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Comparison of foam dressings with silver versus foam dressings without silver in the care of malodorous malignant fungating wounds

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Summary

Purpose: *To investigate the effectiveness of foam dressings with silver vs. foam dressings without silver to reduce malodorous and septic phenomena in malignant fungating wounds (MFWs).*

Methods: *The study included 26 patients with malodorous MFWs at home care. Thirteen patients formed the intervention group A (foam dressings with silver), and another 13 patients formed the control group B (foam dressings without silver). The patients' selection was random. The dressing changes were carried out according to the needs of the ulcer and depending on the exudates' level. The evaluation of the odor was 4 weeks after the start of the study. The patients' evaluation was excluded due to familiarization with the odor.*

Results: *In group A 10/13 (76.9%) patients showed a significant reduction of the odor compared with 4/13 (30.8%) patients in group B ($p = 0.049$).*

Conclusion: *Microbial activity and septic phenomena in the ulcerated surface of MFWs are the causes of unpleasant odor. This study provided evidence that the antimicrobial property of silver dressings is very useful in the treatment of microbial activity and can reduce malodorous and septic phenomena.*

Key words: foam dressings, fungating, malignant, malodorous, silver, wounds

Introduction

Five to 10% of patients with metastatic cancer will develop a MFW [1].

MFWs are complex wounds and very often become malodorous due to infection depending on the microbes' activity and sepsis [2,3].

Patients with MFWs usually suffer from bleeding, pain, and local or systemic infection [4]. These wounds can be challenging for practitioners and devastating for patients and their families [5]. Specialized care provided by experienced professionals using modern techniques and appropriate materials are important to help cancer patients with MFWs have a comparatively normal life [6,7].

Various materials have been used in the treatment of malodorous MFWs such us topical metronidazole, mesalt dressings, activated carbon dressings, foam dressings and curcumin ointment [8-10].

Use of foam dressings with silver in other types of chronic wounds has shown a wide antibacterial spectrum that included aerobes, anaerobes, multi-resistant microorganisms and fungi [11-13]. Using foam dressings with silver may help reduce the odors of malodorous MFWs due to the antimicrobial activity of silver's ions.

The aim of this study was to compare the effectiveness of foam silver dressing vs. foam dressing without silver in reducing odors of malodorous MFWs after 4 weeks of continuous treatment.

Methods

All patients, practitioners and caregivers gave written informed consent.

Patients suffering from malodorous MFWs were considered for inclusion in the study. Exclusion criteria were: patients in termi-

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nal stage of cancer, MFWs close to uncovered vessels, and patients receiving radiotherapy in the ulcerated area.

Patients were randomly assigned to the study group A (foam dressing with silver; n=13) or the control group B (foam dressing without silver; n=13). Group A included 6 men and 7 women with mean age 76.46± 6.06 years. Group B included 4 men and 9 women with mean age 73.15± 8.81 years.

The dressing changes were made according to the needs of the ulcer and depending on the exudates' level.

At the start of this study, both health professionals and not professionals caregivers who looked after the patients confirmed that the sores were malodorous. The first recording was the first day of the study for each patient, followed by one recording each week until the end of the trial.

In the last recording health professionals and caregivers reported whether the odors increased, decreased or remained the same.

The patients' opinion was not taken into account as they were familiar with the smell and could not tell the difference.

In both groups, wounds were cleansed using normal saline solution and a 10% povidone iodine solution. In group A wounds were covered with adhesive or non-adhesive foam dressings containing 1 mg/cm^2 silver measuring either 10 × 10 cm or 15 × 15 cm, depending on the ulcer size and peri-wound skin. In group B, wounds were covering with an adhesive or non-adhesive foam dressing without silver 10 × 10 cm or 15 × 15 cm, also depending on ulcer size and peri-wound skin.

Patients were followed for 4 weeks. Wound dressings were changed 2 or 3 times a week.

Statistical considerations

Statistical analysis was performed using the statistical program IBM SPSS Statistics 19 for Windows. Statistical analysis was performed using parametric and nonparametric tests as appropriate.

The normal distribution of the two groups in relation to patients' age and the size of the ulcers was evaluated by the Kolmogorov-Smirnov Z test, with 95% confidence interval (CI).

For the comparison of the two groups in relation to patients' age and the size of the ulcers the Student's t-test with 95% CI was used.

