Impact of Gastric Feeding Evaluation on Infant Outcomes: Is It Safe to Stop?

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What is the effect of omitting gastric residual evaluation on infant outcomes in preterm infants in the neonatal intensive care unit?

- **Population**: Premature infants
- **Intervention**: Omitting gastric residual evaluation
- **Comparison**: Evaluation of gastric residuals
- **Outcome**: Impact on infant outcomes
- **Time**: While on trophic feeds
- **Setting**: Neonatal Intensive Care Unit

Optimal nutrition in preterm neonates is crucial for normal growth and development, resistance to infection, and proper nerve maturation and development (Lee & Choi, 2019; Olsen et al., 2018; Thomas et al., 2018). Although parenteral nutrition is utilized for all preterm infants, early enteral nutrition remains the foundation of nutrition; yet neonatologists encounter many challenges preventing preterm infants from receiving ideal enteral nutrition. Preterm infants are at an increased risk of feeding intolerance and necrotizing enterocolitis (NEC) (Thomas et al., 2018)**.**

For decades, routine monitoring and evaluation of gastric residual in preterm infants on enteral feedings has been a standard of care. Pre-feed gastric residual is the measure of volume of milk along with gastrointestinal secretions remaining in the stomach before each feed (Abiramalatha et al., 2019a). Gastric residual volume aspiration poses potential risks such as damage to the mucosa resulting in bloody aspirates and loss of gastric juices necessary for digestion (Lee & Choi, 2019; Thomas et al., 2018). Despite evidence suggesting evaluation may

be unnecessary, over 97% of nurses check pre-feed gastric residuals (Parker et al., 2019). There is no clear definition as to what constitutes a large residual. The presence of large gastric residuals traditionally indicated feeding intolerance, risk of aspiration, ventilator-associated pneumonia (VAP), and an early sign of NEC (Kaur et al., 2015; Parker et al., 2019).

Furthermore, standards to guide how residuals should be handled post aspiration are lacking (Rysavy et al., 2020). Although gastric residual monitoring remains a widespread practice, recent studies question its reliability as markers of feeding intolerance or NEC in the absence of other suspicious clinical signs and suggest omitting routine gastric residual volume evaluation (Parker et al., 2019; Riskin et al., 2017). An increase in gastric residuals may be related to gastrointestinal maturity and reduced gut motility instead of feeding intolerance (Abiramalatha et al., 2019a; Riskin et al., 2017). Neonatologists continue to use gastric residual volumes to guide enteral feeding advancements (Singh et al., 2018; Thomas et. al., 2018). Additionally, feedings are withheld, or volumes are decreased with the presence of large or green gastric residuals (Kappel et al., 2020; Singh et al., 2018).

It was previously thought omitting gastric residual evaluation removed early indicators thus increasing the risk of NEC. However, the meta-analysis by Abiramalatha (2019b) showed a trend towards increased risk of NEC in the routine monitoring group. Scientific evidence supporting the relationship between gastric residual volumes and NEC is inadequate (Kappel et al., 2020; Thomas et al., 2018). Studies found green gastric residuals were not indicative of feeding intolerance or NEC (Kappel et al., 2020; Riskin et al., 2017). Green residuals may be related to duodenogastric residual or overzealous aspiration (Dutta et al., 2015). Evidence from a study done on preterm piglets as models for infants suggested gastric residuals as a poor indicator of early NEC progression and further supported current clinical evidence of routine

gastric residual monitoring possibly leading to unnecessary withholding of enteral feeding (Kappel et al., 2020).

Evaluation of residuals may occur six or more times in a 24-hour time frame for a period of weeks to months. Withholding monitoring of gastric residual has been shown to enhance enteral nutrition delivery without increasing feeding intolerance or VAP (Abiramalatha et al., 2019b; Parker et al., 2019). In a randomized control trial conducted by Rysavy et al. (2020) infants randomized to no routine gastric residual evaluation advanced enteral feedings more rapidly than those randomized to no residual evaluation**.** A single-center retrospective study by Riskin et al. (2017) further supported the evidence that avoiding pre-feed gastric residual volume evaluation was associated with earlier attainment of full enteral feedings without increasing the risk of NEC. In contrast, two studies discovered removing gastric residual evaluation did not shorten the time to reach full feeds (Lee & Choi, 2019; Singh et al., 2018). The studies did not show any benefits of removing gastric residual volume evaluation but also found no evidence to support the role of assessing gastric residual volumes in preventing NEC or predicting feeding intolerance.

Early and aggressive nutrition therapy is vital to prevent long-term problems with growth and neurodevelopment (Olsen et al., 2018). Additionally, the rapid advancement of enteral feedings may decrease the duration of parenteral nutrition, central venous line usage and their complications (Abiramalatha et al., 2019b; Lee & Choi, 2019). The longer a central venous catheter is in use, the higher the incidence of acquiring a healthcare-associated infection. This contributes to excess morbidity, mortality, and resource use (Olsen et al., 2018). Further studies are necessary to provide more precise estimates on the outcomes of infection, central line usage

days, and duration of hospital stay due to rapid advancement of enteral feedings secondary to omission of gastric residuals (Abiramalatha et al., 2019b).

Abdominal girth circumference is a non-invasive measurement of the abdomen using measurement tape. Although this practice has not been systematically evaluated, abdominal circumference (AC) measurement has been used as an alternate tool for the assessment of feeding intolerance (Kaur et al., 2015; Thomas et al., 2018). Kaur et al. (2015) and Thomas et al., (2018) conducted studies comparing gastric residual volumes and abdominal girth measurement in the assessment of feed tolerance in preterm and very low birth weight (VLBW) infants. Both studies suggested AC monitoring without measurement of gastric residual volumes as a criterion for identifying feed intolerance. Feeding intolerance was identified and feedings withheld if the abdominal girth increased by 2 cm or more. The use of AC monitoring instead of gastric residual aspiration enabled preterm infants to reach full feeds faster. Further studies are required to determine if a uniform threshold of an increase in AC is a better marker of feeding intolerance for infants across all gestations (Kaur et al., 2015) and the effects of AC measurement on hospital stay, length of parenteral nutrition, infections and NEC (Thomas et al., 2018).

In contrast, a published guideline for feeding preterm, VLBW infants identified abdominal girth as an unreliable measure of feed intolerance. This is due to the paucity of studies evaluating an increase in girth with clinical outcomes and subjectivity of abdominal measurements (Dutta et al., 2015). Per the rationale stated by the guideline, abdominal circumference may vary by 3.5 cm during one feeding cycle in premature infants. The variation in measurement correlates with time from last defecation (Dutta et al., 2015).

Premature infants remain a highly vulnerable population resulting in limited research in a variety of areas. Literature supports the cessation of gastric residual volume evaluation in preterm infants in the absence of signs or symptoms of gastrointestinal dysfunction (Parker et al., 2019; Riskin et al., 2017; Singh et al., 2018). However, it is recommended discontinuation of this practice occurs simultaneously with the implementation of protocols to evaluate infants with other signs of feeding intolerance or early signs of NEC (Riskin et al., 2017). A standardized evidence-based protocol, throughout NICUs, is necessary for gastric residual volume evaluation because evaluation can affect patient outcomes (Lee & Choi, 2019). Research indicates the development of standardized guidelines improves patient outcomes regardless of the actual guideline (Olsen et al., 2018). Additionally, healthcare professionals strive to improve outcomes for patients without causing harm. Limiting gastric residual evaluation to symptomatic patients may increase enteral nutritional delivery consequently improving additional patient outcomes.

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