorded. Associations were assessed using the Mann–Whitney U test for continuous variables and Fisher's exact test for categorical variables. Results: Seven of 15 patients (46.7%) developed postoperative wound dehiscence. Mean operative duration was 91.4 ± 3.8 minutes in the dehiscence group and 86.3 ± 4.4 minutes in the non-dehiscence group (exact Mann–Whitney $p = 0.054$). Drain duration was 4.43 ± 0.53 versus 3.75 ± 0.46 days ($p = 0.072$). Diabetes mellitus was present in 5/7 (71.4%) versus 0/8 (0%) patients (Fisher's exact $p = 0.007$). Hypertension and fascial closure technique were not significantly associated with dehiscence. Conclusion: Wound dehiscence occurred in 46.7% of patients. Diabetes showed a significant association, while operative and drain durations showed non-significant trends. Findings require caution because of the small sample size.

Keywords: Umbilical hernioplasty, Wound gaping, Operative duration, Mesh placement, Wound healing

1. Introduction

Umbilical hernias account for approximately 6–14% of abdominal wall hernias in adults and are increasingly encountered due to rising rates of obesity and metabolic disorders. Surgical repair remains the definitive treatment, with mesh-based hernioplasty demonstrating lower recurrence rates compared to primary suture repair [1,2]. However, wound-related complications remain clinically important after hernia repair. Postoperative wound dehiscence, including separation of wound edges, can delay healing and may require additional wound care or secondary intervention. Factors related to operative technique, duration of surgery, drainage, closure, and patient comorbidity may influence postoperative wound outcomes [3–7].

The available literature has examined wound complications after umbilical and ventral hernia repair, but institutional data specifically evaluating factors associated with wound dehiscence after umbilical hernioplasty remain limited. The present study therefore examines selected operative and patient-related factors using retrospective institutional data.

2. Literature Survey

Umbilical hernia repair is commonly performed using mesh reinforcement, with previous studies reporting lower recurrence rates with mesh repair compared with primary suture repair [1,2]. However, postoperative wound complications remain an important concern following abdominal wall and ventral hernia surgery. Previous studies

have examined several factors that may contribute to wound morbidity, including mesh position, duration of surgery, use and duration of drains, closure technique, and patient-related comorbidities [3–7]. Studies evaluating mesh position have reported differences in wound complications, while research on abdominal wall closure and postoperative drainage has highlighted their potential influence on surgical-site outcomes [3–5]. Patient factors such as diabetes mellitus have also been associated with impaired wound healing and increased postoperative wound complications [6,7].

Despite these findings, the relative contribution of individual operative and patient-related factors to postoperative wound dehiscence following umbilical hernioplasty remains uncertain. In particular, evidence is limited regarding the association of operative duration, drain duration, closure technique, and comorbidities with wound dehiscence in patients undergoing **onlay mesh repair**. Furthermore, the available literature includes heterogeneous patient populations and surgical techniques, making direct comparison with a single institutional cohort difficult. The present study was therefore undertaken to evaluate selected operative and patient-related factors associated with postoperative wound dehiscence within 30 days following elective umbilical hernioplasty in a tertiary-care centre.

3. Problem Definition

Postoperative wound dehiscence remains a relevant complication after umbilical hernioplasty. The present study evaluates whether selected operative and patient-related

factors are associated with wound dehiscence occurring within 30 days of surgery. The recorded variables included mesh placement, duration of surgery, duration of drain placement, closure and suture technique, diabetes mellitus, hypertension, and postoperative wound status.

4. Aim and Objectives

Aim: To evaluate the association between selected operative and patient-related factors and postoperative wound dehiscence following umbilical hernioplasty in a tertiary care centre.

Primary Objective: To determine the proportion of patients developing postoperative wound dehiscence within 30 days following umbilical hernioplasty.

- 1) To assess the association between comorbidities and postoperative wound dehiscence.
- 2) To evaluate the relationship between duration of surgery and postoperative wound dehiscence.
- 3) To analyse the impact of duration of drain placement on postoperative wound dehiscence.
- 4) To study the effect of wound closure and suture technique (continuous versus interrupted) on wound dehiscence.
- 5) To describe wound healing outcomes and the requirement for secondary suturing among patients who developed postoperative wound dehiscence

5. Methodology / Approach

Study Design and Setting: This retrospective observational study was conducted in the Department of General Surgery,

Mallareddy Narayana Multispeciality Hospital, a tertiary care centre.

