The characteristics of video capsule endoscopy in pediatric Henoch–Schönlein purpura with gastrointestinal symptoms

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Research article

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Abstract

Background Henoch–Schönlein purpura (HSP) is a systemic small-vessel vasculitis that commonly affects gastrointestinal tract. The video capsule endoscopy (VCE) characteristics of pediatric HSP patients were rarely investigated.

Methods Patients diagnosed with HSP by VCE examination at our hospital from February 2010 to January 2019 are analyzed. The clinical features, laboratory findings, and the characteristics of VCE findings are studied.

Results There are 30 patients enrolled in this investigation from February 2010 to January 2020. The mean age of these patients is 96.9±35.8 months, and the most frequent finding of VCE is mucosal erosion, which account for 69 % of the patients, and followed by mucosal erythema or petechia accounted for 79.3 % of the patients. Regarding to the disease location detected by endoscopy, jejunum is the most common involved part of the gastrointestinal tract in pediatric HSP patients. All the patients had jejunum involved except in one patient the VCE did not pass through the pylorus. One third of the patients involved the descent part of duodenum. No side effects are observed in this study.

Conclusions VCE is safe and effective in the diagnosis of gastrointestinal involved HSP patients with or without typical skin purpura. Jejunum is the most common involve location in gastrointestinal.

Background

Henoch–Schönlein purpura (HSP) is a systemic small-vessel vasculitis that often affects children and occasionally affect adults. It is named Ig A vasculitis as well. And it is relative more common in the Asian population than the Western population. HSP mainly involves the small vessels of skin, joints, gastrointestinal (GI) tract, and kidney. About 50 % to 85 % of the HSP patients have gastrointestinal symptoms [1]. GI symptoms include acute abdominal pain, nausea, vomiting, hematochezia or melena, and diarrhea. However, endoscopic evaluations are not performed in all HSP patients with GI symptoms. Among the patients with GI symptoms, there is a rare portion of patients without skin manifestations, which need endoscopy evaluation for diagnosis and differential diagnosis. HSP most affects the descending of the duodenum in adult patients, and the typical indication of endoscopy of HSP are erythema, petechia, erosion and ulceration [1,2]. Although esophagogastroduodenoscopy (EGD) is useful in the diagnosis of majority HSP patients with GI tract affected, there is still a portion of patients who could not be diagnosed. These patients need video capsule endoscopy (VCE) to evaluate the mucosa of small bowel.

There are several literatures revealed the traits of endoscopy findings of adult HSP patients. However, there is no report focuses on the diagnosis value of VCE in pediatric HSP patients. Here we report a cohort of pediatric HSP patients who are performed VCE examination. All the patients are diagnosed with HSP and had GI symptoms. We summarize the clinical and VCE findings of these patients in this study.

Materials And Methods

We enrolled in 30 cases of HSP patients who performed VCE examination at Children's Hospital, Zhejiang University School of Medicine from February 2010 to January 2019. The clinical features, the laboratory findings, and the findings of VCE were reviewed. This study was approved by the Ethics Committee in Children's hospital, Zhejiang University School of Medicine.

All the patients had EGD examination and had biopsy at the duodenum and antrum. The indications for VEC examination were as following: 1. Patients who were suspected HSP without typical skin palpable purpura and EGD did not reveal characteristic findings of HSP. 2. HSP patients with GI symptoms but were not completely responsive to steroids treatment or steroid-dependent. 3. Patients who were suspected HSP but needed to be differentiated with other small intestinal diseases. Patients with massive intestinal bleeding could not tolerate VCE examination or with acute surgical indications were excluded. Small bowel radiography, magnetic resonance enterography (MRE) or computed tomography (CT) were performed to exclude the stricture before VCE examination. The device used for VCE was OMOM (Chongqing, China). The capsule was either swallowed by the patient or was delivered by EGD in patients who cannot swallow the capsule.

