

# A Pill on A String Remarkable Innovation for The Early Detection of Esophageal: A Cancer

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## ABSTRACT

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## INTRODUCTION

Barrett's oesophagus can be diagnosed by having a test called an endoscopy. But endoscopy can be uncomfortable and does have some risks. It is not practical for everyone who has heartburn or indigestion to have an endoscopy. So, many cases of Barrett's oesophagus are not picked up.

The condition in which we replace the abnormal columnar epithelium in to the stratified squamous epithelium is known as Barrett's Esophagus, stratified squamous epithelium lines to the esophagus which is distal. Whenever the normal esophageal mucosa is injured by the refluxed gastric juice so, the Barrett's Esophagus appears, by the metaplasia division the injury starts to heal, it is the process in which replacement of the one type of adult cell by another cell has done.

During the examination of endoscopy for the analysis of GERD symptoms, Barrett's Esophagus has discovered. [1]

Virtual chromo endoscopy, chromo endoscopy, gastroscopy, magnification endoscopy are the methods used for the detection and other advanced technologies for the endoscopic imaging is also used. With the targeted biopsies can easily verify the diagnosis of esophageal cancer. [3] There are some risks in the endoscopic methods, and they are also expensive and time consuming. It is not practical for every person who has conditions such as heart burn and indigestion to have an endoscopy. So, not much incidence is picked up for Barrett's esophagus. To detect a B.E cancer at an early stage a cytosponge method is used which is very easier and less expensive as well as less painful. [4] The cytosponge is the non-endoscopic method which is developed for the screening in large population. It can be applied with a lower cost and medical personnel are involved to handle this method. Unfortunately, without the risk of stratification diagnosis of Barrett's esophagus has increased which might increase the management cost because there would be more surveillance occur, which is cost ineffective. [5]

## OBJECTIVE

Therefore there was a need of developing a simple method for screening. The researchers are trying to find out if something called a cytosponge can pick up Barrett's oesophagus. Thus 'Cytosponge' is a useful innovation for early detection. It sits within a pill which, when swallowed, dissolves to reveal a sponge that scrapes off cells when withdrawn up the gullet. It allows doctors to collect cells from all along the gullet, whereas standard biopsies take individual point samples. Furthermore, when it moves along the passage of the esophagus it will collect cells on the sort of honeycomb lattice and about half a million cells can be analyzed. Thus, at an early stage they can help to overcome the problem of wide variation between biopsies. This article deals with the mechanism, usage, advantages and risk factors of using cytosponge.

## METHODOLOGY

We focused on research investigating the simple and convenient method cell sampling device-Cytosponge of screening for Barrett’s esophagus than traditionally used method that is endoscopy. We conducted a internet search through Medline, Google scholar, EMBASE using the key term of Barrett’s esophagus, detection method and advancement for Early detection of esophageal cancer. We focused on the articles that discussed esophageal cancer, its investigating procedure , advance developed methods globally, primary data relevant to the topic, were selected; 3 being cohort studies, 1 randomized controlled trial, 1 case-controlled study, 1 prospective study, I qualitative (interview based) study, and 1 comparative modeling analysis. This assessment was based on the prospective view that the technique holds a potential for being introduced and widely accepted in Pakistan as a cheaper and much simpler approach than others.

## RESULTS

S.No	Years	Type Of Study	Findings
1.	2009	Prospective study	Trefoil factor 3 proved to be a positive biomarker for capsule sponge due to its good sensitivity of 78% in the patients having Barrett’s esophagus. This result contributed to the property of biomarker that it could be easily expressed at the luminal surface of Barrett’s esophagus [1].
2.	2010	Prospective cohort study	99% patients has successfully swallowed the cytosponge, from 99% patients 3 patients were not able to swallow the cytosponge. Out of 501, 2 cytosponge failed to expand fully therefore low cell yield came in a sample. By swallowing cytosponge there were no adverse drug event has occurred. For trefoil factor 3 no failure occurred in the sampling. No bleeding and aspiration has been observed. [2]
3.	2013	Cohort study	In a cohort study conducted by Benaglia et.al, the cytosponge technique was found to be cost-effective in a 50 year old male cohort suffering from esophageal adenocarcinoma per quality-adjusted life years (QALYs), as well as reduced the incidence of esophageal adenocarcinoma by 19% which was more than the screening by endoscopy [3].
4.	2015	Case control study	The cytosponge has successfully swallowed by 93.9% patients, related to device there were no serious adverse drug event has observed. In comparison with endoscopy, cytosponge was favorably rated. 79.9% was the overall sensitivity of the test. In dysplasia patient there was no loss of sensitivity. The patient with reflux symptoms, cytosponge method is approachable as it is very simple and inexpensive as compare with endoscopy [4].

5.	2017	Cohort study	Cytosponge with a combination of various biomarkers proved to be very much successful in risk-stratifying the patients with lower risk of progression of Barrett's esophagus more objectively and allowed for better monitoring in these patients. The study paved a new way for avoiding chances of overdiagnosis and overtreatment [5].
6.	2017	Qualitative study	The data suggests for the majority of patient who were having Barrett's esophagus risk factors, the cytosponge was acceptable, and it also suggests that for GERD symptoms it is a first line test to investigate.
7.	2017	Comparative modeling	Curtis et.al conducted a comparative modeling analysis between cytosponge and endoscopic screening and found out that the cytosponge approach was more cost friendly as compared to endoscopic screening as cost reduction was up to 38-41% in case of cytosponge[5].

## DISCUSSION

Barrett esophagus may give rise to esophageal adeno carcinoma which is the most prevalent form of esophageal cancer. Monitoring can be carried out in patients once the individuals with BE get identified. This may also help, if necessary, in the treatment by removing abnormal cells and thus reducing the risk of developing esophageal cancer. The standard diagnostic technique for Barret's esophagus is endoscopy and biopsy which is a costly and painful procedure for patients, requiring sedation along with several risks. Endoscopic screening may take up to 15-30 minutes and the patients are required to withdraw food for a minimum of eight hours prior to the procedure. The Cytosponge is a new feasible device consisting of a small sponge of mesh within a gelatin capsule that is soluble in nature which when administered orally helps in the collection and sampling of esophageal cells for analysis. The technique is also advantageous as no serious adverse effects associated with the use of Cytosponge have been reported apart from some minor bleeding abrasions which did not require medical attention or treatment.[1]

## CONCLUSION

The Cytosponge technique is already introduced, well accepted and being experimented for further advancements in the Western world, but unfortunately the people of Pakistan are still unaware of this unique innovation. After reviewing several articles related to Cytosponge we look forward to introduce this device in Pakistan as it is a developing country with increasing population which obviously need this device for the ease of their people as its cost friendly, time saving, less painful, easily administered and swallowed, and more effective then endoscopy or other painful endoscopic techniques.

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