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Original Research Article

Role of cadexomer iodine ointment as debriding agent in 50 cases of skin and soft tissue infections

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ABSTRACT

Background: The management of skin and soft tissue infections is a tedious job to tackle as many factors play important roles in wound healing. Wounds can be better managed and healed faster if infection is removed and the way to eliminate infection is by use of antiseptics, antibiotics and solutions over wounds along with the use of systemic antibiotics. In this study, we used cadexomer iodine ointment for management of various types of wounds.
Methods: This study was conducted in a tertiary care hospital. After screening, 50 patients with various types of wounds (venous leg ulcers, postoperative infected wounds, infected traumatic wounds, controlled diabetic wounds, ulcers with slough, abscesses left for healing by secondary intention after operation) were taken and cadexomer iodine was applied when the wound was infected and had visible slough with pus discharge.
Results: Majority of the patients (about 88%) were free of visible slough in about a week and in about two weeks, all patients (100%) were free from visible slough. 74% patients have complete closure of the wound and 22% patients have reduction in total wound surface area between 75-99% in 4 weeks period.
Conclusions: Under controlled conditions, cadexomer iodine is a good topical agent for debridement of wounds which are infected and have a visible slough along with pus discharge. It also helps in healing the wound.

Keywords: Cadexomer iodine, Venous leg ulcers, Postoperative infected wounds, Infected traumatic wounds, Ulcers with slough, Controlled diabetic wounds

INTRODUCTION

Skin and soft tissue infections (SSTIs) are the microbial invasion of the layers of the skin and underlying soft tissues. They vary widely ranging from mild infections, such as pyoderma, to serious life-threatening infections, such as necrotizing fasciitis.[1]

Many different treatment modalities have been tried for management of wounds. Iodophores were developed in 1950s to overcome the side effects associated with elemental iodine. Iodophores are preparations that bind iodine to a solubilising agent or carrier. The two most commonly used iodophors in modern wound dressings are: povidine iodine, a chemical complex of polyvinylpyrrolidone and elemental iodine; cadexomer iodine: an iodine and polysaccharide complex (produced by the reaction of dextrin with epichlorhydrin).[2]

Cadexomer iodine is a water-soluble preparation which provides controlled release of iodine at the wound site.[3,4] On application of cadexomer iodine, exudate, pus and debris are absorbed into the highly hydrophilic cadexomer beads. This results in swelling of beads to form a gel. The swelling cause breaking of cross-linked bonds of cadexomer matrix which leads to release of iodine into surrounding wound environment. The iodine is released in a controlled manner as it is proportional to the volume of fluid absorbed in the beads. Released iodine is able to rapidly kill bacteria by impairing

metabolic enzymes and denaturing DNA and disrupting the cell membrane. This process continues until all iodine has exhausted. The slow and controlled release of iodine prevents accumulation of high concentration of iodine on wound surface, thereby minimizing the complications associated with previous iodine products.[5]

The main objective was to study and document the performance of cadexomer iodine as debriding agent in patients of severe skin and soft tissue infections or serious surgical site infections and evaluation of wound healing, non-surgical (without the use of scalpel) debridement of wounds and their healing.

METHODS

This was a prospective study of 50 cases of SSTIs conducted at Guru Nanak Dev Hospital, attached to Government Medical College, Amritsar over a period of 18 months from January 2021 to June 2022. The patients were selected based upon following inclusion and exclusion criteria.

Inclusion criteria

All cases of SSTIs irrespective of age and sex, abscesses operated and left for healing by secondary intention, ulcers with slough, controlled diabetic wounds, infected traumatic wounds, postoperative infected wounds were included.

Exclusion criteria

Patients with TSP levels <5.5 gm/dl, patients on immunosuppressants, malignant ulcers, uncontrolled diabetic wounds, superficial and deep burn wounds were excluded.

Procedure

Cadexomer iodine was applied after thoroughly cleaning the wound and surrounding area with a gentle stream of sterile water or saline. The cadexomer iodine was applied directly to a dry, sterile non-adherent gauze and positioned onto the wound. Compression bandage was applied at the end. The dressing was changed in the similar manner after 48 hours. Cadexomer iodine was applied when the wound was infected and had visible slough with pus discharge. Patients were evaluated at base line for various wound characteristics which include length, breadth, diameter (when the wound was circular), depth of the wound, presence/absence of slough, odour, pus or discharge from wound. Thereafter patients were evaluated on weekly basis for a period of 4 weeks on same characteristics evaluated at the baseline. Approval was obtained from Institutional Ethics Committee (IEC/1/21).

Statistical analysis was performed using IBM SPSS Statistics for Windows, version 25.0. Armonk, NY:IBM Corp. Results on categorical variables were presented as number and percentage and calculated as mean and standard deviation. P value <0.05 was considered statistically significant.

