

## **Infant Gastric Physiology – Ultrasound studies of the term and preterm infant**

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Ultrasound imaging is a well-established noninvasive imaging modality used to assist clinicians in diagnosis and management of patients. Ultrasound was explored as a method of monitoring gastric emptying in both preterm and term infants 30 years ago. Since that time imaging transducers have reduced in size, increased in frequency and subsequently produce images more superior in resolution therefore we are revisiting this area with the aim of extending our knowledge of gastric emptying in both preterm and term infants.

Mother's own milk (MOM) is considered the optimal nutrition and protection for the preterm infant, however, as these infants have high energy and protein requirements both MOM and donor milk are fortified to improve growth with the aim of attaining comparable growth rates to that of a fetus of the same gestational age. Studies addressing the effects of composition, volume, energy content and protein energy ratio on gastric physiology are incomplete, yet this information is essential to provide a basis for feeding protocols. It is known that slowed gastric emptying and large gastric residuals are associated with severe complications such as feed intolerance and necrotising enterocolitis. Furthermore due to the increased nutritional and protective benefits of human milk compared to formula, the provision of fortified pasteurised human donor milk for preterm infants is increasing rapidly, creating a need for studies to compare the effects of different types of milk.

We have found the calculation of stomach volume by ultrasound to be an accurate and reliable method of estimating feed volume. Ultrasound also provides additional information such as whether or not there is a residual volume in the stomach and how the milk in the stomach changes over time.

Gastric emptying studies in the term infant, largely carried out in formula fed infants, have shown that gastric emptying times are influenced by the composition and volume of milk. Given that breastmilk is a much more complex and diverse fluid containing live cells, probiotics and proteins that are non-existent in formula the gastric response may be different in breastfed infants. If such differences exist then

Abstract of presentation  
"7<sup>th</sup> International Breastfeeding and Lactation Symposium"  
April 20<sup>th</sup> and 21<sup>st</sup> Vienna, Austria



this may have implications in the management of feeding as well as sleep and colic issues.

It is anticipated that these new studies will provide much needed information regarding the gastric physiology of the human milk fed infant leading to more effective feeding strategies.