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SOME CLINICAL, ENDOSCOPIC FEATURES AND ETIOLOGYS OF PEPTIC ULCER DISEASE IN CHILDREN AT PHU THO OBSTETRIC AND PEDIATRIC HOSPITAL

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ABSTRACT

Background: Patients with duodenal inflammation and ulcers, it may be due to one or a combination of many related causes or factors that together aggravate the disease condition with different clinical and paraclinical manifestations. What are the clinical and paraclinical manifestations of children with duodenal ulcers treated at Phu Tho Provincial Obstetrics and Children's Hospital? What is the cause of duodenal ulcers in these patients? **Objectives:** Description some clinical, endoscopic features and etiology of peptic ulcer disease in children. **Methods:** A cross-sectional descriptive study on 84 patients diagnosed with peptic ulcer disease (PUD) at Phu Tho Obstetric and Pediatric Hospital from October 2022 to July 2023. **Results:** Mean age was 9.08 ± 3.5 years (y). Male/female ratio was 1.33/1. The proportion of children living in urban areas was 48.8%. The most common symptoms are abdominal pain (98.8%) and vomiting (97.6%); the rate of vomiting blood was 2.4% and melena was 6.0%. Endoscopic results: gastritis 100%, ulcers 33.3%, gastrointestinal bleeding 15.5%, Forrest IIa score accounted for the most at 11.9%. In cases of ulcers, two or more ulcers was 23.8% and deep ulcers was 16.6%. 59.4% of patients had no determined cause; the rate of Helicobacter pylori (H. pylori) infection was 31%, 31%, H. pylori+NSAID was 6%, using only non steroidal anti inflammatory drugs (NSAIDS) was 3.6%. **Conclusion:** Children with peptic ulcer disease, abdominal pain and nausea, vomiting were the most common clinical symptoms; endoscopic findings had high value in identifying lesions and H. pylori infection was the common cause.

Keywords: Peptic ulcer disease; H. pylori; NSAIDs; Children.

INTRODUCTION

Peptic ulcer disease is a quite common disorder in our country and around the world that affect 0.1–1.5% per 1000 people annually, according to a meta analysis of data in United States, and they are increasingly trending younger individuals[1]. This is a chronic condition with numerous symptoms that not only significantly impact one's quality of life and the development of children but can also lead to various dangerous complications such as gastrointestinal bleeding, stomach perforation, gastric cancer, etc. The most common symptom of peptic ulcer discease is abdominal pain, accounting for over 95% of cases, other common symptoms include nausea, vomiting, and epigastric burning sensation geographical region[2-3].

Helicobacter pylori plays a crucial role in the pathogenesis of peptic ulcer disease, being the leading causative agent and a factor in disease recurrence. The prevalence of H. Pylori infection in pediatric patients with peptic ulcer in the study conducted by Nguyen Thi My Le was 43.8%, and by Niv Y. was 36 – 54% depending on the geographical region[1-2]. Additionally, other common disease etiology include drug side effects, include NSAIDs, steroids, and anti-cancer drugs[3]... These factors can act singly or in combination, exacerbating the disease condition. So, what distinguishes the characteristics of pediatric patients with peptic ulcer disease in Phu Tho province, and what are the common disease etiology? Therefore, we conducted this study with the aim: "Describing the clinical characteristics, endoscopic findings, and identifying the etiology of peptic ulcer disease in pediatric patients treaded at Phu Tho Obsteric and Pediatric Hospital in 2022 – 2023".

METHODS

Study subjects, time, and place: 84 pediatric patients were diagnosed with PUD and were treated at Phu Tho Obsteric and Pediatric Hospital from October 2022 to July 2023.

Inclusion criteria:

Clinical: Patients exhibit symptoms of PUDwhich indications for gastrointestinal endoscopy include: recurrent abdominal pain, vomiting, nausea, bloating, difficalty in swallowing, epigastric

burning sensation or gastrointestinal bleeding, anemia of unkown cause.