RESULTS

Out of 50 cases, majority of patients (58%) belong to age group 41-60 years and males account for 72% of the patients. 18% patients are controlled diabetics and their treatment duration is longer as compared to non-diabetics. Majority of cases (22%) are of post laparotomy wound infections. At the end of 1 week, 100% patients have no growth at the pus culture reports, the number of superficial wounds become 86% from 60% which amounts to a significant change with a p value of 0.0063 ($p<0.05$; significant), 90% wounds become free from visible pus/ooze, all the patients become free of the foul smell. Majority of the patients (about 88%) are free of visible slough in about a week and in about two weeks, all patients (100%) are free from visible slough. At the end of fourth week, the mean±SD of length when compared with at the initiation of treatment are statistically significant with p value <0.0001, the mean±SD of breadth when compared with at the initiation of treatment, are statistically significant with p vale <0.0001, 74% patients have complete closure of the wound while 22% patients have reduction in total wound surface area between 75-99%. The surgical debridement is done in two patients (Fournier's gangrene and gluteal abscess) at the end of 1st week and later on, they undergo secondary suturing. The mean±SD of duration of treatment with cadexomer iodine ointment (Cadomer) is 21.94±3.34 with minimum duration of treatment being 16 days and maximum being 34 days.

Table 1: Visible wound slough presence during course of treatment.

Weeks	Slough	Frequency	Percentage
0	Present	50	100
	Absent	0	0
1	Present	6	12
	Absent	44	88
2	Present	0	0
	Absent	50	100
3	Present	0	0
	Absent	50	100

Continued.

Weeks	Slough	Frequency	Percentage
4	Present	0	0
	Absent	50	100

Table 2: Trends of wound length along the course of treatment.

Weeks since initiation of treatment	Mean (cm)	Median (cm)	Standard deviation (SD)	Minimum value (cm)	Maximum value (cm)
0	5.4	5	1.93	2	10
1	4.33	4	1.75	1	9
2	2.75	3	1.49	0.5	7.5
3	1.24	1	1.06	0.3	6
4	0.23	0	0.56	0	3

Table 3: Trends of wound breadth along the course of treatment.

Weeks since initiation of treatment	Mean (cm)	Median (cm)	Standard deviation (SD)	Minimum value (cm)	Maximum value (cm)
0	2.55	2	1.17	1	5.5
1	1.89	1.5	1.01	0.5	4.5
2	1.17	1	0.75	0.1	3
3	0.59	0.45	0.57	0	2.5
4	0.12	0	0.27	0	1.5

Table 4: Assessment of improvement by physician scale at the end of 4 weeks.

Physician scale	Frequency	Percent
0	0	0.00
1	0	0.00
2	2	4.00
3	11	22.00
4	37	74.00
Total	50	100.00

0=reduction in total wound surface area (wound size reduction) to <24%; 1=reduction in total wound surface area (wound size reduction) between 25-49%; 2=reduction in total wound surface area (wound size reduction) between 50-74%; 3=reduction in total wound surface area (wound size reduction) between 75-99%; 4=complete closure of wound.

Figure 1: Post mastectomy chest wall infected wound showing slough at week 0.

Figure 2: Liquefaction of slough 48 hours after cadexomer iodine ointment application.

Figure 3: Slough decreases at the end of 1st week.

Figure 4: Healthy granulation tissue appears at the end of 2nd week.

DISCUSSION

Infection is an important risk factor for wound healing failure and excessive bioburden can inhibit normal progression to wound healing. In many chronic wounds, bacteria persist in adhesive, polymeric matrix biofilm communities in which they induce chronic inflammation that delays healing and hence are more resistant to antimicrobial therapy.[6,7] Many different treatment modalities have been tried for management of wound and the final word on it is yet to be written. In our study ,we took cases of ulcers with slough, controlled diabetic wounds, postoperative infected wounds, infected traumatic wounds and cases of SSTIs which are in accordance with the study done by Gupta et al, Woo et al and Hansson et al.[8-10] In our study, we found that at the end of one week of cadexomer iodine treatment, all the positive cultures had converted to negative cultures which is statistically significant and was in accordance with the studies conducted by Soriano, Malone et al and Fitzgerald et al.[11-13] In our study, we found that at the start of therapy all the patients (100.00%) had visible slough in the wound. At the end of 1st week, only 6 (12%) patients had visible slough which as compared with at the start of therapy is statistically significant with a p value of <0.0001 which was similar to the study done by Woo et al, Soriano, Laudanska et al and Holloway et al.[9,11,14,15] In our study, we found that at the end of 1 week, 26% deep wounds were converted into superficial making total 86% superficial wounds which amounts to a significant change. Also by the end of two weeks, all the remaining deep wounds became superficial which too was statistically significant and this was similar to the study done by Gupta et al.[8] In our study, we found that at the end of 1 week, the mean of wound dimensions namely length and breadth had significantly reduced from that of at the initiation of treatment. Also, we assessed the response of wounds at the end of weeks 2, 3 and 4 for reduction in wound dimensions which was statistically significant. This was in accordance with the study done by Raju et al and Gupta et al.[8,16] In our study, we found that at the end of 1st week, 90% of the total patients were free from visible pus or discharge from the wounds and all the patients were free of foul smell from the wound. This was in accordance with the study done by Laudanska et al, Holloway et al and Gupta et al.[8,14,15] In our study, the average duration of cadexomer iodine treatment was 21.86 days with maximum duration being 34 days and minimum being 16 days while it was 1 week in the study done by Gupta et al and 12 weeks in the study done by Raju et al.[8,16] In our study, the therapy was stopped either if the wound was completely healed or any other intervention like secondary suturing was planned. At the end of 4 weeks, the overall reduction of wound surface area was assessed and was found that out of the total 50 patients, 37 (74%) patients had complete closure of the wound while 11 (22%) patients had reduction in total surface area (wound size reduction) <75-99%. Only 2 (4%) patients had reduction in total wound surface area (wound size reduction) <50-74%. The two patients with less than 75% reductions were of Fournier's gangrene and gluteal abscess in which surgical debridement was also done at the end of 1st week and later on, they had to undergo secondary suturing.

