Chapter 35

Silver Sol and The Successful Treatment of Hospital Acquired MRSA in Human Subjects With Ongoing Infection

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ABSTRACT

The patented form of Silver Sol (US Patent # 7135195) has been shown to destroy bacteria, viruses, and mold both *in vitro* and in living systems.[20] *Staphylococcus aureus* can be completely destroyed by Silver Sol in as little as two minutes and *in vitro* studies show it will stay dead for 28 days. Rustum Roy Ph.D. reported that strains of methicillin-resistant *Staphylococcus aureus* (MRSA) could be destroyed by Silver Sol treatment *in vitro*. The University of California Berkeley reports that Silver Sol can completely destroy *in vitro* forms of MRSA and Vancomyocin resistant *Enterococcus (*VRE) at levels as low as 2.5 ppm in as little as 45 to 60 minutes. With MRSA continuing to mutate and sustain resistance to antibiotics, it is encouraging to report the findings from this study, which demonstrates an all-natural opponent to this modern day plague.

This study demonstrates the benefits of Silver Sol on human subjects with serious MRSA infections of the skin. These patients were hospitalized and contracted their MRSA infections while staying in the hospital. Patients wound size, depth, and closure rates were photographed and digitized for weekly calculations that quantified the time to wound closure and overall seriousness of the infection. Before, during, and after photos demonstrate a visual accounting of the benefit of the Silver Sol treatment. All treatments were given by the hospital medical staff where patients received Silver Sol Gel sprayed topically on the wound twice daily and orally ingested 2 teaspoons of the liquid Silver Sol twice a day.

The results of this study indicate that twice-daily treatment with Silver Sol Gel (spray form) and twice-daily oral ingestion of liquid Silver Sol significantly improved treatment of hospital acquired MRSA infections in human subjects. The average time to closure improved, and patients taking Silver Sol reported a significant reduction in pain associated with the wound.

INTRODUCTION

Methicillin resistant *Staphylococcus aureus* (MRSA) is approaching pandemic levels and there is an immediate need for a substance like Silver Sol in controlling this potentially fatal disease. MRSA is a resistant variation of the common bacterium *Staphylococcus aureus*, which is resistant to a significant group of antibiotics called beta-lactams, which include penicillins and cephalosporins.[1] The organism is often sub-categorized as community-associated MRSA (CA-MRSA) or healthcare-associated MRSA (HA-MRSA). CA-MRSA cases were first reported in the late 1980's. Recently, HA-MRSA has plagued the medical professionals and patients that work or live in hospitals. It is estimated that as much as 60% of hospital nurses carry MRSA in their noses and on their skin.[2] MRSA could be considered to be a modern day plague because it has evolved the ability to survive treatment with most antibiotics including methicillin, dicloxacillin, nafcillin, and oxacillin.

Hospitals have a special need for help in patients with open wounds that use invasive devices, or have a weakened immune system, as these patients are at greater risk of MRSA infection. Heightened risk of infection is also seen in the hospital employees who do not follow meticulous hygiene and proper sanitizing procedures. Such employees may self-infect or transfer the contagion to patients or visitors. Indeed, a study reported by the Association for Professionals in Infection Control and Epidemiology, in 2008, concluded that the poor hygiene habits remain the principle barrier to a significant reduction in the spread of MRSA. They also indicate that this hospital risk is exponentially great when you combine the propensity for the general public to spread this superbug in public restrooms, restaurants, airplanes, nurseries, schools, athletic events, and in the home.

MRSA is progressing toward pandemic proportions. The Centers for Disease Control and Prevention (CDC), estimated that the number of MRSA infections in the US doubled in just six years from 127,000 in 1999 to 278,000 in 2005, while at the same time, deaths increased from 11,000 to more than 17,000.[2] According to the *Journal of the American Medical Association,*[3] MRSA was

responsible for 94,360 serious infections and associated with 18,650 hospital-stay related deaths in the United States in 2005.

MRSA is growing out of control, and the statistics suggest grave outcomes. Liu *et al* reported that the annual incidence of CA-MRSA in San Francisco residents during 2004-2005 was 316 cases per 100,000 population, while the annual incidence of HA-MRSA was 31 cases per 100,000 population.[4] Noskin *et al* reported that MRSA patients had, on average, three times longer stays (14.3 days versus 4.5 days), incurred three times the expenditure ($48,824 versus $14,141), and experienced five times the risk of in-hospital death (11.2% versus 2.3%) as compared to patients without this infection.[5] Whilst Wyllie *et al* reported that 34% of patients with MRSA died within 30 days of infection.[6] Wyllie also reported that the most common sites of infection were the nostrils, respiratory tract, open wounds, intravenous catheters, and urinary tract.

Hospitals in Denmark, Finland, the Netherlands,[7] and VA hospitals in Pittsburg report that MRSA infections can be significantly reduced using sanitary methods that include swabbing the nostrils and hands with antibacterial protection. These studies demonstrate the potential benefits of an antibacterial agent used prophylactically on the hands and nostrils as long as resistance is not a potential long term problem.

MRSA is a resistant *staphylococcus* infection that usually presents as a patch of small pus surrounded by redness and swelling, and resembles pimples, spider bites, or boils. Infection may or may not be accompanied by a fever and rash. The bumps become larger and spread, and larger, painful, pus-filled boils can develop deep into the tissue. Approximately 75% of CA-MRSA infections are localized to the skin and soft tissue, however a minority of these infections spread and affect vital organs, causing sepsis, toxic shock syndrome, and flesh eating (necrotizing) pneumonia.[8] At present, it is not fully understood why some healthy people survive MRSA infections and others do not.

