

Upper Endoscopic Findings in Children with Recurrent Abdominal Pain: High Prevalence of Hiatus Hernia

Farzaneh Motamed^{1,2}, MD; Sayna Norouzi^{*2}, MD; Mehri Najafi^{1,2,3}, MD; Ahmad Khodadad^{1,2,3}, MD;
Fateme Farahmand^{1,2}, MD; Sara Mossahebi², MD, and Giv Heidari-Bateni², MD

1. Department of Pediatrics, Tehran University of Medical Sciences, Tehran, Iran
2. Pediatrics Center of Excellence, Children's Medical Center, Tehran, Iran
3. Growth and Development Research Center, Tehran University of Medical Sciences, Tehran, Iran

Received: Apr 25, 2011; Final Revision: Jan 12, 2012; Accepted: Feb 16, 2012

Abstract

Objective: Recurrent abdominal pain (RAP) by itself is one of the common reasons in child-aged patients to refer to a clinician. Some of these patients are presented with more serious features, so-called the "red flag". The most important issue in management of RAP is to distinguish the type of it, whether it is functional or organic. In this study we aimed to assess the redundancy of red-flagged RAP with findings of esophago-gastro-deudonoscopy.

Methods: In a 2 year prospective study 150 consecutive children with RAP who showed red flags underwent esophago-gastro-deudonoscopy. The prevalence of each finding was recorded. Overall positive predictive value of predicting an endoscopic finding while having a red-flag was calculated.

Findings: Among all the patients, 126 cases showed at least a positive finding in their endoscopy that corresponded to the positive predictive value of 84% for predicting the presence of an endoscopic finding according to red flags. Interestingly, 20% of patients showed hiatus hernia when surveyed.

Conclusion: Comprehensive physical examination is needed to avoid performing esophago-gastro-deudonoscopy without indication in patients with recurrent abdominal pain.

Iranian Journal of Pediatrics, Volume 22 (Number 3), September 2012, Pages: 309-313

Key Words: Recurrent Abdominal Pain; Esophago-Gastro-Deudonoscopy; Hiatus Hernia; Children

Introduction

Recurrent abdominal pain (RAP), refers to episodes of abdominal pain which is severe enough to implicate the daily activity of a child. It is demonstrated by three or more bouts in at least a three-month period^[1]. Making the appropriate decision about the functional or organic etiology of the pain could be the most challenging task for a clinician.

Before the introduction of esophago-gastro-duodonoscopy (EGD), the majority of RAPs had been categorized as functional pain with psychogenic sources^[2]. However, after the advent of pediatric EGD in 1970s, organic etiologies gradually became more prominent and reached to greater proportions. Nowadays, they are responsible for something less than 10% to as much as 50% of RAPs^[3].

Although EGD helps gastroenterologist to

* Corresponding Author;

Address: Division of Pediatric Gastroenterology, Children's Medical Center, No 62, Dr Gharib St, 14194, Tehran, Iran

E-mail: sayna.norouzi@yahoo.com

© 2012 by Pediatrics Center of Excellence, Children's Medical Center, Tehran University of Medical Sciences, All rights reserved.

clinically differentiate serious organic insults from those of nonspecific non-organic etiologies, its routine application as a diagnostic modality for children suffering RAP is still of controversy^[4-6] Nowadays, a practical approach to distinguish patients who need further evaluation, like EGD, from those with less serious conditions is the so-called red flags criterion. This criterion is based just on simple but precise physical and laboratory examinations which finally lead to application of EGD.

In this study we aimed to assess the prevalence of various EGD findings in red flagged children suffering RAP. Meanwhile, the positive predictive value of the criteria is evaluated.

Subjects and Methods

In a 2-year prospective study starting from April 2007, any child who was aged between 4 to 16 years old attending the pediatric gastroenterology clinic presented with red-flagged RAP underwent EGD. Here, RAP was defined as at least three episodes of abdominal pain severe enough to affect their activity in a three-month period^[1].

In order to truly detect RAP cases, we took a complete medical history, with a specific focus on the pattern and temporality of abdominal pains, and children's quality of life. Subsequently, a comprehensive physical examination was performed with regard to developmental and psychomotor milestones. All the process of physical examination was done by a single physician.

Further evaluations were as follows; complete blood count (CBC), urine analysis (U/A), urine culture (U/C), stool examination (S/E) and erythrocyte sedimentation rate (ESR).

Children were categorized as having red flags if they had any of the following listed findings: anemia, high ESR, GI bleeding, failure to thrive (FTT), persistent vomiting, severe weight loss and local tenderness in epigastric zone.

Those with complaints of frequent awakening due to distressing abdominal pain were also

included for upper endoscopy.

Patients with a palpable mass in physical examination, those who were responsive to an H2 blocker trial, those whose pains seemed to be related to psychogenic etiology with regard to the history and physical examination, those with hepatobiliary involvements and patients without red flags who responded to lactose-free regimen were excluded from the study. Before performing upper GI endoscopy, written consents were obtained from parents or patients, whenever appropriate, and all the study protocol was approved by the hospital's ethics committee.

