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USE OF AN OCTENIDINE WOUND GEL FOR THE DIFFERENTIATED CARE AFTER SECOND-DEGREE BURNS

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ABSTRACT

Principles: Octenisept (octenidine dihydrochloride in combination with phenoxyethanol) is a wound and mucous membrane antiseptic that is widely used in surgery. It contains no phenol, silver or PVP-iodine, is not absorbed, and therefore has no systemic effect. In order to be able to make use of these advantages also in surface therapy in the treatment of burns, the influence of octenidine dihydrochloride (octenidine) in the form of a wound gel for keeping second-degree thermally caused wounds was investigated. In addition, the subjective patient sensitivity on first application was determined, and the management of the dressing carried out with octenidine gel in everyday clinical routine was evaluated. During use in the clinic, possible allergic reactions or other pathological skin changes were to be documented. Finally, the dressing regimen with octenidine gel was to be evaluated in comparison with the previously carried out protocol with Lavasept Gel.

Material and methods: Octenidine dihydrochloride was applied as a gel containing 0.05 % octenidine. Over a period of six months a total of 107 patients with superficial second-degree thermal lesions were treated prospectively with the octenidine gel. The wound care consisted of initial debridement and sterile wound covering with perforated silicon film (Mepitel) in combination with octenidine gel. The first dressing change was carried out between the fourth and sixth day following the injury, further dressing changes with renewed gel application were carried out every three to four days until healing was achieved. Both in-patients and outpatients of all age groups were included.

Results: Among the 107 patients included in the study, two wound infections (1.68 %) occurred during use of the octenidine dihydrochloride wound gel. A total of 48 patients reported a pleasant feeling or freedom from pain on first application of the octenidine gel (45 %). During treatment with the octenidine gel there was an extremely low wound infection rate of only 1.68 %. Intolerability reactions such as allergic skin irritations, skin redness or other pathological skin symptoms as a reaction to the surface treatment with octenidine gel were not observed.

Conclusion: As a result of the use of octenidine dihydrochloride in gel form as part of the treatment of IIa degree thermally caused wounds, an easy and simple to use moist dressing is available, which is characterised by uncomplicated use and has no disadvantages compared with the previously used dressing regimen with Lavasept Gel. As a result of the antimicrobial effect of octenidine dihydrochloride, the dressing can be left on the wound for up to five days. As with the dressing protocol with Lavasept Gel that was previously used in IIa degree thermal lesions, the

pain is minimised with the Octenisept Gel treatment and the number of necessary dressing changes is reduced, as reflected in the results of the subjective patient reports.

PRINCIPLES

The purpose of the study was to evaluate the use of octenidine wound gel for differentiated antimicrobial superficial therapy after thermal lesions, including evaluation of the subjective patient perception on first application of the octenidine gel. In addition, use of the octenidine gel moist dressing in everyday clinical routine was tested. Finally, the treatment regimen with octenidine gel was to be evaluated in comparison with the previously used protocol using Lavasept Gel. The trial centre was the Centre for Severe Burns Patients with Plastic Surgery of the Berlin Accident Hospital. The patients were recruited from eight intensive care beds in the EO department, four beds for severe burns cases in the Intermediate Care Department DO, from the peripheral departments and from the outpatient clinic. In addition, in co-operation with the Lindenhof Paediatric Clinic, children with second-degree burns were treated as in-patients. In a year, the Centre for Severe Burns Patients with Plastic Surgery of the Berlin Accident Hospital treats more than 300 patients as in-patients and more than 1000 patients as out-patients. The study started on 1st December 2003 and ended six months later on 31st May 2004.

MATERIAL AND METHODS

IIa degree thermal lesions are treated at the Berlin Burns Centre with Mepitel / Lavasept Gel moist dressings. This dressings regimen was replaced by moist dressings with Mepitel in combination with octenidine gel. The study was limited to a six-month study period from 1.12.2003 to 31.05.2004.