Study Population: Adult patients (≥ 20 years) who underwent elective umbilical hernioplasty during the study period were included. All 15 patients in the present dataset underwent open onlay mesh repair.

Inclusion Criteria:

- Age ≥ 20 years
- Patients undergoing elective umbilical hernioplasty
- Availability of complete operative and postoperative records
- Minimum follow-up of 30 days

Exclusion Criteria:

- Grossly contaminated or dirty wounds at surgery
- Pre-existing surgical site infection
- Previous mesh infection
- Incomplete records or inadequate follow-up

Primary Outcome: Postoperative wound dehiscence/gaping within 30 days, defined in the study protocol as partial or full-thickness wound separation > 1 cm.

Operative Variables Studied: Mesh placement technique, duration of surgery, duration of drain placement, and type of wound closure and suture technique. All 15 patients underwent onlay mesh repair; therefore, mesh position was descriptive only and could not be compared between groups.

Follow-up and Wound Assessment: Wound assessment data were obtained from postoperative records documented on postoperative days 2, 7, 14, and 30. The primary outcome was wound dehiscence/gaping occurring within 30 days.

Patient-Level Data

Case	Mesh	Surgery (min)	Drain (days)	POD2	POD7	POD14	POD30	Seroma	Dehiscence	2° Suturing	30-d Deh.
1	Onlay	90	4	Mild edema	Clean	Healed	No complication	No	No	No	No
2	Onlay	85	4	Clean	Healthy	Healed	Stable	No	No	No	No
3	Onlay	95	5	Mild serous soakage	Improved	Healed	Stable scar	Mild	Yes	Yes	Yes
4	Onlay	90	5	Mild edema	Healthy	Healed	No recurrence	Mild	Yes	Yes	Yes
5	Onlay	80	3	Clean	Clean	Healed	No recurrence	No	No	No	No
6	Onlay	90	4	Mild edema	Healthy	Healed	Stable scar	No	No	No	No
7	Onlay	85	4	Clean	Clean	Healed	No complication	No	Yes	Yes	Yes
8	Onlay	90	4	Mild edema	Healthy	Healed	Stable	No	No	No	No
9	Onlay	95	4	Mild edema	Clean	Healed	No complication	Mild	Yes	Yes	Yes
10	Onlay	95	5	Mild soakage	Wound gaping	Secondary suturing done	Healed	Mild	Yes	Yes	Yes
11	Onlay	80	3	Clean	Clean	Healed	Stable	No	No	No	No
12	Onlay	90	4	Clean	Mild discharge	Wound gaping	Healed after resuturing	No	Yes	Yes	Yes
13	Onlay	85	4	Clean	Clean	Healed	Healthy scar	No	No	No	No
14	Onlay	90	4	Mild edema	Clean	Healed	No recurrence	No	No	No	No
15	Onlay	90	4	Edema	Discharge	Secondary suturing	Healed	Mild	Yes	Yes	Yes

Comorbidities and Closure Data

Case	Diabetes	Hypertension	Fascial closure	Subcutaneous closure	Skin closure
1	No	No	Interrupted	Vicryl 2-0 interrupted	Ethilon interrupted
2	No	No	Interrupted	Vicryl 2-0 interrupted	Nylon interrupted
3	Yes	Yes	Interrupted	Vicryl 2-0 interrupted	Nylon interrupted
4	Yes	Yes	Interrupted	Vicryl 2-0 interrupted	Nylon interrupted
5	No	No	Continuous	Vicryl 2-0 interrupted	Subcuticular Vicryl
6	No	Yes	Interrupted	Vicryl 2-0 interrupted	Nylon interrupted
7	Yes	Yes	Interrupted	Vicryl 2-0 interrupted	Nylon interrupted
8	No	Yes	Interrupted	Vicryl 2-0 interrupted	Nylon interrupted
9	Yes	No	Interrupted	Vicryl 2-0 interrupted	Nylon interrupted
10	Yes	Yes	Interrupted	Vicryl 2-0 interrupted	Nylon interrupted
11	No	No	Interrupted	Vicryl 2-0 interrupted	Nylon interrupted
12	No	No	Interrupted	Vicryl 2-0 interrupted	Nylon interrupted
13	No	No	Continuous	Vicryl 2-0 interrupted	Subcuticular Vicryl
14	No	Yes	Interrupted	Vicryl 2-0 interrupted	Nylon interrupted
15	No	No	Interrupted	Vicryl 2-0 interrupted	Nylon interrupted

Statistical Analysis

Data were analysed using Statistical Package for the Social Sciences (SPSS), version 25.0. Continuous variables are expressed as mean $\pm$ standard deviation (SD), and categorical variables as frequencies and percentages.

