



Transnasal Esophagoscopy—Our Experience

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Abstract

Introduction Transnasal esophagoscopy (TNE) is a widely used tool both in the diagnosis and treatment of patients presenting complaints within the head and the neck. This is because this investigative adjunct examination provides the advantage of visualizing above the level of the cricopharyngeus muscle when compared to the more widely used esophagogastroduodenoscopy (EGD).

Objectives We have assessed if the implementation of TNE within a district general hospital (DGH) was feasible, and investigated if the resources of our patients could be better directed away from other investigations such as barium swallow and EGD in favor of this novel technique. The TNE technique has been largely applied in central teaching hospitals within the United Kingdom, but there are still no published reports of a DGH investigating its applicability in this smaller-sized clinical environment.

Method We have analyzed our theater database to find all the patients who had undergone TNE, and recorded their reason for presenting, the preceding investigations, and the procedural findings.

Results In most cases, the TNE was conducted without technical issues, and we were able to identify positive findings in 43% of the patients who underwent Esophagogastroduodenoscopy (EGD). We were able to treat patients successfully during the investigation when a cricopharyngeal stricture or narrowing was found. A normal EGD did not preclude further investigations with TNE. All but one of our patients were treated as day-case procedures.

Conclusion Transnasal esophagoscopy can be successfully delivered within a DGH. A previous EGD does not mean that the TNE will not reveal positive findings due to its superior visualization of the pharynx and the upper esophagus.

Keywords

- ▶ Endoscopy
- ▶ esophagoscopy
- ▶ deglutition disorders

Introduction with Objectives

The use of transnasal esophagoscopy (TNE) is increasing across the world in the field of otolaryngology as an investigative and interventional tool in patients with reflux, globus and dysphagia.¹ The procedure has been widely validated since the first switch from oral to nasal esophageal intubation using a flexible fiber-optic scope in the 1990's. Jonathan Aviv, an American head and neck surgeon, developed the technique and demonstrated that it could be performed in an outpatient setting, without sedation, in consecutive clinical patients.² Since then, TNE has been

used to carry out biopsies, balloon dilation of the esophagus, medialisation of the vocal cords, and secondary tracheoesophageal puncture.^{3,4}

The primary advantage of TNE over the more traditional esophagoscopy, with oral intubation, or rigid esophagoscopy, under general anesthesia, is that the patients do not require sedation or a general anesthetic. This, in turn, results in a reduced hospital stay and in a shorter procedure time.⁵ An economic analysis has shown TNE to be more cost-effective as a result.³

We have recently incorporated a TNE service into our ear-nose-throat (ENT) department within a district general

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hospital (DGH) in Lancaster, United Kingdom. We had noticed that many of the patients referred to us had already undergone other investigations, mainly in the form of esophagogastroduodenoscopy (EGD), for the same complaint. The main aim of the present study was to assess if, in the future, we could prevent the duplication of endoscopic examinations within the gastroenterology and ENT departments.

This study presents a case series detailing the results obtained from our first 25 patients undergoing TNE. Due to the limited space in our outpatient clinic, our TNE procedures are currently performed in the operation theater. Currently, we only possess one TNE endoscope, and do not have the sterilization equipment set up to run back-to-back procedures. Therefore, we run a half-day operation theater list where we perform two TNE procedures interspersed with a general anesthesia procedure, in order to allow time for the scope to be sterilized. However, our long-term aim is to develop the infrastructure required to integrate this procedure into the clinic.

Methods

There were no ethical considerations needed for the collection of data or its analysis. All data was fully anonymous.

We have searched our theater database using Microsoft Excel (Microsoft Corp, Redmond, WA, US) for procedures that used TNE from the initial trial period in March 2016 up to June 2017. The details of the patients were extracted, and their electronic patient record (Lorenzo) was analyzed for the following information: preceding investigations, indication for TNE, whether a biopsy was taken, the endoscope view, and the type of anesthetic used.

During that period, 25 TNE procedures were listed. One of these procedures was cancelled due to a patient having uncontrolled hypertension, and another patient was unable to be analyzed due to a missing operation note. This left us with 23 procedures for analysis.

All the statistical analysis was performed using the simple tools available in Microsoft Excel and free online statistical tools on Calculator.net.

Results

The average age of the patients undergoing TNE was 61 years old (standard deviation [SD] = 17). All of these patients underwent TNE after a combined administration of a topical anesthetic and a decongestant nasal spray (lidocaine and phenylephrine). ► **Table 1** shows each patient numbered with their previous investigations and information detailing their individual TNE.

