The Research of Medical Science Review
ISSN: 3007-1208 & 3007-1216 Volume 3, Issue 7, 2025

DRY DRESSING IN SURGICAL WOUND MANAGEMENT: A PROSPECTIVE OBSERVATIONAL STUDY AT A TERTIARY CARE HOSPITAL

Dr: Muhammad Bilal[*1], Dr: Qazi Muhammad Tariq[2], Dr: Sana Shahid[3], Dr: Foad Ali Moosa[4], Dr: Mehmood Sattar[5], Dr: Haya Ahsan[6]

*[*1]MBBSPostgraduate Trainee Kutiyana Memon Hospital*
[2]MBBS, FCPS Consultant General Surgeon (Supervisor) Kutiyana Memon Hospital
[3,4]MBBS, FCPS Consultant General Surgeon Kutiyana Memon Hospital
[5,6]MBBS Postgraduate Trainee Kutiyana Memon Hospital

[*1]bilalbijuda984@gmail.com, [2]qazimuhammadtariq1963@gmail.com, [3]sanasss150@gmail.com, [4]famoosa@hotmail.com, [5]mahmoodsattarchandio@gmail.com, [6]Haya.ahsan@hotmail.com

DOI: https://doi.org/10.5281/zenodo.22654602

Keywords
Dry gauze dressing; surgical wound; wound healing; wound infection; wound management; tertiary care hospital.

Article History
Received: 10 July 2025
Accepted: 15 July 2025
Published: 20 July 2025

Corresponding Author: *
Dr: Muhammad Bilal

Abstract

Objective:
To assess the clinical outcomes of surgical wounds managed with dry gauze dressings and factors influencing wound recovery at a tertiary care hospital.

Methods:
A prospective cohort study was conducted in the General Surgery Department of Kutiyana Memon Hospital, a tertiary care hospital. Adult patients aged ≥18 years with open wounds requiring wound care were recruited through nonprobability consecutive sampling. A total of 288 patients were included. Data were collected using a proforma covering demographic characteristics, wound history, surgical details, wound management, and follow-up outcomes. Outcomes included wound healing, duration of wound healing, hospital stay, wound infection, dressing changes, and hospital readmission. Data were analyzed using IBM SPSS version 26. Continuous variables were expressed as mean ± standard deviation or median with interquartile range, while categorical variables were presented as frequencies and percentages. Chi-square and independent-samples t-tests were used to assess associations, with $p \leq 0.05$ considered statistically significant.

Results:
Among 288 patients, 171 (59.4%) were male and 117 (40.6%) were female, with a mean age of 43.6 ± 15.7 years. Wound healing within six months was achieved in 221 (76.7%) patients. The median duration of wound healing was 45 days (IQR: 28–78). Wound infection occurred in 20 (6.9%) patients, while 15 (5.2%) required hospital readmission. The mean hospital stay was 6.1 ± 4.3 days. Delayed wound healing was more frequently observed among patients with baseline wound infection, larger wound area, comorbidities, and wounds following emergency surgery ($p<0.05$).

Conclusion:
Dry gauze dressing was associated with satisfactory wound-healing outcomes in patients with open surgical wounds. Baseline wound characteristics, infection, comorbidities, and emergency surgery may influence recovery. These findings support dry gauze dressing as an accessible wound-care option in resource-limited tertiary care settings.

INTRODUCTION

Surgical site infections significantly influence patient outcomes and healthcare systems, making them a crucial concern in postoperative treatment. They cause 5–20% of hospital-acquired infections, which raises the risk of morbidity, prolonged hospital stays, readmissions, and medical expenses (1). Preventing these consequences requires careful management of surgical wounds. Regardless of the severity of the wound, it is imperative to provide appropriate care, which includes placing an appropriate dressing (2).

The goal of traditional wound care techniques includes applying gauze dressings to absorb exudate and shield the wound from infection (3). The main purpose of dry gauze dressing (DGD), which is widely accessible and used, is to protect wounds (4). Gauze continues to be the most widely accessible dressing because of its affordability and simplicity of use. Newer materials are used to manufacture other dressings, which are likely less available and significantly more expensive. Decisions regarding dressing selection may therefore depend on wound characteristics, exudate management, patient comfort, availability, and cost (5).