The comparison of the two groups in relation to odor reduction was realized using the x^2 test with Yates's correction and 95% CI.

Results

Ten of the patients were men (mean age 76.20± 5.85 years) and 16 women (mean age 73.94±8.58 years). Eleven patients had malodorous MFWs in the breast, 7 in the head and neck and 8 in other parts of the body (Table 1 and Figures 1-3).

The size of the ulcers was measured with a sterile graph page and ranged from 7 to 357 cm^2 (7-273 cm^2, mean± 87.54±79.58 in group A, and 8-357 cm^2, mean± 89.46±106.86 in group B).

The distribution of the two groups in relation to age and MFW surface area did not differ significantly (Kolmogorov-Smirnov Z-test; p>0.05).

Statistical analysis in relation to age between the two groups showed no significant difference (Student's t-test; p = 0.21).

Also no significant difference between the groups was noted concerning ulceration (Student's t-test; p= 0.95; Table 2).

On the first day of the study health professionals and caregivers in both groups reported that all the 26 (100%) MFWs were malodorous.

In the last recording in group A, decrease of malodorous MFWs was noted in 10 (76.9%) patients, while in 3 (23.1%) the odors remained the same. In no case the odor increased. In group B in 4 (30.8%) patients the odor was reduced and in 9 (69.2%) remained the same. In no case the odor increased. The difference in reducing the malodor between the two groups was statistically significant (p = 0.049; x^2 test with Yates's correction; Figure 4).

No adverse effects were registered in both groups and all patients enrolled in the study completed the trial.

Table 1. Characteristics of the 2 groups: age, surface, localization of MFW

Patients, N	*Group A Age (years)*	*Group B Age (years)*	*Group A Surface (cm^2)*	*Group B Surface (cm^2)*	*Group A Localized MFW*	*Group B Localized MFW*
1	69	68	16	45	Breast	Breast
2	75	79	7	262	Head/neck	Breast
3	81	57	58	48	Other	Other
4	80	65	135	357	Breast	Other
5	79	66	54	19	Breast	Breast
6	65	86	62	151	Breast	Breast
7	79	67	40	8	Head/neck	Other
8	66	65	220	10	Other	Head/neck
9	76	82	185	47	Head/neck	Breast
10	81	79	22	32	Breast	Head/neck
11	78	79	72	63	Other	Head/neck
12	82	81	30	72	Other	Other
13	83	77	237	49	Head/neck	Breast
Mean ± SD	76.46 ± 6.06	73.15 ± 8.81	87.54 ± 79.58	89.46 ± 105.86		

SD: standard deviation, MFW : malignant fungating wound

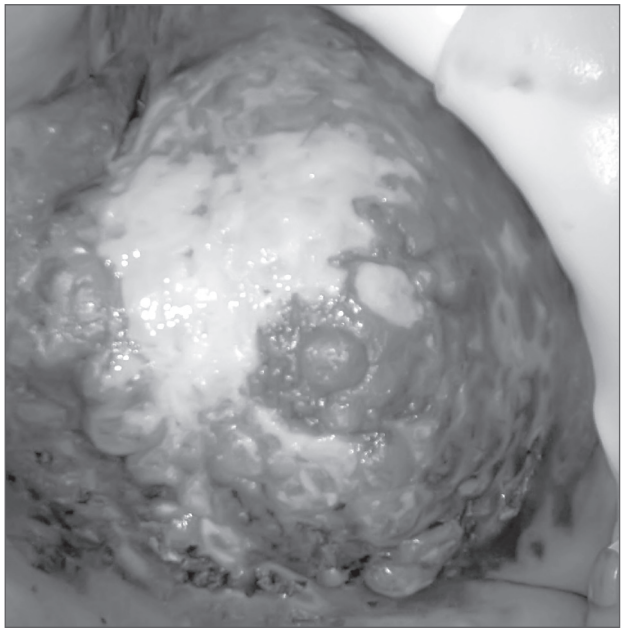

Figure 1. MFW localized in the breast.

Figure 3. MFW localized in the vulva and the left thigh.

Figure 2. MFW localized in the right neck.

