Bugs and Scrubs! Maintaining Surgical Asepsis in the Field

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Shelter Outreach
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Who is doing surgery?
What is a field clinic?

• MASH-style operation (Mobile Army Surgical Hospital)
  • Temporary
  • Equipment, supplies, personnel brought to site
  • Often held in a public location
Why set up a field clinic?

• Target specific patient populations
• Overcome geographic and demographic challenges
• Most cost-effective model of spay-neuter clinic
Is asepsis really required?

• Definition
  • State of being free from disease-causing microorganisms
  • Practices used to promote or induce that state
Is asepsis really required?

• Goals
  • Minimize or prevent contamination of the surgical environment
  • Prevent contaminants from entering the surgical wound
  • Prevent surgical morbidity
Is asepsis really required?

3%
Overall SSI rate among surgical procedures

22%
All healthcare-associated infections

66%
Incisional infections

9,000-20,000
Deaths per year
Is asepsis really required?
Is asepsis really required?

- Veterinary Medicine
  - 82% hospitals reported nosocomial infection outbreak
  - 24.5% of all surgical procedures had SSI

<table>
<thead>
<tr>
<th>Reference</th>
<th>Species</th>
<th>Procedure Type</th>
<th>SSI Rate (%)</th>
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</thead>
<tbody>
<tr>
<td>Vasseur 1988</td>
<td>Dogs &amp; cats</td>
<td>Clean</td>
<td>2.5</td>
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<tr>
<td></td>
<td></td>
<td>Clean-contaminated</td>
<td>4.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Contaminated</td>
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<tr>
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<td></td>
<td>Dirty</td>
<td>18.1</td>
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<tr>
<td>Brown 1997</td>
<td>Dogs &amp; cats</td>
<td>Clean</td>
<td>4.7</td>
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<tr>
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<td></td>
<td>Clean-contaminated</td>
<td>5.0</td>
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<td>Contaminated</td>
<td>12.0</td>
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<tr>
<td></td>
<td></td>
<td>Dirty</td>
<td>10.1</td>
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<tr>
<td>Nicholson 2002</td>
<td>Dogs &amp; cats</td>
<td>Clean-contaminated</td>
<td>5.9</td>
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<tr>
<td>Eugster 2004</td>
<td>Dogs &amp; cats</td>
<td>Clean</td>
<td>6.9</td>
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<tr>
<td></td>
<td></td>
<td>Clean-contaminated</td>
<td>8.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Contaminated</td>
<td>13.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dirty</td>
<td>24.5</td>
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<tr>
<td>Burrow 2005</td>
<td>Dogs</td>
<td>Clean-contaminated</td>
<td>8.5</td>
</tr>
</tbody>
</table>
Is asepsis really required?

• Standard of care
• Directly impacts patient outcome

“We've cheapened the entire profession with bargain-basement spays...[and]... wasted a lot of time and money sending people to school ...to perform a simple procedure that takes three months to master.”

– Dr. Craig Woloshyn

“Doing a spay as a “no-frills” procedure...may make sense as “herd” medicine — but depending on how it’s done it can be riskier and more painful.”

– Dr. Marty Becker

“Spay and neuter clinics are cheap. They work on the principle of low cost and high volume—kind of like McDonald's. And what pet owners receive there is similar: just the basic burger, no tasty or satisfying extras. Sure, your medical care may be of a much higher quality, but clients probably don't understand the technical nuances well enough to base their decisions on these differences.”

– Tumblin & Hoekstra
Is asepsis really required?

• Field clinics…
  • Lack of access to veterinary care
  • Logistical difficulty in providing patient follow-up

Strict adherence to aseptic technique and best surgical practices are even more critical!
The Association of Shelter Veterinarians’ 2016 Veterinary Medical Care Guidelines for Spay-Neuter Programs

Best Practices

www.ShelterVet.org
Primum non nocere
Primum non nocere
Primum non nocere

“...there exists a minimally acceptable level which all clinics should mandate. This ensures safety and well-being of the animals.... The standards applied to the patient...will affect the immediate outcome of the patient as well as have effects long after the patient has recovered....

