Radionuclide esophageal transit time in patients of suspected esophageal motility disorders

Impaired esophageal motility is a common cause of dysphagia. Most of these patients are evaluated by endoscopy, barium swallow, and esophageal manometry. Kazem initially developed the use of radionuclide procedures for assessment of esophageal motility in 1972. Radionuclide esophageal transit time (RETT) in patients suspected to have esophageal motility disorder (EMD) is noninvasive, reproducible, gives quantitative interpretation, and has a low-radiation exposure.

Twenty-five patients (Group A; 20 women) with mean age 42.06 years (range 18–75) with history of dysphagia and a normal endoscopy were referred for RETT study. Seventeen voluntary healthy subjects (Group B, 8 women) with mean age 45.92 years (range 15–70) were recruited as controls.

Following initial clinical assessment, the patients and controls underwent RETT study after a 6–8-hour fast. Patients were placed in a supine position under a large field of view gamma camera interfaced to a computer. They then aspirated a measured bolus of 9.25 mBq of $^{99m}$Technetium sulfur colloid diluted in 15–20 mL of water through a straw. Subjects were instructed to retain the bolus in the mouth for a few seconds and then swallow the entire bolus in one go, followed by dry swallows at 15 seconds intervals. Data acquisition was done in two phases. In the first phase (2 minutes), 120 frames of 1 second duration were acquired. In the second phase (10 minutes), 40 frames of 15 seconds duration were acquired. Both phases were acquired without a pause. Data were analyzed and time activity curves (TAC) generated for four regions of interest (ROI), which corresponded to the proximal, middle, distal esophagus and a larger ROI corresponded to the entire esophagus (Fig. 1).

Global RETT was defined as time to clear 90% of radioactive bolus from esophageal ROI. Similarly, segmental RETT was defined as time to clear 90% of radioactive bolus from the corresponding ROI of proximal, middle, or distal esophagus. In addition to quantitative data processing the composite image was assessed visually to evaluate the pattern of hold up and transit.

The mean (SD) RETT in control subjects was 22.1 (7.6) seconds. Amongst patients with suspected EMD, 12 (48%) patients had a normal mean RETT of 19.0 (5.6) seconds, and 13 (52%) patients (9 women) had prolonged mean RETT of 4.8 (4.0) minutes.

Based on their segmental RETT and scan appearance, patients were diagnosed as diffuse EMD (n=9), achalasia (2) and lower EMD (2). Patients with achalasia (both women) had the maximum RETT of more than 10 minutes with gross dilatation of lower and middle esophagus. Patients with diffuse EMD had prolonged RETT involving all segments with fragmentation of radionuclide bolus similar to what is sometimes referred to as nutcracker esophagus. Patients with lower EMD had a prolonged RETT involving the lower esophageal segment without any visible dilatation-like achalasia.

The present study reflects the usefulness of RETT as a tool to assess the function of esophagus in patients suspected to have EMD. RETT is a convenient and safe diagnostic test in the evaluation of EMD. The protocol of RETT acquisition and analysis needs to be uniform, and interpretation...
of results has to be standardized. The regional and ethnic RETT values need to be established.

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Awareness of the endoscopist affects detection rate of heterotopic gastric mucosa in esophagus

Heterotopic gastric mucosa (HGM) is a congenital anomaly of the proximal esophagus. It is usually seen on the lateral or posterior surface of the proximal esophagus, during careful withdrawal of the endoscope, which can easily be missed during a routine procedure.¹ It is known to be an asymptomatic lesion. Nevertheless, it can be responsible for webs, strictures, ulcers, fistula and adenocarcinoma.²

In this prospective study, we aimed to determine HGM prevalence, and assess whether awareness about HGM influences the frequency of its detection.

Consecutive patients with dyspepsia (n=1947), undergoing elective, diagnostic upper gastrointestinal endoscopy, were randomized into 2 groups. The first 964 patients were examined by endoscopists, who were aware of a study being done to find the frequency of HGM. The second 983 patients were examined by endoscopists, who were unaware of the study.

