

Benefit of Hydrocolloid SSD Dressing in the Outpatient Management of Partial Thickness Burns

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Silver sulfadiazine has been used as topical medication in the treatment of partial-thickness burns or secondary degree burns for many years. Pain during daily wound cleansing is the main problem. Urgotul SSD™, a hydrocolloid dressing with silver sulfadiazine (SSD) has been reported to reduce infection and exhibit antimicrobial activity in burn wounds. The purpose of the present study was to compare the efficacy of Urgotul SSD™ and 1% silver sulfadiazine for treatment of partial thickness burn wounds. The authors reviewed 68 patients who had partial thickness burn wound less than 15% total body surface area (TBSA%) and were treated at Siriraj outpatient burn clinic during July 2005-December 2006. All patients were divided into two groups: Urgotul SSD™ treated group (34 patients) and 1% silver sulfadiazine treated group (34 patients). The two groups were compared by the demographic data including age, gender, % total body surface area (TBSA) burn, % TBSA deep burn, type of burn as well as percent of wound infection, total cost of wound dressing, pain medication, level of pain and time of wound healing. There were no differences in demographic data of age, % TBSA burn, % wound infection, total treatment cost of burn wound care (52 ± 38 US\$ for Urgotul SSD™ versus 45 ± 34 US\$ for silver sulfadiazine treated group). Time of wound closure was significantly shorter in the Urgotul SSD™ treated group (10 ± 4 days in Urgotul SSD™ versus 12 ± 6 in 1% silver sulfadiazine treated group) between both groups ($p < 0.05$). Average pain scores and pain medication in Urgotul SSD™ treated group was significantly lower than 1% silver sulfadiazine treated group (3 ± 1 versus 6 ± 2 and respectively, $p < 0.05$). All of the patients who developed wound infection responded well to targeted topical and oral antibiotic treatment. The authors conclude that Urgotul SSD™ has advantages of reducing pain symptom, pain medication requirement, increased patient convenience due to decreased time of follow-up at outpatient burn clinic, limiting the frequency of replacement of the dressing at comparable total cost and incidence of burn wound infection. The present study confirms the efficacy of Urgotul SSD™ in the treatment of partial thickness or secondary degree burn wound at the outpatient clinic.

Keywords: Silver sulfadiazine, Urgotul SSD™, Burn, Wound infection

J Med Assoc Thai 2009; 92 (10): 1300-5

Full text. e-Journal: <http://www.mat.or.th/journal>

Silver sulfadiazine (SSD) is one of the agents of choice frequently used in the treatment of partial-thickness burn wounds at the outpatient clinic⁽¹⁾. However, one of its disadvantages is that the patient

has to come for follow-up repeatedly. Also, there is a need for a high frequency of silver sulfadiazine application, so anxiety and fear related to a dressing change can have a dramatic effect on patients, with pain being the most dreaded aspect⁽²⁾.

One of the important points of using a dressing to promote healing is to find the dressing that does not cause considerable damage to the new tissue on removal. Cells migrate between the fibres of the dressing, exudate may dry and cause the dressing to

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stick and capillary loops may also have grown into the dressing⁽²⁾.

Urgotul silver sulfadiazine (Urgotul SSD™) (Laboratoires Urgo SA, Chenave, France) is a non-adherent hydrocolloid dressing material impregnated with silver sulfadiazine, which has been introduced as an effective antimicrobial barrier dressing managing partial thickness burn wounds for several years⁽³⁾.

It is constituted of a polyester net impregnated with hydrocolloid particles dispersed in a petroleum jelly matrix, which is non-greasy to the touch⁽³⁾, thin pliable, conformable and hopefully to prevent the problems described above. Urgotul dressing is able to be left in situ for treatment of partial thickness burn wounds up to 3-5 days⁽³⁾. Exudate can easily drain through the open mesh, thus preventing maceration. The pain and maceration after the Urgotul dressing might less than regular dressing with silver sulfadiazine⁽³⁾. The purpose of this prospective randomized control study was to compare the efficacy of Urgotul SSD™ and 1% silver sulfadiazine in the treatment of partial-thickness burn wounds at Siriraj outpatient burn clinic, Thailand.

