Letters to the Editor

Infant Feeding Formula Contaminated by *Enterobacter Cloacae*

To the Editor:

The newborn nursery of our hospital, a university-affiliated teaching facility, recently sent a single bottle of Enfamil feeding formula (Mead Johnson, Lot #P7125-05/MKE 39) to our microbiology laboratory for testing. The bottle, with seal unbroken, showed visibly separated and coagulated formula. Upon culturing of the contents, a pure growth of *Enterobacter cloacae* was reported (1.87×10^8 col/ml by quantitative technique).

Review of nursery records of infants delivered during the month that the bottle was discovered indicated only one episode of diarrheal illness which was not believed to be related to contaminated feeding formula. In addition, survey of mothers of neonates, who took bottles of Enfamil home with them from the hospital during that month, did not reveal any illness that could be linked to infected formula.

Bottles of the remaining lot were removed from hospital stock (69 bottles). Twenty-one of these (30.4%) were cultured with 0.5 ml of formula from each bottle being inoculated onto two separate blood agar plates. No growth was noted from any sample following 48 hours incubation at 37°C. Further testing indicated that following inoculation of a 1 ml suspension of *E. cloacae* (2×10^2 col/ml) into eight bottles of the feeding formula, an average of 3.5 $\times 10^8$ col/ml were detected after 48 to 72 hours at room temperature. This was the time required for visual coagulation of the formula to occur.

Bacterial contamination of various bottled solutions used in hospitals has been noted frequently in the past.[1-6] Although not always causally related with clinical illness, the potential for serious infections due to these contaminated products is well-documented.[1,2] Organisms such as *Enterobacter cloacae* and *Enterobacter agglomerans* as well as other organisms from the tribe Klebsielleae have been isolated from contaminated sugar-containing solutions.[1]

The fact that no clinically recognized illness related to contaminated feeding formula has been recognized in our hospital nursery is not surprising. The likelihood of this would be exceedingly small as bottles are discarded following each use. Bottles which may become contaminated with a similar organism, during preparation by the manufacturer, would be expected to be visibly abnormal by the time hospital delivery occurred and would not be likely to be used as long as appropriate inspection of the bottle was performed. On the other hand, if bottles become contaminated following use, significant bacterial growth might occur within 48 hours, prior to evidence of visible contamination, and reuse could be dangerous to the neonate. It seems that this possibility would be of greatest concern in the home environment.

It is therefore recommended that: 1) manufacturer's prepared bottled formula be carefully inspected for visible evidence of separation or coagulation of contents prior to initial use, 2) bottles of feeding formula be heat-sterilized prior to reuse, and that 3) evaluation of neonatal diarrhea include historical evaluation for possible contaminated manufacturer's formula as well as observing for high stool colony counts of bacteria, including *Enterobacter cloacae*, which may be potentially associated with feeding formula contamination.

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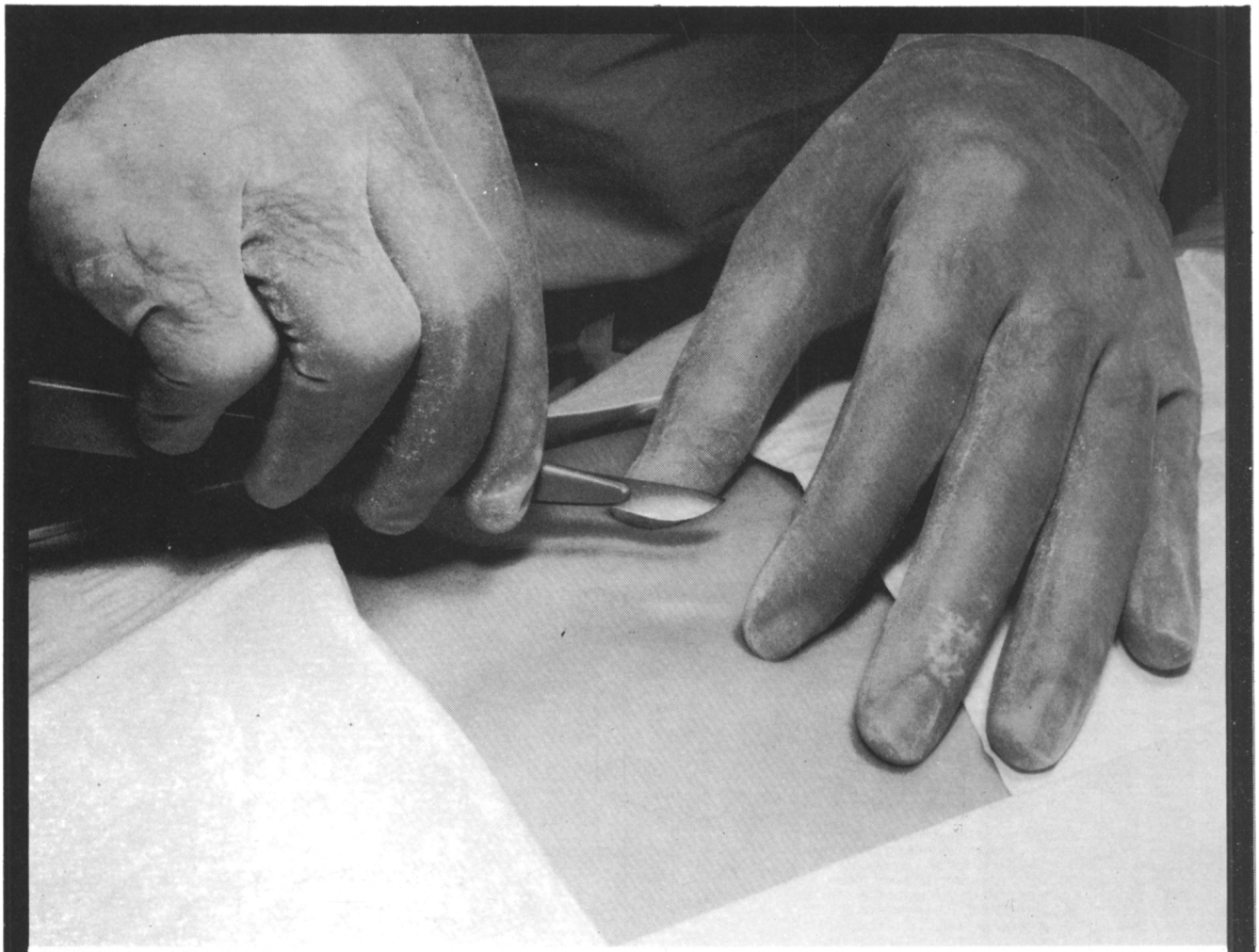

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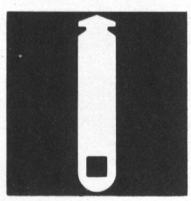

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