
Study of the bactericidal effectiveness of MRSA Wash Lotion

MRSA Wash Lotion is a preparation that is used for decontaminant washing of patients colonised by methicillin-resistant *Staphylococcus aureus* (MRSA). In this study, we tested whether MRSA Wash Lotion displays significantly better efficacy in practical tests against staphylococci than a soap without microbicidal properties.

MATERIAL AND METHODS

Test of bactericidal effectiveness in the quantitative suspension test

The quantitative suspension test was carried out in accordance with the Guidelines for the Testing and Evaluation of Chemical Disinfection Procedures (date: 12.7.91) issued by the German Society for Hygiene and Microbiology (DGHM). The test solutions were inoculated with test organisms that were stored and cultured in accordance with DIN EN 12353 (December 1999) and prEN 12054 (May 1999).

Test of bactericidal effectiveness in tests simulating practical conditions

Test design

A crossover design was used for the test. For this, the subjects were randomly assigned to two groups of approximately equal size. In a first run-through, the test areas of group 1 were treated with the test preparation and the test areas of group 2 with the reference solution soft soap. After the first run-through the test was repeated in a second run-through with reversed assignment.

Performance of the test

On 15 volunteers, three adjacent areas, each 5 x 5 cm in size, were marked on the inner sides of each forearm. These areas were contaminated with 0.1 ml of a suspension of *Staphylococcus epidermidis* (initial bacterial count: 3×10^8 cfu/ml). The suspension was rubbed onto the skin until it dried. Then one test area on the arm was treated with 0.2 ml water (control). The other test areas were treated with 0.2 ml of the undiluted MRSA Wash Lotion. One arm of each volunteer was used for determining the effectiveness after a 2-minute contact time, the other arm for determining the effectiveness after a 3-minute contact time. After the contact time in each case, a stainless steel ring (height 20 mm, inner diameter 30 mm) was placed on the skin inside the test areas, and pressed down slightly. 3 ml of a neutralisation solution (3 % Tween 80, 3 % saponin, 0.3 % lecithin, 0.1 % histidine in tryptone NaCl) was pipetted into the ring. The skin inside the ring was massaged for 1 minute with a glass rod (rounded end). The liquid was then drawn off with a pipette and used for determination of the bacterial count.

Test organisms

The following MRSA isolates were used for the quantitative suspension tests: 12366 and 15351 (Heidelberg University Hospital); 37816 and 37981 (University Hospital Eppendorf, Hamburg). For the tests under simulated practical conditions *Staphylococcus epidermidis* ATCC 12228 were used.

RESULTS

The results of the quantitative suspension tests show that a reduction in bacterial count of more than 5 log steps (> 99.999 %) could be achieved after just 1 minute's contact time with the 25 % MRSA Wash Lotion in the case of all MRSA isolates that were tested (Table 1). In the tests under simulated practical conditions, after use of soft soap with a contact time of 3 minutes a mean reduction factor of 1.05 was determined (Table 2). After use of the MRSA Wash Lotion a mean reduction factor of 1.38 (= 96 %) was achieved (Table 3). This RF value was significantly higher than that of the reference solution (Table 4).

CONCLUSION

On the basis of the results that were obtained, it can be recommended that MRSA Wash Lotion be allowed to act for at least 3 min on the skin of patients who are colonised with MRSA.

BIOLOGY DEPARTMENT
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Table 1 Effectiveness of MRSA Wash Lotion against MRSA isolates in the quantitative suspension test			
Concentration [%]	Contact time [min]		
	0.5	1	2
MRSA 37816 (1 x 10⁹ cfu/ml)			
25	≥ 5.67	≥5.58	≥5.52
50	≥ 5.67	≥ 5.58	≥ 5.52
75	≥ 5.67	≥5.58	≥ 5.52
Control log cfu/ml	6.67	6.58	6.52
MRSA 37981 (3 x 10⁹ cfu/ml)			
25	3.06	≥ 5.43	≥ 5.41
50	≥ 5.36	≥ 5.45	≥ 5.41
75	≥ 5.36	≥ 5.45	≥ 5.41
Control log cfu/ml	6.36	6.45	6.41
MRSA 12366 (5 x 10⁹ cfu/ml)			
25	2.21	5.24	≥ 5.74
50	3.02	≥ 5.84	≥ 5.74
75	≥ 5.72	≥ 5.84	≥ 5.74
Control log cfu/ml	6.72	6.84	6.74
MRSA 15351 (6 x 10⁹ cfu/ml)			
25	5.26	≥ 5.67	≥ 5.61
50	≥ 5.73	≥ 5.67	≥ 5.61
75	≥ 5.73	≥ 5.67	≥ 5.61