Subclinical: Diagnosed through endoscopy that reveals signs of PUD + Both the patient and their family consent to participate in the research.

Exclusion criteria: The patient has a history of surgery on the esophagus and gastroduodenuma; has contraindications for esophagogatroduodenoscopy; is currently undergoing treatment for cardiovascular, respiratory, liver, kidney diseases, malignant conditions, or coagulation disorders, and has a history of antibiotic or bismuth use within the last 4 weeks or PPI within the last 2 weeks.

Methods

Study design*:* Cross-sectional descriptive study.

Research indicators:

Clinical characteristics: Age, gender, place of residence, family history of H. pylori infection, clinical symptoms upon admission.

Gastroduodenoscopic findings: Type of lession (inflammation, ulceration, bleeding), classification of bleeding according to the Forrest criteria with 6 levels (Ia, Ib, IIa, IIb, IIc, III), number of lessions, degree of ulceration: superficial ulcers – mucosal layer, deep ulcers – submucosal layers.

Etiology of peptic ulcer disease: H. pyroli infection confirmed through the Clo test or C13 breath test, history of using anti-inflammatory (NSAIDs, corticosteroids).

Research indexes:

- Percentage of reason for hospitalization of children.

- Rate of clinical symtom in children.

- Rate of characteristics of gastric and duodenal lesions on endoscopy.

- Rate of endoscopy results of the stomach and duodenum: assess the type of damage, number of lesions, and location of damage.

Data collection methods: Data collection was conducted using the research patient record template and the medical records from Phu Tho Obsteric and Pediatric Hospital. Clinical indicators were directly obtained through interviews and examinations of the pediatric patients, as well as from their parents or guardians

following the research patient record template. Endoscopic findings were collected based on the medical records of the pediatric patients.

Data analysis: Using SPSS 22.0 software. Calculating the frequency and percentage (for quanlitative variables), and computed the mean and standard deviation (for quantitative variables). Compraring two proportions using the Chi-square test and compared two means using the test t-student. Differences were considered significant with p – value < 0.05.

Research ethics:

The research was approved by the Ethics Committee in Biomedical Research of Thai Nguyen University of Medicine and Pharmacy and received consent from the Director of Phu Tho Obsteric and Pediatric Hospital. Parents or legal guardians of the children provided informed voluntary consent by signing an informed consent form to participate in the research. Patient information was kept confidential, and patients had the right to withdraw from the study at any time.

RESULTS

Table 1. The common characteristics of pediatric patients in research

Characteristics		n	%
Age	≤ 5 y	11	13.1
	6 – 9 y	37	44.0
	≥ 10 y	36	42.9
	Mean	9.08 ± 3.5	
Gender	Male	48	57.1
	Female	36	42.9
Family members have H. pylori infection		4	4.8
Place of residence	Urban area	41	48.8
	Rural area	43	51.2

Geographic Distribution	Viet Tri city	36	42.9
	Phu Tho township	4	4.8
	Phu Ninh	5	6.0
	Lam Thao	9	10.7
	Thanh Ba	5	6.0
	Thanh Son	4	4.8
	Yen Lap	2	2.4
	Cam Khe	2	2.4
	Other districts	5	6.0
	Neighboring provinces	12	14.3

The avergage age of the pediatric patients in the study was 9.08 ± 3.5 y, with the highest proportion of children aged 6 – 9 years old was 44%. The prevalance in urban and rural areas was quite similar. The highest rate was in Viet Tri City (42.9%).

Table 2. Clinical characteristics of pediatric patients admitted

Clinical symptoms	**n**	**%**
Abdominal pain	83	98.8
Vomiting, nausea	82	97.6
Epigastric buring sensation	38	45.2
Bloating, indigestion	10	11.9
Distention	7	8.3
Anemia	7	8.3
Melena	5	6.0
Hematochezia	2	2.4

The most common symptoms were abdominal pain (98.8%) and vomiting (97.6%). Gastrointestinal bleeding: hematochezia (2.4%) and melena (6.0%).