“If a program cannot maintain minimal requirements for each patient and individual welfare is compromised, then one must reevaluate their approach to a field clinic.”

~HSVMA RAVS
The Greatest Challenge
The Greatest Challenge

- Patients
- Environment
- Surgeons
- Instruments
Clinic Environment

Basics

- Animal housing
- Anesthesia & patient preparation
- Surgeon scrub sink
- Operating room
- Recovery
Clinic Environment

Extras

- Dressing rooms
- Supply rooms
- Instrument preparation
- Gowning and gloving
Clinic Environment

Size
- Personnel
- Equipment

Barriers
- Physical
- Visual

Furnishings
- Remove wall coverings
- Clean ceiling fans
- Discard perishables

HVAC
- Humidity
- Temperature
- Air flow

Work surfaces
- Smooth, non-porous
Clinic Environment

- Traffic Flow
  - Unidirectional
  - Protected areas

Intake/Discharge & Physical Examination
Recovery
OPERATING AREA
Anesthesia & Surgery Prep
Clinic Environment
Clinic Environment
Clinic Environment
Operating Room

**Ideal**

- Separate working unit isolated from general facility traffic
Operating Room

- Designated area within multi-purpose room
- Physical and visual barriers
Surgical Instruments

Cleaning & decontamination

Packaging

Sterilization
Cleaning and Decontamination

• Removal of organic contamination (e.g., blood and mucous)
  • Contamination inactivates chemical germicides
  • Dried blood, body fluids and saline can result in corrosion, rusting and pitting

• Clean with detergent and water
  • pH neutral, low-foaming
Packaging

Woven

• Cotton/polyester blend
• Minimum thread count 140
• Launder to rehydrate, prevent superheating

Non-woven

• SMS (spunlace-meltblown-spunbounded)

Paper-plastic peel pouches
Sterilization

- Liquid chemical
- Dry heat
- Steam
Liquid Chemical Sterilization

Cold sterile

- Items must be clean & dry
- Disassemble complex items
- Observe proper immersion time (6-12 hours)
- Rinsed & dried aseptically
- Change sterilant after each use
Dry Heat Sterilization

**Pros**

- Portable
- Low cost (<$100 USD)
- Will not corrode delicate or sharp instruments
- Use for materials damaged or impenetrable by steam

**Cons**

- Require electricity
- Limited load size
- Prolonged run cycles (60-150 mins.)
- Uneven heat distribution
- Sterilization of all contents unreliable
Steam Sterilization

Pressure Cookers

• Require heat source
• Low pressure thresholds; longer run cycle
• Limited capacity

Tips

• Instruments must not contact water
• Begin when chamber filled with steam
• Proper packaging & loose loading
Steam Sterilization

Autoclave (Gravity displacement)

- Inexpensive stovetop sterilizers ($300-600)
- Limited capacity
- Settings vary based on contents

Tips

- Allow to dry & cool thoroughly
- Do not stack or place on cool surface
- Proper packaging & loose loading
# Steam Sterilization

<table>
<thead>
<tr>
<th>Item</th>
<th>Temperature</th>
<th>Time (Min.)</th>
<th>Pressure (PSI)&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Instruments</strong></td>
<td>250°F</td>
<td>15-30</td>
<td>15-17</td>
</tr>
<tr>
<td></td>
<td>270°F</td>
<td>12-15</td>
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<td>275°F</td>
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<td><strong>Textiles</strong></td>
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<td></td>
<td>270°F</td>
<td>12-25</td>
<td>27-30</td>
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<tr>
<td></td>
<td>275°F</td>
<td>12-25</td>
<td>27-30</td>
</tr>
<tr>
<td><strong>Flash sterilization</strong>&lt;sup&gt;b&lt;/sup&gt;</td>
<td>270-275°F</td>
<td>3-10</td>
<td>27-29</td>
</tr>
</tbody>
</table>

<sup>a</sup>For every 1,000 feet of altitude, add an additional 0.5 psi above 15 psi (normal atmospheric pressure at sea level)

