Constipation in infants: Remedy of infant constipation, Standard Formula vs New Formula

Formula transition to NF may be considered as treatment in constipated infants with hard stools.

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Summary

Background

Nutrilon Omneo (new formula; NF) contains high concentration of sn-2 palmitic acid, a mixture of prebiotic oligosaccharides and partially hydrolyzed whey protein. It is hypothesized that NF positively affects stool characteristics in constipated infants.

Methods

Thirty-eight constipated infants, aged 3–20 weeks, were included and randomized to NF (n = 20) or a standard formula (SF; n = 18) in period 1 and crossed-over after 3 weeks to treatment period 2. Constipation was defined by at least one of the following symptoms: 1) defecation frequency < 3/week; 2) painful defecation; 3) abdominal or rectal palpable mass.

Results

Period 1 was completed by 35 infants. A significant increase in defecation frequency (NF: 3.5 pre versus 5.6/week post treatment; SF 3.6 pre versus 4.9/week post treatment) was found in both groups, but was not significantly different between the two formulas (p = 0.36). Improvement of hard stool consistency to soft stool consistency was found more often with NF than SF, but did not reach statistical significance (90% versus 50%; RR, 1.8; 95% CI, 0.9–3.5; p = 0.14). No difference was found in painful defecation or the presence of an abdominal or rectal mass between the two groups. Twenty-four infants completed period 2. Only stool consistency was significantly different between the two formulas (17% had soft stools on NF and hard stools on SF; no infants had soft stools on SF and hard stools on NF, McNemar test p = 0.046).

Conclusion

The addition of a high concentration sn-2 palmitic acid, prebiotic oligosaccharides and partially hydrolyzed whey protein resulted in a strong tendency of softer stools in constipated infants, but not in a difference in defecation frequency. Formula transition to NF may be considered as treatment in constipated infants with hard stools.

Background: Constipation in infants

Between 16–40% of the infants with constipation experience symptoms before the age of six months [1-3]. In approximately 90% of infants no specific organic cause can be found [4]. It is well established that the bowel pattern in infants is influenced by the type of feeding in the first months after birth. Constipation is more commonly found in formula-fed infants, who have a greater tendency to produce hard stools compared to breast-fed infants [5]. Differences in the composition between breast- and formula feeding may explain this finding.

The structure of lipids differs between human milk and infant formulas. In both human milk and infant formulas palmitic acid is the predominant saturated fatty acid. In human milk 70–85% of palmitic acid is positioned at the sn-2 position of the triacylglycerol molecule, whereas in regular infant formulas 88–94% of palmitic acid is found at the sn-1 and sn-3 position [6-10]. Lipolysis of triacylglycerol by pancreatic lipase occurs predominantly at the sn-1 and sn-3 positions, yielding free fatty acids and a 2-monoacylglycerol [11,12]. Subsequently, free palmitic acid may form insoluble

calcium fatty acid soaps which are excreted via the feces, resulting in firmer stools. Stool hardness has been positively associated with the presence of calcium fatty acid soaps in the stools [5]. In human milk however, palmitic acid esterified at the sn-2 position of the triacylglycerol molecule is well absorbed as 2-monopalmitin, since it readily forms mixed micelles with bile acids [11,13-15].

Human milk is further known to be a rich source of oligosaccharides [16]. These oligosaccharides resist digestion in the small intestine and thus reach the colon unaltered, where they serve as prebiotics [17]. They act as growth substrate for bifidobacteria, which are thought to have beneficial effects on the host's health by supporting the gut barrier, stimulating normal intestinal function, and strengthening the immune system [18-20]. In addition, due to their non-digestibility, they may be considered to be a form of soluble fibres and contribute to the softer stools produced by breast-fed infants [17,21].

Based on these findings, the concept of adding modified triacylglycerol and prebiotic oligosaccharides to infant formulas has arisen. A new infant formula (NF; Nutrilon Omneo, Nutricia Nederland BV, Zoetermeer, the Netherlands) was developed which contains modified vegetable oil with a high proportion (41%) of palmitic acid at the sn-2 position, a mixture of prebiotic oligosaccharides, partially hydrolyzed whey protein and a reduced lactose content. The oligosaccharides mixture consists of 90% short-chain galacto-oligosaccharides (GOS) and 10% long-chain fructo-oligosaccharides (lcFOS), 0.8 g/100 ml, and resembles human milk oligosaccharides with respect to its molecular weight distribution and high galactose content [22]. The effect of NF on stool frequency and consistency has been assessed in one study in healthy term infants [23]. Infants receiving NF were found to produce softer stools than those fed a regular infant formula. We hypothesized that this NF will also have a positive effect stool characteristics in constipated infants.

Summary: Standard formula, New Formula and constipation in infants

Background:Causes and remedy for constipation in infants References

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