Statistical analysis

The continuous variables with normal distribution were presented as mean±SD, otherwise were presented with median ± interquartile range (IQR); and, discontinuous variables were presented as number or percentage. The statistical analyses were conducted with SPSS 22.0 statistical software (SPSS Inc., IBM Corp., Armonk, NY, United States).

Results

The demographic features of the patients

There were 30 patients performed VCE examination and was suspected HSP. There were 30 patients enrolled in this study from February 2010 to January 2020. The demographic characteristics of these patients was showed in **Table 1**. All the patients had GI symptoms, including abdominal pain, vomiting, and intestinal bleeding. Half (15/30) of patients had purpura at admission or during hospitalization. 43.3% (13/30) patients had typical purpura, and two patients were reported to have purpura but not observed by doctor. The GI symptoms and other symptoms of these patients were also shown in **Table 1**. The complications included hypertension, appendicitis, acute pancreatitis and acute intestinal perforation. A patient with intestinal perforation had surgery. Five patients had a history of HSP previously. And one patient had another episode of HSP a year later.

The laboratory findings of the patients

The laboratory results of these HSP patients were listed in **Table 1**. Mean count of white blood cells and serum plasm D-dimers levels were elevated, and median CRP and ESR levels were normal.

Images of HSP patients

Fourteen patients had MRE or CT scan of abdominal, and ten patients revealed thickening of the small bowel. Other patients did not show inflammation of small bowel.

The features of endoscopy finding.

All the patients had EGD examination and obtained biopsy at duodenum and gastric antrum. Among them, 27 patients had first EGD in our hospital, three patients had EGD in other hospitals before admission, and one patient had second EGD in our hospital. No typical traits of HSP were detected by the EGD examination in 19 patients. One patient revealed duodenum ulcers by first EGD examination at the acute stage of diseases, while the second EGD examination in our hospital five months later was normal. The most frequent findings of EDG were mucosal ecchymosis, petechiae, erosion, and multiple ulcers. EGD revealed typical traits of HSP in the descending of the duodenum in nine patients. Two patients had the whole stomach involved, and one also had the lower part of the esophagus involved. Thirteen patients performed colonoscopy, and two patients detected ulcers in the terminal ileum, and one patient detected a polyp in the colon, which considered as comorbidity.

Thirty patients had VCE examination. The capsule did not pass through pylorus in one patient, and the others all went through the whole small bowel. The median time of the VCE examination was 21.0 days (IQR: 13.8 to 36.0) after the initial symptoms of HSP appeared. VCE detected multiple mucosal ecchymosis, erosion, and irregular superficial ulcers, which resembled the findings of EGD in 27 patients. Moreover, some patients with massive intestinal bleeding tend to have diffuse erosion and large areas of ulcers (**Fig 1**). The numbers and percentage of different lesions identified by VCE were listed in **Table 2**. One male patient had massive intestinal bleeding, and intestinal perforation was treated with surgery and followed with oral methotrexate (MTX). He had a VCE examination to assess the recovery of intestinal lesion eight months after the onset of disease onset, and the VCE only detected mucosal congestion in the jejunum. The disease location of patients detected by endoscopy was shown in **Table 3**. The most frequently involved disease location in this cohort was jejunum, which account for 96.7 % of the patients, and followed by the descending part of the duodenum which was accounts for 33.3 %. None of these patients affected colon. There was no retention or other side effect observed in this study.

The EGD, VCE, and colonoscopy findings of HSP patients with or without skin purpura were shown in **Table 4**.

Treatment

90 % (27/30) of the patients were initially treated by steroids, and another three patients received PPI or montelukast for unremarkable gastrointestinal symptoms. Four patients were treated by immunoglobin combined with steroids, and seven patients were treated by immunosuppressants, because they were not

completely responsive to steroids or dependent on steroids. One patient with intestinal perfusion had surgery and then treated with methotrexate for two months. All the patients were followed in our hospital and were completely recovered.

