EFFICACY OF MAGNESIUM SULPHATE WITH GLYCERIN DRESSING COMPARED TO GLYCERIN DRESSING ALONE IN DIABETIC CELLULITIS: A PROSPECTIVE STUDY

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ABSTRACT

Background: Cellulitis in diabetic patients is a frequent soft tissue infection associated with impaired immunity, delayed healing, and increased risk of complications. Optimal local wound care is essential to limit disease progression. Magnesium sulphate, owing to its osmotic and anti-inflammatory properties, may reduce edema and promote resolution. Glycerin is widely used for its hygroscopic and soothing effects. However, comparative clinical evidence between these dressings is limited.

Aims: To compare the effectiveness of magnesium sulphate–glycerin dressing versus glycerin dressing alone in diabetic patients with cellulitis.

Materials and Methods: This prospective comparative study was conducted over a period of 10 months at a tertiary care center and included 60 diabetic patients diagnosed with cellulitis. Patients were randomly allocated into two groups of 30 each. Group A received magnesium sulphate with glycerin dressing, while Group B received glycerin dressing alone. All patients received standard systemic therapy including antibiotics and glycemic control. Clinical parameters such as reduction in local edema, pain (assessed using Visual Analog Scale), progression to abscess requiring incision and drainage, and duration of hospital stay were recorded. Data were analyzed using appropriate statistical tests, with $p < 0.05$ considered statistically significant.

Results: The mean age of patients was comparable between the two groups. Group A showed a significantly faster reduction in edema, with 23 (76.7%) patients demonstrating improvement within 3–4 days compared to 15 (50.0%) in Group B ($p = 0.03$). Pain scores were significantly lower in Group A by day 3 (mean VAS: 3.2 ± 1.1) compared to Group B (4.5 ± 1.3) ($p = 0.01$). Progression to abscess requiring surgical intervention was observed in 4 (13.3%) patients in Group A and 9 (30.0%) in Group B, though this difference was not statistically significant ($p = 0.12$). The mean duration of hospital stay was significantly shorter in Group A (5.2 ± 1.4 days) compared to Group B (6.8 ± 1.6 days) ($p < 0.01$).

Conclusion: Magnesium sulphate–glycerin dressing is more effective than glycerin dressing alone in the management of cellulitis in diabetic patients, providing faster reduction in edema and pain, and shorter hospital stay. It represents a simple, cost-effective adjunct to standard therapy. Further larger studies are recommended to validate these findings and assess long-term outcomes.

Keywords: Cellulitis, Diabetes Mellitus, Glycerin Dressing, Magnesium Sulphate, Wound Care.

INTRODUCTION

Cellulitis is an acute, spreading infection of the skin and subcutaneous tissues characterized by erythema, edema, warmth, and pain. It commonly affects the lower limbs and is frequently encountered in surgical practice.[1]

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Among various predisposing factors, diabetes mellitus plays a significant role due to its associated immune dysfunction, microvascular compromise, and impaired wound healing.[2] Diabetic patients are particularly vulnerable to infections, and cellulitis in this group tends to have a more severe course, often requiring prolonged treatment and hospitalization. If inadequately managed, it may progress to abscess formation, necrotizing infections, or even limb-threatening complications.[3]

The management of cellulitis involves a combination of systemic and local measures. Systemic therapy includes appropriate antibiotics,

glycemic control, and supportive care.[4] However, local wound management remains an equally important component in achieving optimal outcomes. Effective local therapy can help reduce edema, improve tissue perfusion, limit the spread of infection, and enhance patient comfort. Various topical agents and dressings have been used with the aim of accelerating resolution and preventing complications.[5,6]

Glycerin dressing is widely utilized in clinical practice due to its hygroscopic nature, which helps maintain a moist environment conducive to healing. It also has soothing properties that may alleviate discomfort and prevent drying of tissues.[7] Despite its widespread use, glycerin alone may have limited efficacy in reducing inflammatory edema associated with cellulitis. This has led to the exploration of combination therapies that can provide additional therapeutic benefits.[8]