The current treatments of MRSA include vancomycin and teicoplanin, which are prescription antibiotics categorized as glycopeptides.[9] The absorption of these antibiotics is very poor and they must be given intravenously in order to control systemic infections.[10] However, there are several new strains of MRSA that have become resistant even to vancomycin and teiocplanin.[11,12] At present, linezolid, quinupristin/dalfopristin, daptomycin and tigecycline are used to treat more severe infections that do not respond to glycopeptides such as vancomycin.[13] In addition, oral treatments include linezolid, rifampicin and fusidic acid, rifampicin and fluoroquinolone, pristinamycin, co-trimoxazole, doxycycline or minicycline and clindamycin. *Nature*[14] reported that a new antibiotic called platensimycin has demonstrated MRSA activity.[15,16] It should be noted that some of the newest drug discoveries can cost $1600 per day, which may prohibit their ubiquitous distribution.

The spread of MRSA is complicated by the fact that hospitals discharge contagious patients into the community, workforce, schools, and general public.[17] In the US, it is estimated that 95 million people carry *Staphylococcus aureus* in their noses, of these 2.5 million carry MRSA,[21] and 23% of these require hospitalization.[22] MRSA is nearing pandemic proportions and there is a serious need for a daily use antibacterial that does not produce resistant strains of MRSA. Currently, Silver Sol may be the only prophylactic use product that has activity against MRSA, and that could be used for prevention as well as treatment of MRSA because it does not produce resistant strains.

MATERIALS AND METHODS

AHS is a hospital-based elderly health care provider that approved the study of 308 subjects in their elderly care (nursing home) hospitals. The patients were admitted to the hospital without MRSA, but had acquired the MRSA infection while in hospital and the skin infections were ongoing for over one year.

The Medical staff treated and photographed the wounds before any Silver Sol treatment and every week during the treatment. The size and depth of the wounds were measured in centimeters and recorded weekly by the hospital staff. Silver Sol Gel was sprayed (using a hand operated pump spray) on the wounds topically twice a day. Patients answered a questionnaire regarding their wellness, including pain evaluations.

RESULTS

Tables 1, 2, and 3 illustrate significant improvement in the ability of Silver Sol to close a wound and improve the time to wound closure.

Table 1. Percent Wound Closure in HA-MRSA Patients (ongoing 1 year)

% Closed	Week 1	Week 2	Week 3	Week 4	Week 5
100				98%	100%
90			97%	XXX	XXX
80		95%	XXX	XXX	XXX
70		XXX	XXX	XXX	XXX
60	67%	XXX	XXX	XXX	XXX
50	XXX	XXX	XXX	XXX	XXX
40	XXX	XXX	XXX	XXX	XXX
30	XXX	XXX	XXX	XXX	XXX
20	XXX	XXX	XXX	XXX	XXX
10	XXX	XXX	XXX	XXX	XXX
0	XXX	XXX	XXX	XXX	XXX

Table 2. Average Wound Size in Centimeters in HA-MRSA Patients

Week 0	Week 1	Week 2	Week 3	Week 4	Week 5
0.25 cm	0.15cm	0.10 cm	0.10 cm	0.10 cm	0.0 cm

Table 3. Summary of Data

Week	Size of Wound (cm)	% Wound closure
0	0.25 cm	0%
1	0.15 cm	67%
2	0.10 cm	95%
3	0.10 cm	37%
4	0.10 cm	98%
5	0.0 cm	100%

CONCLUDING REMARKS

The results of this study strongly suggest that Silver Sol Liquid and Gel demonstrate the ability to destroy HA-MRSA and significantly improve healing outcomes. The results indicate that wounds close as much as three times faster than wounds not treated with Silver Sol, thus quantifying the benefits of Silver Sol. HA-MRSA can be fatal and cause serious infections – even when treated with antibiotics – yet, Silver Sol Gel and Liquid demonstrate improved wound treatment and improved time to wound closure in human subjects. The improvements in wound healing, as identified by a shorter time to wound closure, suggests that there is an improvement in immune function due to the fact that Silver Sol reduces the bacteria in the wound. By reducing the bacterial infection wound healing improves by approximately three times and reduces pain in the process. This reduction in pain and improvement to healing can be attributed to the fact that infection, inflammation, and tissue damage are reduced when using Silver Sol, and suggests that there are several beneficial mechanisms of action at work. The fact that there are wounds in this study that are large enough to be difficult or impossible to close on their own, and yet when Silver Sol is used the wounds heal completely, suggest the possibility that stem cell activation is being produced.

By observing the healing results published in this study, it is evident that this remarkable and bactericidal liquid and gel should be considered to be leaders in the defense against HA-MRSA. The improvements demonstrated here suggest that Silver Sol can help improve healing times, which could potentially reduce the overall cost of treatment by as much as three times and reduce the average length of stay in a hospital. This study demonstrates the benefits of Silver Sol in reducing the infectious nature of a skin born disease acquired in a hospital. In today's world of mutating bacteria and antibiotic resistant infections producing potentially fatal disease, Silver Sol could be the health vector that helps reduce the health risk to all patients, staff and visitors in the hospital.

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