TNE View and Technical Issues

In three cases, there were problems with the endoscope view. Two of these were due to the scope itself, and one was due to large amounts of secretions. In another case, we were unable to pass the scope through the cricopharynx, and in another patient the scope did not fit through the nasal airway

due to a septal spur. In the remaining 78% of the cases, there were no anatomical or technical issues.

TNE Findings

From the total of 23 patients, 13 (57%) had normal findings during the TNE. All 10 (43%) patients with positive findings presented with benign pathologies, which included the following: vallecular cyst, hiatus hernia, esophageal candidiasis, cricopharyngeal stricture and spasm, Schatzki ring, and foreign body.

Previous Investigations

From the total of 23 patients, 5 (21%) had previously undergone a successful EGD with normal findings. Four of these patients had exactly the same findings during the TNE. The remaining patient had some cricopharyngeal narrowing, which was dilated using a balloon with good postoperative outcomes.

Balloon Dilation

From the total of 23 patients, 5 (21%) required balloon dilation, which was tolerated well in 4 of these patients. One patient found the procedure painful after one minute of dilation, so further attempts were abandoned.

Biopsy

Only one patient required biopsy of a vallecular cyst, which returned results of normal squamous epithelium.

Findings from the Larynx to the Cricopharynx

One patient had a stricture at the level of the pyriform fossa. In other cases in which a pathology was evident, it was at the level of or below the cricopharynx.

Day Case versus Inpatient

One patient was admitted for observation overnight. The rest of the patients were admitted as day-case procedures.

Local versus General Anesthesia

All cases were performed with local anesthesia.

Previous Barium Swallow

From the total of 23 patients, 6 (26%) had undergone prior investigation with barium swallow. All of these patients had persistent dysphagia after no pathology was identified on the swallow test. Through the TNE, three out of these six patients were found to have a pathology, including cricopharyngeal spasm and esophageal candidiasis.

Reflux Disease

Gastroesophageal or laryngopharyngeal reflux disease were not commented on in any of the TNE reports, indicating that this was not a common finding.

Indication

The most common reason for the performance of TNE was dysphagia 57% (13) and globus 22% (5), followed by submandibular mass, odynophagia, dyspnea, choking and hoarseness, each with an incidence of 4% (1).

Table 1 Demographics of patients undergoing transnasal esophagoscopy, their indication and the procedural details

Age	Procedure	Preceding investigation	Indication	Biopsy taken and result	TNE view	Findings	Anesthesia type	Length of stay
48	TNE	MRI - right vallecular cyst, chronic sialadenitis. EGD 2012 = gastritis	Fluctuating right submandibular mass	Yes = normal squamous epithelium	No issue	Vallecular cyst	LA	Day-case
70	TNE	EGD 2015 = gastric polyp	CP contraction and ? Pouch	No	Blurry (x2 passes); balloon dilation abandoned	Normal	LA	Day-case
60	TNE	Barium swallow. Removal of vallecular cyst. Subsequently able to eat and drink normally	Globus	No	No issue	Normal	LA	Day-case
46	TNE	TNE	Odynophagia	No	No issue	Normal	LA	Day-case
85	TNE	EGD 2010 = Barrett's esophagus (dysphagia)	Globus	No	Poor view, passed to 35 cm	Normal	LA	Day-case
76	TNE	EGD 2013 = gastritis and small HH	Globus	No	No issue	Small HH	LA	Day-case
73	TNE	Barium swallow	Dysphagia	No	No issue	Esophageal candidiasis, HH	LA	Day-case
68	TNE	Previous Head and Neck Ca and Radiotherapy	Dysphagia	No	Unable to pass past pyriform fossa	Stricture at level of pyriform fossa	LA	Day-case
90	TNE	Failed EGD. Barium swallow. Previous direct esophagoscopy and balloon dilation (December 2016)	Dysphagia	No	No issues	Normal	LA	Day-case
57	TNE	Previous total laryngectomy with neck dissection	Dysphagia	No	Poor view - secretions	Unclear	LA	Day-case
32	TNE	None	Tightness in chest	No	No issues	Normal	LA	Day-case
72	TNE	Barium swallow, EGD 2013 = candidiasis, gastritis	High dysphagia	No	No issues	Normal	LA	Day-case