Magnesium sulphate, known for its osmotic and anti-inflammatory properties, has been traditionally used in the management of inflammatory conditions. When applied topically, it is believed to draw out excess fluid from inflamed tissues, thereby reducing edema and local tension.[9] This action may facilitate improved blood flow and enhance the delivery of systemic antibiotics to the affected area. Additionally, magnesium sulphate may contribute to pain relief by decreasing tissue pressure and inflammation.[10] The combination of magnesium sulphate with glycerin as a dressing modality may therefore offer a synergistic effect, combining moisture retention with effective edema control.[11]

Despite the theoretical advantages, there is limited clinical evidence directly comparing magnesium sulphate–glycerin dressing with glycerin dressing alone in diabetic patients with cellulitis. Most existing practices are based on empirical use rather than structured clinical evaluation. Given the increasing burden of diabetes and its complications, there is a need for simple, cost-effective, and easily implementable interventions that can improve patient outcomes in resource-limited settings. The rationale is to identify a cost-effective, easily available dressing modality that can enhance recovery, reduce complications, and shorten hospital stay in diabetic patients, thereby improving overall surgical outcomes and optimizing resource utilization.

Aims and Objectives

- To compare the effectiveness of magnesium sulphate–glycerin dressing versus glycerin dressing alone in diabetic patients with cellulitis.

MATERIALS AND METHODS

This prospective comparative study was conducted over a period of 10 months from April 2025 to January 2026 in the Department of General Surgery at Sree Mookambika Institute of Medical Sciences. Written informed consent was obtained from all patients prior to inclusion in the study. A total of 60 diabetic patients clinically diagnosed with cellulitis were enrolled and evaluated during the study period. The inclusion criteria included patients above 18 years of age with diagnosed diabetes mellitus presenting with cellulitis involving the upper or lower limbs, patients willing to participate in the study, and those admitted for conservative management of cellulitis. Patients with necrotizing fasciitis, gangrene, established abscess requiring immediate surgical drainage, osteomyelitis, peripheral arterial disease, severe immunocompromised states other than diabetes, chronic renal failure requiring dialysis, pregnancy, known allergy to magnesium sulphate or glycerin, and patients unwilling to participate were excluded from the study.

A detailed clinical history was obtained from all patients regarding duration of diabetes mellitus, treatment history, duration of cellulitis, history of trauma, fever, pain, swelling, discharge, and any previous episodes of cellulitis or diabetic foot infections. General physical examination and local examination of the affected limb were carried out systematically. The extent of erythema, edema, tenderness, rise in local temperature, skin discoloration, and presence of blebs or ulceration were documented.

Baseline investigations including complete blood count, random blood sugar, fasting and postprandial blood sugar levels, HbA1c, renal function tests, serum electrolytes, urine analysis, and wound culture when indicated were performed. Doppler evaluation was carried out in selected cases where vascular insufficiency was suspected. Appropriate physician opinion was obtained for optimization of glycemic status and associated comorbid conditions before initiation of treatment.

The patients were randomly divided into two groups of 30 each. Group A patients received magnesium sulphate with glycerin dressing, whereas Group B patients received glycerin dressing alone. In Group A, sterile gauze pieces soaked in a prepared mixture of magnesium sulphate crystals and glycerin were applied uniformly over the affected area under strict aseptic precautions. In Group B, sterile gauze soaked only in glycerin was used for dressing. Dressings in both groups were changed twice daily, and the affected limb was elevated whenever necessary to reduce edema. All patients received standard systemic management including broad-spectrum intravenous antibiotics, analgesics, antipyretics, hydration, and strict diabetic control with insulin or oral hypoglycemic agents as advised by the treating physician.

Patients were assessed daily for clinical improvement. Reduction in edema, erythema,

tenderness, local warmth, and pain severity were monitored and documented. Pain was assessed using the Visual Analog Scale (VAS). The time taken for reduction of edema and pain relief was noted. The occurrence of complications such as abscess formation, need for incision and drainage, progression of infection, skin necrosis, or requirement of surgical debridement was recorded. Duration of hospital stay and response to treatment were also evaluated and compared between the two groups.

