NASOGASTRIC/NASOENTERIC TUBE PLACEMENT IN TRAUMATIC CRANIOFACIAL FRACTURES

SUMMARY

Nasogastric tube (NGT) and nasoenteric (NET) placement is frequently indicated in the traumatically injured to achieve decompression of the stomach, prevention of aspiration, administration of enteral nutrition and medications, and gastric lavage. In the intensive care unit setting, enteral nutrition may be the only immediately available form of nutrition support available to the patient. In individuals with facial and/or skull fractures, there is a potential for unintentional nasocranial intubation with a NGT/NET, which is a severe and potentially life threatening complication that increases morbidity and mortality as well as length of hospital stay and hospital cost.

RECOMMENDATIONS

- **Level 1**
  - **None**
- **Level 2**
  - **None**
- **Level 3**
  - **In patients with anterior basilar skull fractures (sphenoid and/or ethmoid), nasogastric/nasoenteric tubes should not be inserted**
  - **In patients with fractures of the nasal, frontal, maxillary bones, or vomer, nasogastric/nasoenteric tubes may be safely inserted**

INTRODUCTION

Nasogastric tube (NGT) and small-bore nasoenteric feeding tubes with a stylet (NET) are frequently indicated in the traumatically injured population for decompression of the stomach, prevention of aspiration, administration of tube feeds and medications, and gastric lavage. Although the benefits of NGT/NET utilization are relatively well accepted, placement in patients with craniofacial fractures can be controversial. Management practices are often based on institution and physician-specific training and preferences developed from anecdotal experience rather than evidence-based medicine as there is a paucity of literature describing best practice.

LITERATURE REVIEW

What are some measures to prevent unintentional intracranial intubation?

In the traumatically injured patient, if there is any CT imaging evidence of anterior basilar skull fracture, the placement of a NGT/NET should not be attempted. If head or maxillofacial CT imaging has not been obtained and there is evidence of craniofacial trauma, or the mechanism of injury suggests that craniofacial injury may be present, appropriate CT imaging should be obtained before NGT/NET placement is attempted. In 1998, Bhattacharyya performed an experiment in 12 cadaver heads in which

EVIDENCE DEFINITIONS

- **Class I:** Prospective randomized controlled trial.
- **Class II:** Prospective clinical study or retrospective analysis of reliable data. Includes observational, cohort, prevalence, or case control studies.
- **Class III:** Retrospective study. Includes database or registry reviews, large series of case reports, expert opinion.
- **Technology assessment:** A technology study which does not lend itself to classification in the above-mentioned format. Devices are evaluated in terms of their accuracy, reliability, therapeutic potential, or cost effectiveness.

LEVEL OF RECOMMENDATION DEFINITIONS

- **Level 1:** Convincingly justifiable based on available scientific information alone. Usually based on Class I data or strong Class II evidence if randomized testing is inappropriate. Conversely, low quality or contradictory Class I data may be insufficient to support a Level I recommendation.
- **Level 2:** Reasonably justifiable based on available scientific evidence and strongly supported by expert opinion. Usually supported by Class II data or a preponderance of Class III evidence.
- **Level 3:** Supported by available data, but scientific evidence is lacking. Generally supported by Class III data. Useful for educational purposes and in guiding future clinical research.

he created various nasopharyngeal defects and introduced various size nasogastric tubes. He showed that the larger the tube size, the less chance that the NGT/NET would travel into the cranial vault, even with a basilar defect present. He found that an 18 French tube was optimal, and that regardless of size, the tube should be directed inferiorly in the nose, parallel to the hard palate and nasal floor (1). Another method described by several authors is to place the NGT/NET under direct vision via bronchoscope or fluoroscopy when one is unsure of the status of the anterior skull base (1-4). By and large, if there is confirmed injury to the anterior basilar skull, or suspicion thereof, the safest thing to do is forego placement of nasal tube and utilize an orogastric tube (OGT) instead.

What types of fractures are and are not contraindicated for placement of NGT/NET?

Elliott (2003) and Spurrier et al. (2008) investigated through literature review the various types of traumatic injury that predispose patients to unintentional intracranial intubation. Through these papers, it was found that patients with fractures of the ethmoid and sphenoid bony complexes of the anterior skull base were overwhelmingly involved in iatrogenic injury of the cranium. Although in some cases, there were also nasal, maxillary, temporal, zygomatic, and frontal bone fractures, the only type of fracture that was illustrated in each of the cases was an ethmoid and/or sphenoid fracture (2,3). This is reasonable, as these two bony complexes include the cribiform plate and sphenoid sinus, which are described as the two most common routes of entry into the cranial vault (2,3,5). In fact, Paul et al. described the cribiform plate to be the site of entry in 71% of cases (6).

What are the types of iatrogenic injuries documented from nasogastric/nasoenteric/nasotracheal device use?

Numerous complications from NGT/NET placement have been described including epistaxis, retropharyngeal dissection, turbinectomy, endotracheal placement, lung perforation, pneumothorax, pneumomediastinum, esophageal and gastric perforation, rupture of varices, erosion of nose and/or soft palate and intracranial intubation (4,6-8).

What are the treatments of nasocranial intubation after it has occurred?

After review of available case reports, it is most reasonable to approach removal of the intracranial tube in a method based on the specific type of injuries sustained from the NGT/NET placement. Ferreras et al. performed a rapid withdrawal of the NGT nasally without surgical intervention, and this patient suffered no permanent neurologic deficit (9). Other authors who performed this method have varying results from no neurologic deficit to death. Several case reports opted for craniotomy to remove the NGT (3,7,9,10). Psarras described a trauma patient whose intracranial NGT was pulled and then taken to the operating theater for definitive management of intracranial injury (11). This patient experienced full recovery.

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