There were few potential limitations of the study, we had no prior information about patients with known or suspected iodine sensitivity, some patients experienced a transient smarting or pain within first hour after application and lastly two patients had to undergo surgical debridement and secondary suturing.

CONCLUSION

Application of cadexomer iodine dressing is effective in healing SSTIs with good patient satisfaction. For this though, the other parameters and factors influencing wound healing other than infection such as

immunosuppression status, diabetes, cause of SSTIs, nutrition and other co-morbidities need to be controlled in a multimodal approach. With all these potential benefits, cadexomer iodine is safe and efficient in the management of wounds or ulcers, potentially improving the quality of life of patients in quick time and without any need to use the scalpel. It also lowers healthcare expenses. The final word in the management of Sepsis effectively is yet to be written but Cadexomer iodine is proving to be a good tool in its management. Sepsis should never be allowed to become a Battle of Waterloo for the surgeons who toil with their flesh and blood to save the lives of serious patients.

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REFERENCES

1. Swartz MN. Clinical practice. Cellulitis. N Engl J Med. 2004;350:904-12.
2. Angel DE, Morey P, Storer J, Mwipatayi BP. The great debate over iodine in wound care continues: a review of the literature. Wound Pract Res J Austral Wound Manage Assoc. 2008;16(1):6-21.
3. Zhou LH, Nahm WK, Badiavas E, Yufit T, Falanga V. Slow release iodine preparation and wound healing:in vitro effects consistent with lack of in vivo toxicity in human chronic wounds. Br J Dermatol. 2002;146(3):365-74.
4. Miller C. Examining the efficacy of silver and cadexomer iodine dressings in treating wounds compromised by bacterial burden: A review of the literature. Mendez-Vilas A, Science against microbial pathogens: communicating current research and technological advances. Formatex Res Centre. 2011;1:14-22.
5. Murdoch R, Lagan K. The role of povidine and cadexomer iodine in the management of acute and chronic wounds. Phys Ther Rev. 2013;18(3):207-16.
6. Frykberg RG, Banks J. Challenges in the treatent of chronic wound adv wound care. New Rochelle. 2015;4(9):560-82.
7. Rhoads DD, Wolcott RD, Percival SL, Biofilms in wounds: management strategies. J Wound Care. 2008;17:5028.
8. Gupta S, Shinde RK, Shinde S. Comparison of the outcomes of cadexomer iodine and povidone-iodine ointments in wound management. Cureus. 2022;14(5).
9. Woo K, Dowsett C, Costa B, Ebohon S, Woodmansey EJ, Malone M. Efficacy of topical cadexomer iodine treatment in chronic wounds: Systematic review and meta-analysis of comparative clinical trials. Int Wound J. 2021;18(5):586-97.
10. Hansson C. The effects of cadexomer iodine paste in the treatment of venous leg ulcers compared with hydrocolloid dressing and paraffin gauze dressing. Cadexomer Iodine Study Group. Int J Dermatol. 1998;37:390-6.
11. Soriano JV. Chronic wounds treated with iodinated cadexomer. Study of a series of clinical cases with Iodosorb. Revista de enfermeria (Barcelona, Spain). 2010;33(11):38-42.
12. Malone M, Johani K, Jensen SO, Gosbell IB, Dickson HG, McLennan S, et al. Effect of cadexomer iodine on the microbial load and diversity of chronic non-healing diabetic foot ulcers complicated by biofilm *in vivo*. J Antimicrob Chemother. 2017;72(7):2093-101.
13. Fitzgerald DJ, Renick PJ, Forrest EC, Tetens SP, Earnest DN, McMillan J, et al. Cadexomer iodine provides superior efficacy against bacterial wound biofilms *in vitro* and *in vivo*. Wound Rep Regenerat. 2017;25(1):13-24.
14. Laudanska H, Gustavson B. In-patient treatment of chronic varicose venous ulcers. A randomized trial of cadexomer iodine versus standard dressings. J Int Med Res. 1988;16(6):428-35.
15. Holloway GA, Johansen KH, Barnes RW, Pierce GE. Multicenter trial of cadexomer iodine to treat venous stasis ulcer. West J Med. 1989;151(1):35.
16. Raju R, Kethavath SN, Sangavarapu SM, Kanjarla P. Efficacy of cadexomer iodine in the treatment of chronic ulcers: a randomized, multicenter, controlled trial. Wounds Compend Clin Res Pract. 2019;31(3):85-90.

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