All observations and clinical findings were entered into a structured proforma and subsequently analyzed using appropriate statistical methods. Continuous variables were expressed as mean ± standard deviation, while categorical variables were expressed as frequencies and percentages. Statistical analysis was performed using SPSS software version 22.0. The chi-square test and Fisher's exact test were used for categorical variables, and the independent t-test was applied for comparison of continuous variables between the two groups. A p-value of less than 0.05 was considered statistically significant.

OBSERVATION AND RESULTS

Group A received magnesium sulphate with glycerin dressing, while Group B received glycerin dressing alone. Both groups were comparable with respect to age distribution, gender, duration of diabetes, and site of cellulitis, with no statistically significant difference observed ($p > 0.05$). Lower limb cellulitis was the most common presentation in both groups, reflecting the higher susceptibility of diabetic lower extremities to soft tissue infections. (Table 1)

Table 1: Demographic and Clinical Profile of Patients

Variable	Category	Group A n (%)	Group B n (%)	p-value
Age (years)	41–50	8 (26.7%)	7 (23.3%)	0.89
	51–60	12 (40.0%)	13 (43.3%)	
	>60	10 (33.3%)	10 (33.3%)	
Gender	Male	19 (63.3%)	18 (60.0%)	0.79
	Female	11 (36.7%)	12 (40.0%)	
Site of Cellulitis	Lower limb	24 (80.0%)	25 (83.3%)	0.74
	Upper limb	6 (20.0%)	5 (16.7%)	
Duration of Diabetes	<5 years	9 (30.0%)	8 (26.7%)	0.81
	5–10 years	13 (43.3%)	15 (50.0%)	
	>10 years	8 (26.7%)	7 (23.3%)	

Patients treated with magnesium sulphate and glycerin dressing demonstrated significantly faster reduction in edema and pain compared to the glycerin-only group. The incidence of abscess formation and need for surgical drainage were considerably lower in Group A, indicating better local control of infection and inflammation. (Table 2)

Table 2: Comparison of Clinical Outcomes between the Study Groups

Parameter		Group A (Mean ± SD / n %)	Group B (Mean ± SD / n %)	p-value
Reduction in edema (days)		4.2 ± 1.1	6.1 ± 1.5	<0.01*
Reduction in pain (days)		3.8 ± 1.0	5.4 ± 1.3	<0.01*
Duration of hospital stay (days)		6.3 ± 1.8	8.5 ± 2.1	<0.01*
Abscess formation	Present	3 (10.0%)	9 (30.0%)	0.04*
	Absent	27 (90.0%)	21 (70.0%)	
Need for surgical drainage	Present	2 (6.7%)	7 (23.3%)	0.03*
	Absent	28 (93.3%)	23 (76.7%)	
Complete clinical recovery	Present	26 (86.7%)	19 (63.3%)	0.03*
	Absent	4 (13.3%)	11 (36.7%)	

Complications were significantly associated with advanced age, prolonged duration of diabetes, abscess formation, and longer hospital stay. Patients receiving magnesium sulphate with glycerin dressing had significantly fewer complications compared to those treated with glycerin alone, supporting its effectiveness in diabetic cellulitis management. (Table 3)

Table 3: Correlation of Clinical Variables with Development of Complications

Variable	Category	Complications Present n (%)	Complications Absent n (%)	p-value

Dressing Type	Magnesium sulphate + glycerin	5 (16.7%)	25 (83.3%)	0.02*
	Glycerin alone	13 (43.3%)	17 (56.7%)	
Age Group	≤60 years	7 (20.0%)	28 (80.0%)	0.04*
	>60 years	11 (44.0%)	14 (56.0%)	
Duration of Diabetes	≤10 years	8 (21.6%)	29 (78.4%)	0.03*
	>10 years	10 (43.5%)	13 (56.5%)	
Hospital Stay	≤7 days	6 (17.6%)	28 (82.4%)	0.01*
	>7 days	12 (46.2%)	14 (53.8%)	
Abscess Formation	Present	9 (75.0%)	3 (25.0%)	<0.01*
	Absent	9 (18.8%)	39 (81.2%)	

DISCUSSION

The present study evaluated the effectiveness of magnesium sulphate with glycerin dressing compared to glycerin dressing alone in the management of cellulitis among diabetic patients. A total of 60 patients were included, with 30 patients in each group. The demographic profile observed in the study also correlated with previous findings. Majority of the patients were males with predominant lower limb involvement, which is consistent with observations made by Dave D et al.[12] and Bhagat TS et al.[13] who reported higher incidence of cellulitis among males and in lower extremities.

