Post-hospital discharge procedure specific surgical site infection (SSI) surveillance in small animal patients

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INTRODUCTION

•Surgical site infections (SSIs) are an inherent risk of any surgical procedure and can be associated with significant morbidity, mortality and treatment costs. The international epidemic of methicillin-resistant staphylococcal infections has increased interest in SSIs because of patient health, the potential for outbreaks, and zoonotic disease concerns.

•Despite the relevance of SSIs, limited data are available for companion animals, particularly studies using active surveillance and standard SSI definitions. Reliance on medical record data, failure to differentiate SSI from inflammation and inadequate timeframe for follow-up are common weaknesses of reported SSI data.

•Good SSI data are required for proper assessment of risk, implementation of infection control measures and assessment of patient care and effectiveness of interventions.

OBJECTIVES

1) To describe the incidence of SSI in dogs and cats undergoing surgical procedures at the Ontario Veterinary College Health Sciences Centre (OVCHSC) over a 1-yr period.
2) To describe and compare procedure-specific SSI rates.
3) To identify risk factors for development of SSI.

MATERIALS AND METHODS

•All dogs and cats undergoing a surgical procedure between Sept 1, 2010 and Sept 1, 2011 were enrolled.

•Patient, procedure and various medical and outcome data were obtained from the medical record.

•Active surveillance for SSI was performed by calling animal owners 30d after surgery, with additional investigation 1yr after surgery for procedures that involved a surgical implant.

•Standard SSI definitions were used (Table 1).

•Fisher's exact or chi-squared tests were used for categorical comparisons.

Category	Criteria
Superficial SSI	- Within 30d. - Skin and/or subcutaneous tissues - 1 or more of: Pus Bacteria Heat, redness, pain OR localized swelling AND incision reopened by surgeon UNLESS culture negative.
Deep SSI	-Within 30d, 1 yr if implant. -Deep soft tissues of the incision -1 or more of: Pus Spontaneous dehiscence of deeper incision OR incision is deliberately opened when patient has fever, localized pain OR tenderness UNLESS culture negative Abscess of other evidence of infection on imaging or histology.
Organ/Space SSI	-Within 30d, 1 yr if implant. -Any area other than the incision that was encountered during surgery -1 or more of Pus Bacteria Abscess or other evidence of infection on exam, re-operation, histology or imaging.

Table 1: Surgical site infection definitions. Horan et al. CDC/NHSN surveillance definition of healthcare associated infection and criteria for specific types of infections in the acute care setting. Am J Infect Control 2008.

RESULTS

•30 day follow-up has been completed on 561 patients, with complete medical record data compiled for 395 (368 dogs and 27 cats).

•SSIs were identified in 18 (3.2%) animals (Table 1), 17 (4.6%) dogs and 1 (3.7%) cat (*P*=0.90).

•Superficial SSI was most common (Figure 1). An additional 14 (2.8%) of animals had incision inflammation, for a total abnormal incision rate of 5.7%.

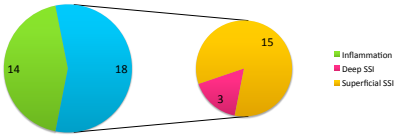

Figure 1: Surgical site inflammation and infection in 561 dogs and cats.

Type	Number	SSI
Orthopedic	150	11 (6.1%)
Soft tissue	114	4 (3.5%)
Gastrointestinal	56	2 (3.6%)
Neurological	23	0
Ophthalmological	12	0
Cardiothoracic	9	1 (11%)

Table 2: SSI rates by surgical type. *P*=0.40

•SSIs occurred in 9/106 (8.5%) procedures with an implant and 9/242 (3.7%) without (P=0.065). All deep infections were implant-associated and two required further surgery.

•Only one SSI developed was identified before discharge. hospitalization. Only 6 (33%) of the SSI cases were recorded in the medical record.

•There was a significant difference in SSIs between surgical classifications (*P*=0.046), with highest rates among clean and dirty procedures (Table 3).

Classification	Number	SSI
Clean	261	15 (5.7%)
Clean-contaminated	32	1 (3.1%)
Contaminated	48	0
Dirty	11	2 (18%)

Table 3: Surgical site infection rate by surgical classification.

•Among orthopedic procedures, the SSI rate for tibial plateau leveling osteotomy (TPLO), a procedure anecdotally associated with a high rate of MRSP infections in many facilities, was 4/34 (9.3%).

•Methicillin-resistant staphylococci were the most commonly identified pathogens (Figure 2).

RESULTS

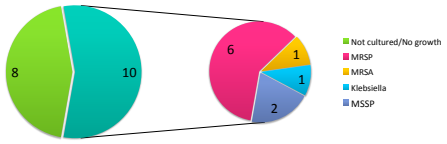

Figure 2: Culture data for SSIs in 18 patients.

CONCLUSIONS

•The SSI rate was consistent with other data and while SSIs only occurred in small percentage of infections, the impact is potentially high. This is particularly true in surgeries involving implants, where the implications of SSI can be particularly high.

•The 9.3% TPLO infection rate, while similar to other recent studies, is of concern because of the commonness of this elective procedure and the potential implications of implant infection.

•While superficial infections were most common, deep infections accounted for 20% of infections. Deep infections are of greater concern because they can be much harder to treat.

•Reliance on the medical for SSI data can potentially result in poor quality data. Only one third of SSIs were clearly documented in the record. Additionally, failure to differentiate infection from inflammation can result in inclusion of a significant percentage of false positive cases. Therefore, medical record based data should be interpreted with care unless there is corresponding evaluation of the accuracy of such data.

•The low rates of SSIs being reported in the medical record likely indicates poor reporting of SSIs identified by referring veterinarians after patients were returned to their care. This highlights the need for better communication and the potential underestimation of SSI rates when relying on medical record data

•Methicillin-resistant staphylococci were the most commonly documented causes of infection. These did not appear to be associated with any outbreaks, indicating the importance of these pathogens as causes of endemic disease.

•Active SSI surveillance is an important aspect of the infection control program. However, obtaining high quality data can be cumbersome and approaches to optimize reporting with limited personnel time are required.

ACKNOWLEDGEMENTS

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