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EBP Phase 2
Title: "Where's the Tube? A Nurse's Guide to Ultrasound Mysteries

Introduction:
- A. Ultrasound
    - a. Reliable, Noninvasive imaging technology
    - b. Can be used to check gastric residual volume (GRV) and tube placement in patients with NG tubes
- B. Gastric Residual Volume
    - a. Assess patients' tolerance to nutrition
    - b. Assessing GRV attempts to prevent vomiting and aspiration pneumonia
- C. Confirming Nasogastric Tube Placement
    - a. Misplacement of NGT can lead to respiratory distress from aspiration causing possible pneumonia
    - b. Tip of NGT must be placed 10cm past the esophageal sphincter
- D. Training of Nurses for Ultrasound of NGT
    - a. ICU nurses can be easily trained

Purpose: "The aim of our study was to validate a new US method of assessing GRV and NGT positioning performed by trained ICU nurse care staff in comparison to a standard nursing care protocol" (Brotfain et. al, 2022).

Methods:
- A. Single-center cross-sectional prospective study
- B. The study was performed at the general ICU of the Soroka University Medical Center
    - a. 1000 bed tertiary care teaching hospital in Southern Isreal
- C. The information in this study was collected over 2018 to 2019
- D. Population
    - a. Critically ill patients over 18 years old
    - b. The study included 90 participants
    - c. Patients were in the ICU during their stay receiving enteral nutrition though NGT
- E. Design Phase
    - a. 2 ICU nurses and 2 observers were included in each group (Team A & B)
    - b. The 4 ICU nurses went through 4 hours of ultrasound training
    - c. The education was taught by 3 ICU physicians
        - i. The training included visual and hands on practice of ultrasound usage for NGT placement and GRV
- F. Experimental Phase
    - a. First GRV was assess by a nurse using standard protocol

         i. Standard protocol for NGT placement is a CXR
        ii. Standard protocol for GRV is a "whooshing" sound over the epigastrium when 10-30ml of air is pushed through the NGT
    b. Measurements of GRV were confirmed by ultrasound
         i. First trained ICU nurse used the probe
              1. The probe was placed over the epigastric area while the patient is in a right lateral decubitus position
        ii. The second trained ICU nurse calculated the GRV
       iii. This was done simultaneously as a team (A or B)
    c. NGT confirmation of positioning with ultrasound
         i. NGT placement is confirmed with standard protocol first
        ii. NGT placement is validated with ultrasound
               1. 50ml of 0.9% NS injected into the NGT
G. Data Collection
    a. Data was collected and analyzed using SPSS statistical software
    b. Summary using frequency tables, summary statistics, confidence intervals, and p-values when appropriate

Results:
A. Total number of double assessments was 360
    a. 90 participants with 4 assessments each
B. Statistics
    a. 32% were administered metoclopramide or erythromycin for high GRV (above 250ml)
    b. 71% received polymeric feed (1.1 kcal/mL) through NGT
    c. 18% had episodes of recurrent vomiting
C. Reliability of Assessment of GRV
    a. Ultrasound assessment of GRV were closely correlated with the standard protocol for checking GRV
         i. High ICC rates of 0.814 for team A
        ii. ICC rate of 0.85 for team B
D. Reliability of Assessment of NGT placement
    a. Verification of NGT placement was successful in both teams (A & B)
         i. Team A (78%) and Team B (70%)

Conclusion:
A. The use of bedside ultrasound in the ICU for daily nursing care will help to optimize safe routine care
B. The use of ultrasound by trained ICU nurses has recently had an increase in popularity for its efficiency and effectiveness.
C. There has been found a strong correlation between ultrasound and the normal standard protocol for checking GRV and NGT placement
D. With the 30% unsuccessful visualization of NGT placement, future studies will be needed to continue research and implementation

Citation:

Brotfain, E., Erblat, A., Luft, P., Elir, A., Gruenbaum, B. F., Livshiz-Riven, I., Koyfman, A.,
Fridrich, D., Koyfman, L., Friger, M., Grivnev, A., Zlotnik, A., & Klein, M. (2022). Nurse-
performed ultrasound assessment of gastric residual volume and enteral nasogastric tube
placement in the general intensive care unit. *Intensive and Critical Care Nursing, 69.*
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