According to Ubbink et al., it took 66 days for occlusive dressings to cure wounds, whereas gauze took 45 days. Their randomized clinical trial demonstrated that gauze dressings were associated with faster healing of postoperative wounds compared with occlusive dressings, although there was no significant difference in overall healing time between the groups (6). A systematic review of dressings and topical agents for surgical wounds healing by secondary intention found insufficient evidence to establish superiority of one dressing type over another for wound healing (7).

Scab formation is facilitated by dry gauze and will typically separate on its own as re-epithelialization takes place (8). Sterile gauze pads can be used to absorb fluids and exudates from an open wound by using their fibers. A study conducted in Rawalpindi found no difference in infection rate between gauze dressing (7% infection rate) and hydrocolloid dressing (5% infection rate) after surgery (9). Shinohara et al. acquired similar results, with no discernible difference between gauze and hydrocolloid dressings in terms of wound infection (10). Evidence from systematic reviews also suggests that no particular postoperative dressing has been shown to consistently reduce surgical-site infection compared with other dressing types or leaving wounds exposed (11,12).

Many tertiary care facilities discovered inadequate methods for managing and treating wounds because the materials used to heal surgical wounds were not handled properly. Due to these acts of neglect, patients experienced longer hospital stays, slower wound healing, and higher treatment costs. The current dearth of high-quality data about surgical wound healing with DGD is a significant barrier to patient communication, care delivery optimization, and the planning of future research. There is limited data available from Pakistan on DGD in surgical wound management. Henceforth, this study will be the base for understanding the pros and cons of DGD in hospital settings of this region.

Materials and Methods

This prospective cohort study was conducted in the General Surgery Department of Kutiyana Memon Hospital (KMH), a tertiary care hospital, over a period of six months. Adult patients aged ≥18 years with open wounds requiring local wound care were recruited from the General Surgery and Obstetrics and Gynecology wards using nonprobability consecutive sampling. Patients with burns or ulcerating cancer, wounds undergoing surgical closure, treatment with vacuum-assisted closure devices, ostomies or drain openings, chemotherapy

or local irradiation, or a life expectancy of less than six months were excluded.

The sample size was calculated using a postulated frequency of 75.1% of patients achieving wound healing within six months. Using OpenEpi, with a 5% margin of error, 95% confidence level, and design effect of 1, the calculated sample size was 288 patients. Eligible participants were recruited after obtaining written informed consent.

Data were collected prospectively using a structured proforma inspired by previously published studies by Chetter et al. and Ubbink et al. The proforma consisted of five sections covering demographic characteristics, wound history, surgery details, wound management, and follow-up details. Dry gauze dressing was considered the independent variable, while wound healing within six months was considered the dependent variable. Clinical outcomes included duration of wound healing, hospital stay, occurrence of wound infection, dressing changes, and hospital readmission.

Data were entered and analyzed using IBM SPSS Statistics version 26. Continuous variables, including age, number of surgical wounds, wound size, time to first dressing change, duration of wound, and hospital stay, were summarized as mean or median as appropriate. Categorical variables, including gender, tobacco use, baseline comorbidities, medications, wound characteristics, wound etiology, wound location, baseline infection, antibiotic use, surgical subspecialty, type of surgery, treatment environment, infection during follow-up, hospital readmission, dressing changes, and wound healing within six months, were presented as frequencies and percentages. Prespecified prognostic factors including age, gender, tobacco use, baseline comorbidities, wound location, emergency versus elective surgery, wound infection, and baseline wound area were assessed for their association with wound healing. Chi-square and t-tests were used as appropriate. A p-value ≤0.05 was considered statistically significant.

Results

A total of 288 patients with open wounds requiring local wound care were included in the study. The mean age of the participants was 43.6 ± 15.7 years. Of the total participants, 171 (59.4%) were male and 117 (40.6%) were female. The demographic characteristics and baseline clinical profile of the study population are presented in Table 1.

