The Hidden Costs of Reconciling the Surgical Sponge Count

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Disclosure

• Funding for this study was provided through a grant from RF Surgical Systems.
Other Members of the Research Team

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Surgical counts are performed to “account for all items used on the surgical field and to lessen the potential for injury to the patient as a result of a RSI.”¹

Health care organizations are responsible for “employing practices to account for all surgical items used during a procedure including, but not limited to: complete and accurate counting, radiological confirmation, and the use of adjunct technology.”¹
Surgical Counts

• Performed by the circulating nurse & scrub person at the following surgical events:
  – Prior to the start of the procedure
  – When closing a cavity within a cavity (e.g. bladder)
  – When closing the first layer of tissue (e.g. fascia)
  – When closing the final layer (e.g. skin)\(^1\)
Why Sponges?

• Cotton gauze sponges account for 52% to 69% of RSIs\textsuperscript{2-4}
• Result in more serious tissue reaction than metal items
• Reliable adjunct technology available
Operating Room: Incorrect Surgical Count

**Surgeon**
- Stop closure
- Explore cavity/incision site for missing item

**Circulating RN**
- Incorrect Surgical Count
  - Repeat surgical count
  - Notify surgical team of incorrect count
- Search sterile field
- Search the room (off the sterile field)

**OR**
- Count reconciled, continue with closure of surgical site

OR
- Count unreconciled, x-ray is ordered and taken in the operating room to rule out retained surgical item

**Radiology**
- Complete x-ray in the operating room
- Communicate x-ray findings to surgical team

**Scrub**
- Follow facility specific policies
- Complete documentation in chart, including patient safety report
“The manual surgical sponge count does not adequately prevent retained sponges.”

6 Phases of Sponge Management:

**Room Preparation**
- Sponges used during count
- Sponge dropped on floor

**Initial Count**
- Miscounting, counting sponge twice
- Not separating sponges

**Adding sponges**
- Not handing off sponges in packaged groups (5, 10)

**Removing sponges**
- Counting too early
- One person counting – not 2

**First closing count**
- Scrub person counting too fast
- Not placing sponges into pockets

**Final closing count**
- Circulating RN unable to see from location
- Placing too many sponges into a pocket

**TIME PRESSURE**
- Sponge put someplace else during setup
- Part of sponge thought to be whole sponge

**DISTRACTION**
- Dressings unwrapped during procedure
- Handing off sponge with specimen

**MULTITASKING**
- Not recording added sponges on count sheet
- Not visualizing sponges

Additional issues:
- Not counting added sponges
- Recording too few sponges on count sheet
- Recording too many sponges on count sheet
Retained Surgical Items (RSIs)

- One of the most frequent reported sentinel events
- Half of the malpractice settlements for surgical “never events”
- 1 in every 5500 surgeries
- Negative patient outcomes
- Manual surgical counts = national standard for preventing RSIs
  - Sensitivity - 77%
- Intraoperative imaging failed to detect 33% of retained items
- AORN guideline for prevention of RSIs recommends that “Perioperative personnel should evaluate existing and emerging adjunct technology to determine the application that may be most suitable in their setting.”
Purpose

• Estimate the cost of nonproductive OR time reconciling surgical sponge counts
• Estimate the costs of using radiography to rule out the presence of retained sponges

This information is needed for perioperative nurses to evaluate the cost-effectiveness of purchasing alternatives (e.g. adjunct technology) to supplement the surgical sponge count.
Methods

• Descriptive study
• Retrospective review
• Academic medical center – Level 1 trauma center
• Sample: All patients undergoing surgery in the Main OR from 2/14 through 10/14
  – Exceptions: ophthalmology, dentistry, nonsurgical procedures, aborted procedures, procedures when patient expired
Data Collection

- Recorded by circulating nurses
- EPIC® Optime® surgical log
  - “Hard stop”
- Incident reports
Results

• 13,322 patient surgeries
• Additional time & effort to reconcile 212 sponge counts
  – Services most often involved:
    • Neurosurgery (23.6%)
    • Orthopedics (21.2%)
    • General surgery adult/plastics (19.3%)
Location of Missing Sponges

- The missing sponge(s) were found in 186 (87.7%) of the 212 surgical sponge counts requiring reconciliation:

<table>
<thead>
<tr>
<th>Location</th>
<th>Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>In wound</td>
<td>16 (7.5%)</td>
</tr>
<tr>
<td>On sterile field</td>
<td>91 (42.9%)</td>
</tr>
<tr>
<td>Nonsterile areas of the OR</td>
<td>79 (37.2%)</td>
</tr>
<tr>
<td>Unreconciled</td>
<td>26 (12.2%)</td>
</tr>
</tbody>
</table>
### Steps Taken to Reconcile Sponge Counts

<table>
<thead>
<tr>
<th>Step</th>
<th>Number of searches (% of searches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surgeon notified</td>
<td>84 (39.6%)</td>
</tr>
<tr>
<td>Wound searched</td>
<td>34 (16.0%)</td>
</tr>
<tr>
<td>Sterile field searched</td>
<td>164 (77.4%)</td>
</tr>
<tr>
<td>Nonsterile area(s) searched</td>
<td>124 (58.5%)</td>
</tr>
<tr>
<td>Additional personnel</td>
<td>24 (11.3%)</td>
</tr>
<tr>
<td>Other</td>
<td>14 (6.6%)</td>
</tr>
</tbody>
</table>
Intraoperative Radiographs

• 55 intraoperative radiographs
  – 25 taken during liver transplant per protocol
  – 24 due to missing sponge
  – 4 for emergency procedure (no initial count)
  – 2 for second look laparotomy procedures

• Surgical sites:
  – Abdomen, head & neck, leg, chest, spine, groin, hip, and hand
Time

• Time spent searching for missing sponge(s):
  – Ranged from one (1) to ninety (90) minutes
  – For 9 searches, nurses recorded number of minutes as “greater than 30” – analysis was done using 30 minutes
  – Overall time (1,700 minutes) is an underestimate of actual time
Use of Published Costs

- Average radiology costs = $286/patient\textsuperscript{11}
  - Also included OR time associated with obtaining an intraoperative radiograph = 30 minutes\textsuperscript{12}

- Operating time = $62/minute\textsuperscript{13}
  - Conservatively estimated that 50% of the time spent searching for a missing sponge is nonproductive
Costs

• Annualized cost of time = $140,533
  – Adjusted annualized cost of time (assuming 50% nonproductive) = $70,266

• Cost of obtaining and reading radiographs = $14,872 + cost of OR time to obtain radiograph = $96,720
  – Combined annualized cost of obtaining, reading, and waiting for results = $148,789

• Total annualized cost of searching for missing sponges and using radiography to rule out the presence of a RSI = $219,056
Strengths and Limitations

**Strengths**
- Generalizability
- Large volume of cases = clinically relevant findings

**Limitations**
- Estimated costs are likely lower than actual costs
  - “Documentation fatigue”
- Time
  - Greater than 30 minutes = 30 minutes
  - Underestimated unproductive OR time
- Radiograph costs higher in other settings
Conclusions

• When considering the cost-effectiveness of adjunct technology, perioperative managers, directors, and value analysis teams often consider the cost of supplies (e.g. sponges) alone.
  – This limited view does not take into consideration the cost of current practices & “hidden” costs.
References