

### Esophageal Capsule Endoscopy in Children to Diagnose Portal Hypertension

It is recommended that adult patients with portal hypertension (PH) undergo screening for varices, especially in order to prevent the complication of variceal hemorrhage. There is variability in PH management in children, often due to complicating factors such as a child's smaller size. Capsule endoscopy, specifically the esophageal capsule (EC) that captures images on both ends of the capsule at a rapid frequency, has been used to assess for esophageal varices in adults. Although EC has no therapeutic ability, it can screen for variceal formation in patients without the requirement of anesthesia. Minimal data on EC use in children with portal hypertension is available, and the authors performed a single-center, retrospective study to assess the capability of EC for variceal screening in a specific pediatric population with PH.

A 12-year chart review occurred to identify children with a diagnosis of PH who had undergone screening using EC. Patients had to be able to swallow an EC, and children with prior abdominal surgery or pacemaker placement were excluded. Three models of EC capsules (PillCam ESO, PillCam ESO2, and PillCam UGI Capsule made by Given Imaging Ltd, Yoqneam, Israel/Medtronic) were utilized. After a patient swallowed the EC by standard protocol, esophageal varices were described in regards to esophageal location (proximal, mid, or distal esophagus) and size (small, medium, or large). The electronic medical record was reviewed on each included patient to determine various aspects including testing indications for PH as well as medication

use. The clinical status for each patient was defined as compensated cirrhosis, decompensated cirrhosis (cirrhosis with complications such as ascites, encephalopathy, variceal hemorrhage, or hepatopulmonary syndrome), noncirrhotic portal hypertension, cardiac cirrhosis (such as from congenital heart failure), and suspected PH.

A total of 98 patients were included in the study (57.1% male), and 146 completed EC studies were performed. The average age at the time of EC was 16 years with a median interquartile range of 13.7 – 18.5 years. Compensated cirrhosis was present in 57% of patients; noncirrhotic portal hypertension was present in 19.5% of patients. EC was used as a screening modality in 66.5% of studies and for surveillance for known varices in 33.5% of patients. No portal hypertension changes were seen in 74 EC studies, and 64 EC studies demonstrated variceal formation (59 esophageal, 17 gastric, 6 duodenal). Other findings included blood flecks (23% of studies), erosions (22.5%), portal gastropathy (18.1%), esophagitis (14.5%), heterotopic tissue (9.4%), scarring from prior ligation (12.3%), and ulcer formation (3.6%). Most identified varices were in the esophagus (59 studies), specifically in the distal esophagus (56 studies), and most varices were described as small (40 studies). The authors noted that 12 of the EC studies led to new medication use while 11 esophagogastroduodenoscopies were performed as a result of EC studies (mostly esophageal variceal band placement). Finally, a total of 4 patients had an episode of GI bleeding within 1 year of their EC study; however, none of these patients had a bleeding event due to missed findings on EC.

This study demonstrated that EC is an effective screening and surveillance tool for varices in children with portal hypertension. The safety of EC use makes it a potential quick tool for determining variceal formation, and it has the potential to be used for screening / surveillance in children who cannot tolerate anesthesia.

Pai A, Jonas M, Fox V. Esophageal capsule endoscopy in children and young adults with portal hypertension. *Journal of Pediatric Gastroenterology and Nutrition*. 2019;69:641-647.

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### Transnasal Endoscopy for Children with Eosinophilic Esophagitis

Currently, the best way to perform disease monitoring in eosinophilic esophagitis (EoE) is through direct visualization of the esophageal mucosa with biopsy via esophagogastroduodenoscopy (EGD). Repeat EGDs requiring sedation can be a potential risk in children, and the authors of this study evaluated the alternative use of transnasal endoscopy (TNE) to monitor disease in children with EoE. The authors of this study looked at a protocol of monitoring EoE in children in which the patients were given a web-based video to watch prior to the procedure. The patients did not eat or drink 2 hours before the procedure. During TNE the patients wore either movie goggles or virtual reality movie goggles. Topical lidocaine or aerosolized benzocaine was applied orally and intranasally. A small bronchoscope or endoscope (size range 2.8 mm to 4.9 mm outer diameter) was placed transnasally based on the patient's nasal passage size, and esophageal biopsies were obtained via forceps placed through a 1.2 mm or 2 mm operating channel depending on the size of the bronchoscope or endoscope used. Patient demographics, procedure number, completion rate, type of endoscopy, and adverse events were recorded.

There were 300 TNE attempts recorded over a 3-year period, and 294 TNEs were performed successfully (98%). The study population consisted of 190 patients (age range 3 to 22 years). Both operating channel sizes were used throughout the age range. Throughout the 3-year study, the

average number of TNE procedures increased every year (48 in 2015; 131 in 2017), and time from procedure check-in to discharge decreased by a small amount as well (maximum time 79 minutes which decreased to 71 minutes by the end of the study period). The total percentage of endoscopies for EoE that were performed via TNE increased as well (15.7% in 2015 to 31.8% in 2017). In 2018, the average cost for TNE with biopsy for EoE was \$4393 while the average cost for EGD with biopsy for EoE was \$9444.33 (a 53.4% reduction in cost using the transnasal approach). All biopsies obtained by TNE were adequate for examination by a pathologist. Adverse events were rare and only consisted of interventions that included telephone management, reassurance, and supportive care.

This study demonstrates that TNE with video goggles is a safe and effective diagnostic technique to perform in children with EoE. The ability to obtain esophageal tissue with no sedation and with an associated reduction in healthcare costs provides the possibility to expand the use of this procedure throughout pediatric healthcare systems.

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Nguyen N, Lavery W, Capocelli K, Smith C, Deboer E, Deterding R, Prager J, Leinwand K, Kobak G, Kramer R, Menard-Katcher C, Furuta G, Atkins D, Fleischer D, Greenhawt M, Friedlander J. Transnasal endoscopy in unседated children with eosinophilic esophagitis using virtual reality video goggles. *Clinical Gastroenterology and Hepatology*. 2019; 17: 2455-2462.

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