<sup>b</sup>Item should be unwrapped and placed in a perforated metal tray
Surgical Instruments

**Ideal**

- Separately wrapped instrument packs for each procedure
- Steam sterilization
Surgical Instruments

- Separate wrapped instrument packs for each procedure
- Steam, gas, or plasma sterilization
- Dry heat sterilization
- Individual instruments used on a single patient and reprocessed
Suture Materials

**Ideal**

- Individually packaged suture for each patient
Suture Materials

Minimum

- Reeled suture
- Sterile, unused portions shared between patients
Surgeon Preparation

• Surgical attire
  • Caps, masks, gloves +/- gowns
• Surgical hand scrub
Surgical Attire

**Ideal**

- Dedicated surgical attire worn by all personnel
- Attire not worn outside OR
- Attire laundered daily
- Caps and masks worn at all times within OR
- Single-use, sterile, surgical gowns and gloves worn by surgeons for all OR procedures
Surgical Attire

- Dedicated surgical attire worn throughout the day
- Caps and masks for all procedures except castration of cats and puppies
- Single-use sterile gloves for all procedures except cat castrations
Surgeon Preparation

Surgical hand scrub

- Remove debris & transient micro-organisms
- Reduce resident microbial count
- Inhibit rebound growth
Surgeon Preparation

Surgical hand scrub

- Alcohol
- Chlorhexidine
- Iodine/iodophors
- Phenolic compounds

Methods

- Disposable plastic brushes
- Soap-impregnated sponges
- Brushless scrub solution
- Waterless scrubs & rubs
Surgeon Preparation

Rubs & Gels

- All brushless, waterless, antiseptic rubs or gels are not equivalent
- Contact time for surgical antisepsis is greater than for hygiene
- Application technique different than traditional anatomic or timed scrub
Surgeon Preparation

When do I scrub?

• Beginning of surgical period
• After breaks in asepsis
• After procedures >60 minutes

How long do I scrub?

• Initial scrub 5 minutes
• Subsequent scrubs 2 minutes
Surgeon Preparation

• Sterile surgical gloves are not intended for re-use and cannot maintain their integrity with re-sterilization

• Non-sterile examination gloves cannot be sterilized
Surgeon Preparation

**Ideal**

- Surgical scrub performed prior to each procedure and prior to entering OR
Surgeon Preparation

- Surgical scrub performed prior to a series of procedures except for castration of cats and puppies
Patient Preparation

Hair removal
- Electric clippers
- Depilatory creams
- Straight blades

Scrubbing of surgical site
- Scrub, rinse, spray, paint
- Dry thoroughly

Barrier drapes
- High risk of fecal or hair contamination
Patient Preparation

**Ideal**

- Hair removal and operative site prepared after anesthetic induction and prior to entering the OR
Patient Preparation

• Hair removal and operative site prepared within OR
Draping

**Ideal**

- Complete sterile draping performed for all OR procedures
Draping

• Complete sterile draping performed for all abdominal procedures
# Medical and Surgical Supplies

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
</table>
| **Sterilization** | • Contact with vascular system or sterile tissue  
• IV catheters, IV tubing |
| **Disinfection**  | • Contact with mucous membranes  
• Laryngoscope blades, masks |
| **Cleaning**     | • Contact with intact skin  
• EKG leads, blood pressure cuffs |
| **Dispose**      | • Single-use items  
• ET tubes, breathing circuits, syringes |
Medical and Surgical Supplies

- Sterilization (vascular)
  - Needles
  - Syringes
- Disinfection (mucous membrane)
  - Endotracheal tubes
  - Masks
  - Breathing circuits*
- Cleaning – (intact skin)
  - Monitoring devices
Asepsis is not optional...even (and especially) in the field!

Surgeons

Patients

Instruments

Environment
Good practices show you care!

- Good Practices
- Successful Outcomes
- Widespread Support
- Happy Clients
- Happy Pets

Good practices show you care!
Who is doing surgery?
What would we see in your clinic?
www.cmpvpr.org/SpayNeuterSeminar/

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sheltermedicine@aspca.org

www.ASPCAPro.org