Patients fasted for a minimum of 4 to 6 hours prior to the procedure and all the EGDs were performed using 7.8 Olympus CLV-U40 and CV-230 with a television set after administering midazolam with a dosage of 0.1 ml/kg.

Findings were registered and descriptive statistics were obtained. The positive predictive value was defined as the proportion of patients with EGD findings among individuals who were positive for red flags.

Findings

The study population consisted of 150 patients of whom 74% were below 10 years old. The indications for EGD is listed in Table 1; as shown, anemia and FTT were the most common causes.

Among all the patients, 84% showed a positive finding in upper GI endoscopy which are presented in Table 2. Value of 84% corresponds to the positive predictive value of the red flag criteria to predict a positive EGD finding among children with RAP. As listed in Table 2, esophagitis was the most prevalent (40%) finding reported in EGD. Here, a considerable finding is the high rate of hiatus hernia among our patients which accounts for 20% of them. It should be noted that, some patients had more than one abnormal finding in their EGD.

In our study EGD was performed without any major complications except for sore throat that was self limited.

Table 1: Indication of esophago-gastro-duodenoscopy in our population study

Variable (Indications of EGD)	Number (%)
Elevated ESR	15 (10)
Anemia	45 (30)
Episodes of awakening pains	6 (4)
Weight loss	12(8)
Episode of Gastrointestinal bleeding	27(18)
Failure to thrive	3(20)
Localized tenderness	15(10)

EGD= Esophago-Gastro-Deudonoscopy, ESR= Erythrocytes Sedimentation Rate

Discussion

In this study, 150 EGDs were performed in red-flagged children with RAP to find out the etiology of their complaints. We found abnormal findings in 84% of patients and the most prevalent (40%) endoscopic finding in the current study was esophagitis.

RAP is a daily activity affecting pain which occurs at least in three episodes within a 3-month period^[7] and is divided into two groups: organic and non-organic pain.

According to the literature non-organic pain is usually characterized by midline abdominal pain which does not awaken the patient from sleep. The patient feels good between the episodes while the lab data is completely normal ^[1,4].

Regarding the high prevalence of abdominal pain complaints and increasing the application of EGD in diagnosis of the etiology, finding precise indications for performing EGD in children with RAP seems mandatory. Nowadays a popular approach for assessing RAP is performing upper GI endoscopy just for those who have red flags ^[5,6].

Application of upper GI endoscopy in all patients suffering from RAP, has been shown to have a sensitivity of only 30% to 58.5% for detecting an upper GI abnormality^[4,7,8] and it is not clear yet if this approach is cost benefit or not.

Normal findings in our study were 16% compared with studies performed in Ghana (41.1%), Kuwait (32%) and Kathmandu (66%). We hypothesize that the differences in rates might be in part because of the precision of physicians in nominating patients as having red flag. For example, in the study performed in Kathmandu all the RAP patients were selected for EGD^[9-11].

The most prevalent findings in our survey were esophagitis. The rate of esophagitis was in the range of the two previously reported studies in the Middle East (31.2%-82%)^[12,13]. However, our finding was in favor of the lower range. Conversely, the rate of esophagitis was quite different from the reported rates in African studies in which gastritis (25.8%) and duodenal ulcers (14.8%) account for the most prevalent abnormal findings^[9,14].

Surprisingly, gastric and duodenal ulcer were

Table2: Findings of esophago-gastro-deudonoscopy in patients identified as having red-flags

Finding	Number of patients (%) *
Normal	24(16)
Hiatal hernia	30(20)
Different grades of esophagitis	60(40)
Esophagial erosion	39(26)
Gastric erythema	51(34)
Nodular gastritis	45(30)
Gastric ulcer	9(6)
Deudonal ulcer	3(2)

* Some patients showed more than one finding

the less common EGD findings in our study (2% and 6% respectively). This is in contrast to the high prevalence of *Helicobacter pylori*, one of the presumptive etiologies of upper GI ulcers in Iran [15,16]. Our rate of prevalence for duodenal ulcer is similar to Scandinavian study (3.7%) but different from studies in Uganda (14.8%) and Kathmandu (13%) [4,9]. The same was achieved for gastric ulcer [9,11].

According to our findings, it seems that geographic variations, whether due to genetic differences or socio-economic status, could play an important role in variable prevalence of endoscopic findings. Another clue for this conclusion is the rate of hiatus hernia among Iranian children (20%) which was also significantly higher than those in Ghana (0.8%) and Kathmandu (3%) but comparable with other studies in the region [10,11,13,17].

Surely, the considerable rate of hiatus hernia in this study is of particular interest. Hiatus hernia is important almost because of its potential short term and long term complications like gastro esophageal reflux disease, aspiration pneumonia, and severe recurrent respiratory infections. Hence, we strongly recommend considering hiatus hernia in children with RAP and further investigate it with better modalities, particularly in Middle Eastern countries.

