

Nasogastric tube in anterior cervical spine surgery, is it necessary?

ABSTRACT

Background: The aim of this article was to verify the utility of nasogastric (NG) tube in primary anterior cervical surgeries. Palpating and identifying the NG tube introduced during induction is one of the ways of preventing esophageal injuries during surgery. It may also be used as a conduit for postoperative feeding. However, the use of NG tube is not without complications. Esophageal perforation is one of them, with an incidence of 0.3%.

Materials and Methods: A retrospective observational study was performed of patients who underwent a primary anterior cervical spine surgery from January 2007 to July 2017 by a single surgeon. The indications were degenerative, trauma, infection, and neoplasia. NG tube was avoided in all cases. The patients were followed for 6 months.

Results: Our study included 356 patients (201 males and 155 females), with a mean age of 43.6 years (18–92 years) and a mean follow-up of 6 months. We had only one case of esophageal perforation (0.28%) attributed to a traumatic burst fracture.

Conclusions: This study indicates that the use of a NG tube in primary anterior cervical spine surgery can be avoided. Comprehensive knowledge of anatomy and meticulous dissection may avoid the disastrous complication of esophageal rupture. This way the discomfort and complications associated with NG tube can be avoided.

Keywords: Anterior cervical discectomy and fusion, anterior cervical spine surgery, esophageal perforation, nasogastric tube, total disc replacement

MeSH Terms: Myelopathy, Cervical spinal cord, Spinal fusion, Esophageal perforation

INTRODUCTION

Anterior approach to the cervical spine has gained popularity among spine surgeons since it was first described in the 1950s.^[1] Excellent exposure, versatility, and low rates of adverse effects were the advantages.^[2-6] However, owing to the complex and vital anatomy surrounding the cervical spine, rare catastrophic complications may occur and prove fatal, esophageal perforation being one of the rarer ones, with an incidence of 0.3%.^[7] Esophageal perforation is a nightmare for the spine surgeon, as it can be rapidly fatal, with mortality rates as high as 50%.^[8,9] Preoperative nasogastric (NG) intubation allowing palpation of the tube and identification of the esophagus intraoperatively has been proposed in literature as a preventive measure against this dreaded complication.^[10,11]

However, there is no published evidence suggesting any success or significance of this claim. Furthermore, NG intubation is rife with complications [Table 1].^[12,13] The aim of this article was to verify the utility of the NG tube in anterior cervical surgeries for varied indications.

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MATERIALS AND METHODS

A retrospective analysis of the patients who underwent anterior cervical spine surgery in our institute from November 2007 to January 2017 was performed. Indications included degenerative disease, trauma, infections, and neoplasms. Patients with single- and multi-level surgeries were included. The institutional review board approval was sought before study initiation. All surgeries were performed by the same surgical team. As a policy, NG tube was avoided in all cases. The patients were followed up for a minimum of 6 months to rule out any delayed esophageal rupture. Standard Smith and Robinson technique was employed for surgery. Demographic data inclusive of age, sex, and body mass index were collected for all patients. Preoperative data was collected and tabulated [Table 2]. We obtained the number of levels fused, duration of operation, length of hospital stays, and mean blood loss [Table 3]. Statistical analysis was done using SPSS software 20.0 (SPSS Inc., Chicago, IL, USA).

RESULTS

A total of 356 patients were analyzed (201 males and 155 females). There were 203 single-level, 55 double-level, 24 three-level, 13 four-level discectomy and fusion surgeries; 30 corpectomies; and 31 total disc replacement surgeries [Table 2]. The mean age group was 43.6 years (18–92 years). The mean operative time was 172.03 min. The mean estimated blood loss was 140.25 cc. The mean duration of hospital stay was 3 days^[2-5] [Table 3]. As a policy, we did not stop antiplatelet medication in any patient. In this study, there was one patient with a traumatic burst fracture of C5 vertebral body who developed an esophageal perforation (0.28%).

DISCUSSION

Esophageal perforation is a dreaded complication in anterior cervical spine surgery owing to the postoperative morbidity and mortality of as high as 50%.^[8,9] However, the incidence of the said complication is minimal in anterior spine surgery. Hershman *et al.* in their multicentric retrospective case series had only two cases of perforation among 9591 anterior cervical procedures (0.02%).^[25] Fountas *et al.* reviewed that 1015 primary anterior cervical surgeries reported only three perforations (0.2%).^[4] Lu *et al.* reported only six esophageal perforations in 1045 (0.5%) anterior cervical surgeries in a 10-year period.^[26] The prevention strategy proposed in literature of palpating a NG tube to delineate the esophagus in surgery^[10,11] is itself flawed due to the absence of any evidence-based study supporting this proposal. The insertion of an NG tube is considered a simple and a safe procedure.