Table 1. Demographic and baseline clinical characteristics of study participants

Variable	**n** (%) / **Mean ± SD**
Total participants	288 (100)
Age, years	43.6 ± 15.7
Male	171 (59.4)
Female	117 (40.6)
Diabetes mellitus	82 (28.5)
Hypertension	61 (21.2)
Other comorbidities	37 (12.8)
No comorbidity	108 (37.5)
Tobacco users	64 (22.2)

Among the participants, 196 (68.1%) had a single wound, while 92 (31.9%) had multiple wounds. The wound area was <10 cm² in 176 (61.1%) patients and ≥10 cm² in 112 (38.9%). Baseline wound infection was present in 47 (16.3%) patients, while 121 (42.0%) were receiving antibiotics at baseline. Elective surgery accounted for 174 (60.4%) cases, whereas 114 (39.6%) followed emergency surgery. The wound and surgical characteristics are presented in Table 2.

Table 2. Wound and surgical characteristics

Variable	**n** (%)
Single wound	196 (68.1)
Multiple wounds	92 (31.9)
Wound area <10 cm²	176 (61.1)
Wound area ≥10 cm²	112 (38.9)
Baseline wound infection	47 (16.3)
Antibiotics at baseline	121 (42.0)
Elective surgery	174 (60.4)
Emergency surgery	114 (39.6)

Dry gauze dressing was used for wound management throughout the follow-up period. The first dressing change was performed at a median of 2 days (IQR: 1–3 days), with subsequent dressing frequency determined according to wound characteristics and wound discharge. During the six-month follow-up, complete wound healing was achieved in 221 (76.7%) patients, while 67 (23.3%) remained unhealed. The median duration of wound healing was 45 days (IQR: 28–78 days). Wound infection occurred in 20 (6.9%) patients, and 15 (5.2%) required hospital readmission. The clinical outcomes are summarized in Table 3.

Table 3. Clinical outcomes during follow-up

Outcome	**n** (%) / **Mean ± SD**
Healed within 6 months	221 (76.7)
Not healed within 6 months	67 (23.3)
Median healing duration	45 days (IQR: 28–78)
Wound infection during follow-up	20 (6.9)

Outcome	n (%) / Mean ± SD
Hospital readmission	15 (5.2)
Hospital stay	6.1 ± 4.3 days
First dressing change	Median 2 days (IQR: 1–3)

Analysis of prespecified prognostic factors showed that delayed wound healing was significantly associated with baseline comorbidities, emergency surgery, baseline wound infection, and wound area ≥10 cm^2 ($p<0.05$). Age, gender, tobacco use, and wound location were not significantly associated with wound healing ($p>0.05$). The association between these factors and wound healing is presented in Table 4.

Table 4. Factors associated with wound healing

Factor	Association with healing	p-value
Age	Not significant	>0.05
Gender	Not significant	>0.05
Tobacco use	Not significant	>0.05
Baseline comorbidities	Significant	<0.05
Wound location	Not significant	>0.05
Emergency surgery	Significant	<0.05
Baseline wound infection	Significant	<0.05
Baseline wound area	Significant	<0.05

Discussion

The present study evaluated the clinical outcomes of surgical wounds managed with dry gauze dressings in a tertiary care hospital. Among 288 patients, 76.7% achieved wound healing within six months, with a median healing time of 45 days. Wound infection during follow-up occurred in 6.9% of patients, while 5.2% required hospital readmission. These findings indicate that dry gauze dressing remains a practical wound-care option, particularly in settings where advanced dressings may be costly or less readily available. However, the effectiveness of any dressing should be interpreted in relation to wound characteristics and patient-related risk factors.

Our findings should be considered in the context of evidence supporting alternative dressing strategies. A recent Bayesian network meta-analysis of randomized controlled trials reported that several moist dressings were associated with better wound-healing outcomes than conventional gauze dressings, although the effectiveness varied between dressing types and the authors emphasized the need for further high-quality trials (13). This suggests that while dry gauze remains widely used, newer dressing technologies may

provide additional benefits in selected patients. Nevertheless, the availability, cost, nursing requirements, and clinical suitability of these alternatives are particularly important considerations in resource-limited healthcare settings.