Discussion

VCE was approved to be used in pediatrics over two years of age by the US FDA in 2009 [3]. The most frequent indications for VCE in children is inflammatory bowel disease (IBD), obscure gastrointestinal bleeding (OGIB), malabsorption, protein-losing enteropathies, abdominal pain, small bowel polyps and tumors [4].

HSP is systemic small-vessel vasculitis diagnosed mainly based on the clinical manifestation and pathological study of the purpura. Diagnosis of HSP usually does not need endoscopy examination. However, in some conditions, patients with the GI tract involved will perform EGD and VCE examination. HSP with gastrointestinal symptoms is common in China, and all of the patients with GI symptoms were advised to performed EGD at our hospital, typical mucosal traits of HSP were observed at the descending part of duodenum among most HSP patients. While a small part of HSP patients with negative finding by EGD were asked to perform VCE. The mucosal change observed at small bowel by VCE were similar with the mucosal change at duodenum. VCE examination is useful to help to make the diagnosis when patients didn't have skin purpura of HSP and EGD is negative. It is crucial to perform an endoscopy to confirm the diagnosis. Additional, to understand the extent and the severity of the disease.

To our best knowledge, there is no previous study focused on the VCE examination of pediatric HSP patients. This study is the largest cohort of pediatric HSP patients who have VCE examination so far. The typical finding of VCE in the small intestinal is similar to the discovery by EGD in other reports from the adult cohort [5], presenting with mucosal edema, congestion, erosion, sporadic purpura or diffuse purpura, and usually with multiple irregular superficial ulcers. In our cohort, the most frequently involved part of the GI tract was jejunum. Almost all the patients had jejunum involved except one did not pass through pylorus. It was different from the report from Eon Jeong Nam *et al.* [2]. In their report with a series of adult HSP patients, the second part and the terminal ileum were the most frequently involved parts of HSP patients, and colon was frequently involved as well. However, the VCE or small intestinal endoscopy was not performed in Nam *et al*'s study; thus, the jejunum was not assessed. On the contrary, in our cohort, none of the patients had colon involved. The different results between the studies could be partially explained by the age of patients participated. The mean age of patients was 96.7 months in our cohort while they were adults in the study of Eon Jeong Nam *et al.*. And also, the location and extent of disease depends on the time of endoscopy examination and the severity of disease. The median time of our patients received VCE was around three weeks.

In most cases, it is easy to diagnosis HSP with typical symptoms and skin purpura according to the diagnostic criteria [6]. HSP shares the similar clinical manifestation and sometimes has a colonoscopy appearance that resembles ulcerative colitis[7]. Application of VCE in these patients could help doctor to

make the diagnosis, evaluate the extent and severity of the disease, which will contribute to the proper treatment for patients. It needs further study that if patients with extensive small bowel involved and with more severe mucosal lesions need longer time of steroid treatment. Although HSP is self-limited, we observed that the inflammation of small intestinal is rather long in our study. The most prolonged patients observed inflammation in the small bowel more than eight months.

MRE and CT were also performed in 14 patients, and 71.4 % of them detected thickening of the small intestinal wall. Compared with VCE, the MRE and CT finding of these patients are not typical, and could not identify superficial ulcers of mucosa or evaluate the condition of bleeding.

This study has some limitations. First, this was a retrospective study with a small cohort of patients. The study only included patients diagnosed by VCE as HSP, meanwhile not all the HSP patients with GI symptoms were evaluated. Second, all of the patients had EGD and VCE in this study. However, not all patients had a colonoscopy examination. Thus, the lesions in the colon may be omitted in some patients. Third, some patients in this study had sole GI symptom during the disease, then it is not enough according to the VCE finding to diagnosis HSP. However, these patients were all followed up in our hospital, and the outcome of these patients were good.