Table 1: Complications of nasogastric intubation

Nasopharyngeal complications ^[14,15]	
Rhinitis (sore and runny nose)	
Sore throat	
Dry mouth	
Thoracic complications ^[16-20]	
Pneumonia	
Atelectasis	
Pneumothorax	
Empyema	
Sepsis	
Hemorrhage	
Nonthoracic complications ^[13,21-24]	
Knotting	
Impaction	
Double backing and kinking	
Obstruction	
Rupture	
Breakage	
Perforation of viscus	
Intracranial entry	

Table 2: Demographics and comorbidities (n=356)

Demographics and co-morbidities	Mean
Patient demographics	
Age (years)	43.6 (18-92)
Female: male	201:155
BMI (kg/m ²)	27.4
Comorbidities, n (%)	
Hypertension	144 (40.5)
Diabetes mellitus	83 (23.3)
Anticoagulant medication	47.3 (13.3)
Smoking	55 (15.6)
Alcohol	38 (10.6)

BMI - Body mass index

A NG tube is used in cases of postoperative dysphagia in anterior cervical procedures with the risk of aspiration.^[27] Literature also specifies its use in revision anterior spine surgery.^[11] However, the complications which can arise from NG tube insertion are many [Table 1]. Desmond *et al.* in their prospective case series showed the evidence of rhinitis in 75% of the patients who received an NG tube.^[14] Padilla *et al.* in their study interviewed patients about the distresses of NG tube feeding, and the most common experiences were sore nose or throat, dry mouth, and runny nose.^[15] Paul *et al.* in their case report described a patient having severe epistaxis following NG tube insertion which required arterial embolism.^[28] Tube knotting, impaction in the posterior nasopharynx, double backing, kinking, rupture and breakage are a few other complications.^[29] Rarely, serious complications may also occur, and Ferrer *et al.* in their study concluded that NG tube feeding in stroke patients is a significant cause of aspiration pneumonia. Teramoto *et al.* in

Table 3: Patient outcomes (n=356)

Outcomes	n
Number of levels	
One level	203
Two levels	55
Three levels	24
Four levels	13
Etiology	
Degenerative	265
Trauma	63
Infection	13
Neoplasia	15
Blood loss (cc)	140.25
Surgical time (min)	172.03
Duration of hospital stay (days)	3 (2-5)

their study also concluded that NG tube feeding is a cause of aspiration pneumonia in ventilated patients.^[30,31] A famous musician Maurice Murphy succumbed to a misplaced NG tube.^[32] There also have been isolated case reports by Psarras *et al.*, Roka *et al.*, Freij and Mullett, and Metheny about inadvertent intracranial insertion of a NG tube, and 33 cases have been reported in published literature about this complication.^[21-23,33] Approximately one-third of the patients with spinal cord injury also suffer from head injuries, thus making this complication important.^[34] Placement of a NG tube into the pulmonary tree is a well-known complication, with an incidence of 0.3%–15%,^[35] and there have been various case reports identifying this complication by Schreiber *et al.*, Thomas *et al.*, and Moorthy.^[16,17,36] The comprehensive knowledge of anatomy and meticulous surgical technique should alert the surgeon on the position of the esophagus rather than palpation of an NG tube. Several anatomic layers must be disrupted to perforate the esophagus.^[37] Careful initial exposure with judicious retractor placement has been suggested to help minimize esophageal injury.^[3] The careful placement of the retractor blades under the Longus colli muscle can help prevent inadvertent escape of the esophagus during the procedure.^[38] Cautious use of the high-speed burr and the use of sleeved electrocautery have also been advocated to reduce esophageal complications. Esophageal rupture due to traumatic fractures of the spine constitutes approximately 1% of esophageal ruptures.^[39] Apart from the one isolated case of esophageal rupture in this study which may be attributed to the burst fracture, the incidence of esophageal perforation in anterior cervical surgery in this series was nil.

CONCLUSIONS

This study indicates that the use of a NG tube in primary anterior cervical spine surgery can be avoided. Comprehensive knowledge of anatomy and meticulous dissection may avoid

the disastrous complication of esophageal rupture. This way the discomfort and complications associated with NG tube can be avoided.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patients have given their consent for their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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