Material and Method

Patient population

The present study was enrolled between July 2005 and December 2006. All patients provided informed written consent to participate in the present study with the approval of our institutional review and ethic committee board.

Patients with burn injuries, who were treated at Siriraj outpatient burn clinic with partial thickness burns covering less than 15% total body surface area (TBSA), were eligible for enrollment.

Inclusion criteria included a patient aged more than 17 years old, partial thickness burns less than 15% total body surface area (TBSA), post burn injury less than 24 hours, clean non-infected wound as diagnosed by 2 experienced burn surgeons. Exclusion criteria included full thickness burns, pregnancy, immuno-suppressed patient and patient with known hypersensitivity to Urgotul SSD™ or 1% silver sulfadiazine dressing.

Patients were computerized randomly assigned into 2 groups according to burn wound treatment: The Urgotul SSD™ treated group and 1% silver sulfadiazine treated group. They received treatment with either hydrocolloid dressing Urgotul SSD™ or 1% silver sulfadiazine dressing.

Wound dressing protocol

In the Urgotul SSD™ treated group, the experimental treatment consisted of the application of an Urgotul SSD™ then dry gauze as secondary dressing. The Urgotul SSD™ dressings were changed every two days until complete wound closure defined as complete epithelialization.

The other treatment consisted of the application and removal of 1% silver sulfadiazine (AgSD) soaked in gauze dressings daily until wound closure.

The primary outcomes of the present study were to compare the efficacy of pain relief and time of wound healing between both groups of treatment. The secondary outcome was to demonstrate rate of wound infection and cost of the treatment between both groups.

Wounds were observed by two experienced burn surgeons each time patients came to Siriraj outpatient burn clinic. Both groups were compared at baseline data with regard to patient demographics including age, gender, cause of burn, total body surface area (TBSA) burn% and deep burn (% deep partial or full thickness), duration of burn (hours) and location of burn.

The present study was conducted until the wounds demonstrated completely epithelial closure. Day of complete wound healing was considered when all areas of initial injury had fully re-epithelialized. Wound infection was evaluated by two experienced burn physicians diagnoses included cellulitis, erythema, induration, purulent discharge. All infected wounds were swabbed and sent for cultured organisms.

Patients were also reviewed for documentation of efficacy of treatment including time of wound closure, total treatment cost of burn wound dressing [total number of gauze dressings, bandages, pieces of Urgotul SSD™ or 1% silver sulfadiazine cream (gms), total labor costs and pain medications (total number of acetaminophen (500mg/tab) and ibuprofen (400 mg/tab) tablets)].

Pain assessment and pain medication

Pain medication regimen included acetaminophen (500 mg) 1-2 tabs every six hours ± ibuprofen (400 mg) 1-2 tabs every eight hours, orally administered.

Average pain scores at 30 minutes after wound dressing were compared between both groups. The pain score was assessed and reported by patients at the time of follow-up to determine if there was a

difference between the two methods, using the visual analog pain scale 1-10; 0 being no pain, 5 being moderate pain and 10, the severe pain⁽⁴⁾.

Statistical analysis

Demographic predictors including age, TBSA burn (%), % deep burn, healing time (days), duration of burn (hours) before coming to the hospital, pain scores, labor cost of wound dressing, follow-up times, pain medications between both groups were analyzed by two-tailed unpaired student t-test. The authors compared potential differences of % of wound infection between both groups using Fisher's exact test. P-value of less than 0.05 was considered to indicate statistical significance. Statistical analyses were performed with the use of Stata, v 6.0 software (StataCorp, College Station, TX 1999).

Results

Sixty-eight patients were recruited: 20 male, 14 female in the Urgotul SSD™ treated group and 19 male, 15 female in the 1% silver sulfadiazine treated group. Patients included in both groups were comparable with no significant differences in demographic data of age, % TBSA burn and % TBSA deep burn, duration of burn hours ($p \geq 0.05$ evaluated by paired Student's t-test) between both groups as shown in Table 1.

