

ROLE OF CYTOSPONGE CAPSULE IN DIAGNOSIS OF OESOPHAGAL CANCER - A REVIEW STUDY

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Abstract: Oesophageal cancer could be a male dominant aggressive malignancy. Oesophageal adeno-carcinoma (OAC) has increased 6-fold since the 1990s. Barrett esophagus (BE), the precursor lesion to AC, will currently be detected and treated endoscopically. This, therefore, offers the chance to forestall the event of OAC. However, most BE patients stay unknown and even state of the art treatment would be ineffective at reducing mortality unless safe, minimally invasive, a reasonable check is developed. Over the past 10 years, faculty member Fitzgerald Associate in Nursing and her team at Cambridge have developed an endonon-endoscopic screening check referred to as the "Cytosponge" pillona string" diagnostic and work check (to find molecular biomarkers) for the identification of BE (Barrett's oesophagus).

Keywords: Oesophageal cancer, Barrett esophagus (BE), Cytosponge Capsule.

INTRODUCTION

Globally, oesophageal epithelial cell cancer (ESCC) remains the predominant microscopic anatomy subtype, as eightieth of oesophageal cancers occur in developing countries wherever epithelial cell cancer is a lot of common. the world incidence of epithelial cell cancer has a lot of or less remained stable and it painted eighty seven of all cases of oesophageal cancer in 2012. In distinction, within the Western world, as well as North America, Western Europe and Australia, oesophageal carcinoma (EAC) has become the foremost common microscopic anatomy subtype of oesophageal cancer. These areas have seen a decline within the incidence of epithelial cell cancer [1,2]

Epidemiology and risk factors

Oesophageal cancer is that the eighth commonest cancer worldwide, and also the sixth commonest reason for cancer-related deaths. the best incidence of oesophageal cancer is seen beside 2 geographical belts, one from north central China through the central Asian republics to northern Asian country, and one from Japanese to southern continent. over half all oesophageal cancer-related deaths occur within the Republic of China. The medical specialty of oesophageal cancer within the Western world has considerably modified. carcinoma of the distal esophagus has become a lot of prevailing than epithelial cell cancer of the higher and middle thirds of the esophagus. The incidence of EAC remains low in China, starting from one.5%–4.5%. In the USA, the incidence of EAC among white men was zero.4 per 100,000 in 1973 to two.8 per 100,000 in 2012. the same increase has been noticed within the UK, Australia, and geographic region. In these countries, the quantitative relation of ESCC to EAC amongst white men was four.7:1 in 1975, reduced to zero.43:1 in 1996–1998. throughout this era, there was Associate in Nursinging 8–10% annual increase within the

incidence of EAC, tho' it's recently declined. This vital increase within the incidence of EAC within the Western world and a few developing countries coincides with a rise within the prevalence of gastro-oesophageal reflux and fat, known risk factors for EAC [3].

Factors associated with inflicting a sickness

- Gender (male dominant disease)
- Obesity
- Helicobacter pylori
- Smoking and alcohol consumption.
- Human benign tumour virus (HPV)
- Gastro-oesophageal reflux sickness (GERD)
- Barrett's passage (BE)
- NSAID consumption.[3]

Presentation and identification

Barrett's passage is typically diagnosed on routine scrutiny for GERD or different oesophageal or stomachic problems. Four-quadrant, one cm apart large biopsies square measure counseled. examination tissue layer surgical process (EMR) ought to be performed for nodular BE as a diagnostic and presumably a therapeutic modality for superficial oesophageal cancer.[3]

Dis-advantage of scrutiny

- uncomfortable
- Does gift some risks.
- Also not sensible or necessary for everybody experiencing symptoms of symptom or upset stomach to possess Associate in Nursing scrutiny.
- An scrutiny prices around £600
- Require sedation

So, as compared of scrutiny, Researchers at the MRC neoplastic cell Unit in Cambridge have developed a straightforward and cheap check referred to as the 'Cytosponge' that may find Barrett's esophagus, a condition that affects around 1-2 per cent of adults within the UK.[4]

Cytosponge The Technology

The Cytosponge (Medtronic GI Solutions) could be a single-use device wont to collect cells from the liner of the esophagus. It consists of alittle mesh sponge, concerning thirty metric linear unit in diameter, contained during a gelatin capsule and connected to a string.11 The patient swallows the capsule with water and also the gelatin coating dissolves

once the Cytosponge reaches the abdomen. The patient could also be offered a local anesthetic throat spray to scale back discomfort. once more or less 5 minutes, the health care supplier uses the string to retrieve the expanded sponge.1 because it is retrieved, the marginally abrasive mesh collects cells on the length of the esophagus. The collected cells square measure analyzed mistreatment immunohistochemical staining to find a biomarker that has been valid as Associate in Nursing indicator of BE: Trefoil issue three (TFF3)[5]'

ADVANTAGE OF CYTOSPONGE:

- comfortable
- Cytosponge check price more or less £25.
- Cytosponge will simply be employed in physician surgeries.
- does not need sedation. [4]

ADMINISTRATION AND COST

Across Canada, gastrointestinal endoscopy is performed by different clinical specialists, including internists, otolaryngologists, thoracic surgeons, gastroenterologists, colorectal surgeons, and family doctors.³⁶ Endoscopy can take from 15 to 30 minutes; patients are required to fast for at least eight hours before the procedure. They may request sedation. In comparison, the Cytosponge is suitable for use in primary care and can be administered by a nurse.¹¹ The time required for the nurse to explain the process to the patient and administer the Cytosponge test is less than 10 minutes.¹³ Nurses are trained to administer the test in one training session. Immuno-histochemical staining and interpretation of Cytosponge samples may involve additional laboratory staff time and costs. If necessary, test samples can be stored (at 4oC) for several weeks.¹³ Biomarker testing can be performed in a centralized laboratory to ensure better quality control. A 2013 UK study modelled the cost-effectiveness of no screening versus endoscopic versus non-endoscopic (i.e., Cytosponge) screening for BE.³⁷ The researchers determined that, in comparison with no screening, Cytosponge screening of 50-year-old men with a history of gastroesophageal reflux is cost-effective, and would reduce mortality from oesophageal cancer. The Cytosponge costs used in the model (converted from UK pounds to US dollars) were as follows: manufacturing cost per Cytosponge, US\$15; test administration, US\$11; and laboratory costs, US\$61.00. The 2014 annual report of the UK's Medical Research Council's technology transfer agency, MRC Technology, noted: "Cytosponge and associated analysis could cost the NHS £50 per examination, compared to £200 per endoscopy."¹⁵ In a 2012 review, the estimated costs of standard endoscopy were considerably higher — at US\$930 and £520 per patient.³¹ Information from another UK study found that of 161 referrals for endoscopy from general practitioners, one in six patients could have received the Cytosponge test instead.³⁸ This would have reduced costs and wait-lists for endoscopy enabled "rapid bedside testing," and provided a less invasive test option for patients unwilling to undergo endoscopy.^[5]

ADVERSE EFFECTS

No serious adverse events related to the Cytosponge were reported. Some patients (16.7%) experienced minor bleeding abrasions due to the Cytosponge, but these did not require treatment.[6]

METHODOLOGY

All participants will swallow the Cytosponge device prior to having an endoscopy. The Cytosponge is composed of a foam sphere, compressed within a capsule, attached to a string, which is swallowed by the patient. When it reaches the stomach, the capsule dissolves releasing sponge. The sponge remains attached to the string and is retrieved by pulling it, sweeping the inside of the oesophagus, collecting cells which can be used as a sample in the laboratory for biomarker analysis[6,7]

The contribution of the NIHR CRF

A high level of logistics and organization was required to complete these intensive studies in which patients could have up to three Cytosponge procedures and endoscopies. The CRF converted a former 2-bedded room into an endoscopy suite and trained their staff (including a nurse endoscopist) to support this work so that the studies could be delivered. Over 1000 procedures were carried out over 5 studies. The CRF staff and state of the art facilities have removed logistic and financial constraints in the main NHS enabling the timely progression of the study and helped secure highly competitive grants. Cambridge CRF support has been essential to enabling the progression of the Cytosponge from bench to bedside [6,7]

Concurrent Developments.

➤ Trans-nasal esophagoscopy.

Trans-nasal endoscopy) is another alternative to conventional endoscopy for viewing the oesophagus. The procedure is performed within the physician's workplace, and only topical anaesthesia is needed. A tiny, "ultrathin" endoscope is passed through one of the nasal passages and into the oesophagus; the lining of the oesophagus is then visible and abnormal tissue can be biopsied as needed. The UK review noted that the cost of ultrathin, transnasal endoscopes is similar to the cost of standard endoscopes (from £20,000 to £25,000), and as these also require specialist expertise, the per-patient cost of endoscopy is similar.

➤ Capsule-based imaging

Capsule based imaging of the oesophagus, such as with the PillCam ESO and ESO 2 (Given/Covidien/Medtronic), is now possible via wireless, ingestible capsules that record pictures of the oesophageal wall as they pass through the digestive tract. These imaging capsules don't need that patients square measure insensible, but, in contrast to scrutiny, they can not collect specimens for analysis.11 the united kingdom review calculable that ingestible capsules value roughly £350 per capsule, with the associated workstation equipment costing £20,000.[8]

Conclusion: in this review an attempt to describe the new technique for diagnosis of Barrett's oesophagus. Routine scrutiny used for GERD or different oesophageal or stomachic problems. But it associates with uncomfortable, does gift, some risks, Require sedation etc. So, as compared of scrutiny, are very comfortable ,Cytosponge will simply be employed in physician surgeries. does not need sedation.

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