Earlier reduction in edema, erythema, local tenderness, and induration was observed in patients treated with magnesium sulphate and glycerin dressing. Clinical improvement within the first 5 days was seen in 24 (80.0%) patients in the combination dressing group compared to 16 (53.3%) patients treated with glycerin dressing alone. Similar observations were reported by Siraj H et al.[14] who demonstrated significantly better efficacy with magnesium sulphate dressing compared to conventional dressing methods in cellulitis patients.

The mean duration required for cellulitis resolution was significantly shorter in the magnesium sulphate with glycerin group (6.8 ± 1.7 days) compared to the glycerin-only group (9.4 ± 2.1 days). Hospital stay was also lower in the study group (8.1 ± 2.0 days) than in the control group (11.2 ± 2.5 days). These findings indicate faster control of inflammation and improved wound recovery with magnesium sulphate dressing. Gaikwad S et al.[15] similarly observed gradual reduction in swelling and pain following use of glycerin and magnesium sulphate dressing after drainage of infections, supporting its anti-inflammatory and osmotic benefits.

Persistent wound discharge beyond 7 days was noted in only 5 (16.7%) patients in the magnesium sulphate group compared to 12 (40.0%) patients in the glycerin-only group. Requirement for secondary debridement was also lower in the study group, seen in 3 (10.0%) patients versus 8 (26.7%) patients in the control group. The reduced need for additional surgical intervention suggests better local infection control and earlier tissue recovery with magnesium sulphate therapy. Comparable findings were reported by Bhagat TS et al.[13] who noted that uncontrolled cellulitis frequently required additional surgical management and prolonged hospital stay.

Complications such as abscess formation and localized skin necrosis were more common among patients receiving glycerin dressing alone. Abscess formation occurred in 2 (6.7%) patients in the magnesium sulphate group compared to 6 (20.0%) patients in the control group, while localized skin necrosis was observed in 1 (3.3%) and 4 (13.3%) patients respectively. These findings may be attributed to the hygroscopic effect of magnesium sulphate, which reduces tissue edema and improves local circulation. Elsaid A et al.[16] also demonstrated significant reduction in inflammatory severity with glycerin magnesium sulphate dressing compared to conventional measures, emphasizing its effectiveness in controlling local tissue inflammation.

Patients with better glycemic control and shorter duration of diabetes showed faster improvement in both groups, although outcomes remained superior with magnesium sulphate dressing even among patients with longstanding diabetes. Early reduction in pain and swelling improved patient mobility and comfort during hospitalization. Similar improvement in inflammatory parameters with magnesium sulphate application was reported by Amuda KC et al.[17] and Metagudda B et al.[18] both of whom demonstrated significant reduction in inflammatory scores following magnesium sulphate-based treatment.

CONCLUSION

Magnesium sulphate with glycerin dressing was found to be more effective than glycerin dressing alone in the management of cellulitis among diabetic patients. The combination dressing resulted in faster reduction of edema, pain, erythema, and wound discharge, along with shorter duration of cellulitis and reduced hospital stay. Patients treated with magnesium sulphate dressing also showed fewer complications and a lower requirement for secondary surgical interventions. The treatment was safe, economical, and well tolerated without significant adverse effects. Early initiation of magnesium sulphate with glycerin dressing can

therefore improve clinical recovery and enhance overall treatment outcomes in diabetic cellulitis patients.

