

Nasoenteric Feeding Tube Insertion Utilizing An Electromagnetic Tube Placement System



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Background

Enteral nutrition is favored over parenteral nutrition whenever possible. Often times small bowel feeding is the preferred route. Many clinicians experience difficulties in blindly placing tubes at the bedside. The procedure is often lengthy, causes discomfort, jeopardizes patient safety and utilizes multiple hospital resources including multiple x-rays and the use of pharmacological agents. Frequently successful placement may require up to several days, thus delaying initiation of nutritional therapy.

An Electromagnetic Tube Placement System (ETPS) was FDA approved in 2005. The device was designed to assist in bedside placement of nasoenteric feeding tubes. The ETPS allows an *in vivo* real time tracking of tubes through the GI tract, and should provide a safer more efficient means of enteric feeding tube placement.

The ETPS was approved for use by our Nutrition Support Service in November 2005. The two RNs on our multi-disciplinary team performed all of the insertions on adult medical-surgical ICU patients.

Study Purpose

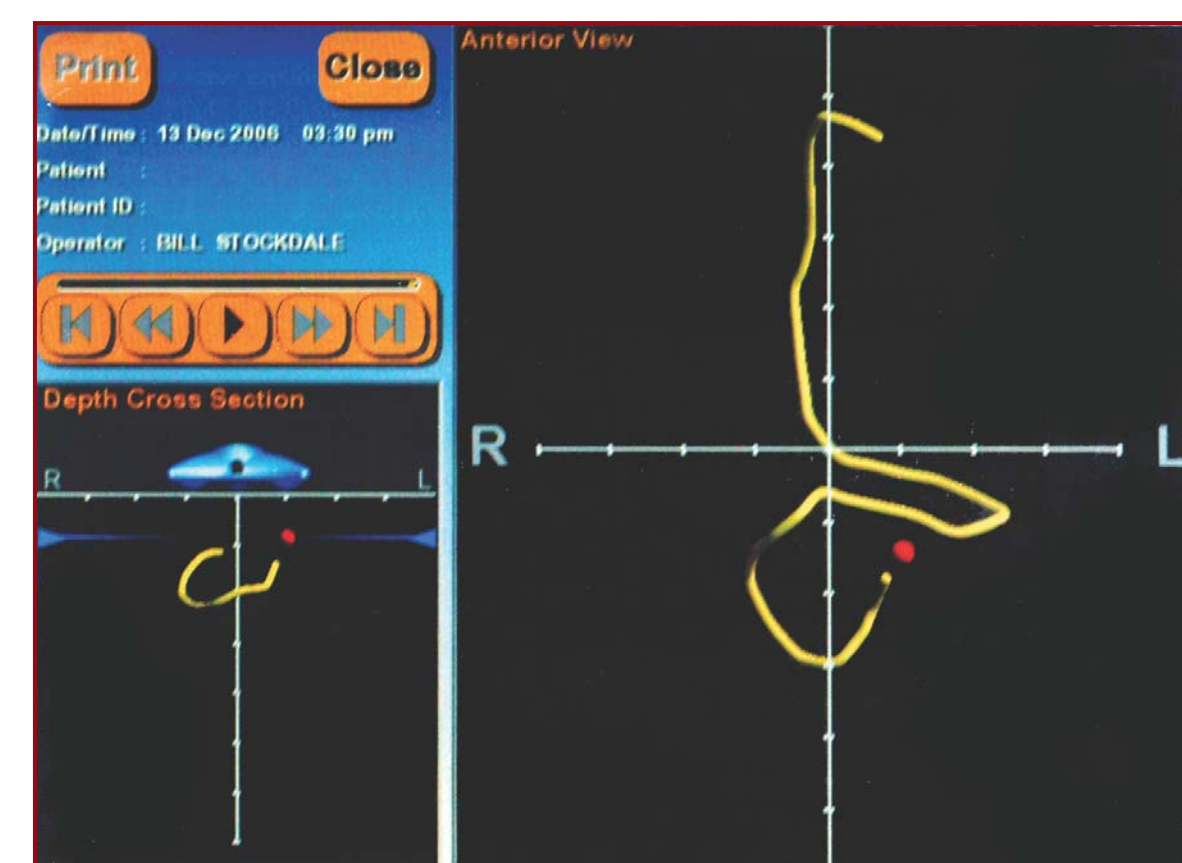
- To prospectively evaluate all enteric feeding tube placements using the ETPS at William Beaumont Hospital in Royal Oak.
- To monitor for markers that could improve tube placements such as, the percentage of small bowel placements on first attempt, correlation of ETPS to abdominal X-ray reports, inadvertent pulmonary placements and economic impact.

Methodology

Upon consultation, indications and contraindications for insertion were reviewed and when appropriate the tubes were placed utilizing the ETPS. After placement, the tip location was documented and a post procedure abdominal X-ray was obtained. The abdominal X-rays were reviewed and correlated to the ETPS for all patients. The time to place tubes was recorded in minutes.

Results

- 483 tubes placed from January 1, 2006 to November 26, 2006
- No inadvertent pulmonary placements noted on x-ray
- 4 asymptomatic bronchial placements were aborted without complication
- 89% of tubes successfully placed on first attempt.
- 97% correlation of ETPS reading to abdominal x-rays
- 66% reduction in overall time to place tubes
- ETPS procedure cost savings totaled \$137,655



Discussion

We did not report our first two months insertions (Nov/ Dec, 2005), as there was a learning curve. Visual confidence in the correlation of the ETPS to anatomy was our primary obstacle.

Successful small bowel placement at our institution is defined as the tip is beyond the first portion of the duodenum.

