Bacterial Contamination of a Closed Enteral Feeding System: Difference Between Laboratory Evaluation and Clinical Experience

Earlier this year, we reported on the contamination of a closed enteral feeding system (Isocal)[1] where Gram-negative bacilli were recovered from nutrient solutions obtained from the feeding tubes of 8/10 patients, within 24 hours of use. Our findings differed from those of laboratory studies carried out by others[2] which indicated that solutions delivered by the same enteral feeding system remained sterile for at least 24 hours.

We suspected that the contamination we observed was retrograde from our patients. To test this hypothesis, we repeated the study in our laboratory. The Isocal system was set up as before except that the nasogastric tube was connected to a sterile 1 litre flask instead of the patient's stomach.

The experiment was repeated five times. For the first three tests, samples of Isocal for culture were taken from the pack, injection port of the tubing before and after flushing with saline, and from the lower end of the nasogastric tubing at 0 hour, four hours later and at the end of 24 hours' hanging time. In the last two tests, the nasogastric tube was immersed in 100 ml (10^2 organisms/ml) of *Escherichia coli* and *Klebsiella pneumoniae* respectively, and samples for culture were taken from the pack and from the injection port.

Three of the authors handled the system at different times. Their fingers were swabbed for culture, before handling.

None of the Isocal samples collected yielded bacterial growth except for one taken from the injection port which grew *Bacillus* species (a common aerial contaminant) at the end of 24 hours' hanging time. Coagulase-positive and negative staphylococci were grown from all finger swabs.

The difference between these results and our previous observations clearly showed that laboratory findings may not be applicable to clinical practice. Our laboratory handling of the Isocal system and sampling procedures were carried out as closely as possible to those performed by nurses in the intensive care unit. But in the absence of patients with endogenous flora, patient-generated activities and cross contamination by medical and nursing staff, the enteral feeds remained sterile even when the nasogastric tubes were immersed in bacterial cultures. Retrograde contamination from the culture flasks to the level of the injection port was not demonstrated within the 24 hour study period. Proper handling including the swabbing of the injection port with alcohol before flushing and sampling appeared to be effective in preventing contamination by direct contact. Hence the 80% contamination rate we obtained in our previous study is probably the result of lapses in aseptic techniques and related to the high density of organisms and multiple routes of transmission in a busy ward setting.

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