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In vitro comparison of gastric aspirate methods and feeding tube properties on the quantity and reliability of obtained aspirate volume

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Abstract:

Gastric residual volume (GRV) is a clinical assessment to evaluate gastric emptying and enteral feeding tolerance. Factors such as the tube size, tube material, tube port configuration, placement of the tube in the gastric fluid, the amount of fluid and person completing the assessment may influence the accuracy of residual volume assessment. Little attention has been paid to

assessing the accuracy of GRV measurement when the actual volume being aspirated is known, and no studies have compared the accuracy in obtaining RV using the three different techniques reported in the literature that are used to obtain aspirate in practice (syringe, suction, and gravity drainage). This in vitro study evaluated three different methods for aspirating feeding formula through two different tube sizes (10 Fr [small] and 18 Fr [large]), tube materials (polyvinyl chloride and polyurethane), using four levels of nursing experience (student, novice, experienced and expert) blinded to the five fixed fluid volumes of feeding formula in a simulated stomach, to determine if the RV can be accurately obtained. The study design consisted of a 3x2x2x4x5 completely randomized factorial ANOVA (with a total of 240 cells) and 479 RV assessments were made by the four nurse participants. All three methods (syringe, suction and gravity) used to aspirate RV did not perform substantially well in aspirating fluid, and on average, the methods were able to aspirate about 50% of the volume available. The syringe and suction techniques were comparable and produced higher proportions of RVs, although the interrater reliability of RV assessment was better with the syringe method. The gravity technique generally performed poorly. Overall, the polyvinyl chloride material and smaller tubes were associated with higher RV assessments. RV assessment is a variable assessment and the three methods did not perform well in this in vitro study. These findings should be further explored and confirmed using larger samples. This knowledge will be important in establishing the best technique for assessing RV to maximize EN delivery in practice and will contribute to future research to test strategies to optimize EN intake in critically ill patients.

Description:

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