Octenidine was used in gel form (0.05 % octenidine dihydrochloride) as a topically applied wound gel for thermally caused IIa degree skin lesions, and was supplied in concentrated form for production of the finished product by the hospital pharmacy. Octenidine gel was used exclusively in combination with silicon wound coverings (Mepitel). Mepitel is a sterile wound covering made of perforated silicon film. After careful cleaning and debridement of the wound, the silicon film was placed in position, and immediately afterwards octenidine gel was applied to the Mepitel. This was followed by a wound dressing of sterile compresses or sterile abdominal covers, then fixation of the dressing by elastic bandages, gauze bandages, Fixomull or Peha-Haft. The first dressing change was carried out between the fourth and sixth days following the injury. The subsequent dressing regimen consisted of changes every two to three days in a similar way until healing was obtained. The silicon film used does not stick and remains on the wound until it has healed. On account of the perforation holes in the Mepitel, in the facial area there is the risk of the perforation holes leaving marks on the skin, so that on the face the position of the Mepitel wound covering should be changed after three days at the latest. The renewed application of octenidine also consisted of

application of 0.05 % gel. At each dressing change, clinical parameters indicating an infection were documented. If necessary, swabs were taken.

All patients with IIa degree thermal skin lesions were included in the study in the order of their admission to the Burns Centre. In the six-month study period from 01.12.2003 to 31.5.2004 a total of 107 patients were included in the study. The mean age of the 107 patients treated with octenidine gel was 29.26 years, with a minimum of 9 months (date of birth 29.10.2003) and a maximum age of 89 years (date of birth 29.05.1915). 62 of the 107 patients included were male (58%), 45 patients were female (42 %). 58 patients received octenidine gel during their period of hospitalisation (54 %), 49 patients were treated during outpatient therapy (46 %). Of the 58 treated as in-patients, eleven children were treated at the Lindenhof Paediatric Hospital. In three cases the condition deteriorated and had to be treated surgically. 19 patients had more severe lesions as well as the IIa degree thermal lesions and had to be treated surgically. Ten patients had pre-existing diseases, with several pre-existing diseases being present in some cases (Table 1).

Table 1

Pre-existing disease	**Frequency**
Alcohol abuse	6.4 %
Nicotine abuse	5.3 %
Inhalation trauma	3.2 %
Obesity	3.2 %
COPD	2.2 %
Diabetes mellitus	2.2 %

In the 107 patients the wound surfaces were located on various regions of the body (Table 2). Overall, in 107 patients 180 regions of the body were treated with octenidine gel:

Table 2

Location	**Number**	**Percentage distribution**
Forearm	34	31.80 %
Face	23	21.50 %
Abdomen	19	17.60 %
Upper arm	19	17.60 %
Back	17	15.90 %
Shoulders	13	12.10 %
Hand	10	9.30 %
Breast	9	8.40 %
Neck	7	6.50 %
Genitals	7	6.50 %
Head	6	5.60 %

Thigh	6	5.60 %
Foot	4	3.70 %
Lower leg	3	2.80 %
Finger	2	1.90 %
Thorax	1	0.90 %

The extent of the burned body surface was on average 5.01 % burned body surface (BBS), with a minimum of 0.5 % and a maximum of 20 % BBS.

In 30 patients the burn area was 1 % of the body surface or less. The documented area was, as is usual in evaluation of burned body surface, divided into 0.5 % sections. In patients who had further, deeper wound areas in addition to the IIa degree thermal lesions, the IIa degree areas were treated with octenidine gel at the same time as the deeper wound areas, which were treated with a different wound regimen.

In 95 patients octenidine gel was applied to the wound surface on the day of the accident. In these patients the minimum period between time of accident and first application was 2.6 hours. In 12 patients the time of the accident and time of first application differed by more than 24 hours. The maximum period was nine days between accident and first application of octenidine gel in a patient who only presented at the Berlin Severe Burns Centre after this period and who had been treated elsewhere with Betaisodona ointment until application of the octenidine gel. Of the total of 107 patients, 12 patients had their accident during or in connection with their work and were covered by their occupational accident insurance. The various causes of the burns were divided into the following classes (Table 3):

Table 3

Cause of accident	**Percentage distribution**
Scald	61 %
Flame burn	26 %
Radiation	7 %
Contact burn	3 %
Electrical burn	2 %
Explosion injury	1 %

The subjective patient perception on first application of the octenidine gel was determined by means of a questionnaire. The patients were questioned about the following events (Table 4):

Cooling sensation
Cooling and analgesic sensation
No sensation
Burning sensation / pain

In some patients no results could be determined on account of their age (children). Also, patients who had been intubated at the site of the accident or who remained ventilated in intensive care for a prolonged period were included in the use of the octenidine gel, and so a subjective report of their perception on first application could not be determined.