Pain scores (visual analog pain score 1-10), labor cost of wound dressing (US dollars), follow-up times and time from burn injury to complete wound healing are summarized in Table 2. Patients treated with Urgotul SSD™ had significantly lower pain score ($p = 0.02$), follow-up times ($p = 0.03$) and time of burn wound closure ($p = 0.04$) compared with silver

Table 1. Demographics of patients in both groups

	1% silver sulfadiazine treated group (n = 34)	Urgotul SSD™ treated group (n = 34)	p-value
Age (years)	38 ± 4	32 ± 13	0.2
TBSA burn (%)	10 ± 3	9 ± 3	0.7
Deep partial thickness (%)	2 ± 1	3 ± 2	0.9
Duration of burn (hours) (range)	6 ± 4	5 ± 3	0.5
Location of burn			
Upper limb	32%	39%	
Lower limb	30%	35%	
Hand	15%	13%	
Other	23%	13%	
Casual agent of the burn			
Flame	35%	42%	
Hot liquid (water, oil, etc)	65%	58%	

Data were presented with mean ± standard deviation or percentage as stated

Table 2. Results in both groups

	1% silver sulfadiazine treated group (n = 34)	Urgotul SSD™ treated group (n = 34)	p-value
Pain scores	6 ± 2	3 ± 1	0.02
Total cost of dressing (US Dollars)	45 ± 34	52 ± 38	0.60
Follow-up times	10 ± 5	5 ± 2	0.03
Time of burn wound closure (days)	12 ± 6	10 ± 4	0.04
Number of tablets of acetaminophen/day	6 ± 2	2 ± 2	0.02
Number of tablets of ibuprofen/day	5 ± 1	2 ± 1	0.01

Data were presented with mean ± standard deviation

sulfadiazine treated group. Patients treated with Urgotul SSD™ have manifested significantly decreased requirements of pain medications ($p = 0.04$) compared to patients in silver sulfadiazine group. The Urgotul Urgotul SSD™ group needed less frequent dressing change. Patients in the Urgotul SSD™ treated group demonstrated higher, but not statistically significant labor cost of wound dressing ($p > 0.05$). Two patients (6%) developed wound infection, 1 in 34 (3%) in the Urgotul SSD™-treated group and 1 in 34 (3%) in 1% silver sulfadiazine-treated group. No growth of organism in both cases. All of the patients who developed wound infection responded well to targeted topical and oral antibiotic treatments and, finally, all wounds healed without required autografting.

Discussion

Most burn injuries are minor and 80 to 90% of burn injuries can be treated on an outpatient basis⁽⁵⁾. Urgotul SSD™ is a non-occlusive antibacterial lipido-colloid interface containing a mixture of CMC-Na dispersed in a lipophilic network of petroleum jelly, combined with silver sulfadiazine⁽⁶⁾. It is intended for topical treatment of secondary degree burns at risk of secondary infection⁽⁷⁾. The purpose of the present study was to evaluate the use of Urgotul SSD™ wound dressing (Laboratoires Urgo SA, Chenave, France) and 1% silver sulfadiazine (Silvadene, Marion) cream in the outpatient management of partial-thickness burns. The application of Urgotul SSD™ proved to be superior to topical treatment with 1% silver sulfadiazine in that it significantly decreased pain, follow-up times, and number of tablets of pain medication/day. This non-occlusive dressing has good, low-adherent properties⁽⁸⁾, which means that the dressings can be changed less frequently, depending on how the treated wound develops. It also contains an antibacterial agent active prophylaxis against a broad spectrum of bacteria⁽⁷⁾. Previous studies have demonstrated the efficacy of URGO products in the management of the healing process, including using Urgotul® as an alternative to conventional non-adherent dressings⁽⁸⁾. Bernard et al, reported this type of dressing promotes the wound healing process by stimulation of proliferation of human dermal fibroblasts⁽⁹⁾. Partial-thickness burns might cause high levels of pain, which normally decreases as the wound heals⁽¹⁰⁾. Anxiety which is often exacerbated by dressing changes is another feature of these injuries⁽¹⁰⁾. The results of the present study suggest that the overall magnitude of pain scores, follow-up

times and the amount of oral analgesic medication in the wounds treated with Urgotul SSD™ was significantly lower than in the wounds treated with silver sulfadiazine. This might be due to the reduction in the number of dressing changes following the application of Urgotul SSD™, as well as the non-adherent property of Urgotul SSD™ to the wound bed, which leads to increased patient comfort and pain relief during dressing replacement. This can also be deduced from decline in use of oral analgesic medication.

