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The Role of Transnasal Endoscopy (TNE) in Diagnosing Pediatric Gastrointestinal Symptoms in a Rural Setting

Executive Summary

Transnasal endoscopy (TNE) is emerging as a safe, effective, and accessible diagnostic alternative to traditional upper endoscopy for children and adolescents presenting with chronic abdominal pain and nausea. Particularly in rural and resource-limited settings, TNE offers a viable solution where access to pediatric anesthesia services, reusable scope high-level disinfection, and hospital-based endoscopy units may be lacking. TNE, performed with disposable scopes, can be completed in 5–10 minutes using only topical nasal anesthesia, making it a powerful tool for early diagnosis and reassurance in functional gastrointestinal disorders.

Introduction: A Diagnostic Gap in Pediatric GI Care

Adolescents presenting with chronic gastrointestinal symptoms, such as abdominal pain and nausea, often require upper endoscopy to assess for conditions including gastritis, peptic ulcers, or eosinophilic esophagitis. In rural areas, barriers to traditional esophagogastroduodenoscopy (EGD) include:

- Limited access to pediatric gastroenterologists
- Inadequate pediatric anesthesia support
- Insufficient sterilization infrastructure for reusable scopes
- Long travel distances for patients and families

These barriers delay diagnosis and treatment, potentially increasing patient morbidity and healthcare costs.

What is Transnasal Endoscopy (TNE)?

TNE is a minimally invasive, office-based procedure that allows direct visualization of the esophagus, stomach, and duodenum via an ultra-thin, flexible endoscope inserted through the nose. Using topical lidocaine for nasal and oropharyngeal numbing, the patient remains awake, alert, and cooperative during a 5–10 minute exam. Newer single-use gastroscopes eliminate disinfection requirements and reduce infection risk.

Clinical and economic/social Benefits of TNE in Pediatric Populations

- Minimally Invasive and Comfortable: Children can watch movies or use virtual reality (VR) “TV goggles” during the procedure, reducing anxiety and improving cooperation.
- No Sedation Required: Avoids risks of general anesthesia, especially beneficial in adolescents with comorbidities.
- Rapid Turnaround: Immediate visualization and reassurance for patients and families.
- Single-Use Gastroscopes: Ideal for rural clinics with limited high-level disinfection capabilities.
- Cost-Effective: Reduces overall costs by avoiding hospital admission and associated anesthesia fees.

Healthcare Impact of TNE to Jonesboro, Arkansas

Bringing sedation-free TNE to children in Jonesboro has transformed the way pediatric patients are cared for in the rural urban interface setting. Specifically, Jonesboro is over 130 miles from the closest tertiary level pediatric center.

Clinical and Economic/Social Benefits of TNE in Pediatric Populations

Families from Jonesboro are relieved to have access to this innovative procedure close to home that eliminates the need to travel and spend all day in Little Rock. EvoEndo provides a low risk, safe, and sedation-free procedure available right in the town of Jonesboro.

Case Example: Adolescent Female, Age 15

A 15-year-old from a rural farming community had been suffering from chronic nausea, bloating, school absence, and intermittent upper abdominal discomfort for over 6 months. Repeated trips to her local clinic yielded no diagnosis. A referral for traditional sedated endoscopy (EGD) was delayed due to a lack of anesthesia services and long wait times at the nearest tertiary center over 130 miles away.

Through a pilot TNE program at a rural pediatric outreach clinic, the patient underwent a TNE with an EvoEndo Model LE single-use gastroscope. With her nasal passages numbed using 4% lidocaine and VR goggles playing her favorite show, a diagnostic upper endoscopy procedure was completed in 7 minutes. The TNE showed the esophagus and stomach were visually normal, without inflammation or ulcers noted. Esophageal and gastric biopsies were normal. Prior to the procedure, IgA TTG, IgA, Fecal H. Pylori Antigen, Fecal Heme Occult, Complete Blood Count (CBC), and Complete Metabolic Panel (CMP) were all performed and negative. These tests evaluated and ruled out celiac disease, H. Pylori infection, anemia, gastrointestinal blood loss, and hypoalbuminemia.

By performing on-site endoscopy in a rural setting, GERD, Eosinophilic Esophagitis (EoE), H. pylori gastritis, gastritis, and infection were ruled out. This real-time reassurance allowed her care team to diagnose *functional dyspepsia*, a common disorder of gut-brain interaction. The patient was started on dietary modifications using a low FODMAP diet, low-dose amitriptyline, and cognitive behavioral therapy. Within 3 months, her symptoms had significantly improved, and she returned to school full-time.

Conclusion and Recommendations

Transnasal endoscopy offers a transformative approach for evaluating pediatric gastrointestinal symptoms, especially in underserved rural regions and rural-urban interface communities. As the healthcare landscape continues to evolve toward value-based care and access equity, expanding TNE programs can bridge a critical gap in pediatric diagnostics.

Recommendations

- Expand training of pediatric providers in office-based TNE.
- Equip rural clinics with portable TNE systems and single-use gastroscopes
- Partner with telehealth and VR companies to enhance patient experience.
- Advocate for enhanced insurance reimbursement for unsedated TNE procedures.

Supporting Research

- Bose P, Pitman R. Pediatric unsedated transnasal endoscopy: applications, equipment, and future directions. *Front Pediatr* 2025;13.
- Smadi Y, Thomas J, Bittar K, et al. Office-based sedation-free transnasal esophagogastroduodenoscopy with biopsies using single-use gastroscopes: A pediatric single-center experience. *JPGN Rep* 2024;5:29-34.
- Thavamani A, Ryan MJ, Leinwand K, et al. Safety and efficacy of a novel ultrathin gastroscope for unsedated transnasal endoscopy in children and adults for evaluation of upper GI disorders. *iGIE* 2023;3:15-19.
- ASGE (2022): Promotes TNE as a safe alternative for upper GI evaluation in appropriately selected pediatric patients.

The EvoEndo® Model LE Gastroscope is intended for the visualization of the upper digestive tract in adults and pediatric patients, specifically for the observation, diagnosis, and endoscopic treatment of the esophagus, stomach, and duodenal bulb. The gastroscope is a sterile single-use device and can be inserted orally or transnasally. The EvoEndo® Controller is intended for use with an EvoEndo® Endoscope for endoscopic diagnosis, treatment, and video observation.