Patients were categorised according to the presence or absence of postoperative wound dehiscence within 30 days: Group A, dehiscence (n = 7); Group B, no dehiscence (n = 8). The Mann–Whitney U test was used for continuous variables because of the small sample size. Fisher's exact test was used for categorical variables. A p-value <0.05 was considered statistically significant.

All patients underwent onlay mesh repair; therefore, mesh position was not subjected to between-group statistical testing.

6. Results

A total of 15 patients who underwent elective umbilical hernioplasty were included. Seven patients (46.7%) developed postoperative wound dehiscence within 30 days, while eight patients (53.3%) did not.

Duration of Surgery: Mean operative duration was 91.4 ± 3.8 minutes in the dehiscence group and 86.3 ± 4.4 minutes in the non-dehiscence group. The exact two-sided Mann–Whitney U test gave $U = 45.0$ and $p = 0.054$. The observed difference therefore did not reach statistical significance, although operative duration was higher in the dehiscence group.

Duration of Drain Placement: Mean drain duration was 4.43 ± 0.53 days in the dehiscence group and 3.75 ± 0.46 days in the non-dehiscence group. The exact two-sided Mann–Whitney U test gave $U = 44.0$ and $p = 0.072$; the difference was not statistically significant.

Diabetes Mellitus: Diabetes mellitus was present in 5 of 7 patients (71.4%) with dehiscence and in none of the 8 patients without dehiscence. Fisher's exact test demonstrated a statistically significant association ($p = 0.007$). Given the small sample size and complete separation of diabetic patients into the dehiscence group, this finding should be interpreted cautiously and does not establish causation.

Hypertension: Hypertension was present in 4 of 7 patients (57.1%) with dehiscence and 3 of 8 patients (37.5%) without dehiscence. Fisher's exact test gave $p = 0.619$, showing no statistically significant association.

Closure Technique: All 7 patients with dehiscence had interrupted fascial closure, while 6 of 8 patients without dehiscence had interrupted fascial closure and 2 had continuous closure. Fisher's exact test gave $p = 0.467$, with no statistically significant association. Skin closure also showed no statistically significant association on exact testing ($p = 0.323$).

Seroma and Subsequent Suturing: Seroma was documented in five patients, all of whom also developed wound dehiscence. Because the temporal relationship between seroma formation and dehiscence could not be reliably established from the retrospective records, seroma was considered a postoperative finding rather than an independent risk factor. Secondary suturing was performed in 7 patients, corresponding to the 7 patients classified with wound dehiscence; it therefore represents management of the outcome rather than an independent predictor.

Mesh Placement: All 15 patients underwent onlay mesh repair. Consequently, the present dataset does not allow comparison of onlay, sublay/underlay, or IPOM techniques.

Summary of Statistical Findings

Statistical Summary

Duration of surgery: 91.4 ± 3.8 vs 86.3 ± 4.4 min; Mann–Whitney $U = 45.0$; $p = 0.054$.

Drain duration: 4.43 ± 0.53 vs 3.75 ± 0.46 days; Mann–Whitney $U = 44.0$; $p = 0.072$.

Diabetes mellitus: 5/7 (71.4%) vs 0/8 (0%); Fisher's exact $p = 0.007$.

Hypertension: 4/7 (57.1%) vs 3/8 (37.5%); Fisher's exact $p = 0.619$.

Fascial closure: interrupted in 7/7 (100%) vs 6/8 (75%); Fisher's exact $p = 0.467$.

Skin closure: Fisher's exact $p = 0.323$.

7. Discussion

Postoperative wound dehiscence occurred in 7 of the 15 patients (46.7%) in the present study following elective umbilical hernioplasty with onlay mesh repair. This proportion indicates that wound complications remain an important postoperative concern even in elective procedures. Previous studies of umbilical and ventral hernia repair have evaluated wound morbidity in relation to operative technique, mesh placement and patient-related factors [1–7]. However, direct comparison of the present proportion with previous reports is limited by differences in study populations, definitions of wound complications, surgical techniques and duration of follow-up. The small sample size of the present study also limits the generalisability of the observed frequency.

