Vancogel®: A Next Generation Topical Treatment for MRSA Infected Wounds

Overview

Over the past several years Berman Medical Inc. has been developing Vancogel®, a proprietary antibiotic agent for wound treatment. This topical drug product constitutes a gel formulation of known antibiotic Vancomycin for the treatment of Methicillin-resistant Staphylococcus aureus (MRSA) infected wounds. By combining Vancomycin with a complex calcium alginate gel formulation, Berman Medical Inc. has developed a highly effective treatment for MRSA infected wounds. In addition, this novel formulation of Vancomycin has shown extended shelf-life characteristics, with samples of Vancogel® demonstrating a high degree of stability and potency with sustained bactericidal effect against MRSA after storage under ambient conditions for 3 years. Initial clinical studies with Vancogel® have proven extremely encouraging, resulting in the observation of high levels of MRSA clearance. Moreover, no incidents of bacterial resistance to this agent have been observed to date. Berman Medical Inc. obtained FDA approval to conduct a Phase 2 trial of Vancogel® for the treatment of MRSA infected wounds. Berman is currently recruiting suitable patients, and this trial is ongoing presently. Additionally, recent studies by Berman have revealed that Vancogel® may have other applications as a preventative agent for MRSA when administered as a nasal swab or applied to nasal carriers and treatment of acne. That will require separate studies that are planned. Since provider-to-patient transfer is a common route for MRSA infection, a second significant opportunity exists for Vancogel® in the area of preventative medicine.

Product History

In the mid-1990's, MRSA evolved rapidly throughout the world, resulting in elevated mortality rates and extended hospitalization periods.[1] The primary site of infection was found to be at the skin level, with the nasal passages being one of the most common forms of carriage.[2] If left unchecked, MRSA infection is found to rapidly spread,

leading to systemic infections, often resulting in death.[3] Given the rapid emergence of MRSA as a significant health threat, Berman Medical Inc. began experimenting with various combinations of drug delivery vehicles and therapeutic agents known to mitigate MRSA infection, with the novel objective of eliminating MRSA infections by direct application to wounds. As a result of these efforts, Berman Medical Inc. has developed a topical bactericidal agent that penetrates the depths of wounds and destroys the virulent MRSA bacteria. This in turn allows for efficient and enhanced wound healing rates presently being tested in a phase 2 clinical trial. Beginning in 2000, a significant research effort by Robert S Berman MD resulted in a stable complex calcium alginate formulation of Vancomycin, which proved to be a highly effective bactericidal agent in MRSA bacterial culture studies.

In 2008, the company established the final formulation of the drug and Berman filed for a utility patent that has since been amended and is declared "patent pending" by the USPTO. Subsequent amendments to this filing concerning the advantageous stability and long-term efficacy properties of this drug, further strengthened their intellectual property position. The product was also given the trademark of Vancogel® at that time, but is now a registered trademark by the USPTO. A year later, in 2009, Berman filed an application with the Western Institutional Review Board for guidance regarding clinical protocols and patient consent, with the intent on conducting clinical trials on Vancogel®. Following an overwhelmingly positive response and further submissions to the FDA (PIND and IND) Berman received permission to conduct a Phase 2 clinical trial on Vancogel®. This trial is designed as a randomized, double blind clinical study and is being conducted in Berman's medical offices located in Jupiter, Florida. Further information about this clinical trial can be found at: http://www.clinicaltrials.gov/ct2/show/NCT00945152 and www.bermanresearch.org

About MRSA

MRSA is highly prevalent in the healthcare industry with many MRSA infections occurring in hospitals and healthcare facilities. Nursing homes or long-term care facilities also display susceptibility to MRSA infections where healthcare provider-to-patient transfer is common.[4] Additionally, in confined environments such as prisons, with a continual admission of a

populace that is often in poor health and prone to infection, there have been a number of challenges reported. Indeed, one of the earliest series of studies on community associated MRSA infection was made by the Centers for Disease Control and Prevention (CDC) in state prisons.[5] In these studies not only was a significant rise in skin and soft tissue infections reported, but MRSA was by far the most commonly reported cause of infections among cultured lesions.

Current Treatments for MRSA Infection and Comparison to Vancogel®.