(Continued)

Table 1 (Continued)

Age	Procedure	Preceding investigation	Indication	Biopsy taken and result	TNE view	Findings	Anesthesia type	Length of stay
58	TNE	Underwent EGD after the procedure (gastritis, CLO test taken)	Globus and Dyspepsia	No	Nasal spur (difficult to pass scope), stomach not visualized	Normal	LA	Day-case
43	TNE	None	Dysphagia, hoarse voice	No	No issues	Normal	LA	Day-case
52	TNE	USS neck = cystic nodule in thyroid	Globus	No	No issues	Normal	LA	Day-case
70	TNE + balloon dilation	None	Dysphagia	No	No issues	Mild GERD, SCJ 3 cm above GEJ, stenotic upper esophagus	LA	Inpatient
48	TNE + balloon dilation	USS neck - midline cysts, MRI neck - midline cysts, gastroscopy 2014 = normal	Choking episodes	No	No issues	Spasm of cricopharyngeus, balloon dilation	LA	Day-case
23	TNE	None	Dysphagia	No	No issues	Food bolus - unable to retrieve, referred for EGD	LA	Day-case
77	TNE	EGD abandoned in 2016	Dysphagia	No	No issues	Normal	LA	Day-case
49	TNE + balloon dilation	None	Dysphagia	No	No issues	Prominent cricopharyngeus, Schatzki ring. Good result at follow-up.	LA	Day-case
49	TNE + balloon dilation	Barium swallow, EGD 2014 = normal	Dysphagia	No	No issues	Spasm of cricopharyngeus	LA	Day-case
68	TNE	None	Dysphagia	No	Difficult procedure*	Normal	LA	Day-case
79	TNE + balloon dilation	Barium swallow	Dysphagia	No	No issues	Narrow cricopharyngeus	LA	Day-case

Abbreviations: Ca, Cancer; CLO test, Rapid Urease Test; CP, Cricopharyngeus; EGD, esophagogastroduodenoscopy; GEJ, gastroesophageal junction; GERD, gastroesophageal reflux disease; HH, Hiatus Hernia; LA, local anesthesia; MRI, magnetic resonance imaging; SCJ, squamocolumnar junction; TNE, transnasal esophagoscopy; USS, ultrasound scan.
 Notes: *No indication was made as to why this was a difficult procedure in the medical notes; all data has been anonymized.

Discussion

Evidence regarding the use of TNE remains confined largely to retrospective case series or cross-sectional studies in larger teaching hospitals.³ The need for prospective randomized trials comparing TNE to oral esophagoscopy in the investigation of particularly esophageal and gastric pathologies remains. This is a small case series presenting our initial findings and experiences with a new technique available to us for which resources are limited, and that has restricted our output.

Synopsis of Key New Findings

We have demonstrated that we are able to diagnose benign pathologies and successfully treat cricopharyngeal strictures using balloon dilation. Several patients had previously undergone an EGD, and while the findings during the TNE were mirrored in the majority of cases, one patient was found to have an upper esophageal problem. This leads to a clinical conundrum, as it makes it difficult to preclude patients from investigation with TNE who have undergone previous esophagoscopy via oral intubation, as well as selecting patients for TNE, as there are advantages of this technique over EGD, which include visualization of the pharynx and upper esophagus. Ultimately, we have decided that a normal EGD does not necessarily mean that the TNO findings will be the same. In the cases in which there are ongoing symptoms after an initial EGD, a TNE can offer an alternative investigation, despite its similarity.

Clinical Applicability of This Study

What is clear is that TNE is gradually becoming a useful adjunct examination in otolaryngology, as its potential uses are wide ranging. An example of this is to perform in a clinical setting a tracheoesophageal puncture after laryngectomy via the Seldinger technique.⁶ It also results in improved sizing of the subsequent voice prosthesis when compared to those created under general anesthesia.⁷ It can also be employed to aid the removal of esophageal foreign bodies, a problem that

currently requires either referral to gastroenterology for endoscopy or a general anesthetic for a rigid esophagoscopy with associated higher morbidity.⁸

Conclusion

We have successfully developed a TNE service within a DGH. In the present study, we have demonstrated clinical success in using balloon dilation as an adjunct examination to this investigative technique. It appears that prior investigation in the form of a normal EGD does not preclude a further examination through a TNE. It also poses the question as to whether gastroenterologists should perform a TNE as the primary investigation of choice in the future.

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