

## Selective Digestive Decontamination to Prevent Pneumonia after Esophageal Surgery

[Letter regarding "Perioperative Management for the Prevention of Postoperative Pneumonia with Esophageal Surgery" (Ann Thorac Cardiovasc Surg 2009; 15: 280–5)]

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### To the Editor:

We read with interest the review by Akutsu and Matsubara on the prevention of postoperative pneumonia in esophageal surgery.<sup>1)</sup> However, we believe that the section on oral care was not comprehensive because the use of selective decontamination of the digestive tract (SDD) was not accurately reported.

Oropharyngeal flora has been recognized as the major source of potential pathogens causing pneumonia in critically ill patients requiring intensive care unit (ICU) treatment. SDD has been shown to prevent pneumonia developing during ICU treatment of nonoperated and operated patients.<sup>2)</sup> The concept of SDD is based on the observation that the eradication of the oropharyngeal and intestinal carriage of potential pathogens prevents serious infections, and mortality, in ICU patients.<sup>2)</sup>

We were puzzled why Akutsu and Matsubara ignored the evidence of SDD as a preventive measure of pneumonia in esophagogastric surgery, citing only the negative study by Farran et al.<sup>3)</sup> In this Spanish randomized controlled study (RCT) evaluating the impact of SDD on anastomotic dehiscence and on pulmonary infection in esophagogastric surgery, the postoperative pneumonia was reduced, but not significantly. We performed a systematic review of all 60 published RCTs of SDD, and we found three RCTs assessing SDD in (gastro)-esophageal surgery (Table 1).<sup>3–5)</sup> A total of 410 patients (198 SDD, 212 control) were included. Fifty-six developed pneumonia, 15 (7.65%) in

the SDD group and 41 (19.34%) in control. SDD significantly reduces the odds for pneumonia by 64% (odds ratio 0.36; 95% confidence interval 0.19–0.69;  $p = 0.0018$ ). Interestingly, anastomotic leakage was significantly reduced in Shardey's study to 2.9%, from 10.6% ( $p = 0.04$ ),<sup>4)</sup> but in the Farran study, the reduction to 2.5% from 5.9% was not significant.<sup>3)</sup>

Remarkably, there is a substantial difference in the decontaminating agents used in the three RCTs. The Spanish study<sup>3)</sup> employed erythromycin rather than polymyxins, which were used in the other two studies.<sup>4,5)</sup> In comparison with polymyxins, macrolides, such as erythromycin, are inferior decontaminating agents because they are absorbed from the gastrointestinal tract, and their spectrum of activity covers only "normal" potential pathogens. Erythromycin has been shown to clear oropharyngeal carriage of *Streptococcus pneumoniae* and *Haemophilus influenzae* and gut carriage of *Escherichia coli* following salivary and biliary excretions, but it failed to eradicate "abnormal" potential pathogens such as aerobic gram-negative bacilli.<sup>6)</sup>

We believe these observations may help the reader to recognize that SDD may be considered as a preventive maneuver that significantly reduces pneumonia after esophageal surgery.

### References

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Received January 6, 2010; accepted for publication March 29, 2010  
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**Table 1. Characteristics of randomized trials of selective decontamination of the digestive tract in gastroesophageal surgery and meta-analysis of the impact on pneumonia.**

First author	Year	Type of surgery	SDD regimen			Patients enrolled		Patient with pneumonia		OR (95% CI)
			S	O-P	I	SDD	C	SDD	C	
Tetteroo	1990	Esophageal resection	CTX	PTA	PTA	56	58	1	8	0.11 (0.01-0.94)
Shardey	1997	Gastrectomy	-	PTAV	-	102	103	9	23	0.34 (0.15-0.77)
Farran	2008	Esophago-gastric	-	EGN	-	40	51	5	10	0.59 (0.18-1.88)
Total						198	212	15	41	0.36 (0.19-0.69)†

SDD, selective decontamination of the digestive tract; C, control group; S, systemic; O-P, oropharyngeal; I, intestinal. CTX, cefotaxime; P, polymyxin E; T, tobramycin; A, amphotericin B; V, vancomycin; E, erythromycin; G, gentamicin; N, nystatin, OR, odds ratio; CI, confidence interval.

Results of the meta-analysis are presented as OR with 95% CI using the random effects model. The Cochran *Q* statistic for heterogeneity was used. Heterogeneity was considered to be significant if the *p* value was <0.10. *I*<sup>2</sup> measure of inconsistency was also 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 *I*<sup>2</sup> are put equal to 0%; zero percent indicates no observed heterogeneity, while an *I*<sup>2</sup> of < 30% indicates mild heterogeneity, 30%–50% moderate, and > 50% severe heterogeneity.

† *p* = 0.0018. No heterogeneity was observed ( $\chi^2 = 1.8397, df 2, p = 0.40; I^2 = 0$ )

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**Reply:**

Thank you for your response to our ATCS review article entitled “Perioperative Management for the Prevention of Postoperative Pneumonia with Esophageal Surgery.”

Exactly, your opinion is reasonable. The guideline<sup>1)</sup> indicated that selective digestive decontamination (SDD) is useful to reduce the frequency of hospital-acquired pneumonia, or ICU-acquired ventilator-associated pneumonia. However, the guideline also said “routine prophylactic use of antibiotics should be discouraged, especially in hospital settings where there are high levels of antibiotic resistance.” From this point of view, we cannot recommend a prophylactic use of antibiotics, because our article is a review article. As you say, “use of antibiotics is NOT effective” may be too strong, and we should have used a more appropriate expression.

The reason why we cited the negative data in our article is because we tried to explain the importance of mechanical removal to reduce the dental plaque. As you know, antibiotics themselves cannot reduce dental plaque. So our

description does not intend to deny SDD completely. Our belief is that the major reservoir of the bacteria is the dental plaque, and the removal of the plaque is quite effective for the prevention of postoperative pneumonia following esophageal surgery. We recently published new interesting data.<sup>2)</sup>

**References**

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