In the present study, delayed wound healing was significantly associated with baseline comorbidities and larger wound area. These findings are consistent with evidence indicating that patient-related factors can influence postoperative wound infection and healing. A systematic review and meta-analysis of surgical wounds identified several patient-dependent factors associated with wound infection, highlighting the importance of considering individual patient characteristics rather than attributing outcomes solely to the dressing method (14). Similarly, other evidence has demonstrated associations between diabetes, smoking, emergency procedures, and other clinical characteristics and postoperative wound complications (15). Therefore, appropriate optimization of comorbid conditions and careful assessment of wound characteristics remain important components of wound management.

Emergency surgery was also significantly associated with delayed healing in our study. Emergency procedures frequently involve contaminated or infected wounds, limited opportunities for preoperative optimization, and more severe underlying pathology. These factors may collectively contribute to delayed wound recovery. Evidence from observational studies and meta-analyses has similarly demonstrated an increased risk of postoperative wound complications following emergency procedures, supporting the association observed in our cohort (16).

The frequency and timing of dressing changes may also influence patient comfort, resource utilization, and wound outcomes. In our study, the first dressing change occurred at a median of two days. Although dry gauze is inexpensive and widely available, it may require relatively frequent replacement depending on the amount of wound exudate. Recent systematic evidence evaluating postoperative dressing management has shown that dressing type can influence wound complications, dressing-change requirements, and subsequent healthcare utilization (17). Thus, dressing selection should balance wound requirements with practicality and available resources.

Negative pressure wound therapy (NPWT) represents another approach for selected complex surgical wounds. Evidence from recent systematic reviews suggests that NPWT can reduce surgical-site infections in certain surgical populations, although the magnitude of benefit varies according to the type of surgery and patient characteristics (18). In particular, prophylactic negative-pressure dressings have been associated with reduced wound complications following emergency laparotomy, a finding that is relevant to the subgroup of patients undergoing emergency procedures in resource-limited surgical settings (19). However, NPWT requires specialized equipment, trained personnel, and additional resources and therefore may not be feasible for routine use in all patients.

Evidence regarding NPWT in specific wound populations should also be interpreted cautiously. A meta-analysis of cancer-related surgical wounds found potential reductions in some wound complications with NPWT, but the results varied between observational studies and randomized trials (20). Similarly, expert recommendations emphasize individualized selection of patients for advanced negative-pressure incisional therapy rather than universal application (21). In this context, dry gauze dressing may continue to have an important role for uncomplicated wounds, particularly where affordability and accessibility are major considerations. NPWT should instead be considered when wound characteristics or patient risk factors justify escalation of wound-care management. Recent literature on NPWT in complex surgical wounds further supports its role as a selective treatment option rather than a universal replacement for conventional dressings (22).

The present study has several limitations. Its prospective observational design does not permit direct comparison between dry gauze and alternative dressing techniques, and therefore causal conclusions regarding the superiority of one dressing method cannot be made. The study was conducted at a single tertiary care hospital, which may limit generalizability to other healthcare settings. In addition, follow-up was limited to six months, and some potentially important factors influencing

wound healing may not have been fully captured. Despite these limitations, the study provides prospective data from a resource-limited tertiary-care setting and identifies important patient- and wound-related factors associated with delayed healing.

Overall, dry gauze dressing was associated with wound healing within six months in the majority of patients in this cohort. However, healing outcomes were influenced more strongly by patient and wound characteristics, particularly comorbidities, wound size, baseline infection, and emergency surgery. Dry gauze remains a feasible and accessible option for routine wound care, while advanced dressings and NPWT may be considered selectively for patients at increased risk of wound complications. Future comparative studies, preferably randomized controlled trials involving different dressing strategies in similar resource-limited settings, are needed to determine the most effective and cost-effective approach to surgical wound management.

Conclusion

Dry gauze dressing resulted in satisfactory wound-healing outcomes in the majority of patients and remains a simple, affordable, and accessible option for surgical wound management, particularly in resource-limited settings. Delayed wound healing was associated with comorbidities, larger wound area, baseline wound infection, and emergency surgery. Recognition and optimization of these patient- and wound-related risk factors are essential to improve healing outcomes and guide timely selection of patients who may require advanced wound-care strategies.

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