Auditing Intraoperative Radiographs Following a Surgical Count Discrepancy: A Multidisciplinary Perspective

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Disclosures

We have nothing to disclose
Background

- A retained foreign body (RFB) is a patient safety incident where a surgical object is accidentally left in a body cavity following a procedure – this is a “never event”
- RFBs can be detected early in the postoperative period or months or years later
Background

• Surgical counts provide accountability for sponges, small items, and instruments used in surgery

• Following an incorrect surgical count, standard procedure commonly includes an intraoperative radiograph to detect RFBs
  • False negative rates of intraoperative x-rays have been reported in up to 10-15% of cases
  • Contributing factors:
    • uncertainty of the radiographic appearance of RFB
    • obscuration by overlapping material
    • time pressure
    • unclear clinical history

NO CURRENT LITERATURE ON THE FREQUENCY OF X-RAYS PERFORMED IN THE PERIOPERATIVE PERIOD FOR RFB AND THE POSITIVITY RATE
Background

- Communication is important in medicine
- Often there is little, incomplete or incorrect document history for radiologists
- Incomplete history when interpreting an intraoperative radiograph leaves room for error, increasing the possibility of retained surgical items
Purpose

To audit all x-rays taken following a surgical count discrepancy...

To identify how images are taken, what information is conveyed to the radiologist, and how x-rays are reported...

To improve reporting standards and identification of retained surgical items...

To adhere to ALARA as much as possible and reduce unnecessary work
Materials and Methods

Current surgical count policies at our institution were reviewed.

Key stakeholders within the radiology and surgical divisions were engaged.

All x-rays performed for an incorrect or absent surgical count between January 2018-December 2020 were reviewed.

Clinical indication for each x-ray as provided on the requisition was compiled.

All final x-ray reports were reviewed to identify each instance where a retained surgical item was identified.

This data was complied against data obtained directly from the surgical divisions at our institution.
Results: Current Surgical Policy

• If incorrect count OR emergent surgery (and sweep of the surgical cavity and operating room is negative)
  • X-ray is performed STAT and a verbal report provided prior to patient leaving OR
  • **800-1700h** *(regular hours):* first call is staff radiologist
  • **1700-800h + weekends** *(afterhours):* first call is radiology resident
  • X-ray required for **suture size o to 6-0**; no x-ray if >6-0
  • If missing item not located and high suspicion remains, a CT is performed

• During regular hours first call is a radiology staff; during the afterhours first call is a radiology resident
  • Residents are back-up by staff 24/7
Results

Number of surgeries performed from 2018-2020
84,066 surgeries

Number of x-rays taken for count discrepancy 2018-2020
811 x-rays (1.0% of all surgeries)
Results: Time

- The majority of x-rays (64%) were performed in the after-hours period.
- At this time, the preliminary report would be dictated by a radiology resident.
Results: Indications

- X-ray indications either listed a specific item ie. sponge or gave no specific history ie. missing instrument
- From the 811 x-rays performed 36% gave a nonspecific history
- Most common specific history: sponge or needle
- Of all documented indications, 81 were overtly incorrect (10%) based on radiologists conversations with the surgical team
### Results: Retained Items

- Out of 811 x-rays performed for a count discrepancy there were 12 positive x-rays for a retained item (1.5%)
  - 11 were retained sponges
  - 1 was retained suture
- Each item was retrieved from the patient while still on the operating table
- There were 17 incidences where a CT was performed for an incorrect count following a negative x-ray; each CT was negative for RFB

<table>
<thead>
<tr>
<th>Procedures with retained items</th>
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<tbody>
<tr>
<td>1 TAH-BSO for endometrial cancer</td>
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<tr>
<td>2 LVAD implantation</td>
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<td>3 Radical Prostatectomy</td>
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<td>4 Liver transplant</td>
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<td>5 Kidney and pancreas transplant</td>
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<td>6 TURBT, right distal ureterotomy and ureter reimplantation</td>
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<tr>
<td>7 LAR of rectosigmoid colon, TAH-BSO</td>
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<td>8 Liver transplant</td>
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<td>9 Paraspinal tumor resection and lumbar laminectomy</td>
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<tr>
<td>10 Laparotomy, irreversible electroporation treatment of pancreatic Ca and gastrojejunostomy</td>
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<tr>
<td>11 Complex sarcoma resection</td>
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<tr>
<td>12 Complex sarcoma resection</td>
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Discussion

- X-rays taken for surgical count discrepancy is a very common study with a total of 811 x-rays read by our radiologist group from 2018-2020 for this indication
  - However, this still remains a low percentage of all surgeries (1.0%)
- No data in the literature regarding the number of x-rays taken for incorrect surgical counts at other institutions
- Only 12 of these x-rays were positive for a retained surgical item (1.5%)
- The types of surgeries where a retained item was found were usually complex but spread across many subspecialties

Take Home Points

- We are likely performing an adequate number of intraoperative x-rays
- Relatively low positivity rate for RFBs
- One discipline of surgery is not at greater risk for a RFB, but more complex surgeries are
Discussion

- Lack of Clinical History
  - 36% of all x-ray requests had no nonspecific history ie. missing count
  - 10% of the written histories provided did not concur with the discussion between the staff/resident and the surgical team over the phone, leading to a potential for error
- Importance
  - False negative rates have been reported in up to 10-15% of cases in the literature -> risk factor is poor clinical history
  - 64% of x-rays are first discussed with resident -> more history is more helpful for trainees

Take Home Points

- Too many x-rays at our institution have too little provided clinical history
- Residents most commonly provide the verbal report to the OR’s
- Must improve:
  - Documented clinical history from referrers
  - Documented clinical history by radiologists from verbal discussions with the OR
Discussion

• 17 CTs were performed following a negative x-ray and NONE were positive for a RFB (0%)

Take Home Points

CT is very low yield following a negative x-ray (though sample size is small)
Additional Strategies from the Literature

• Provide an x-ray of the suspected retained foreign body IN ADDITION to the radiograph of the patient so radiologist knows exactly what they are looking for
• Create a compendium of surgical items for the radiologist so they know what they are looking for
• Use radiofrequency sponges which are associated with fewer retained sponges and decreased risk of reoperation
References