Esophagogastroduodenoscopy was carried out after standard pre-medication (topical lidocaine spray or midazolam IV) using a forward-view videogastroscope. Special attention was paid to the proximal esophagus, a region corresponding to its upper sphincter and to the few centimeters distal to it; the proximal esophagus was examined while slowly withdrawing the endoscope with repeated short inflations and rotation of the instrument. Other endoscopic findings were also documented. Lesion(s) that were yellowish pink in color with a velvet-like soft appearance were defined as HGM.

Heterotopic gastric mucosal patch was found in 25 (15 men) of 1947 patients. Their mean age was 46.0 (12.5) years. HGM was identified in 23 (2.3%) of 964 patients in the endoscopist-aware group, and in 2 (0.2%) of 983 patients in the endoscopist-unaware group ($\chi^2$ 16.6; p =0.00002).

Heterotopic gastric mucosa appeared in 17 patients as a single patch; 7 patients had two patches, and one had multiple patches. The approximate diameter of the patches ranged from 5 to 15 mm. In addition to HGM, antral gastritis (n=23), hiatal hernia (n=5), reflux esophagitis (n=7), Barrett’s esophagus (n=1), and duodenal ulcer (n=2) were found.

Heterotopic gastric mucosa is characterized as an asymptomatic congenital anomaly of the proximal esophagus. Alteration of this process results in foci of inlet patch recognizable macroscopically in the post-cricopharyngeal esophagus as a deep pink, well-circumscribed area. They vary in size from a few millimeters in diameter to patches that completely encircle the esophagus, usually ≤2 cm in diameter. Predominant localization of esophageal HGM is in the region immediately below the upper esophageal sphincter.

The prevalence of ectopic gastric mucosa in the upper esophagus has ranged from 4.5% to 21% in autopsy studies in children.³ Recent endoscopic studies suggest a prevalence of ectopic gastric mucosa in 3.8–10% of cases, which is much lower than that found in autopsy studies.⁴ The prevalence of ectopic gastric mucosa in 1.67% has been reported in an earlier Turkish study.⁵ A wide difference in prevalence figures is possibly related to the endoscopists’ awareness about presence of HGM. In cases where the endoscopists...
are aware about the presence of HGM, the prevalence of ectopic gastric mucosa was identified 2.6%, as compared to detection 0.4% in cases where the endoscopist is not actively looking for HGM.\(^6\) In our study, the prevalence of ectopic gastric mucosa was 2.3% in the endoscopist-aware group as against 0.2% in the endoscopist-unaware group.

The mucosal patch may have the capability to secrete acid.\(^3\) Several groups have reported an increased association between HGM and reflux esophagitis.\(^7,8\) However, in our study, only 7 patients had associated esophagitis.

In conclusion, HGM in proximal esophagus is not an infrequent anomaly. The frequency with which this condition is found during routine endoscopic examination is related to the awareness of the endoscopist. In order to rule out the presence of HGM, the endoscope must be withdrawn slowly at the end of the procedure.

Do endoscopic markers still play a role in diagnosis of celiac disease?

We read with interest the article by Emami et al. on the utility of endoscopic markers in celiac disease (CD) in a recent issue of the Journal.\(^1\)

The primary aim of the study was “to determine the diagnostic value of endoscopic markers and find ways to apply them in the diagnosis of CD”. The suspicion of CD is based predominantly on clinical presentation, either as a chronic diarrheal illness or several well-recognized non-diarrheal manifestations such as, failure to thrive, unexplained iron deficiency anemia, metabolic bone disease. Recently, two more additions have been made to this list: screening of high risk patients and incidental detection during endoscopy performed for unrelated conditions. The initial endoscopic findings attributed to CD were scalloping of duodenal folds and reduction in the number of duodenal folds. Subsequent studies confirmed that these are non-specific and are seen in several conditions other than CD.\(^2\) Their only utility lies in the fact that if these findings are detected incidentally, while performing endoscopy for other indications, then a biopsy may be taken to rule out silent or obvious CD.

The authors mention that a considerable number of patients have undergone endoscopy prior to them being diagnosed as CD, and hence could have been diagnosed at an earlier stage. In our experience the number of patients in whom an early diagnosis of CD can be made in this way is likely to be insignificant. Also, in patients with suspected CD, endoscopy is primarily done to obtain a biopsy to rule out CD.