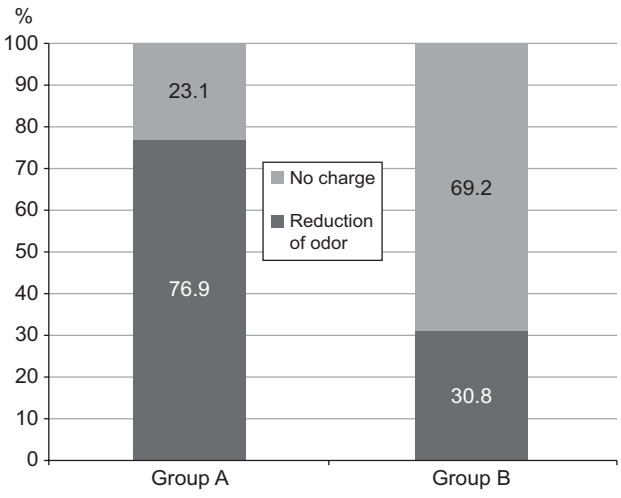

Figure 4. Evolution of odor per group after 4 weeks of treatment. Group A: Foam dressing with silver; Group B: Foam dressing without silver; p = 0.049 (x^2 with Yates's correction).

Table 2. Distribution test of two groups

	Group A Age (years)	*Group B Age (years)*	*Group A Surface (cm^2)*	*Group B Surface (cm^2)*
N	13	13	13	13
Normal parameters				
Mean	76.46	73.15	87.54	89.46
SD	6.064	8.811	79.581	105.866
Most extreme differences				
Absolute	0.216	0.208	0.270	0.335
Positive	0.140	0.182	0.270	0.335
Negative	–0.216	–0.208	–0.156	–0.221
Kolmogorov-Smirnov Z	0.777	0.750	0.972	1.207
Asymp. Sig. (2-tailed)	0.582	0.627	0.301	0.109
Student's t-test	p = 0. 21		p = 0. 95	

SD: standard deviation

In both groups the skin around the ulcers remained in good condition. In 3 cases of group A and 1 case in group B improvement of the peri-wound skin was seen as in these cases patients suffered from maceration before the study entry due to high exudation. Ulcers treated with silver dressings showed progressively a reduction of inflammation, which could be attributed to the reduction of infection; however, no safe conclusions could be drawn as the study was not focused on this problem.

Discussion

Few clinical studies have shown a beneficial effect from the application of foam silver dressing on various types of chronic wounds with moderate to high exudation, clinical infection and malodors [9,11,14]. Measurement of odors based on human sensing is a difficult issue and there is a factor of uncertainty about the outcomes [15]. Different techniques have been proposed based on technology for objective measurement of odors, like virtual chemical sensors with non-overlapping responses using ultrahigh-speed gas chromatography with a surface acoustic wave sensor (GC / SAW) [16]. These techniques are complex and require high-tech equipment. Usually, they find applications in the industry and odor problems on a large scale, but they couldn't be used in clinical practice. On the other hand, many researchers recorded odors of MFWs based on the human sense but they didn't try to measure it because of absence of an easy to use, objective measurement tool [2,4,5,7,17]. Owing to these reasons, in this trial we chose to record the changes of odors as a quality characteristic and did not try to make a quantitative measurement.

The foam dressings with silver were introduced in 1998 and quickly became popular due to their superior properties to manage exudates. This foam has a soft, skin-friendly adherent layer comprising < 50% of the foam surface in order to maintain effective exudation management [18, 19].

To our knowledge, this is the first study in which a foam dressing with silver was used to treat malodorous MFWs. Overall, the difference between the two groups was a factor of the optimal odor management and the wide antibacterial spectrum of the foam dressings with silver, a combination that promotes the quality of life of the patient suffering of MFW. The lack of side effects of foam dressings with silver in this study makes its use even more appealing.

Despite recent advances in wound care, malodorous MFWs continue to be a challenging problem both for patients and the public health. Aside from medical complications that require costly treatment, malodorous MFWs can also seriously affect the quality of life of a patient and his family.

In this clinical trial a significant reduction of odor was shown after 4 weeks of care, using a simple approach of topical wound care with a foam dressing with silver.

Major limitations of this study include the small number of subjects and absence of an easy to use, objective measurement tool. More detailed studies are needed to determine whether the known antibacterial effect of silver was a critical factor in the observed reduction of odors.

Larger clinical trials are necessary to determine optimal treatment protocols (duration, frequency of dressing changes, possible co-administration of other agents, etc.) in order to further improve the outcome of this unpleasant situation.

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