Fighting Surgical Site Infections in Small Animals

Are We Getting Anywhere?

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KEYWORDS

• Surgical site infections • Prevention • Compliance • Antimicrobial prophylaxis

KEY POINTS

- Surgical site infection (SSI) rates after surgery are still considerable, despite the array of preventive measures available.
- Hand hygiene, appropriate antimicrobial prophylaxis, careful selection of surgical patients, and surgical experience/technique are the preventive measures with highest preventive impact on SSIs.
- Compliance rates with known and established measures are dramatically low.
- Correct adherence to the current knowledge has the greatest potential in reducing SSIs.

INTRODUCTION

Surgical site infections (SSIs) are a burden of surgery. They lead to increased health care cost as a result of additional treatment, antimicrobial administrations, extended hospital stay, and patient morbidity/mortality. Further, these complications create emotional and financial distress for owners and drastically affect the animal's welfare. We are distant from the early days of surgery, when the treatment was worse than the disease. In those days, most surgical procedures failed because of infectious complications. In the early eighteenth century, pus was believed to be normal, even adequate, during the phases of wound healing. Discoveries made by Louis Pasteur showed the involvement of microbes in this process, and simultaneously, methods were established to focus on combating sepsis, ushering in the antisepsis era.

Before the antimicrobial era, the pioneering work of Semmelweis in the mid-1800s made us understand the critical role of the hands of health care workers in the

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transmission of infections.[1] Soon after, and led by Pasteur's saying "Instead of fighting bacteria in wounds, would it not just be better not to introduce them?," surgeons like Koch, Lister, and Halstead developed the principles to avoid the development of sepsis; the principles of asepsis and aseptic technique were established. These discoveries, coupled with the understanding of the germ theory of disease and the development of aseptic techniques, may have had the greatest impact on patient survival with regard to infectious diseases or any other medical advancement. With the discovery of antimicrobials, many believed that infectious disease would become a thing of the past, and the focus on prevention measures may have lapsed because of the ease with which infections could seemingly be treated. However, in the late twentieth and early twenty-first centuries, with the effectiveness of the antimicrobial arsenal waning, infection prevention has come to the forefront once again. Considering that no pathogen has yet developed any resistance to aseptic technique, the saying by Pasteur is more pertinent than ever in our journey trying to chase zero infection rates.

DEFINITIONS

Surveillance of SSI rates, including feedback to the surgical team, has been shown to be an important and effective component of SSI reduction strategy in human medicine.[2–4] A successful surveillance program includes proper identification of the targeted risks and the use of universally accepted infection definitions.[5] Differentiating inflammatory processes, infections present on admission (POA), and other health care–associated infections (HAI) from SSI is, therefore, the cornerstone of a multimodal approach to SSI prevention. The US Centers for Disease Control and Prevention (CDC) has recently updated its documents *Surveillance Definitions for Specific Types of Infections*[6] and *Surgical Site Infection Event*[7] (**Table 1**).

At its most basic level, an SSI is an infection that is associated with a particular operative procedure and the facility in which that procedure was performed.[7] An operative procedure is defined as a procedure in which at least 1 incision is made through the skin or mucous membrane or reoperation is performed via an incision made during a previous operative procedure. Primary incisional closure is not part of the operative procedure definition, and infections occurring in wounds that have not been closed by primary intention (packed with gauze, covered with adhesive plastic) are, therefore, included in SSI surveillance.[7] The duration of the operative procedure is defined as the interval in hours and minutes between the start and the end of the procedure. The start of the procedure is defined as the moment when the incision is made. The procedure ends when all instruments and sponge counts are completed, all radiologic studies to be performed in the operating room (OR) are completed, all dressings and drains are secured, and the surgeon has completed all procedure-related activities on the patient.[7]

SSIs are classified according to superficial, deep, or organ/space infections (see **Table 1**). The combined interpretation of clinical and laboratory data allows identification of an SSI in one of these categories.

EPIDEMIOLOGY

Surgical Site Infection Incidence

SSIs account for as many as one-fourth of all HAIs (nosocomial infections) and are the most common cause of infections in human surgical patients.[9] The rate of SSIs is highly dependent on the type of surgery.[10] Several veterinary studies have reported SSI rates, including overall infection and procedure-specific infections (**Table 2**). Most of these studies are limited by the lack of use of appropriate SSI definitions, absence