In evaluating a diagnostic test the usual procedure is to compare a test group with one or more control groups. The authors have arbitrarily divided their patient population into 3 groups: with typical presentation of CD, with atypical presentation of CD, and with failure to thrive and other disorders. The authors have included constipation, epigastric pain, reflux and vomiting as atypical symptoms; these symptoms have not previously been described in celiac disease. Failure to thrive in children is an important presentation of CD; the authors have included diabetes mellitus in this group without specifying whether it was insulin-dependent diabetes mellitus (IDDM) or non-insulin-dependent diabetes mellitus (NIDDM). IDDM is an indication for

References

screening of CD, whereas NIDDM is not. The absence of a control group is a major drawback as specificity cannot be determined merely with three diseased groups.

It is interesting to note that of the 110 patients, who had typical presentation, only 5 had CD. The diagnosis in the remaining 105 is not specified. The values of sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV), which the authors have calculated are possibly based on the erroneous value of 110 being test positive, whereas 69 patients had endoscopic markers of CD; on substitution of 110 by 69, all the values, except sensitivity, would change accordingly. The sensitivity and PPV of endoscopic markers in patients with atypical symptoms is 0%; none of the patients in this group had CD.

The authors mention that more patients have atypical symptoms rather than classical CD, referring to the experience of a tertiary referral center in India. With increasing awareness of the disease in India, a large number of typical cases are diagnosed at primary and secondary level, and tertiary referral centers report a higher proportion of non-diarrheal disease.

The authors conclude that clinical symptoms should not be considered as the basis of selecting patients for duodenal biopsies. Ignoring clinical symptoms for the mere appearance of duodenal mucosa would be akin to ‘missing the wood for the trees’.

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Reply:
We thank Drs Tyagi and Puri for their comments.

Various protocols may be followed to screen patients undergoing endoscopy for celiac disease (CD). These range from performing routine biopsy of the second part of duodenum (D2) in all patients undergoing endoscopy irrespective of symptoms, or based on typical symptoms; alternatively biopsy may be performed if endoscopic abnormalities typical of CD are found. Routine D2 biopsy in all patients is not justified.1–3

We categorized patients with weight loss, anemia, or diarrhea as typical presentation of CD, and those with unexplained epilepsy, insulin-dependent diabetes mellitus (IDDM), failure to thrive (FTT), infertility, rheumatic disease, Crohn’s disease, ulcerative colitis, lymphoma and liver disease as the associated disorders of CD. Other indications for endoscopy, such as abdominal pain, reflux, dyspepsia, vomiting or nausea and constipation were considered as atypical for CD. This classification was based on a previous study by Hopper et al.4 Symptoms such as constipation, epigastric pain, reflux and vomiting have recently described in CD;5 and 50% of asymptomatic patients may be found retrospectively to have such symptoms.6

Different symptoms in each category do not have the same diagnostic value. Prevalence of CD is estimated to be 9% in IDDM,7 10% in FTT, and 2.7% in unexplained epilepsy.8 Since we did not have adequate number of patients in each of these disorders separately, we estimated the overall diagnostic value.

In our study, of 647 patients who underwent endoscopy, 69 had endoscopic markers suggestive of CD, remaining 578 who did not have these endoscopic features were considered as controls. Five out of 110 patients with typical symptoms were diagnosed to have CD. The remaining 105 patients were worked up according to clinical or endoscopic findings, but their diagnosis was not mentioned, as it was not within the purview of our article.

We inferred that clinical symptoms alone should not be considered to select patients for duodenal biopsies; endoscopic findings should also be considered.

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Living donor liver transplantation for hepatocellular carcinoma: is surgeon a prognostic factor?

