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Cost-minimization Analysis

Wound treatment costs comparing a bio-cellulose dressing with moist wound healing dressings and conventional dressings

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ABSTRACT

Aim: The aim of the present paper was to compare material and labour costs of a bio-cellulose dressing[1] with traditional dressings (surgical pads, tulle grass, saline soaked gauze) and moist wound healing dressings.
Methods: A prospective cohort study measured clinical efficacy, materials and labour costs when using bio-cellulose dressing[1] + film[2] or bio-cellulose dressing[1] + foam.[3] 60 patients with 73 complex wounds of various aetiologies were treated for a period of 1 year, in an out-patient clinic setting in Frankfurt and Neuwied, Germany and Bologna, Italy. The evaluated bio-cellulose dressing[1] was combined with polyhexamethylene biguanide for reduction of bacterial burden. The present study results were compared to published data on complex wounds, treated with traditional dressings and moist wound healing dressings, to calculate cost differences.
Results: For the traditional dressings, cost calculations are based on 7.0 dressing changes/week. For moist wound healing dressings this was 3.0/week and for the bio-cellulose dressing 1.4/week. In comparison to the treatment with traditional dressings wound treatment costs with moist wound healing dressings were significantly lower. For calculation of a 3 months period, cost reduction for moist wound healing dressings was 49.4%, for bio-cellulose dressing[1] + foam[3] 61.9% and 73.7% for bio-cellulose dressing[1] + film.[3]
Conclusion: Moist wound healing dressings showed a cost reduction, compared to traditional dressings, with a larger cost reduction shown for bio-cellulose dressing.[1] These findings are to be confirmed by randomized controlled studies.

1. Introduction

Complex wounds are an important source of morbidity to patients and generate high costs to hospitals and community health care organizations [1,2]. Randomized controlled trials may not always be the first choice to address the divergent variance in complex wound issues. In practice, the best available research evidence is to be reviewed and compared with current clinical practice [2–4]. This approach tries to offer objective input for clinical–medical decisions to be made, applying relevant scientific data and ensuring appropriate utilization of resources [5]. Evidence in this context is data on effectiveness of a treatment or intervention, proven, comparing therapy with an appropriate control [1,4]. Translational medicine is an emerging approach of medical practice and is considered a progression from evidence based medicine [4]. This type of research looks specifically at improving patient outcomes and sustainable solutions for real live situations [6]. Refusal to adopt new technologies for wound treatment may be based on the myth of high product cost and not on clinical evidence [6]. Posnett identified that there is a lack of data on the prevalence of wounds among European hospitals and that more research is needed [2]. Especially there is a need for data

Abbreviations: PHMB, polyhexamethylene biguanide; BD, bio-cellulose dressing; MWH, moist wound healing dressings; TD, traditional dressings; NHP, Nottingham Health Profile; WWS, Würzburger Wundscore.

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[1] Suprasorb® X + PHMB, Lohmann & Rauscher GmbH.
[2] Suprasorb® F, Lohmann & Rauscher GmbH.
[3] Suprasorb® P, Lohmann & Rauscher GmbH.

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on avoidable wounds and wound complications, such as infections. This information is needed to identify the true extent of costs associated with wounds [2]. Sackett defined evidence-based wound treatment as the integration of best research evidence with clinical expertise and patient values [3]. Cost-effectiveness analysis simultaneously identifies, calculates, and compares costs and outcomes of therapeutic approaches using clinical units as impact measures [7–9]. These units include outcome, results or impact of the interventions, including monetary components and effectiveness [8].

German studies, Sellmer [10], Protz [11] and Wessig [12] have looked at weekly costs of materials and staff, treating complex wounds with traditional dressings and moist wound healing (MWH) dressings. Due to more frequent dressing changes especially the costs for staff were much higher [8]. Janβen used a cost calculation method, comparing traditional dressings (TD) and MWH, calculating costs per week, in 100 patients with complex wounds [7]. In the present cohort study we implemented wound treatment with a bio-cellulose dressing[1] (BD) that was shown to be clinically effective [13].

