Human Milk for Low Birthweight infants - What's New ?

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Introduction

The value of human milk for young infants is universally acknowledged. The common disadvantages of formula feeds especially in developing countries are also well known. This article will therefore lay emphasis on relatively newer and the more special features related to use of human milk in low birthweight infants.

Contribution to Host Defense

Perhaps one of the unique features is the presence of immunological factors. Their role in prevention of infection is best recognized in developing countries (Narayanan et al 1982, Narayanan et al 1984), but has also been noted in advanced centres, especially relevant to problems such as necrotising enterocolitis.

Impact on Neurodevelopment

Studies have shown that preterm infants receiving human milk have a higher intelligent quotient than those on the formula (Lucas, et al 1992). In addition, visual acuity is better in such babies, the differences being attributable partly to the beneficial influence of fatty acids such as docosahexanoeic acid (Makrides et al 1992).

Minimal Enteral Feeding (Gastrointestinal Trophic Features)

In recent years the value of early introduction of minimal enteral feeding has been realized. The main impact is on trophic changes in the intestines, priming the latter to subsequently accept more efficiently and readily full enteral requirements. Intraluminal food is a profound stimulus for the growth of the intestinal mucosa and the exact trophic changes is influenced by the nature of the feed. Human milk with its growth factors such as epidermal growth factor, insulin, and other peptides can result in an increase in DNA synthesis. In addition there are non-mucosal effects such as induction of optimal maturation of the intestinal muscular function in preterm infants, beneficial endocrine and metabolic effects with enhanced postprandial release of peptides (Berseth, 1995). Enteral feeding also produces changes in the gut flora. Here the nature of the milk influences the type of flora, human milk promoting the beneficial lactobacilli and bifidibacteria. In contrast with formula feeds there is a predominance of Enterobacteriaceae, Bacteriodes and Clostridium species. The method of feeding can influence motor activity either through oro-gastric or transpyloric route, slow continuous infusion permitting better gasttric emptying and less gastro-oesophageal reflux. However, because of other problems noted with continuous infusion noted below, intermittent bolus feeding is most appropriatte, especially for developing countries.

Method of Feeding

The most common technique of feeding is by intermittent gastric feeding, the tube being passed through the oro-gastric or naso-gastric route. As many hospitals do now have the syringe infusion pump, some units may also employ the continuous infusion method either through the naso gastric or naso duodenal route. The latter has advantages in the extremely low birthweight infants but it is not recommended as a routine, expecially the transpyloric route, as it bypasses the stomach with its

important lipase activity. It is also associated with decreased fat and potassium absorption, increased colonization of the upper intestines and risk of perforations. Further when a non-homogenised milk such as human milk is given, fat separates out early and gets trapped and retained in the delivery system. Methods to decrease fat loss is to use an eccentric nozzled syringe with the nozzle kept upper most, tilt the syringe tip upwards, use relatively shorter connecting tubes, take smaller volumes in the syringe in order to decrease the time during which a particular aliquot of milk is being infused, and empty the syringe completely after each infusion (Narayanan, et al 1984). It is better to switch to the intermittent bolus feeding as soon as possible.

Human Milk and HIV

With the advent of HIV, human milk, especially from milk banks has been regarded with a jaundiced eye as there is a definite risk to the infant. Because of risk of transmission of a number of infections, especially AIDS, to infants from other than the natural mother, donor milk should not be used raw. This is especially so in developing countries where screening of donors is practically non existent. Where donor milk is utilised it should be pasteurised (62.5°C or at least 56° C with a holding time of 30 min.). In relevant situations, informed consent may also be required to obviate legal problems.

Regarding the problem of HIV infection use of expressed human milk has a somewhatt different connotation to direct breastfeeding. The W.H.O. recommends continuation of brestfeeding (WHO/UNICEF, 1992) while the Centre for Communicable Diseases, Atlanta, considers it a contraindication (Worthington-Roberts, 1993). In contrast to this where expressed human milk is concerned, appropriate pasteurisation of the latter can destroy the virus and make it safe for the baby. Human milk has ben shown to have natural anti viral properties present both in HIV +ve and -ve women. The inhibitor activity survives temperatures used in pasteurisation of human milk.

