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Total events
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20.9%
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Incidence of bag
- Capnography
- Proceeding
- Hypoventilation/ apnea
- Normal ventilation
- Hypoventilation/apnea
- Hypoxemia
- Tissue oxygen desaturation
- Bradycardia
- Hypotension
- Cardiac arrest
- Mortality

Figure 1. The respiratory compromise cascade

METHODS

Literature searches were conducted in PubMed, the Cochrane Library and EMBASE using Medical Subject Heading (MeSH) terms and title and abstract free-text searches.

Searches identified RCTs in patients receiving sedation during ambulatory surgery and in which visual assessment of ventilation and pulse oximetry monitoring (SoC) was compared with SoC plus capnography.

METHODS

A systematic review of PubMed, EMBASE and the Cochrane Library was conducted to systematically identify randomized controlled trials (RCT) of capnography versus standard monitoring published after January 1995. Endpoints of interest were desaturation (primary, apnea, asphyxia, bradycardia, hypotension, premature procedure termination, respiratory failure, use of assisted bag-mask ventilation and death. A random effects meta-analysis was conducted using RevMan 4.3.5 with outcomes reported as the odds ratios for capnography versus standard of care.

Figure 1. Random effects meta-analysis of mild desaturation

### Table 1. Odds ratios based on high-quality studies

<table>
<thead>
<tr>
<th>Event</th>
<th>n</th>
<th>OR with capnography relative to SoC</th>
<th>95% confidence interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild desaturation</td>
<td>8</td>
<td>0.54</td>
<td>0.40-0.66</td>
</tr>
<tr>
<td>Severe desaturation</td>
<td>3</td>
<td>0.49</td>
<td>0.34-0.71</td>
</tr>
<tr>
<td>Apnea</td>
<td>4</td>
<td>0.54</td>
<td>0.25-1.16</td>
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<tr>
<td>Minesupplemental oxygen</td>
<td>0.83</td>
<td>0.59-1.17</td>
<td></td>
</tr>
<tr>
<td>Bradycardia</td>
<td>3</td>
<td>1.23</td>
<td>0.87-1.74</td>
</tr>
<tr>
<td>Hypotension</td>
<td>4</td>
<td>1.03</td>
<td>0.74-1.43</td>
</tr>
</tbody>
</table>

Randomized, controlled trial requirements

- **RCT size** to detect statistically significant differences between two monitoring modalities was calculated using 14.

- The incidence of bag-mask ventilation was 1.16% with capnography and 0.60% with capnography. An RCT to detect this difference would need to enroll over 8,400 patients.

- For mortality and severe morbidity, 27,126 patients would need to be enrolled if a 50% reduction in event incidence (from 0.33%) is assumed.

A 10% reduction would require >900,000 patients.

CONCLUSIONS

- Capnography monitoring was associated with statistically significant reductions in apnea, and mild and severe oxygen desaturation.
- Reduction in events in the immediate respiratory compromise cascade may increase patient safety with respect to later events.
- RCTs provided to have direct links between use of monitoring and a reduction in patient harm may not be feasible.

ACKNOWLEDGMENTS

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REFERENCES
