Malignant Hyperthermia Preparation. Are you doing it right?

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Background

- Malignant hyperthermia preparation
- Historically cleansed after 20 min flush.
- Newer generations – complex components → up to 10 to >100 min.
- Hypothesis – differences between MHAUS recommendations and common practice at UIC.

Figure 1. Washout times to <5ppm Desflurane. (B)

<table>
<thead>
<tr>
<th>Machine</th>
<th>Washout Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Datex-Ohmeda</td>
<td>27 min</td>
</tr>
<tr>
<td>Aestiva</td>
<td>30 min</td>
</tr>
<tr>
<td>Drager Apollo</td>
<td>53 min</td>
</tr>
<tr>
<td>GE Avance</td>
<td>40 min</td>
</tr>
<tr>
<td>GE Aestiva</td>
<td>30 min</td>
</tr>
</tbody>
</table>

*Values vary considerably depending on source

Figure 2. Department Role

<table>
<thead>
<tr>
<th>Position</th>
<th>CRNA</th>
<th>Tech</th>
<th>Resident</th>
<th>Attending</th>
</tr>
</thead>
<tbody>
<tr>
<td>Follow 7%</td>
<td></td>
<td></td>
<td>37%</td>
<td>16%</td>
</tr>
<tr>
<td>N = 57</td>
<td></td>
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</tbody>
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Methods

- IRB approved cross-sectional survey - anesthesia providers and technicians (N=57) at UIC
- 7-question web survey (Qualtrics)
- Regarding workstation cleansing practices

Figure 3. Level of experience in years

- Survey response rate: 44.5% (57/128)
- Residents (37%) vs attendings (37%)
- Experience: <5 yrs (48%) vs ≥5 yrs (52%)

Results

Figure 4. Overall responses to 5 key questions on machine preparation

- MHAUS recommendations
- Our results
- Disables/remove vaporizer.
- Change CO2 absorbent.
- New circuit/bag to Y-piece, set ventilator to inflate periodically.

- Only 28% chose the recommended circuit configuration.
- 37% of subjects with >5 yrs vs 19% of subjects with <5 yrs of experience
- Older—10L/min for 20 min. Newer—10L/min for up to 104 min.
- 98% of all subjects used FGF of ≥10L. 47% would flush for ≥20 min but only 15% would flush for ≥90 min.
- During case keep FGF >10L/min to avoid “rebound phenomenon”.
- Overall, 12% would maintain FGF >10LPM during case; Range: 10-15% regardless of level of experience.

Discussion

- Must consider machine wash out times on an individual (manufacturer) basis.
- Dräger Fabius – 104 min to achieve Sevo concentration <5ppm (1).
- Washout times vary even if produced by same manufacturer (Fig. 1); (2).
- Most chose appropriate high FGF, but did not choose recommended circuit or appropriate FGF during case (Fig. 4).
- Experience level correlated with choosing correct circuit configuration.
- “Rebound phenomenon” unknown
- Variability may represent knowledge gaps across larger sample population.
- Future studies should recruit a nationally representative sample.
- Will use results to develop protocol for QI and patient safety.

Alternatives (MHAUS)

- Activated charcoal filters
- Dedicated vapor-free or ICU ventilator

Only 2 subjects selected

- High FGF rates
- Correct circuit configuration
- Appropriate flush times for UIC workstations

References