Another important feature of this study is the criteria we used for EGD. Although a considerable proportion of children with RAP suffer from organic etiologies and it is increasing [4,8]. But still there are so many patients with non-organic RAP.

Performing EGD for such patients is costly or even unethical. Recent studies have been focused on the appropriateness of performing EGD in selected conditions and not as a routine modality [5,6,18,19]. In this study we reached positive predictive value of 84% for the application of red flag criteria as a guide in performing EGD. Although this would be a convincing value, it does not convey any sensitivity or even specificity for the criteria. Therefore, finding a reliable criteria for application of EGD in RAP and commitment to it is still necessary.

Limitations: In this study we used the well known red flags for performing EGD in children suffering RAP. Although the percentage of positive findings

in our study was rather high, this does not preclude the potential need for applying EGD in the rest of patients who were excluded at the time of recruitment. Surely more comprehensive studies are needed to define the best indications for EGD in children with RAP.

Conclusion

This study demonstrates that application of the so called red flags could be practical to distinguish between organic and non-organic pain. As we showed, comprehensive physical examination and meticulous medical history is needed to avoid performing unnecessary EGD in patients with recurrent abdominal pain. Further studies are needed to clarify sensitivity and specificity for the proposed criteria.

Acknowledgment

This study was supported by the Tehran University of Medical Sciences. Institute's ethical approval was obtained from the local research ethics committee.

Conflict of Interest: None

References

1. Apley J. Recurrent abdominal pain. *Br J Clin Pract* 1959;13:586-7.
2. Boyle JT. Recurrent abdominal pain: an update. *Pediatr Rev* 1997;18(9):310-20.
3. Stordal K, Nygaard EA, Bentsen BS. Recurrent abdominal pain: a five- year follow-up study. *Acta Paediatr* 2005;94:234-6.
4. Ashorn M, Mäki M, Ruuska T, et al. Upper gastrointestinal endoscopy in recurrent abdominal pain of childhood. *J Pediatr Gastroenterol Nutr* 1993;16(3):273-7.

5. Jantchou P, Schirrer J, Bocquet A. Appropriateness of upper gastrointestinal endoscopy in children: a retrospective study. *J Pediatr Gastroenterol Nutr* 2007;44(4):440-5.
6. Gieteling MJ, Bierma-Zeinstra SM, Passchier J, et al. Prognosis of chronic or recurrent abdominal pain in children. *J Pediatr Gastroenterol Nutr* 2008;47(3):316-26.
7. Shahraki T, Farahmand F, Khatami GR, et al. Recurrent abdominal pain: an etiological study among in a referral children's medical center in Iran. *Iran J Pediatr* 2007;17(3):235-240.
8. Ukarapol N, Lertprasertsuk N, Wongsawasdi L. Recurrent abdominal pain in children: the utility of upper endoscopy and histopathology. *Singapore Med J* 2004;45(3):121-4.
9. Okello TR. Upper gastrointestinal endoscopic findings in adolescents at Lacor Hospital, Uganda. *Afr Health Sci*. 2006 Mar; 6(1):39-42.
10. Aduful H, Naaeder S, Darko R, et al. Upper gastrointestinal endoscopy at the Korlebu teaching hospital, Accra, Ghana. *Ghana Med J* 2007;41(1):12-6.
11. Joshi MR, Sharma SK, Baral MR. Upper GI endoscopy in children in an adult suite. *Kathmandu Univ Med J (KUMJ)* 2005;3(2):111-4.
12. Rafeey M, Alyari A. Comparison of endoscopy with pathology in the diagnosis of esophagitis among children. *Indian J Gastroenterol*. 2003; 22(6):236.
13. Amini-Ranjbar S, Torabinejad MH. Diagnostic endoscopy in children of two months to 15 years of age. *Am J Appl Sci* 2009;6(10):1812-4.
14. Lodenyo H, Rana F, Mutuma GZ, et al. Patterns of upper gastrointestinal diseases based on endoscopy in the period 1998-2001. *Afr J Health Sci* 2005;12(1-2):49-54.
15. Gottrand F. The role of *Helicobacter pylori* in abdominal pain in children. *Arch Pediatr* 2000; 7(2):197-200.
16. Ashorn M, Miettinen A, Ruuska T, et al. Seroepidemiological study of *Helicobacter pylori* infection in infancy. *Arch Dis Child Fetal Neonatal Ed* 1996;74(2):F1412.
17. Rawashdeh MO, Abu-Farsakh N, al-Jaberi TM. Paediatric upper gastro-intestinal endoscopy in developing countries. *Ann Trop Paediatr* 1996; 16(4):341-6.
18. Farahmand F, Modaresi V, Najafi M, et al. Prevalence of celiac disease in Iranian children with recurrent abdominal pain referred to a pediatric referral center. *Iran J Pediatr* 2011; 21(1):33-8.
19. Miele E, Giannetti E, Martinelli M, et al. Impact of the Rome II paediatric criteria on the appropriateness of the upper and lower gastrointestinal endoscopy in children. *Aliment Pharmacol Ther* 2010;32(4):582-90.

Archive