2. Materials and methods

The aim of the present paper was to compare material and labour costs of a bio-cellulose dressing[1] with traditional dressings (surgical pads, tulle grass, saline soaked gauze) and moist wound healing dressings (foams and alginates). Data were used from a prospective cohort study which compared costs when using BD + PHMB[1] with TD and MWH dressings in the treatment of complex wounds of various aetiologies. During a 1 year period data were collected from centres in Frankfurt and Neuwied, Germany and Bologna, Italy. The cohort study aimed to examine costs of BD[1] and comparing it with TD and MWH dressings using effect variables [7] that may be examined as part of everyday clinical routine, looking at: time to wound healing, patient' concordance, quality of life aspects (Nottingham Health Profile (NHP) and Würzburger Wundscore (WWS)) [7]. The WWS looks at evolution of wound healing, relevant medical status and quality of life issues. The cohort study included $N = 60$ adult patients who consented. They had complex wounds, healing by secondary intention, with light, or moderate exudate production [14]. Excluded were patients with wounds healing by primary intention, highly exuding wounds and clinically manifest infected wounds. Patient information was collected on age, gender, wound type, clinical history, co-morbidities and medication. Participating unit staff was trained on dressing changes and wound documentation. Where appropriate the underlying disease was treated and attention was paid to nutrition and nutritional status of the included patients. The cohort study employed BD[1] as a primary dressing and depending on the exudate production, BD[1] was covered with a foam,[3] a film[2] or an absorbent pad. Dressing changes took place when dressings were saturated or leakage occurred and were at the discretion of the clinician.

Calculations were based on complex wounds, which were treated with TD and MWH dressings, using the method as described by Janβen [7].

Effect variables: Relative measure of effects of the dressing was determined using frequency of dressing change and absence of dressing-related complications. Complications included skin-related issues (maceration), no signs of wound evolution and/or wound deterioration. Absence of complication was defined as the absence of any unexpected event related to the use of the dressings, such as infection, maceration, and increase in pain, reported by the patient. For the effect variables, each wound was considered one unique case, the study included 73 cases in $N = 60$ patients. Total costs are calculated per day, per week, per month and per 3 months (quarterly).

Statistical evaluation was performed applying IBM SPSS Statistics Standard, using where appropriate, the independent sample *t*-test. Tests were carried out at the 5% significance level, and 95% confidence interval.

3. Results

3.1. Cohort study

Patients from centres in Germany and Italy were selected as there are similarities in their reimbursement system and cost structure. $N = 60$ patients (32 females and 28 males) with 73 complex wounds of various aetiologies were included in the analysis. Patients had a mean age of 73 years (49–89 years). The majority of patients had venous leg ulcers (69%). Other wound types were diabetic foot ulcers (7%), pressure ulcers 6% and surgical wounds healing by secondary intention (7%). The duration of the wounds was a mean of 7.7 months (0.1–24 months). There were no wound infections present at baseline. Dressing change interval was a mean of 4.9 days. BD[1] + foam[3] was used in 45% of wounds, BD + film[2] in 22%, BD[1] + absorbent pads in 15% and BD[1] + other dressings in 18% of wounds. The study results obtained from the cohort study on costs of materials used, labour costs, wound healing results and complications were compared to published data from Germany [10–12] (Fig. 1).

3.2. Calculations

The calculations are based on Sellmer [10]. Table 1 shows cost calculations for dressing change materials, used with traditional and MWH dressings. Table 2 shows cost calculations for traditional dressings, MWH and BD,[1] combining material costs and labour costs. For the traditional dressings, cost calculations are based on 7.0 dressing changes/week, for MWH this was 3.0/week and for BD[1] this was 1.4/week. The authors used the price per unit, based on the pharmacy retail price (Germany) (Table 3). In comparison to traditional dressings wound treatment costs with MWH were

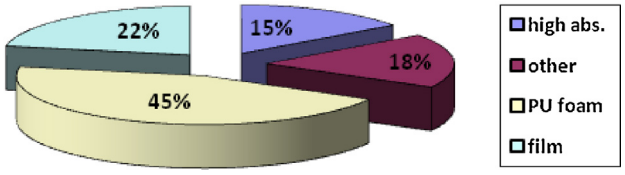

Fig. 1. Distribution of types of secondary dressings used during the study period.

Table 1
Calculations of costs for traditional – and MWH dressings [10].

Material	Units/ dressing change	Traditional wound treatment	MWH dressing
Gloves, non-sterile	1	0.18 €	0.18 €
Gloves, sterile	1	1.10 €	1.10 €
Kidney dish	1	0.13 €	0.13 €
Padding	1	0.27 €	0.27 €
ES-gauze 10 cm × 10 cm, sterile	3 × 2	0.81 €	0.81 €
Hand disinfectant	5 ml	0.15 €	0.15 €
Hydrogen peroxide solution 3%	50 ml	0.69 €	
Wound therapeutics	5 g	2.50 €	
Ointment applicator	1	0.05 €	
Ointment gauze	1	1.60 €	
Fixomull stretch 10 cm	20 cm	0.43 €	
Saline solution 0.9% Miniplasco	1		0.47 €
MWH dressing ca. 10 cm × 10 cm	1		8.26 €
Total per dressing change		7.91 €	11.37 €