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Can endosheath technology open primary care doors to Barrett's esophagus screening by transnasal endoscopy?

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Articles on esophageal adenocarcinoma (EAC) generally begin with statistics regarding its alarming rise in recent decades [1]. Despite the ease with which Barrett's esophagus, the precursor of EAC, can be identified at endoscopy, there has been little progress in prevention or early detection of EAC. The limitations of current guidelines that hesitatingly recommend sedated esophagogastroduodenoscopy (EGD) in patients with symptoms of gastroesophageal reflux disease (GERD), multiple risk factors, or alarm symptoms are self-evident. A strategy based on symptoms will fail to detect Barrett's esophagus in asymptomatic individuals and will also fail in those with well-controlled symptoms. Unless we can improve screening for Barrett's esophagus, the status quo will not change, with fewer than 5% of EACs detected early as part of Barrett's surveillance programs [2]. Promising ablative endoscopic therapies for dysplastic Barrett's esophagus [3,4] will also have little impact, and the 5-year survival for EACs will remain a dismal 18% [1] unless we develop effective alternatives to sedated EGD for identifying Barrett's esophagus in the general population.

The need to use sedation prohibits the performance of EGD in the primary care setting; it also adds direct costs (medication administration, monitoring, personnel, and recovery time), indirect costs (day off work for both the patient and a companion who is needed to drive or accompany the patient home), and increases complications. Endoscopic procedures that can be performed without sedation, such as transnasal endoscopy (TNE) and capsule esophagoscopy, can potentially change our current paradigm of screening for Barrett's esophagus. The effectiveness of unsedated procedures for screening will depend on a combination of factors—sensitivity for detecting Barrett's esophagus, complication rates, costs, tolerability, and acceptability to both patients and physicians [5]. A majority of primary care physicians, when surveyed, did not recommend sedated EGD for chronic symptoms of GERD but they did indicate that the availability of unsedated endoscopy within the primary care setting would lead to increased screening [6].

TNE is as sensitive as EGD for identifying Barrett's esophagus; it is also well tolerated and less expensive than EGD [7–9]. A recent systematic review and meta-analysis demonstrated that TNE was comparable to EGD in terms of technical success rates (particularly when the

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TNE scope diameter was <5.9mm). Acceptability was high for TNE (85.2%), and 63% of individuals preferred TNE to EGD [10]. TNE is also quite well tolerated by individuals who undergo the procedure, and approximately 90% are willing to have the procedure again [5,8,9,11,12]. Yet, acceptability has been the major barrier preventing the widespread adoption of TNE. Perhaps because of social and cultural differences, TNE has been accepted more readily in Asian countries than in the West [13–15]. Acceptability of a new healthcare procedure remains a complex issue, and depends as much on the attitudes of healthcare providers as patient perceptions and cost considerations.

Sheath technology for endoscopes was developed over two decades ago. The concept of a sterile disposable sheath that would permit rapid turnover of endoscopes without the need for lengthy disinfection was, and remains, quite attractive. However, poor imaging prevented the adoption of this technology to regular endoscopy. This sheath technology has now been adopted for transnasal esophageal screening for Barrett's esophagus, a condition that can be detected even when the quality of the image is not as good as standard endoscopy, as shown in the study by Shariff et al. in this issue of Endoscopy [16].

A previous multicenter study of 426 patients using the new sheath esophagoscope found the technology to be safe, well tolerated, and acceptable [17]. Barrett's esophagus was diagnosed in 4% of patients who underwent this procedure in an office-based setting. TNE using this technology was also found to have comparable effectiveness to EGD in a community-based randomized trial. Participation rates (47%), tolerability, and yield of esophageal pathology for TNE performed with the endosheath esophagoscope were comparable to conventional sedated EGD (40%). More intriguingly, these characteristics remained comparable between TNE performed in a hospital endoscopy suite and procedures in a mobile research unit [18]. Similarly to previous studies, 80% of individuals undergoing sheath TNE were willing to undergo the procedure again, which is comparable to TNE performed using conventional endoscopes.

The well-designed, prospective, randomized, crossover study by Shariff et al [16] confirms the utility of this sheath TNE technology for Barrett's esophagus screening by demonstrating its sensitivity for endoscopically suspected Barrett's esophagus, albeit in a population selected to have a high prevalence of Barrett's esophagus >2cm. The sensitivity of this technology for diagnosing very short Barrett's segments remains unclear, although it can be argued that the risk of progression for ultrashort Barrett's esophagus may be minimal.

Of course, the key to cancer prevention in a Barrett's screening program is the detection of dysplastic Barrett's mucosa. The endosheath is currently available in two configurations, with and without a biopsy channel. The biopsy channel allows the acquisition of biopsies using a pediatric biopsy cable. In a small minority of patients, the nasal passage may be too narrow to allow the passage of the esophagoscope. In such situations, the sheath without the biopsy channel may be able to negotiate the narrower nasal passage and allow visualization of any columnar metaplasia in the distal esophagus. The limited ability to obtain biopsy samples, as found by Shariff et al., might limit sheath TNE to a diagnostic method. Without the biopsy channel, the technology could only visualize the mucosa, and subsequent conventional sedated EGD with high resolution imaging and biopsy would be required in

those patients who were suspected of having Barrett's esophagus in order to confirm the diagnosis and to detect prevalent dysplasia. Sheath TNE with the biopsy channel would allow biopsies to be taken for histologic confirmation at the screening visit.

The question remains, despite numerous studies that demonstrate its efficacy, will TNE ever be adopted for Barrett's esophagus screening of patients in primary care? The sheath technology described in the study by Shariff et al. potentially brings adoption one step closer by making it possible to perform TNE in an office-based setting, similarly to an ENT laryngoscopy. To pursue this concept, we actually trained two nurse practitioners to perform TNE using this same sheath technology and placed them in a primary care setting at our hospital, the Louis Stokes Wade Park VA Medical Center in Cleveland, Ohio [19]. However, once the research was completed, we found that the uptake of TNE screening by primary care physicians remained low in subsequent years. Any new method for Barrett's esophagus screening, whether it is TNE or a capsule on a string [20], will need to appeal not only to patients but also to healthcare providers before it is widely accepted and applied. Economic considerations such as absolute direct and indirect medical costs (compared with conventional endoscopy), and overall cost effectiveness of these minimally invasive approaches for the detection of Barrett's esophagus also need to be defined before widespread adoption becomes a reality.

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