In the present study, no differences were observed in the rates of wound infection and time of burn wound closure between both groups. The rate of wound infection in each group was low (3%) and all wound infection was normally local and easily controlled. This suggested that Urgotul SSD™ has also been shown effective for preventing burn wound infection with comparable result to the traditional wound treatment with silver sulfadiazine. The time of burn wound closure in the Urgotul SSD™-treated group was significantly lower than in the silver sulfadiazine-treated groups. This might be due to the daily dressings in the silver sulfadiazine group which caused wounds to be exposed to mechanical and chemical manipulation. In addition, a larger frequency of burn wound dressing changes in the silver sulfadiazine-group may cause a higher rate of breakdown of epithelization on the wound surface. This might disturb the time of wound healing⁽¹¹⁾. These circumstances have a significant impact on wound healing. In the presented protocol, Urgotul SSD™ already has low-adherent properties and it was left intact on the wound with dressing changes less often: every two days. So the wound underneath could heal undisturbed. Reduction in the number of dressings following the application of Urgotul SSD™ leads to a decrease in appointment time, wound cleansing solutions, number of gauze dressing, bandages and labor cost. Urgotul SSD™ can be considered to be used for partial thickness burn wounds treatment due to it providing patient convenience with comparable costs to standard treatment with silver sulfadiazine cream.

Conclusion

The application of Urgotul SSD™ to partial-thickness burns has many advantages over topical treatment with 1% silver sulfadiazine including. It demonstrated significant decreases in the level of pain, follow-up times, time of wound closure with a comparable rate of wound infection and cost of

treatment. Urgotul SSD™ can be considered to be used as an effective burn wound dressing in the treatment of partial thickness burn wounds at the outpatient burn clinic.

Acknowledgements

The authors wish to thank Mrs. Supaparn Suvanchote and Miss Rachanee Benjathanang for helping to conduct the study.

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ประโยชน์ของการนำแผ่นปิดแผลไฮโดรคอลลอยด์ เอสเอสดี มาใช้ในการรักษาผู้ป่วยนอกที่มีบาดแผลไฟไหม้ของผิวหนังบางส่วน

พรพรม เมืองแมน, สายพิณ เมืองแมน, สุภาพร โอภาสานนท์, กฤษณ์ แก้วโรจน์, จอมจักร จันทรสกุล,

ซิลเวอร์ซัลฟาไดออกไซด์ถูกนำมาใช้รักษาเฉพาะที่ สำหรับบาดแผลไฟไหม้น้ำร้อนลวกบริเวณผิวหนังบางส่วน หรือ บาดเจ็บไฟไหม้ระดับสองเป็นเวลานานหลายปี ความเจ็บที่เพิ่มขึ้นทุกครั้งจากการทำความสะอาดแผลคือ ปัญหาหลักที่พบ เออร์โกทูเอสเอสดีคือ แผ่นปิดแผลชนิดไฮโดรคอลลอยด์ที่มีซิลเวอร์ซัลฟาไดออกไซด์เป็นสารฆ่าเชื้อ เป็นแผ่นปิดแผลที่นำมาใช้ลดการติดเชื้อ และยับยั้งขบวนการเจริญเติบโตของแบคทีเรีย ในแผลไฟไหม้น้ำร้อนลวก

วัตถุประสงค์ของการศึกษานี้เพื่อเปรียบเทียบประสิทธิภาพของเออร์โกทูเอสเอสดีกับซิลเวอร์ซัลฟาไดออกไซด์ครีม 1% ในการรักษาแผลไฟไหม้น้ำร้อนลวกระดับที่สอง

