

Treatment

In newborns, changing parenteral nutrition sets every 48 hours rather than every 24 hours did not increase infusate contamination

Fox M, Molesky M, Van Aerde JE, et al. *Changing parenteral nutrition administration sets every 24 h versus every 48 h in newborn infants. Can J Gastroenterol* 1999 Mar;13:147-51.

QUESTION: In newborn infants, does changing total parenteral nutrition fluid administration sets (TASs) every 48 hours, rather than every 24 hours, increase the rate of contamination of infusates (amino acid plus dextrose solution [AADS] or lipid emulsion)?

Design

Randomised (allocation not concealed), blinded (unclear), controlled trial.

Setting

A neonatal intensive care unit in Edmonton, Alberta, Canada.

Patients

166 infants who received total parenteral nutrition during a 12 month period. Infusate samples from 148 infants (89%) (mean gestational age 32.8 wks, mean birth weight 2036 g, mean postnatal age 12.9 d) were included in the analysis.

Intervention

53 infants were allocated to have their TAS changed every 24 hours. 113 infants were allocated to have their TAS changed every 48 hours. The TAS was changed by the bedside nurse assigned to the infant's care. For both groups, bags containing AADS were changed daily, whereas lipid emulsion bottles were changed with the line sets. Line care was standardised across groups.

Main outcome measures

Infusates were assessed (3 times/wk for 2 wks) for contamination using microbiological cultures. Cultures were categorised as positive contamination (≥ 10 colony forming units/ml), questionable contamination (1-9 colony forming units/ml), or no growth.

Main results

A total of 2686 infusate samples were analysed. The overall bacterial contamination rate was 4.3% (3.0% for AADS and 5.6% for lipid emulsion). The 24 and 48 hour groups did not differ for bacterial contamination of AADS (3.1% of samples *v* 2.9%, { $p=0.8$ }*) or lipid emulsion (6.0% *v* 5.1%, { $p=0.6$ }*). The 24 hour group had a higher rate of fungal contamination of lipid emulsion than did the 48 hour group (3.1% *v* 0.5%, $p<0.01$); however, when samples from 1 infant in the 24 hour group (who had candida septicaemia and meningitis, with subsequent contaminated TAS fluid cultures) were omitted from the analysis, fungal contamination rates were similar (0.2% *v* 0.5%).

Conclusion

Among newborn infants receiving total parenteral nutrition, bacterial contamination of infusates (amino acid plus dextrose or lipid emulsion) was similar when fluid administration sets were changed every 48 hours or every 24 hours.

* p Value calculated from data in article.

COMMENTARY

Limited published research is available on microbial contamination of infusate when TASs are changed every 48 hours compared with every 24 hours in newborns. Most research has been done in adult populations or focuses on clear dextrose solutions. A recent trial of newborn infants receiving lipid treatment found more frequent microbial contamination of infusion sets when delivery systems were changed every 72 hours compared with every 24 hours.¹ The study by Fox *et al* provides evidence that TASs can be changed every 48 hours rather than every 24 hours without increasing the risk of infection to newborn infants.

Because all newborns admitted to the neonatal intensive care unit over 12 months who received total parenteral nutrition were included in the study, it is likely that the study findings are generalisable to similar settings and populations of infants. Feeding intolerance and infection are common problems in this population. The number of cultures required for each group was determined in such a way that reassures the reader that it is unlikely that the authors missed a clinically important difference. In studies such as this, it is important that the microbiologists determining the extent of culture growth be "blinded" or unaware of group allocation. Although it is likely that this was the case, it was not stated explicitly in the paper. The authors also stated that no data were collected on the number of times the administration sets were manipulated (ie, systems were opened), an activity that is likely to contribute to contamination.

Although they did not do a comprehensive economic analysis, the authors did calculate the annual savings for every line change eliminated and, as expected, changing TASs every 48 hours rather than every 24 hours resulted in cost savings (approximately CN\$16 per line change eliminated).

The findings increase our knowledge of the associated risk of microbial contamination when infusions are given. Although changing TASs every 48 hours is supported by this study and will be of interest to advanced nurse practitioners, pharmacists, nutritionists, and managers, the limited research in this area warrants caution. Implementation of these findings should be initially accompanied by careful monitoring of infusate contamination.

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1 Matlow AG, Kitai I, Kirpalani H, et al. A randomized trial of 72- versus 24-hour intravenous tubing set changes in newborns receiving lipid therapy. *Infect Control Hosp Epidemiol* 1999;20:487-93.

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