Diabetes mellitus showed the clearest association with postoperative wound dehiscence in this cohort. Diabetes was present in 5 of 7 patients (71.4%) who developed dehiscence, compared with none of the 8 patients without dehiscence, with Fisher's exact test demonstrating a statistically significant association ($p = 0.007$). This finding is consistent with the established clinical concern regarding impaired wound healing in patients with diabetes and with previous literature identifying diabetes as a relevant patient-related factor in postoperative wound complications [6,7]. However, all five diabetic patients in this dataset belonged to the dehiscence group, resulting in complete separation within this small sample. Therefore, although the observed association is statistically significant, it should be interpreted cautiously and cannot be considered evidence of an independent causal relationship. Larger studies with adjustment for glycaemic control and other potential confounders would be required to establish the strength of this association.

Operative duration and duration of drain placement were both higher among patients who developed wound dehiscence. Mean operative duration was 91.4 ± 3.8 minutes in the dehiscence group compared with 86.3 ± 4.4 minutes in the non-dehiscence group, although the difference did not reach statistical significance ($p = 0.054$). Similarly, mean drain duration was 4.43 ± 0.53 days compared with 3.75 ± 0.46 days, respectively, with $p = 0.072$. These findings suggest possible trends that may warrant further evaluation, but the present study does not provide sufficient evidence to establish either operative duration or prolonged drainage as independent risk factors. Previous studies have examined operative duration and drain use in relation to postoperative wound complications following abdominal wall and ventral hernia surgery [3–5]. Differences between studies may reflect variation in operative complexity, patient characteristics, drain practices and definitions of postoperative wound complications.

All 15 patients in the present study underwent open onlay mesh repair, preventing comparison of wound outcomes between different mesh positions. Similarly, interrupted fascial closure was used in all patients with dehiscence and in 6 of 8 patients without dehiscence; the difference was not statistically significant ($p = 0.467$). Skin closure technique was also not significantly associated with dehiscence ($p = 0.323$). These findings should be interpreted in the context of

the limited sample size and the small number of patients in some closure categories. Seroma was documented in five patients, all of whom also developed dehiscence; however, because the temporal relationship between seroma formation and dehiscence could not be reliably established, seroma was considered a postoperative finding rather than an independent predictor. Overall, the findings support the need for larger prospective studies incorporating patient comorbidities, operative factors, drain management, closure technique and different mesh positions to better determine factors associated with wound dehiscence following umbilical hernioplasty.

8. Postoperative Frequency Findings

The postoperative day 14 distribution recorded in the dataset was: healed, 12/15 (80.0%); secondary suturing, 2/15 (13.3%); and wound gaping, 1/15 (6.7%). These POD14 figures describe wound status at that specific time point and are not equivalent to the cumulative 30-day outcome.

Seroma

Mild: 5 (33.3%); No: 10 (66.7%)

Wound Dehiscence

Yes: 7 (46.7%); No: 8 (53.3%)

Secondary Suturing

Yes: 7 (46.7%); No: 8 (53.3%)

Diabetes Mellitus

Yes: 5 (33.3%); No: 10 (66.7%)

Hypertension

Yes: 7 (46.7%); No: 8 (53.3%)

Skin Closure

Ethilon interrupted: 1 (6.7%); Nylon interrupted: 12 (80.0%); Subcuticular Vicryl: 2 (13.3%)

9. Conclusion

Postoperative wound dehiscence occurred in 7 of 15 patients (46.7%) undergoing elective umbilical hernioplasty with onlay mesh repair. In the patient-level analysis, diabetes mellitus was significantly associated with postoperative wound dehiscence in this small cohort ($p = 0.007$); however, this finding requires confirmation in larger studies. Operative duration ($p = 0.054$) and drain duration ($p = 0.072$) showed higher values in the dehiscence group without reaching statistical significance. Hypertension and closure technique were not significantly associated with dehiscence.

These findings are exploratory because of the small sample size and retrospective design. The concentration of diabetes among patients with dehiscence warrants confirmation in a larger cohort before drawing clinical conclusions.

10. Future Scope

Future studies should include larger prospective cohorts and should evaluate operative duration, drain management, closure technique, mesh position, and relevant patient comorbidities using predefined outcome criteria. Larger

datasets would allow adjustment for confounding factors and more reliable estimation of associations with postoperative wound dehiscence.

11. Limitations

- Small sample size, limiting statistical power.
- Retrospective design and reliance on existing medical records.
- Lack of control of potential confounders.
- All patients underwent onlay mesh repair, preventing comparison of mesh positions.

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Author Profile



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