Due to the highly resistant nature of MRSA to anti-bacterial agents, treatment options are limited; with the glycopeptide antibiotics Vancomycin and Teicoplanin being most commonly used.[6] Teicoplanin is a derivative of Vancomycin that has a similar activity spectrum but a longer half-life. Because the oral absorption of Vancomycin and Teicoplanin is very low, these agents must be administered intravenously to control infections. As a result, treatment of MRSA infection with Vancomycin or Teicoplanin can be complicated, due to their inconvenient routes of administration and toxicity by those routes. The non-ambulatory administration of these agents not only reduces patient compliance rates, but also elevates the risk of re-infection, as hospital and managed care acquired MRSA infection still remains a significant contributor to disease progression and mortality. Thus, Vancogel® offers significant advantages to existing therapies in that its simple, ambulatory administration will elevate patient compliance rates and minimize opportunistic re-infection. In addition, the application of Vancogel® allows for ultrahigh, localized concentrations of Vancomycin to be obtained that result in a rapid bactericidal effect. This in turn allows for far greater bactericidal effect against so called high-MIC MRSA strains that have proven difficult to treat using current therapies.[8] (Note, ultra-high intravenous Vancomycin administration is not clinically feasible due to the nephrotoxicity associated with high systemic levels of Vancomycin).

Market Potential

Given the prevalence of MRSA and the limitations of current treatments, significant market potential exists for an effective and easily administered treatment for MRSA infected wounds. The ease of administration, storage and potentially high effectiveness of Vancogel® against multiple strains of MRSA gives reason to believe that this product could readily become the first line of pharmaceutical defense against MRSA. In 2007, the last year that figures are available, the CDC estimated that MRSA infections were responsible for $9.7 billion in added healthcare costs each year.[?] Additionally, recent studies by Berman have revealed that Vancogel® may have a second application as a preventative agent for MRSA when administered as a nasal swab. Care provider-to-patient transfer is a very common route for MRSA infection to occur, and the nasal passages often contain high levels of MRSA bacteria, even in healthy individuals. Thus, another significant opportunity exists for Vancogel® in the area of care provider preventative medicine and hospitalized patients. Given this, it is reasonable to estimate that Vancogel® has the potential to be a multi-hundred million to billion dollar annual revenue product.

Military Applications of Vancogel®

The areas of anti-infective agents and wound healing are of significant focus to the United States military, with the treatment of MRSA infections remaining an area of high interest. The treatment regimen for Vancogel® is quite simple in that the wound treated by cleansing and /or debridement, followed by the application of a thin layer (-4/8") of Vancogel® and subsequent dressing. Results thus far have shown that on most all occasions, MRSA infection is eliminated within 24 to 72 hours after one to three treatments allowing for accelerated wound healing. Given the ambulatory nature of this treatment regimen and the fact that there are no apparent restrictions to mobility during or after treatment, the battlefield applications of Vancogel® are significant. Moreover, given the powerful antibiotic profile of Vancomycin, demonstrating efficacy against a wide range of gram-positive bacteria, it is reasonable to assume that any wound treated
with Vancogel® will be far less prone to gram positive bacterial infection in general. Other significant advantages to Vancogel® for military use are the pharmaceutical stability and

potency profiles, both being excellent after long term storage under ambient conditions. Thus, as shipping and transport can be conducted under prevailing conditions, Vancogel® is an excellent candidate for battlefield use.

Conclusions

In conclusion, Vancogel® represents a clear advance in the treatment of MRSA infected wounds with a simple mode of administration and high MRSA clearance rates.

Moreover, we consider the development of Vancogel® as a lower risk investment as the known active pharmaceutical ingredient, Vancomycin, has already demonstrated a good pharmaceutical safety profile, and the intravenous administration of Vancomycin has been conducted for over 50 years. Given the high prevalence of MRSA infection in the managed care facilities, nursing homes, prisons, locker rooms, schools, hospitals, day care centers and military environments, coupled with the potential of Vancogel® as a preventive agent against MRSA when used as a nasal swab, it is apparent that this is a product of significantly high potential worldwide and addresses an unmet need in the area of a low risk treatment and prevention of MRSA infection.

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