Selective decontamination of the digestive tract reduced intensive care unit and hospital mortality in adults


Q Does selective decontamination of the digestive tract (SDD) reduce mortality and acquisition of resistant bacteria in adult patients in the intensive care unit (ICU)?

**METHODS**

**Design:** randomised controlled trial.

**Allocation:** (concealed)*.

**Blinding:** unblinded.

**Follow up period:** to hospital discharge.

**Setting:** an ICU at an academic medical centre in Amsterdam, The Netherlands.

**Patients:** 1090 patients >18 years of age (mean age 60 y; 59% men; based on n=934), who had an expected duration of mechanical ventilation >48 hours, an expected ICU stay of >72 hours, or both. Exclusion criteria: previous ICU admission within 3 months, known hypersensitivity to study medication, pregnancy, perceived imminent death, and participation in another study.

**Intervention:** 537 patients were allocated to the SDD unit, and received 0.5 g of an oral paste (2% polymyxin E, 2% tobramycin, and 2% amphotericin B), applied to the buccal cavity 4 times daily; polymyxin E, 100 mg, tobramycin, 80 mg, and amphotericin B, 500 mg, administered through gastric tubes; and intravenous cefotaxime, 1000 mg, 4 times daily for the first 4 days. Surveillance cultures were taken at admission and twice weekly; >1 occasion of positive sputum cultures for aerobic gram negative bacteria or yeasts was treated with nebulised polymyxin E, 80 mg, or amphotericin B, 5 mg, 4 times daily until cultures were negative. 553 patients were allocated to standard oropharyngeal care (mouth rinsing with water 4 times daily and tooth brushing twice daily; initiation of enteral feeding as early as possible, and systemic antibiotics for proven or suspected infections as clinically indicated).

**Outcomes:** ICU and hospital mortality and acquired colonisation by any resistant strain (>48 h after inclusion).

**Patient follow up:** 86%.

*Information provided by author.

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**MAIN RESULTS**

Patients in the SDD unit had lower ICU and hospital mortality rates than patients in the standard care unit (table). Follow up cultures were available for 773 patients (71%). Patients in the SDD unit had lower rates of acquired colonisation with >1 resistant strains of *Pseudomonas aeruginosa* or other gram negative bacteria than patients in the standard care unit (table).

**CONCLUSION**

Selective decontamination of the digestive tract reduced intensive care unit and hospital mortality among adult patients in the intensive care unit.

**Commentary**

SDD selectively targets pathogenic organisms with the aim of reducing nosocomial infections. Although recent systematic reviews have shown reduced mortality associated with SDD, its use in ICUs has been challenged. In particular, concerns have been raised about the increased risk of resistance to antibiotics and the added costs of treating resistant nosocomial infections.

The important work by De Jonge et al., however, suggests that SDD reduces resistant organism colonisation and increases patient survival. A strength of the study is the heterogeneous sample of patients allocated to 2 units in the same centre. The same medical staff treated patients with the same protocols in both units, except that one unit also used SDD. Although this was an open label (unblinded) study, the authors used objective outcome measures. A similar percentage of patients in each group were lost to follow up, and the potential effects of these missing data on the overall findings are unknown. It is also possible that patterns of antibiotic resistance might have been detected if the study had continued. However, recruitment was stopped early because the units were being moved. Despite this, the authors have continued to monitor for antibiotic resistance in their unit, but have not found such a pattern.

ICU staff need to carefully consider SDD. Settings with lower baseline risks of nosocomial infection may not achieve the benefit reported by De Jonge et al. Although, de Jonge et al report the cost of antibiotic use for the 2 groups—with the results favouring the SDD group—a formal economic analysis is needed before the overall cost-benefit of SDD can be firmly established.

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Selective decontamination of the digestive tract (SDD) v standard oropharyngeal care for adult patients in the intensive care unit (ICU)*

<table>
<thead>
<tr>
<th>Outcomes at discharge</th>
<th>SDD</th>
<th>Standard care</th>
<th>RRR (95% CI)</th>
<th>NNT (CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICU mortality</td>
<td>15%</td>
<td>23%</td>
<td>35% (15 to 51)</td>
<td>13 (8 to 23)</td>
</tr>
<tr>
<td>Hospital mortality</td>
<td>24%</td>
<td>31%</td>
<td>22% (4 to 37)</td>
<td>15 (8 to 83)</td>
</tr>
<tr>
<td>Acquired colonisation with &gt;1 resistant strain of gram negative bacteria†</td>
<td>16%</td>
<td>26%</td>
<td>38% (18 to 54)</td>
<td>10 (7 to 23)</td>
</tr>
</tbody>
</table>

*Abbreviations defined in glossary; RRR, NNT, and CI calculated from data in article.
†Based on data from 773 of 934 patients.

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