Table 3. Gastroduodenoscopic findings of pediatric patients

Endoscopic findings			n	%
Type lessions	Inflammation		84	100
	Ulcer		28	33.3
	Bleeding	Forrest Ia	0	0
		Forrest Ib	1	1.2
		Forrest Iia	10	11.9
		Forrest Iib	2	2.4
		Forrest Iic	0	0
		Forrest III	0	0
Ulcer characteristics	Number of ulcers	1	8	9.5
		2	11	13.1
		> 2	9	10.7
	Degree of ulceration	Superficial ulcers	14	16.6
		Deep ulcers	14	16.6

100% of the pediatric patients had gastritis, 28 pediatric patients had accompanying ulcers, accounting for 33.3%. There were 13 pediatric patients with gastrointestinal bleeding (15.5%), with Forrest IIa being the most common at 11.9%. The proportion of pediatric patients with 2 or more ulcers was 23.8%, and deep ulcers acccounted for 16.6%.

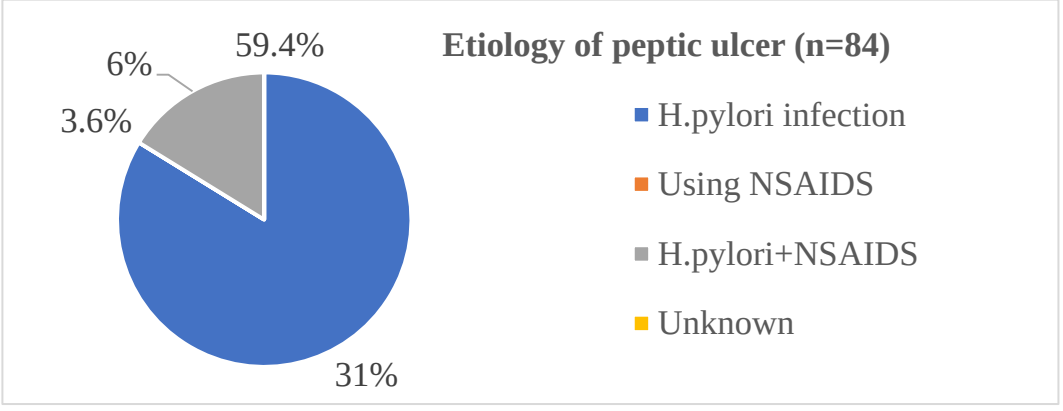

Figure 1. Etiology of peptic ulcer in pediatric patients

59.4% of pediatric patients couldn't determine the etiology of peptic ulcer. Among the identified etiology, the highest proportion was H. pylori infection at 37% (sole H. pylori infection accounted for 31%). The proportion of using NSAIDs was 9.6%.

Table 4. Clinical, endoscopic and etiology of PUD by age

Characteristics (n=84)		Age characteristics: n (%)			p
		≤ 5	6 – 9	≥ 10	
Clinical	Abdominal pain	11 (13.3)	37 (44.6)	35 (42.1)	0.509
	Vomiting, nausea	11 (13.4)	36 (43.9)	35 (42.7)	0.857
	Epigastric buring sensation	4 (10.6)	17 (44.7)	17 (44.7)	0.813
Lessions in endoscopic	Inflammation	11 (13.1)	37 (44.0)	36 (42.9)	-
	Ulcer	1 (3.6)	10 (35.7)	17 (60.7)	**0.035**
	Bleeding	0 (0)	8 (61.5)	5 (38.5)	0.207
	1 ulcer	0 (0)	3 (37.5)	5 (62.5)	0.361
	≥ 2 ulcers	11 (14.5)	34 (44.7)	31 (40.8)	
	Superficial ulcers	0 (0)	5 (37.5)	9 (64.3)	0.589
	Deep ulcers	1 (7.1)	5 (35.7)	8 (57.1)	
Etiology	H. pylori infection	5 (19.2)	9 (34.6)	12 (46.2)	0.394
	NSAID	0 (0)	3 (100)	0 (0)	
	H. pylori+NSAID	0 (0)	2 (40.0)	3 (60.0)	
	Unknown	6 (12.0)	23 (46.0)	21 (42.0)	

Only an association between age groups and ulcer lesions on gastroduodenoscopy was observed with $p < 0.05$: the group of pediatric patients aged 10 ≥ y had the highest ulcer rate (60.7%), while the 6 – 9 y group had a lower rate (35,7%), and the group ≤ 5y had the lowest rate (3.6%).