การศึกษาใช้ผู้ป่วยจำนวน 68 ราย ที่มีบาดแผลไฟไหม้น้ำร้อนลวกบริเวณผิวหนังบางส่วน มีค่าพื้นที่ผิวของแผลที่เกิดบนร่างกาย (TBSA) น้อยกว่า 15% ผู้ป่วยเข้ามารับการรักษาที่คลินิกผู้ป่วยนอกแผลไฟไหม้น้ำร้อนลวก โรงพยาบาลศิริราช ระหว่างเดือน กรกฎาคม พ.ศ. 2548 - ธันวาคม พ.ศ. 2549 โดยแบ่งผู้ป่วยเป็นสองกลุ่ม กลุ่มแรกรักษาโดยใช้เออร์โกทูเอสเอสดี จำนวน 34 ราย และกลุ่มที่สองรักษาด้วยซิลเวอร์ซัลฟาไดออกไซด์ 1% จำนวน 34 ราย ทั้งสองกลุ่มถูกเปรียบเทียบโดยใช้ข้อมูลประชากรศาสตร์ได้แก่ อายุและเพศ, เปอร์เซ็นต์ของพื้นที่ผิวที่เกิดแผลไฟไหม้น้ำร้อนลวก (%TBSA), %ความลึกของแผล, ชนิดของแผลและเปอร์เซ็นต์ของการติดเชื้อ, ค่าใช้จ่ายโดยรวมทั้งหมดของการทำแผล, ยาระงับปวด, ระดับของความเจ็บ และระยะเวลาการหาย ของแผล

ผลการศึกษาพบว่า อายุ, เพศ, เปอร์เซ็นต์พื้นที่ผิวที่เกิดแผลไฟไหม้น้ำร้อนลวก (%TBSA), เปอร์เซ็นต์ของการติดเชื้อ และค่าใช้จ่ายตลอดการรักษาของเออร์โกทูเอสเอสดี ($52 \pm 38\text{US\$}$)กับซิลเวอร์ซัลฟาไดออกไซด์ ($45 \pm 34\text{US\$}$) ไม่มีความแตกต่างกันอย่างชัดเจน ส่วนระยะเวลาในการหายของแผล เออร์โกทูเอสเอสดี จะใช้ระยะเวลาในการหายของแผลสั้นกว่าเมื่อใช้ 1% ซิลเวอร์ซัลฟาไดออกไซด์ (10 ± 4 เออร์โกทูเอสเอสดี, 12 ± 6 ซิลเวอร์ซัลฟาไดออกไซด์ 1%) ซึ่งมีความแตกต่างกันอย่างมีนัยสำคัญ ($p < 0.05$) คะแนนเฉลี่ยของระดับความเจ็บและการใช้ยาระงับความเจ็บ สำหรับผู้ป่วยที่ใช้เออร์โกทูเอสเอสดีน้อยกว่ากลุ่มผู้ป่วยที่ใช้ ซิลเวอร์ซัลฟาไดออกไซด์ 1% อย่างมีนัยสำคัญ ($p < 0.05$, 3 ± 1 กับ 6 ± 2 ตามลำดับ) ผู้ป่วยแผลติดเชื้อทั้งหมดตอบสนองดีต่อการให้ยาฆ่าเชื้อแบบเฉพาะที่ และยาระงับปวด

สรุปผลการศึกษา เออร์โกทูเอสเอสดีมีข้อดีที่เหนือกว่าการใช้ซิลเวอร์ซัลฟาไดออกไซด์ 1% ในด้านการลดอาการเจ็บตลอดระยะเวลาในการทำแผล, ลดการให้ยาระงับอาการเจ็บ, เพิ่มความสะดวกกับผู้ป่วยในการลดความถี่สำหรับการเข้ารับการรักษาอย่างต่อเนื่องในแผนกผู้ป่วยนอกตลอดระยะเวลาการรักษา ไม่ต้องเปลี่ยนแผ่นปิดแผลบ่อย ทำให้มีค่าใช้จ่ายสำหรับการรักษาแผลในระดับที่เหมาะสม อีกทั้งยังลดความเสี่ยงต่อการติดเชื้ออันเนื่องมาจากการทำแผลและเปลี่ยนแผ่นปิดแผลบ่อย ๆ ผลสรุปของการศึกษาแสดงให้เห็นว่า เออร์โกทูเอสเอสดีมีประสิทธิภาพที่ดีเหมาะสมสำหรับใช้รักษาผู้ป่วยแผลไฟไหม้น้ำร้อนลวกบริเวณผิวหนังบางส่วน หรือ บาดเจ็บไฟไหม้ความลึกระดับที่สอง ที่ต้องเข้ามารับการรักษาในคลินิกผู้ป่วยนอกแผลไฟไหม้น้ำร้อนลวก