DEVELOPMENT AND EVALUATION OF A LOW-COST, REUSABLE LAPAROSCOPIC ENTRY AND EMERGENCY MODEL

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OBJECTIVES

• Develop a laparoscopic emergency model using on-hand, low-cost, widely available materials

• Determine whether the model and scenario were acceptable for use by surgical residents and attendings

• Primary hypothesis: The decision to perform an exploratory laparotomy in response to hemodynamic instability differs depending on experience level
Injury to a major retroperitoneal vessel is a rare but serious complication of laparoscopic entry

- Incidence: 0.01–0.64%
- Mortality: 12–23%

Obstetric emergency drills have resulted in improved communication, recognition, and management

Needs assessment of residents:
- Of 93 respondents, 84% participate in OB simulation drills
- Of 90 respondents, 8% participate in laparoscopic emergency simulations
MODEL DESIGN
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Methods

- Convenience sample of OB/GYN and general surgery residents (n=20) and attendings (n=9)
- Laparoscopic entry followed by hemodynamic instability
- Study was designed to establish content, response process, and relations with other variables evidence
  - Performance checklists completed during the scenario
  - Post-simulation surveys
SCENARIO
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RESULTS

• Performance checklist results:
  • A difference ($P=0.005$) existed in decision to perform an ex lap
    • Junior resident group (n=12): 41.7%
    • Senior resident, fellow, attendings (n=17): 82.4%
  • Median (range) time: 3 (2-5) minutes
  • Hematoma identified laparoscopically ($P=0.87$)
    • Junior resident group (n=12): 25%
    • Senior resident, fellow, attendings (n=17): 23.5%
## RESULTS

<table>
<thead>
<tr>
<th>Post-Simulation Survey</th>
<th>Neither agree nor disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>The simulated drill approximates the stress of a vascular injury during laparoscopy</td>
<td>2 (6.9%)</td>
<td>14 (48.3%)</td>
<td>13 (44.8%)</td>
</tr>
<tr>
<td>The model set up appears appropriate for approximating a retroperitoneal hematoma</td>
<td>2 (6.9%)</td>
<td>20 (69%)</td>
<td>7 (24.1%)</td>
</tr>
<tr>
<td>The model is useful in improving recognition of a vascular emergency</td>
<td>1 (3.4%)</td>
<td>18 (62.1%)</td>
<td>10 (34.5%)</td>
</tr>
<tr>
<td>The model is useful in improving management of a vascular emergency</td>
<td>1 (3.6%)</td>
<td>17 (60.7%)</td>
<td>10 (35.7%)</td>
</tr>
<tr>
<td>The model is useful in improving knowledge of the differential diagnosis for hypotension during laparoscopy</td>
<td>3 (10.3%)</td>
<td>15 (51.7%)</td>
<td>11 (37.9%)</td>
</tr>
</tbody>
</table>
Cost: $136.92

- Decommissioned obstetric manikin, felt, foam, isolation gown, Dragon Skin FX Pro and Skin Tite, mannequin from clothing store

Acceptable price range for model:
- Less than $50 (6.9%)
- $51–100 (17.2%)
- $101–200 (31%)
- $201–300 (17.2%)
- Less than $300 (27.6%)
CONCLUSION

- The reusable, laparoscopic simulation model and emergency scenario were rated favorably by participants.
- The majority of participants did not retract the bowel and attempt to identify the simulated retroperitoneal hematoma laparoscopically.
- There was a statistically significant difference in the decision to perform an exploratory laparotomy between junior residents and more experienced surgeons.


