**Introduction**

The therapeutic benefits of enteral nutrition (EN) are dose and time dependent. Wide variation in enteral practice and inadequate enteral dose delivery are common and decrease the benefits and increase the risks for patients needing EN.

Evidence-based practice protocols and order sets for enteral feeding are the standard of care to deliver more nutrition earlier to improve outcomes and reduce aspiration, infections, length of stay, gastrointestinal intolerance, time and cost of clogged tubes and adverse medication interactions.

This includes standardized directions for initiating, advancement, flushes, monitoring, treating clogged tubes, and medication review and administration.

ASPPEN clinical guidelines provide an excellent evidence base for protocols. However, the ability to order non-EN “Red flag list” created, “do not crush” list identified.


Observed number of pneumothorax in year prior to Cortrak implementational (%) vs after (0) vs. expected (2-4) with 1.5-2% of blind placements using cost of $12,000 to $40,000 each per CMS/CDC estimate of 9 LOS.

Net savings per Cortrak® placement $350-$501.40 more for Cortrak tube vs. $288 x-ray and 1.5 x-ray blind placement.

**Methods**

Multi-disciplinary team developed consensus on enteral protocols, enteral order set, and completed a pilot study in 2011. Order set was revised over 18 times and online nursing education module completed prior to hospital wide implementation in 2012. Key changes:

- Prescribe EN as hourly rate and 24 hour goal volume. RN may adjust hourly rate to meet total 24 hour goal volume prescribed.
- Raised default GRV to 500ml (250ml ICU), more emphasis on physical s/s intolerance.
- Local declogging kit created for prn use. Standardized water flush to prevent clogs.
- Medication review: EN “Red flag list” created, “do not crush” list identified.


Observed number of pneumothorax in year prior to Cortrak implementational (%) vs after (0) vs. expected (2-4) with 1.5-2% of blind placements using cost of $12,000 to $40,000 each per CMS/CDC estimate of 9 LOS.

Net savings per Cortrak® placement $350-$501.40 more for Cortrak tube vs. $288 x-ray and 1.5 x-ray blind placement.

**Results**

Before and after implementation compared to international survey (Cahil et al 2010)

- Average Day 3 enteral dose delivery improved from baseline of 53% to over 90% by late 2014.
- Order set now used 93% of the time.
- RD “evaluate and treat” 74% of EN orders, almost twice as likely to start <48 hrs of admit.

**Discussion**

The iterative process of creating consensus for protocols within existing resources takes time, about a year, but pays off in good acceptance and successful implementation as well as long term success. (2011-2015)

Tracking day 3 dose delivery on paper forms was a practical and effective ongoing metric for tracking EN performance outcomes in a hospital with an average LOS of 4.5 days.

**Conclusions**

Evidence based order sets and protocols developed with multi-disciplinary input were successful in increasing 24 hour goal volume delivery to patients from 53% to 94%, exceeding best in class benchmarks.

Electromagnetic feeding tube placement system, Cortrak®, eliminated pneumothorax associated with the blind placement method previously used and had significant cost savings up to quarter of million dollars a year.

RDs can be successful in placing and verifying enteral feeding tubes.

**Acknowledgments:**

Original ESPPN Team members: Sandy R. Wyman, RD, CND, LD (Project chair 2011-2012), Kyle Bergmann, RD, CND, LD, CDE (2011), Sara Lee Thomas, RD, RD, LD (Project chair 2011-2012), Martin Aide, Pharm.D, RPh (Pharmacist), Kaylee Stoo, Pharm.D, RPh (Pharmacist), Judith L. Swanson, RN, MSN (RN Coordinator), Lori Ritter, RN, BSN, CNRN (RN Coordinator), Jacquelyn Sinclair, RN, CPNN, BSN (RN Coordinator), Cheryl Jones, RN, AGN (RN Coordinator), Matthew Heisterman, MD (RN Coordinator), Bill Howden, RN, MSN (RN Coordinator), Chuck Martin, RDN, LD, CNS (RD Coordinator), Kyle Sinclair, RN, CCRN, BSN (RN Coordinator) and Sarah Enthal (RN Coordinator).

**References:**


Cortrak® is FDA approved for feeding tube platform verification without x-rays. Real time tracings with anterior, lateral, and depth views allows precise positioning and avoids lung placements.


Sara Lee Thomas, MS, RD, LD, Clinical Nutrition Manager
Good Samaritan Regional Medical Center, Corvallis, Oregon