Control log cfu/ml	6.73	6.67	6.61
Presented in logarithmic reduction factors			

Table 2

MMD: 275

SKIN TEST

Preparation: Soft soap, 20 %
 S. epidermidis, initial bacterial count: 3×10^8
 Inactivator: TLSH

	Pre-value (control) log cfu 3'	Post-value log cfu 3'	RF	Mean RF
1	5.05	3.95	1.10	
		3.92	1.13	1.12
2	4.96	4.02	0.94	
		4.14	0.82	0.88
3	4.88	3.91	0.97	
		3.98	0.90	0.94
4	5.21	3.93	1.28	
		3.96	1.25	1.27
5	5.09	3.78	1.31	
		3.76	1.33	1.32
6	4.97	3.96	1.01	
		3.83	1.14	1.08
7	5.10	3.91	1.19	
		4.04	1.06	1.13
8	5.40	4.26	1.14	
		4.29	1.11	1.13
9	5.45	4.22	1.23	
		4.20	1.25	1.24
10	5.28	4.48	0.80	
		4.49	0.79	0.80
11	5.35	4.54	0.81	
		4.56	0.79	0.80
12	5.49	4.42	1.07	
		4.41	1.08	1.08
13	4.97	4.00	0.97	
		4.07	0.90	0.94
Mean of 13 subjects	5.16	4.11		1.05

Table 3

MMD: 275

SKIN TEST

Preparation: MRSA Wash Lotion TPH 5636 No. 483/106/108
 S. epidermidis, initial bacterial count: 3×10^8
 Inactivator: TLSH

	Pre-value (control) log cfu 3'	Post-value log cfu 3'	RF	Mean RF
1	6.20	4.56	1.64	
		4.96	1.24	1.44
2	5.14	3.67	1.47	
		3.81	1.33	1.40
3	5.28	4.31	0.97	
		4.29	0.99	0.98
4	6.04	4.70	1.34	
		4.81	1.23	1.29
5	6.11	3.79	2.32	
		3.88	2.23	2.28
6	6.11	4.12	1.99	
		4.09	2.02	2.01
7	5.16	3.88	1.28	
		3.90	1.26	1.27
8	5.02	3.58	1.44	
		3.61	1.41	1.43
9	4.80	3.74	1.06	
		3.55	1.25	1.16
10	4.96	4.02	0.94	
		4.00	0.96	0.95
11	4.94	3.79	1.15	
		3.74	1.20	1.18
12	4.98	3.75	1.23	
		3.73	1.25	1.24
13	4.97	3.69	1.28	
		3.74	1.23	1.26
Mean of 13 subjects	5.36	3.98		1.38

Research and Development



Table 4. Statistical pair comparison of the values found with R and P (Wilcoxon's signed rank test for pair differences)

Subjects	R	P	R-P	Rank of the difference	
				Without sign	With sign
1	1.11	1.44	- 0.33	8.5	- 8.5
2	0.88	1.40	- 0.52	11	- 11
3	0.93	0.98	- 0.05	2	- 2
4	1.26	1.29	- 0.03	1	- 1
5	1.32	2.28	- 0.96	13	- 13
6	1.07	2.01	- 0.94	12	- 12
7	1.12	1.27	- 0.15	4.5	- 4.5
8	1.12	1.43	- 0.31	7	- 7
9	1.24	1.16	0.08	3	+ 3
10	0.80	0.95	- 0.15	4.5	- 4.5
11	0.80	1.18	- 0.38	10	- 10
12	1.07	1.24	- 0.17	6	- 6
13	0.93	1.26	- 0.33	8.5	- 8.5

RF = reduction factor; R = reference solution; P = test preparation

Rank sum (+) = 3

Rank sum (-) = 88

Calculated smaller rank sum (here 3) is ≤ 12

P = 0.01 (table value = 12 with n = 13)