Table 5. Clinical, endoscopic and etiology of peptic ulcer disease by gender

Characteristics (n=84)		Gender characteristics: n (%)		P
		Male (48)	Female (36)	
Clinical	Abdominal pain	48 (57.8)	35 (42.2)	0.245
	Vomiting, nausea	47 (57.3)	35 (42.7)	0.836
	Epigastric buring sensation	23 (60.5)	15 (39.5)	0.569
Lessions in endoscopic	Inflammation	48 (57.1)	36 (42.9)	-
	Ulcer	13 (46.4)	15 (53.6)	0.161
	Bleeding	7 (53.8)	6 (46.2)	0.794
	1 ulcer	3 (37.5)	5 (62.5)	0.238
	≥ 2 ulcers	45 (59.2)	31 (40.8)	
	Superficial ulcers	7 (50.0)	7 (50.0)	0.705
	Deep ulcers	6 (42.9)	8 (57.1)	
Etiology	H. pylori infection	13 (50.0)	13 (50.0)	0.313
	NSAID	3 (100)	0 (0)	
	H. pylori+NSAID	2 (40.0)	3 (60.0)	
	Unknown	30 (60.0)	20 (40.0)	

No differences were observed between the two genders regarding common clinical symptoms, somes endoscopic findings, and etiology of peptic ulcer, with $p > 0.05$.

DISCUSSION

During from October 2022 to July 2023, 84 pediatric patients with PUDwere treated at Phu Tho Obsteric and Pediatric Hospital that were collected, we presented the following discussions:

Clinical characteristics of pediatric patients

The research group had an average age of 9.08 ± 3.5 y, with the proportion of children above6 age accounting for 86%. This result is consistent with the study by Nguyen Thi My Le (2022), which

found the highest incidence rate of peptic ulcer in the 7 – 11 age group (45.7%) and lower in the < 7 age group with a rate of 21.9%[2]. The research results of Nguyen Thuy Dung (2023) showed the highest incidence rate of peptic ulcer in the 11 – 15 age group at 60.7% and only 2.5% of pediatric patients under 7 years olds[4]. One of the major factors effecting the age of pediatric patients with PUD peptic ulcer was H. pylori infection. In Snyder's study, among children aged 0 – 4, 16% ones had PUD, but only 4% of them tested positive for H. pylori. For children aged 5 – 9, incidence rate was 19% with an increased H. pylori infection rate of 23%. The highest incidence rate was observed in the 10 – 15 age group, with 67% of children testing positive for H. pylori[5]. Nguyen Thi My Le's study in 105 pediatric patients with PUD , the incidence in male was 52.4% , in - female 47.6%[2], Nguyen Thuy Dung (2023) observed 108 pediatric patients, found a male – to – female ratio of 74.7% to 25.3%, with a ratio of 48.1% for males and 51.9% for females in gastroduodenitis group)[4].

We observed that the number of children with PUD in urban and rural areas did not differ significantly, and the highest incidence rate was in Viet Tri city compared to other districsts and township in Phu Tho province. Epidemiological studies revealed that socioeconomic factors play a role in the incidence of PUD in children. H. pylori is one of the important factors increasing the risk of disease. Children in rural areas may have an increased risk of developing PUD related to dietary habits, hygiene, diet, and living environment. Furthermore, the cohabitation of many people from multiple generations in poor sanitation can significantly increase the risk of H. pylori infection and the developing the disease[6].