I read with interest the article by Pandey et al. Living–donor liver transplantation (LDLT) is increasingly being offered to patients with hepatocellular carcinoma (HCC), especially in Asian countries. The authors reported a dismal overall 3-year actuarial survival of 51% and tried to justify this by stating that 5 of 8 deaths were unrelated to recurrent HCC. However, the cause of death in 4 of 5 patients was related to transplant. The authors reported a 3-year overall and recurrence-free survival of 24% and 50%, respectively, for patients outside Milan criteria. Most studies, report reasonable 5-year survivals following LDLT for HCC, which is now being increasingly offered, even to patients beyond Milan criteria. Fisher et al., examined mortality and recurrence of HCC among transplant candidates with cirrhosis and HCC at the nine centers participating in the Adult-to-Adult Living Donor Liver Transplantation Cohort Study (A2ALL). They compared 58 LDLT and 34 deceased donor liver transplant (DDLT) recipients, and found that, LDLT recipients had a higher rate of HCC recurrence within 3 years than DDLT recipients (29% vs. 0%, p = 0.002): however, there was no difference in mortality or the combined outcome of mortality or recurrence. LDLT recipients had lower relative mortality risk than patients, who did not undergo LDLT after the center had more experience (p = 0.03). I would suggest that the dismal results reported by Pandey et al. are possibly related to surgeon experience. However, in experienced hands, LDLT for HCC can be performed with good results and a reasonable survival.

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References

Reply:

We thank Dr Sharma for his observations. We agree that, the surgeon’s experience, along with that of the transplant team, is a very important factor influencing the outcome of liver transplantation and more so in living donor liver transplantation (LDLT). Our study was initiated from the start of the LDLT program in 2002. Our results of LDLT have improved over time.

Having said that, it is important to realize that the extent of disease is an important determinant of survival, especially for patients with cancer. Patients of hepatocellular carcinoma (HCC) within Milan criteria fare better than those outside the criteria. Nevertheless, there are several patients beyond the Milan criteria who are potentially curable with transplantation. The point of contention is where to draw a boundary for offering a potentially curative treatment to the patient with HCC with the availability of LDLT, where–in the organ is a dedicated gift to the recipient. As long as the voluntary donor is fully aware of the risks and benefits of the procedure, both to the donor as well as to the recipient, it is perhaps unethical to deny LDLT to a patient with a potentially curable disease.

Further, the “dismal overall 3-year actuarial survival of 51%” that Dr Sharma observes is a rather decent survival for many visceral cancers treated with curative intent.

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References


**Bouveret’s syndrome**

A 71-year-old man with no previous illness presented with 5 days history of bilious vomiting, mild upper abdominal pain and diarrhea. Clinical examination was unremarkable except for the presence of a right inguinal hernia. Chest and abdomen X-rays were normal, and USG showed a large gall stone with pneumobilia. Upper GI endoscopy showed a large stone eroding into the duodenum (Fig. 1) and causing obstruction. CT scan showed a dilated stomach, pneumobilia, and a large gallstone obstructing the duodenal lumen (Fig. 2). Diagnosis of Bouveret’s syndrome was made. At surgery a partial cholecystectomy with retrieval of the stone followed by repair of fistula using remnant of gall bladder was done. Post-operative period was uneventful.

Bouveret’s syndrome is a rare type of gallstone ileus, in which the stone is lodged in the small bowel.\(^1\) In 85% of patients with bilio-enteric fistula, the fistula communicates with the duodenum and the stone will pass spontaneously without causing bowel obstruction, whereas in 15% of patients, clinical features of bowel obstruction develop. The gall stone most often obstructs the terminal ileum (90%); duodenal obstruction occurs in only 3% of cases.\(^2\) CT scan shows pneumobilia, bowel obstruction and ectopic gallstone. Typical findings on upper GI endoscopy include a dilated stomach and a hard non-fleshy mass at site of duodenal obstruction.

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**Fig. 1** A large gallstone impacted in duodenum on upper GI endoscopy

**Fig. 2** CT scan showing gall stone eroding in to duodenum


**References**


A 27-year-old nulliparous woman presented with recurrent pain abdomen and self-limiting episodes of fever and vomiting since two years. Examination of abdomen was normal. MRI - T2 weighted images were suggestive of multiple cystic lesions involving liver, head and tail of pancreas, ovary and peritoneal cavity (Fig. 1). Hydatid serology was positive. The patient was treated with albendazole 400 mg twice a day for 6 months. She was symptomatically better with minimal radiological improvement.

Liver is the most frequent site of involvement of hydatid cysts (HC) accounting for 50–70% of cases. The peritoneum and intraabdominal organs are involved following previous surgery on liver cysts or trauma, and rarely due to spontaneous micro rupture. CT and MRI are the imaging modalities of choice. Radical surgical approach for this entity reported earlier along with pharmacotherapy.

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