Further details relevant to the above issue and salient features of collection, instructions to be given to mothers, storage, processing and administration of human milk with special relevance to the Third World are published elsewhere (Narayanan, 1996).

Human Milk Fortifiers

Neonatal units in advanced industrialized countries recommend fortified preterm human milk, preferably the mother's own milk, as the first choice for the premature infant. This is primarily to increase the calorie density, supply additional protein, sodium, calcium, phosphorous, zinc and some vitamins. However, even in the best of centres there are risks in the form of precipitation of mineral salts due to improper mixing, hazards of infection either due to lapses in hygiene or adverse effects of local gut alterations, such as changes in intestinal pH (Narayanan, 1982). In India where a milk fortifier is now available one has to exert restraint in its use.

Certainly it should not be taken like a new fad. Risks are far greater in developing countries. Further such fortifiers are indicated only in the very low birthweight infant and primarily in those in whom the volume of feeds need to be restricted because of problems such as the opening of the ductus. Many of the low brithweight infants in this country are growth retarded and do very well on human milk alone especially when given up to 200ml./kg/day. In fact infants given feeds ad lib accept such volumes Older, larger babies take even more

The calorie density of the human milk can be increased significantly by using more of the hind milk which is richer in fat. In units with a microcentrifuge the fat content of the milk can also be checked by the simple method of estimating the crematocrit. As hind milk is only meant to be used temporarily, variations in composition are not likely to cause any long term adverse effects. In practice, even if there is no microcentrifuge to calculate the creamtaerit, mothers can be asked to express their milk in two cups, with the first one fourth to one third portion in the first cup. The milk from the second cup may then be utilized first and only the minimum volume required from the first. Such procedures need only to be tried in special cases for limited periods and when the mother is able to express adequate milk. The

average low birthweight infant does not require it. In fact it may even convey wrong messages to the mother making her feel that some of her milk is "not good".

Non-nutritive Sucking on the "Emptied Breast"

Non-nutritive sucking on pacifiers while the infant is still on gavage feeds has been shown to have a number of advantages including earlier maturation of the sucking reflex, less restless activity, better oxygenation and in some instances better weight gain due to stimulation of sub-lingual lipase (Bernbaum, et al 1983). However, the risks of pacifiers are innumerable, especially in developing countries. The use of the "emptied" breast after expression of milk, before giving gavage feeds has a number of advantages including giving emotional satisfaction, and a beneficial impact on prolonging lactation (Narayanan, et al 1991).

Use of pacifiers and feeding bottles may also promote nipple confusion which may have adverse effects on subsequent breastfeeding (Neifert, & Lawrence 1995). For this reason alternate methods of oral feeding following gavage feeds may have advantages. Contrary to old teaching maturation of sucking and swallowing do not go hand in hand and babies start swallowing before they can suck adequately. Use of spoons, and cups have been recommended. (Kumar, et al 1989, Lang, et al 1994). A controlled prospective study evaluating the use of the bottle, cup and a cups traditional feeding device, the "paladai" or "zippy" has shown that the last mentioned is very useful. The item is simple, cheap, easy to clean, sterilize and use, and less time consuming. The infants accept feeds from the utensil with ease and less exertion. It is associated with less spillage than from the cup. Infants graduate more readily from gavage feeding to the "paladai" than to the bottle. It appears to cause less exertion to the infant, hence can even be used to supplement an infant who is not able to accept adequately from the breast, and it can be taught readily to the mothers, promoting early discharge, (data for publication). In fact in our unit we have actually given up the use of the bottle for over three years.

Promotion of Breastfeeding.

Expending a considerable amount of efforts and valuable resources on the hospital care of the preterm infant has no meaning if the mother does not receive enough training on the subsequent home care and in establishment of breastfeeding, especially in the Third World. Mothers should therefore be motivated to express milk repeatedly, ten minutes on each side, 8-10 times a day in order to sustain lactation. They should be allowed to handle the infant, establish sucking on the emptied breast, avoid pacifiers and bottles, use alternate methods of oral feeding and establish direct breastfeeding as soon as possible.

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