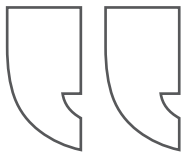


# Clinical Study



According to the experience of the authors, Simini Protect Lavage was a highly effective medical device, that allowed the prevention of infection in surgeries with higher risk of infection and moreover it allowed for the eradication of infections without the need to remove implants when performing surgical revisions in a single stage.\*



\* see full abstract inside

# abstract

## INTRAOPERATIVE ANTISEPTIC LAVAGE WITH SIMINI FOR PREVENTION AND FOR TREATMENT OF SSI

*I. Forzisi\* DVM, L. Vezzoni DVM DECVS, M. Bozzerla DVM, A. Vezzoni DVM DECVS*

Surgical Department, Clinica Veterinaria Vezzoni, Cremona, Italy

### INTRODUCTION

Surgical site infections (SSI) can occur after an operative procedure. Reported rates of SSI vary depending on patient characteristics, degree of wound contamination and type of surgical procedure, but despite advances in surgical asepsis and improvements in sterile surgical techniques, SSIs continue to occur in 0.8% to 18.1% of surgical wounds.

Most infections in orthopedic surgery are caused by biofilm-forming microorganisms, which adhere either on implants or to dead bone (sequesters) forming a biofilm that makes them resistant to host defense mechanisms and most antimicrobial agents.

The most common bacteria identified in veterinary medicine are *Staphylococcus* spp, *Streptococcus* spp and *Escherichia coli*, in particular *Staphylococcus Pseudintermedius* is more common and in recent studies it has been reported that in cases of implant associated osteomyelitis, approximately 50% of the bacteria isolated were methicillin-resistant strains.

In order to minimize the risk of SSI several prevention methods have been introduced, including perioperative antibiotic prophylaxis, specific antiseptic solutions for skin preparation and intraoperative topical adjuvants and antiseptic irrigations.

Recently the use of commercial solution Bactisure Wound Lavage was reported in human medicine and its efficacy in reduction in the bacterial load has been demonstrated after lavage of the surgical site.

A similar solution has been developed for use in veterinary medicine, the Simini Protect Lavage.

Our purpose is to evaluate the effectiveness of Simini Protect Lavage used both in revision surgeries as well as a preventive measure in orthopedic surgeries at higher risk of infection.

### MATERIAL AND METHOD

All animals undergoing orthopedic surgery at Vezzoni Veterinary Clinic in which Simini Lavage was used were retrospectively evaluated. Patients were required to have a minimum follow-up of 2 months. Two groups were created, infected cases and prevention cases.

#### Simini Protect Lavage

Simini Protect Lavage is a hypertonic aqueous solution designed to break cross-links within the extracellular polymeric substance (EPS) of the biofilm produced by bacteria. The bacteria thus exposed are more susceptible and subject to removal or inactivation of washing through traditional antibiotics

and the normal defense mechanisms of the animal. The solution it's composed by: Ethanol, Acetic Acid, Sodium Acetate, Benzalkonium Chloride and Water. Simini Protect Lavage works in one minute and should be rinsed with an equal volume of saline after its exposure.

### **Surgery Procedure**

All animals received the same preparation protocol. Cefazolin Sodium was administrated one hour prior to surgery and then every 90 minutes until end of surgery. All animals received a postoperative antibiotic therapy consisting of Amoxicillin/Clavulanic Acid orally TID until results of culture and sensitivity test were available.

### **RESULTS**

A total of 70 cases fulfilled the inclusion criteria. 24 cases were assigned to the infected group as the culture swab performed before washing with Simini Lavage was positive for bacterial infection. The following bacterial genera were found:

Staphylococcus Pseudintermedius, Pseudomonas aeruginosa, Enterobacter Cloacae, Serratia Marcescens, Candida Tropicalis, Escherichia Coli, Staphylococcus Aureus, Staphylococcus Epidermis, Staphylococcus Haemolyticus, Staphylococcus Hominis, Staphylococcus Simulans ad Methicillin Resistant Staphylococcus Pseudintermedius.

In the other 46 cases the culture swab performed before washing with Simini Lavage was negative and these cases were assigned to the prevention group.

The Simini Lavage was used in 21 primary surgeries, of which 7 had a positive culture swab at the beginning of surgery and 14 with a negative swab, and Simini Lavage was used in 49 revision surgeries of which 17 had a positive swab and 32 had a negative swab at the beginning of surgery.

In 68 cases using the Simini Protect Lavage, there was a negative swab at the end of surgery and no infection developed post-surgery. In two cases that had a revision surgery we recorded the persistence of the infection after Simini Lavage.

### **DISCUSSION**

SSI are challenging complications that are difficult to resolve, particularly in orthopedic surgery due to the presence of implants. Effectively the treatment of SSI is complicated by the presence of biofilm which resists eradication due to bacterial adherence to orthopedic implants. Simini Protect Lavage was developed for the removal of planktonic bacteria and biofilms. In fact, it destroys the EPS matrix thus exposing the bacteria to the action of the body's defense systems and to the action of antibiotics and also promotes the removal of bacteria from the surgical site.

In our study we used Simini Protect Lavage in 70 cases, with good outcomes in 68 cases and 2 cases with a persistent infection.

Persistent infection was recorded in two dogs that underwent a revision surgery for an infected THR. In both cases the swab pre-surgery was positive for Staphylococcus pseudintermedius and the swab after surgery was still positive for Staphylococcus pseudintermedius but with a low colony forming unit, respectively  $10^3$  CFU and 50 CFU. Nevertheless, both dogs underwent a second revision surgery in which only a wash with Simini Lavage was performed and in both cases the infection was eradicated with normal outcomes after six months.

According to the experience of the authors, Simini Protect Lavage was a highly effective medical device, that allowed the prevention of infection in surgeries with higher risk of infection and moreover it allowed for the eradication of infections without the need to remove implants when performing surgical revisions in a single stage.



## Additional References:

1. Hunter C, Duncan S. “Clinical effectiveness of a biofilm disrupting surgical lavage in reducing bacterial contamination in total knee arthroplasty revision surgery in known cases of prosthetic joint infection.” Zimmer-Biomet; 2019. <https://www.zimmerbiomet.com>
2. Premkumar A, Nishtala SN, Nguyen JT, Bostrom MPG, Carli AV: “Comparing the efficacy irrigation solutions on Staphylococcal biofilm formed on arthroplasty surface.” The Journal of Arthroplasty (2021) 1-7
3. Kia C, Cusano A, Messina J, Muench LN, Chadayammuri V, McCarthy MB, Umejiego E, Mazzocca AD, “Effectiveness of topical adjuvants in reducing biofilm formation on orthopedic implants: an in vitro analysis”, Journal of Shoulder and Elbow Surgery (2021)
4. O’Donnell J, Wu M, Cochrane N, Belay E, Myntti M, James G, Seyler T, “Efficacy of Common Antiseptic Solutions Against Clinically Relevant Planktonic Microorganisms,” Orthopedics (2022)