The 3% of tubes that did not correlate to X-ray perplexed us. The radiology reports usually indicated the tube was “coiled” within the stomach. Generally these placements were “more difficult” and the tubes did not follow the usual anatomical path. We obtained repeat x-rays with contrast in these situations and found nearly all tubes to be within the small bowel. One might surmise that the tubes had spontaneously advanced into the bowel, but we found that tip locations on both readings to be the same or very similar. Most likely the pylorus and duodenum lay more posterior and tortuous than the usual path encountered and thus appear “coiled”.

Since the correlation of the ETPS to x-ray is excellent and we aborted all pulmonary placements without complication, our institution has adopted a policy of allowing “expert” users of the ETPS to order a post procedure x-ray at their discretion.



The intimacy of only two clinicians using the device on a significant number of procedures has allowed us to readily recognize anomalies and take appropriate measures to maintain a safe and successful procedure.

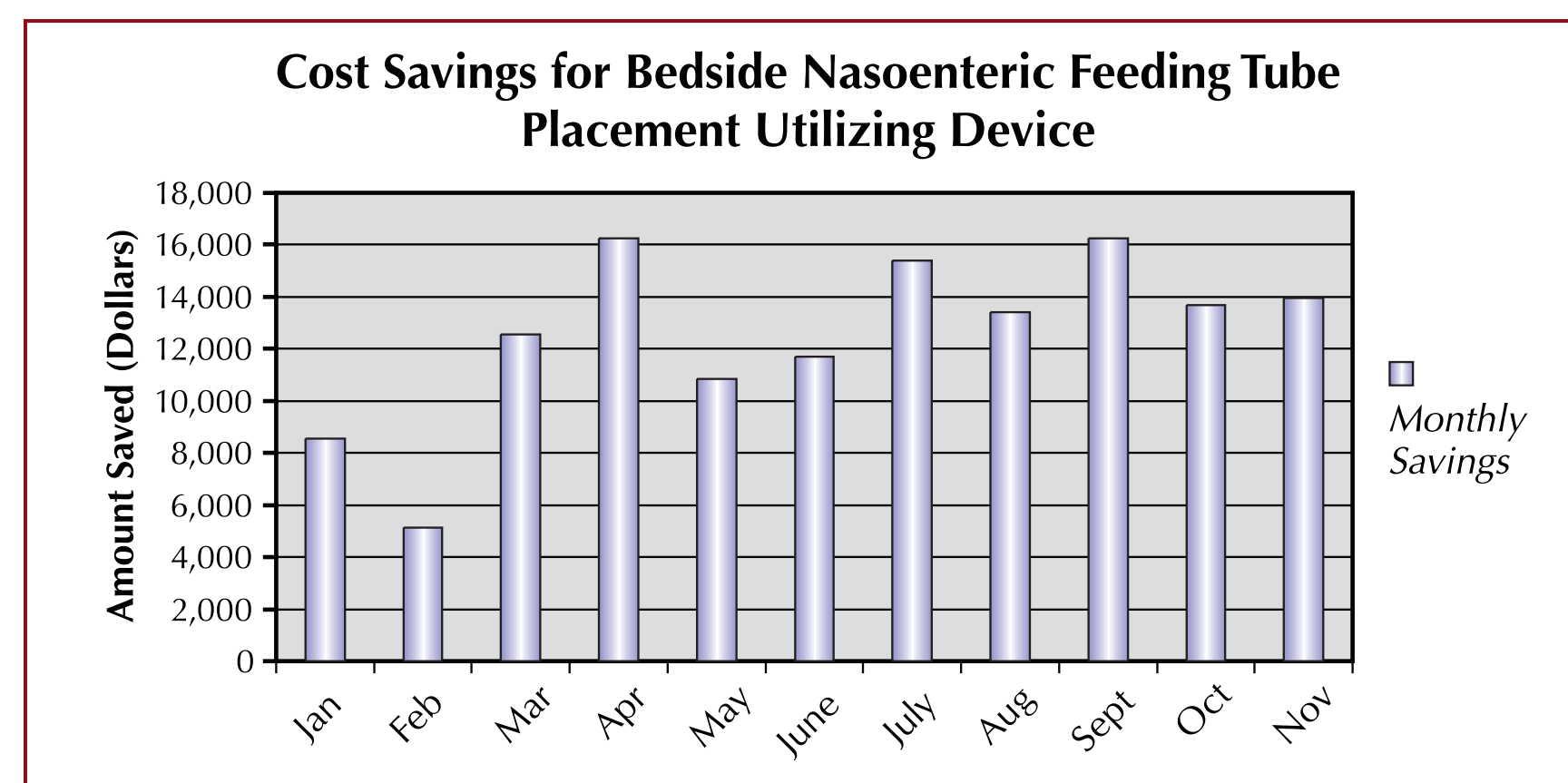
The cost to place an enteral tube only includes x-rays and tubes. We compared our average cost pre trial verses cost using the ETPS.

Our average time for an initial blind small bowel placement was 37 minutes. Initial placement with ETPS averaged 12.5 minutes.

An increasing awareness of the device’s safety, success, and cost savings has increased consults for feeding tubes and appears to have reduced TPN usage at our facility.

Conclusions

The ETPS provided an efficient method of placing bedside enteric feeding tubes while improving patient comfort and safety in addition to reducing hospital costs.



Future Directions

- More efficient and cost-effective means of providing enteral nutrition
- Potential reductions in parenteral nutrition
- Small skilled” Tube Teams” to ensure efficiency and cost reductions
- Multi center trials to further investigate the effects and outcomes associated with early enteral feeding

