COLUMBIA UNIVERSITY MEDICAL CENTER

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Reduction in Discomfort for Colic

Overview: Approximately 25% of newborns suffer from infantile colic, defined as crying in excess of 3 hours per day for more than 3 days per week for over 3 weeks. This problem distresses parents as much as it distresses their newborn, generally beginning around 3-6 weeks of age and continuing until 3-4 months. In most cases the problem is most severe in the evening; in others, colic manifests itself throughout the day. Colic occurs equally in boys and girls, or in those term and premature, breast-fed or bottle fed, or born naturally or by C-section. A variety of other causes for excessive fussiness should be excluded, but most babies do not exhibit other diagnoses.

Clues to the Cause: Breast milk and formulas prepared from cow milk contain lactose as the major source of carbohydrate. Lactose must be digested into its components (glucose and galactose) by an enzyme called lactase in order to be absorbed. Inability to digest lactose may be due, in certain circumstances, to transient lactase deficiency (TLD). When lactose is not digested in the small intestine, it enters the large intestine where bacteria use it as substrate to produce excessive intestinal gas. Such gas production produces distension and discomfort. Studies have demonstrated significantly higher hydrogen gas production on breath analyses of infants with colic, indicative of fermentation of carbohydrates by gut bacteria. New studies demonstrate differences in gut microbial composition in babies with colic compared to their comfortable counterparts. At birth, babies exhibit limited numbers of colonic bacteria. Within hours, the types and numbers greatly expand. Babies destined to have colic have reduced numbers of *Lactobacilli* and *Bifidobacter* from age 2 weeks through 3 months. These specific bacteria aid in gut motility, decrease intestinal inflammation and decrease gas production when lactose is present. When colic resolves, the bacterial composition in colicky babies transitions to that found in their calmer peers. Until this transition occurs, relief can be found by reducing exposure to lactose or pre-digesting lactose in milk.

Rationale for Therapy: Many therapies have been tried and are anecdotally successful. However, few therapies are subjected to gold-standard trials. The gold standard is when parents and investigators are unaware as to whether or not the colicky babies were assigned randomly to treatment or no treatment. Effective therapies have to be measurably different from placebo in eliciting meaningful outcomes, which for colic treatment translates to significant reductions in crying times. One approach to medical therapy aims to reduce colonic spasm. However, antispasmodic side effects in infants contraindicate its use for children this age. A dietary approach provides a substitute formula lacking lactose or elemental formula. This tact requires discontinuation of breast-feeding, which is undesirable because breast-feeding is uniformly regarded as the healthiest, cheapest and safest source for nutrients and immune protection. Furthermore, lactose-free and elemental formula deprives the infant of the nutritionally optimal combination of glucose and galactose as the source of carbohydrate. Thus, the best and safest strategy to quell colic requires pre-digestion of lactose in breast milk and formula before feeding.

The Case for Lactase: Purified lactase treats colic by digesting milk sugar into its non-gas forming components. This results in near complete absorption of milk sugar in the small intestine and elimination of downstream gas production and distension. The rigorous, “gold-standard” trials performed with lactase for colic demonstrated significant reduction in daily crying time as well as decreased hydrogen gas production on breath test analyses. As expected, there were no reported side effects. For these reasons, lactase is a most effective and globally recommended product used for colic relief.

Joel E. Lavine MD PhD

Biography:

Name: Joel (Edward) Lavine, Ph.D., M.D.

Date of Birth: October 16, 1953
Place of Birth: Cleveland, Ohio, USA
Citizenship: USA

Medical School: University of California, San Diego, California (Medicine)

Postdoctoral Training:

Internship and Residency:

6/84-6/85 Intern in Pediatrics
University of California, San Francisco

7/85-6/86 Resident in Pediatrics
University of California, San Francisco

Fellowship:

7/86-3/89 Pediatric Gastroenterology, Hepatology & Nutrition
University of California, San Francisco

Current Teaching Appointments:

02/2010-current Professor of Pediatrics, Columbia University
College of Physicians and Surgeons

Current Hospital Appointments:

02/2010-current Division Director and Attending Staff, Morgan Stanley
Children's Hospital of New York,

02/2010-current Chief, Pediatric Gastroenterology, Hepatology and
Nutrition, Columbia College of Physicians and Surgeons

2012- Chair, Clinical Operations Committee, Dept of Pediatrics, Columbia University

2007-11 Who's Who in America (Marquis)

Awards/Recognition Highlights:

2010-12 Best Doctors in America (Woodward-White), 10th edition

2011 New York "Super Doctors" (Key Media)

Editorial Service:

Reviewer for: Journal of Clinical Investigation, Gastroenterology, Hepatology, Journal of Pediatric Gastroenterology and Nutrition, Pediatrics, Digestive Diseases and Sciences, Perinatal Diagnosis, Journal of Pediatrics, Teratology, Mayo Clin Proc, Pediatric Research, American Journal of Gastroenterology, Diabetes Care, Gut, Clinical Gastroenterology and Journal of the American Medical Association, Journal of the American College of Nutrition, Alimentary Pharmacology and Therapeutics, Liver International, Diabetes/Metabolism Research and Reviews, New England Journal of Medicine, Metabolism-Clinical and Experimental, Hormone Research, International Journal of Pediatric Obesity, Ann Int Medicine, Journal of Pediatric Endocrinology and Metabolism, European Journal of Gastroenterology and Hepatology, BioMed Central Gastroenterology, Meta PLoS One, BMC Biochemistry. Endocrinology, Nature Reviews Gastroenterology and Hepatology, BMC Endocrine Disorders.

2007 Consultant, US Food & Drug Administration,
Washington, DC

Summary:

Dr. Lavine is a leading KOL in GI Pediatrics and recognized both in the USA and Globally. As the Chief of GI, Pediatric Dept., at Columbia his credentials as author will speak for itself as Columbia is a nationally and globally recognized medical institution. His credentials will provide the White Paper the Credibility necessary for General Pediatricians.