RESULTS

In the total of 107 patients included in the study, two wound infections occurred, resulting in an extremely low wound infection rate of 1.68 %. The number of infections observed during the octenidine gel treatment corresponded to the previous dressing regimen with Lavasept gel.
The first infection observed involved a IIa degree scalded area on the left forearm of a five-year-old child (Staphylococcus aureus with haemolysis). The second infection observed involved an 81-year-old female patient with a IIa degree burn on her right foot (Staphylococcus hominis without haemolysis). On account of the infection, the wound treatment of both patients was changed to topical therapy with Betaisodona ointment.

In three patients without obvious infection, the therapy was changed pre-operatively to the wound antiseptic Betaisodona ointment on account of an altered depth of the burn following debridement. One patient came to use with an already present florid infection of a IIa degree burn and was then treated with Furacin-Sol. In contrast, for one patient out of the whole group of 107 patients, who had initially been treated with Betaisodona elsewhere, the wound care regimen was changed from Betaisodona to octenidine gel. Swabs were taken from the wounds in the routine diagnostic procedure; with a total of 97 swabs this microbiological diagnostic procedure was carried out routinely in a total of 56 patients. Colonisation could be detected by means of the swabs, although no infection occurred in these cases. The organisms that occurred during the octenidine gel treatment were as follows (Table 5):

