Selective digestive decontamination reduces ventilator-associated tracheobronchitis

To the editor

We read with interest the systematic review and meta-analysis on frequency, prevention, outcome and treatment of ventilator-associated tracheobronchitis (VAT) by Agrafiotis et al.1 We are surprised by the authors’ finding that selective digestive decontamination (SDD) does not prevent VAT (odds ratio [OR]: 0.62, 95% confidence interval [CI]: 0.31–1.26). We believe that an inadequate literature search is the reason for this result.

The authors found five randomized controlled trials (RCTs) of SDD including about 800 patients. Remarkably, sixteen years ago Kollef analysed seven RCTs including 1043 patients and demonstrated the opposite result that SDD reduced VAT (risk difference 0.052, 95% CI: 0.017–0.087).2 Although the authors mentioned the Kollef’s meta-analysis in their discussion, they failed to explain the opposing results.

We performed a meta-analysis on the impact of SDD on VAT. We searched PubMed, Embase, the Cochrane Register of Controlled Trials, previous systematic reviews on the subject, conference proceedings, and our personal database. We found 60 RCTs of SDD. Twelve of them,3–14 including 2252 patients (1102 SDD, 1150 control), provided useful information on VAT. We excluded one RCT because it reported only VAT episodes.15 There were 135 (12.25%) patients with VAT in the SDD group and 234 (20.34%) in controls, indicating a 46% VAT reduction in the group receiving SDD (OR [fixed effects model]: 0.54, 95% CI 0.42–0.69; p < 0.001) (Fig. 1). Heterogeneity was not demonstrated (χ² = 10.3421, p = 0.50; I² = 0). The results did not change using the random effects model. We also

Figure 1 Forrest plot of randomized controlled trials of the impact of selective digestive decontamination on tracheobronchitis. T+ selective digestive decontamination group; T−, control group. An odds ratio (OR) less than 1 favours treatment; an odds ratio (OR) more than 1 favours control. Results are presented as OR with 95% CI using the fixed effects model. The Cochran Q statistic for heterogeneity was used. Heterogeneity was considered to be significant if the p value was <0.10. I² measure of inconsistency was evaluated with the formula 100% × (Q − df)/Q, where Q is Cochran’s Q statistics and df is the degree of freedom (number of studies − 1). Negative values of I² are put equal to 0%; zero percent indicates no observed heterogeneity, whilst an I² of <30% indicates mild heterogeneity, 30–50% moderate, and >50% severe heterogeneity. The use of the random effects model did not change the results.

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explored the impact of SDD on VAT among subgroups using different types of decontaminating regimens (i.e. parenteral and enteral vs enteral only) (Table 1). Six studies used the full SDD protocol of parenteral and enteral antimicrobials and included 1267 patients (624 SDD, 643 control).\textsuperscript{6,7,9,11,13,14} VAT was demonstrated in 96 (15.38\%) patients of the SDD group and in 182 (28.3\%) patients of the control group, showing a significant 54\% reduction in the odds of VAT. Contrasting, in six studies using only enteral antimicrobials and including 985 patients (478 SDD, 507 controls), the number of patients with VAT was 39 (8.15\%) in SDD and 52 (10.25\%) in control group.\textsuperscript{3–5,8,9,12} The difference was not significant. These results are consistent with those of a previous meta-analysis which showed a significant impact of SDD on pneumonia in patients receiving the full SDD protocol.\textsuperscript{16}

This exercise demonstrates how an appropriate search is crucial in order to reach the correct conclusion. The latest SDD trial that Agrafiotis et al. identified for their meta-analysis dates from 1992. Two RCTs\textsuperscript{4,9} with information on tracheobronchitis published during their search period were missed although Kollef included them in his meta-analysis of 1994.\textsuperscript{8} Additionally, the authors’ search failed to identify other six RCTs that reported information on the occurrence of tracheobronchitis published since 1992.\textsuperscript{7,11–15} We are obliged to Agrafiotis et al. for drawing attention to the effectiveness of SDD on the uncommon outcome measure of VAT, and we are confident that they may accept our effort in improving their analysis. We believe our observation may help the reader to recognize that SDD is an evidence-based manoeuvre which significantly reduces VAT.

**Conflict of interest statement**

All authors have no financial conflicts of interest (such as employment, consultancy, stock ownership, honoraria and paid expert testimony) as well as other forms of conflict of interest, including personal, academic and intellectual issues.

All authors have no personal relationship with other people or organisations that could inappropriately influence (bias) their work.

**References**


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<th>Type of SDD regimen</th>
<th>N^{} of RCTs</th>
<th>N^{} of patients</th>
<th>N^{} of events</th>
<th>OR (95% CI)</th>
<th>p</th>
<th>p Het</th>
<th>i^{}2</th>
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<tr>
<td>Parenteral/enteral</td>
<td>6</td>
<td>624</td>
<td>643</td>
<td>96</td>
<td>182</td>
<td>0.46 (0.35–0.62)</td>
<td>&lt;0.001</td>
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<tr>
<td>Enteral only</td>
<td>6</td>
<td>478</td>
<td>507</td>
<td>39</td>
<td>52</td>
<td>0.78 (0.50–1.23)</td>
<td>0.28</td>
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</tbody>
</table>

SDD, selective decontamination of the digestive tract; RCTs, randomized controlled trials; C, control; OR, odds ratio; CI, confidence interval; Het, heterogeneity.

Results are presented as OR with 95\% CI using the fixed effects model. The use of the random effects model does not change the results.


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