Abdominal pain is most common symptom in pediatric patients with PUD. According to Nguyen Thi My Le, the rate of abdominal pain was 98.1%; vomiting and nausea account for 59%, and epigastric burning sesation was 30.5%, in - female 47.6%[2]. according to Bahremand the proportion of abdominal pain was 98% but vomiting and nausea only accounted for 48%[7]. Our results also reveal that abdominal pain is the most common symptom with 98.8% and vomiting was 97.6%. The frequency of

detecting symptoms in children also depends on the age group in the study, with older children being more likely to exhibit these symptoms compared to younger children. In particular, recurrent abdominal pain is very common clinical symptom. Abdominal pain may be localized in the upper abdomen or extend around the navel, especially when related to meals, which is an improtant suggestive sign of gastritis.

Gastroduodenoscopy findings of pediatric patients

In our study, the proportion of gastroduodenoscopy with inflammation accounted for 100%, with 28 children had accompanying ulcers (33.3%) and 13 children had gastrointestinal bleeding (15.5%). The major progression of chronic peptic ulcer typically begined with inflammation, edema, congestion, recurrent episodes and prolonged, eventually leading to the formation of ulcers, when ulcers became deep which can result in gastrointestinal bleeding. In Nguyen Thi My Le's study, the rate of gastritis was also similar to ours at 100%, with 25.7% accompanied duodenal ulcer and 1% with gastric ulcer[2]. Nguyen Thuy Dung studied in 2019 on chidren who underwent gastrodoudenoscopy indicated that 89.1% of case were diagnosed peptic ulcer, with ulcer accounting for 3.91%[4]. Among the 28 children with gastroduodenal ulcer in our study, the proportion with 2 or more ulcers was 23.8%. Compared to Nguyen Huu Hieu's study on pediatric patients with PUD accompanied H. pylori infection, the proportion of pediatric patients with 2 or more ulcers was higher at 55%[8], whereas our study included both patients with and without H. pylori infection.

Etiology of peptic ulcer disease

100% pediatric patients were diagnosed H. pylori by testting breath C13, with 37% of children positive results. The C13 breath test is considered a highly accurate diagnostic method, esspecially for children over the age of 6. Thisis also an effective non – invasive and diagnisis method. Research by Nguyen Thi My Le indicated that 43.8% of pediatric patients with peptic ulcer tested positive for H. pylori[2].

According to a study by Niv Y., the positivity rate for H. pylori when using the C13 breath test in Israel was 46.9%, in Europe and

the United States was 36% and in Asia and Africa was 54.9%[1]. H. pylori is considered a leading etiology of peptic ulcer in children, especially in developing countries. Additionally, factors that increase the incidence rate in children include prolonged use of NSAIDs, steroids, and immunesuppressing drugs. In our study, the rate of pediatric patients using NSAIDs was 3.6% and 6% of the children had both H. pylori infection and NSAIDs. NSAIDs were commonly used in children for anti-inflammatory, pain relief, and fever-reducing purposes and can be divided into two groups: COX-1 and COX-2 enzyme inhibitors. Specifically, the anti-inflammatory effect through COX-2 inhibition, conversely, COX-1 inhibition reduces prostaglandin production, leading to reduced blood flow to the gastric mucosa, decreased bicarbonate and mucus production, which are the factors causing peptic ulcer disease[9].

CONCLUSIONS

The most common clinical symptoms in pediatric patients with PUD were abdominal pain (98.8%), nausea and vomiting (97.6%), and epigastric burning sensation (45.2%). On endoscopic findings, 100% of the case had gastroduodenitis, 33.3% accompanied by ulcers (with 2 and more ulcers accounting for 23.8% and deep ulcers accounting for 16.6%); 15.5% of children had gastrointestinal bleeding. The etiology of PUD: H. pylori infection was 31%, H. pylori + NSAIDs was 6%, used NSAIDs was 3.6% of cases, and 59.4% of cases could not determine the etilology.

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