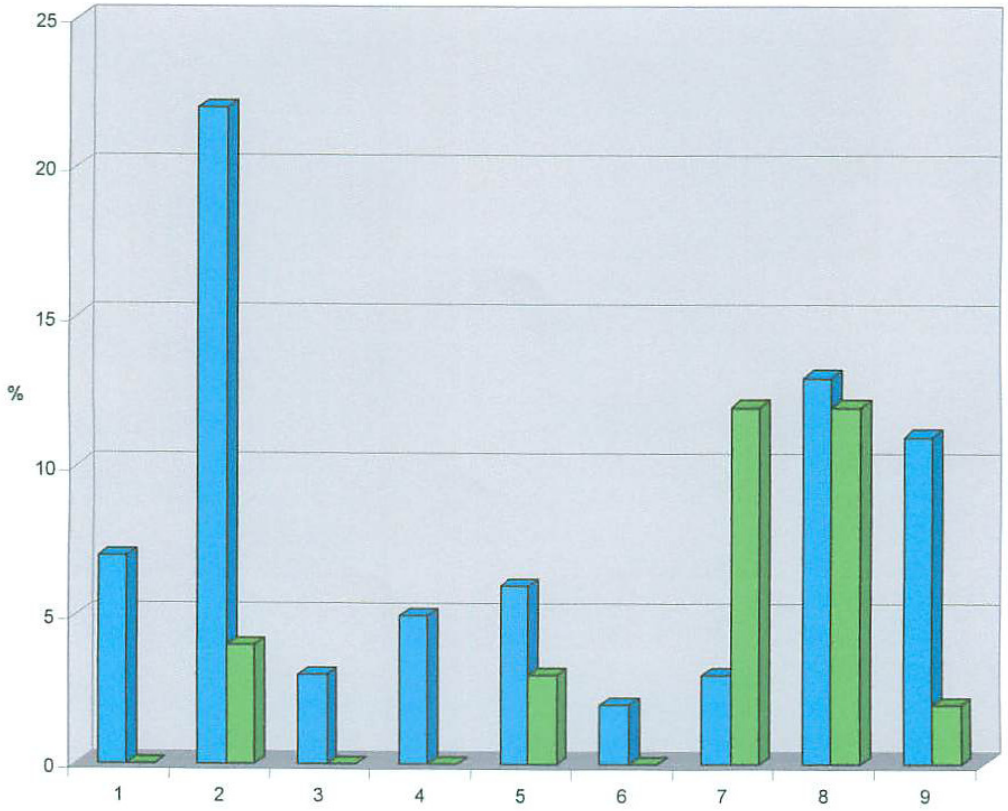
Table 5

Species	**Number**	**Percentage distribution**
Staphylococcus coagulase negative	13	12.1 %
Streptococci viridans	8	7.5 %
Staphylococci with haemolysis	7	6.5 %
Staphylococci without haemolysis	6	5.6 %
Staph. epidermidis	4	3.7 %
Pseudomonas aeruginosa	4	3.7 %

Proteus mirabilis	4	3.7 %
Enterococcus faecalis	3	2.8 %
Aerobic spore-formers	3	2.8 %
Staphylococcus hominis	2	1.8 %
Acinetobacter Lwoffii	2	1.8 %
Acinetobacter baumanii	1	0.9 %
Enterobacter agglomerans	1	0.9 %
Conamonas acidovorans	1	0.9 %
Corynebacterium species	1	0.9 %
Morganella morganii	1	0.9 %
Staphylococcus capitis	1	0.9 %
Staphylococcus saprophyticus	1	0.9 %

The following diagram shows the frequency of the most important pathogens at the Berlin Severe Burns Centre in 2003 (total group in relation to all thermally caused wounds) (blue columns) and compares these with the frequency of the most important pathogens in thermal lesions during octenidine gel treatment in the period from December 2003 to May 2004.

Figure 1



Legend:

1	Escherichia coli
2	Pseudomonas aeruginosa
3	Klebsiella pneumoniae
4	Enterobacter chloacae
5	Acinetobacter group
6	Stenotrophomonas maltophilia
7	Coagulase-negative staphylococci
8	Staphylococcus aureus
9	Enterococci

Diagram 1

1	Escherichia coli
2	Pseudomonas aeruginosa
3	Klebsiella pneumoniae
4	Enterobacter chloacae
5	Acinetobacter group
6	Stenotrophomonas maltophilia
7	Coagulase-negative staphylococci
8	Staphylococcus aureus
9	Enterococci

During the study no increased wound infection rate was observed in the sub-group of the ten patients with obvious pre-existing diseases. No signs of intolerance in the form of allergic skin irritations, skin redness or other pathological skin symptoms as a reaction to the surface therapy with octenidine gel were observed. With regard to the subjective patient perception (Table 7), 19 patients reported having experienced a cooling sensation on first application of the octenidine gel, 13 patients chose the answer cooling and analgesic. In 16 cases no particular sensation was reported. Overall, therefore, 48 patients reported a pleasant feeling or freedom from pain with the first application (45 %). In 33 cases no comment could be made, as the patients were either intubated or were unable to give an answer (31 %). In 26 patients a brief burning sensation occurred (24 %). It must be pointed out here that, in cases of stating a “burning sensation”, this sensation lasted for a maximum of three minutes.

Table 7

Patient perception	**Number**	**Percentage distribution**
Cooling effect	19	18 %
Cooling and analgesic effect	13	12 %
No effect	16	15 %
Burning effect	26	24 %
Patient intubated / unable to give an answer	33	31 %

CONCLUSION

As a result of the use of octenidine dihydrochloride in gel form in the therapy of IIa degree burn wounds, a moist dressing that is characterised by uncomplicated use is available. As a result of the primary preservative and thus organism-inhibiting efficacy of octenidine dihydrochloride, it could be left on the wound for up to five days. As with the previous regimen for IIa degree thermal lesions, using Lavasept Gel, pain was also minimised with the use of octenidine gel in the described protocol, which was expressed in the results of the subjective patient reports. During treatment with

octenidine gel there was an extremely low wound infection rate of only 1.68 %. Overall, as a result of changing the antiseptic therapy from Lavasept Gel to Octenisept Gel, we saw no change in the micro-organism spectrum on the swabs from the wounds carried out in the BVZ, No intolerance reactions in the form of allergic skin irritations, skin redness or other pathological skin symptoms as a reaction to the topical therapy with octenidine gel were observed.