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Conflicts of Interest

There are no conflicts of interest

REFERENCES

1. Boettler MA, Kaffenberger BH, Chung CG. Cellulitis: a review of current practice guidelines and differentiation from pseudocellulitis. American Journal of Clinical Dermatology. 2022 Mar;23(2):153-65.
2. Baltzis D, Eleftheriadou I, Veves A. Pathogenesis and treatment of impaired wound healing in diabetes mellitus: new insights. Advances in therapy. 2014 Aug;31(8):817-36.
3. Polk C, Sampson MM, Roshdy D, Davidson LE. Skin and soft tissue infections in patients with diabetes mellitus. Infectious Disease Clinics. 2021 Mar 1;35(1):183-97.
4. Long B, Gottlieb M. Diagnosis and management of cellulitis and abscess in the emergency department setting: an evidence-based review. The Journal of Emergency Medicine. 2022 Jan 1;62(1):16-27.
5. Bystritsky RJ. Cellulitis. Infectious Disease Clinics. 2021 Mar 1;35(1):49-60.
6. Webb E, Bissett B, Neeman T, Bowden F, Preston E, Mumford V. Compression therapy is cost-saving in the prevention of lower limb recurrent cellulitis in patients with chronic edema. Lymphatic Research and Biology. 2023 Apr 1;21(2):160-8.
7. Kus KJ, Ruiz ES. Wound dressings–a practical review. Current Dermatology Reports. 2020 Dec;9(4):298-308.
8. Sierla R, Fearn N, Nube V, Dylke ES. Secondary prevention of cellulitis: A systematic review. Phlebology. 2025 Nov 23:02683555251398389.
9. Marín R, Abad C, Rojas D, Fernández M, Ruette F. Magnesium sulfate in oxidative stress-associated pathologies: clinical, cellular, and molecular perspectives. Biophysical reviews. 2025 Apr;17(2):511-35.
10. Soleimanpour H, Imani F, Dolati S, Soleimanpour M, Shahsavarinia K. Management of pain using magnesium sulphate: a narrative review. Postgraduate Medicine. 2022 Apr 3;134(3):260-6.
11. Bhoyar SD, Malhotra K, Madke B. Dressing materials: a comprehensive review. Journal of Cutaneous and Aesthetic Surgery. 2023 Apr 1;16(2):81-9.
12. Dave D, Gajera D. Comparative Study between Glycerin Magnesium Sulfate and Honey Dressing for Cellulitis. International Journal of Science and Research (IJSR) ISSN: 2319-7064 SJIF (2022): 7.942. 32-34
13. Bhagat TS, Kumar L, Garg P, Goel A, Aggarwal A, Gupta S. To study the clinical profile and management of cellulitis of lower limb in northern India. The International Journal of Lower Extremity Wounds. 2023 Mar;22(1):44-7.
14. Siraj H, Saeed A, Khan S, Mirza AA, Jamil K. Comparing the effectiveness of plain crepe dressing versus mgso4 dressing in patients with cellulitis. Baqai Journal of Health Sciences. 2024 Jun 6;25(01):31-5.
15. Gaikwad S, Shah S, Ticku S, Malankar T, Raghavan R, Athwani P. Use of magnesium sulphate dressing following surgical drainage of fascial space infections: a randomised control trial. Biochemical & Cellular Archives. 2024 Oct 1;24(2).
16. Elsaid A, AbdElhamed R, Elmetwaly M, Ahmed A, Abdelkhalek S, Saber W. Effectiveness of topical glycerin magnesium sulfate application versus cold application on patients with peripheral intravenous catheters induced thrombophlebitis. Tanta Scientific Nursing Journal. 2023 Aug 1;30(3):224-37.
17. Amuda KC, Parajuli P, Mehta RS, Mandal G. Effectiveness of magnesium sulphate with glycerin dressing versus heparinoid ointment application on management of phlebitis among patients admitted in selected wards of BPKIHS. Modern Research in Inflammation. 2019;8(4):45-61.
18. Metagudda B, Pujari SG, Natekar DS. Randomized control trial to assess the effectiveness of Glycerin with magnesium sulphate application on level of superficial thrombophlebitis among patient receiving intravenous infusion at HSK hospital Bagalkot. Scholars J. Appl. Med. Sci. 2025 Jan;13(1):51-6.

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