Conclusions

In conclusion, this is the first cohort study focused on the VCE finding of pediatric HSP patients. The typical discovery of endoscopy could make the diagnosis of HSP with or without palpable purpura. VCE is a safe and is helpful in the diagnosis of HSP and evaluate the disease severity and extent. It is more sensitive compared with MRE or CT scan to detect the mucosal change of small bowl. VCE could be recognized as the first-line examination for patients suspecting HSP without typical purpura, and EGD does not show typical HSP specific mucosal changes, for these patients constantly had disease location in the small bowel.

List Of Abbreviations

Henoch–Schönlein purpura: HSP; Gastrointestinal: GI; Esophagogastroduodenoscopy: EGD; Video capsule endoscopy: VCE; Interquartile range: IQR; Magnetic resonance enterography: MRE; Computed tomography: CT; Inflammatory bowel disease: IBD; Obscure gastrointestinal bleeding: OGIB.

Declarations

Ethics approval and consent to participate: This study was approved by the Ethics Committee of the Children's Hospital of Zhejiang University School of Medicine.

Consent for publication: Written informed consent was obtained from the parents of the patient for the publication.

Availability of data and materials: All data generated or analysed during this study are included in this published article.

Competing interests: The authors declare that they have no competing interests.

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Authors' contributions: YF collected and analyzed clinical and laboratory data of the patients and write the manuscript. HZ and KP interpreted the data of video capsule endoscopy. JC designed and was a major contributor in writing the manuscript. All authors read and approved the final manuscript.

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Tables

Table 1. The demographic characteristics and laboratory findings of HSP patients

Items	Results
Age (M)	96.9±35.8
Male/Female	19/11
Median time of disease at admitted (Day)	12.5 (IQR: 6.5-20.0)
Median time perform VCE examination (Day)	24.5 (IQR:16.3-42)
Purpura, n (%)	15 (50)
Abdominal pain, n (%)	30 (100)
Vomiting, n (%)	9 (30)
Intestinal bleeding, n (%)	8 (26.7)
Arthralgia, n (%)	4 (13.3)
Hematuresis/proteinuria, n (%)	3 (10.0)
WBC (×10E9/L)	17.4±7.1
Hb (g/L)	128.4±11.7
PLT (×10E12/L)	372.3±111.2
CRP (mg/L)	5.5 (IQR: 0.8-20.8)
ESR (mm/h, n=24)	8 (IQR: 6.0-20.8)
Serum albumin (g/L, n=23)	36.4±6.8
Plasm D-dimers (mg/L, n=22)	2.2 (IQR: 0.5-8.4)
Plasma IgA level (g/L, n=19)	1.9±0.8

HSP: Henoch–Schönlein purpura; WBC: white blood cell; Hb: hemoglobin; PLT: platelet; CRP: C-reactive protein; ESR: erythrocyte sedimentation rate.

Table 2. The characteristics of VCE at small intestinal in pediatric HSP patients

VCE findings	Number (Percentage)
Edema/Congestion	12 (41.4 %)
Mucosal erythema or petechia	20 (69.0 %)
Mucosal erosion	23 (79.3 %)
Multiple ulcers	17 (58.6 %)

VCE: Video capsule endoscopy; HSP: Henoch–Schönlein purpura

Table 3. The disease location detected by video capsule endoscopy.

Disease location	Number (Percentage)
Esophagus	0 (0.0 %)
Stomach	3 (10.0 %)
Duodenum bulb	6 (20.0 %)
Descent of duodenum	10 (33.3 %)
Jejunum	29 (96.7 %)
Ileum	13 (44.3 %)
Total	30

Table 4. Number of patients detected typical lesions of HSP in patients with or without skin purpura by EGD, colonoscopy and VCE.

	With skin purpura N=13	Without skin purpura N=17	Total
EGD	8	4	12
Colonoscopy	0[a]	2	2
VCE	12[b]	17	29

HSP: Henoch–Schönlein purpura; EGD: Esophagogastroduodenoscopy; VCE: Video capsule endoscpy.

a. Colonoscopy detected polyp by colonoscopy in one patient is not considered related to HSP; b. VCE did not pass the gastric pylorus in one patient.

Figures

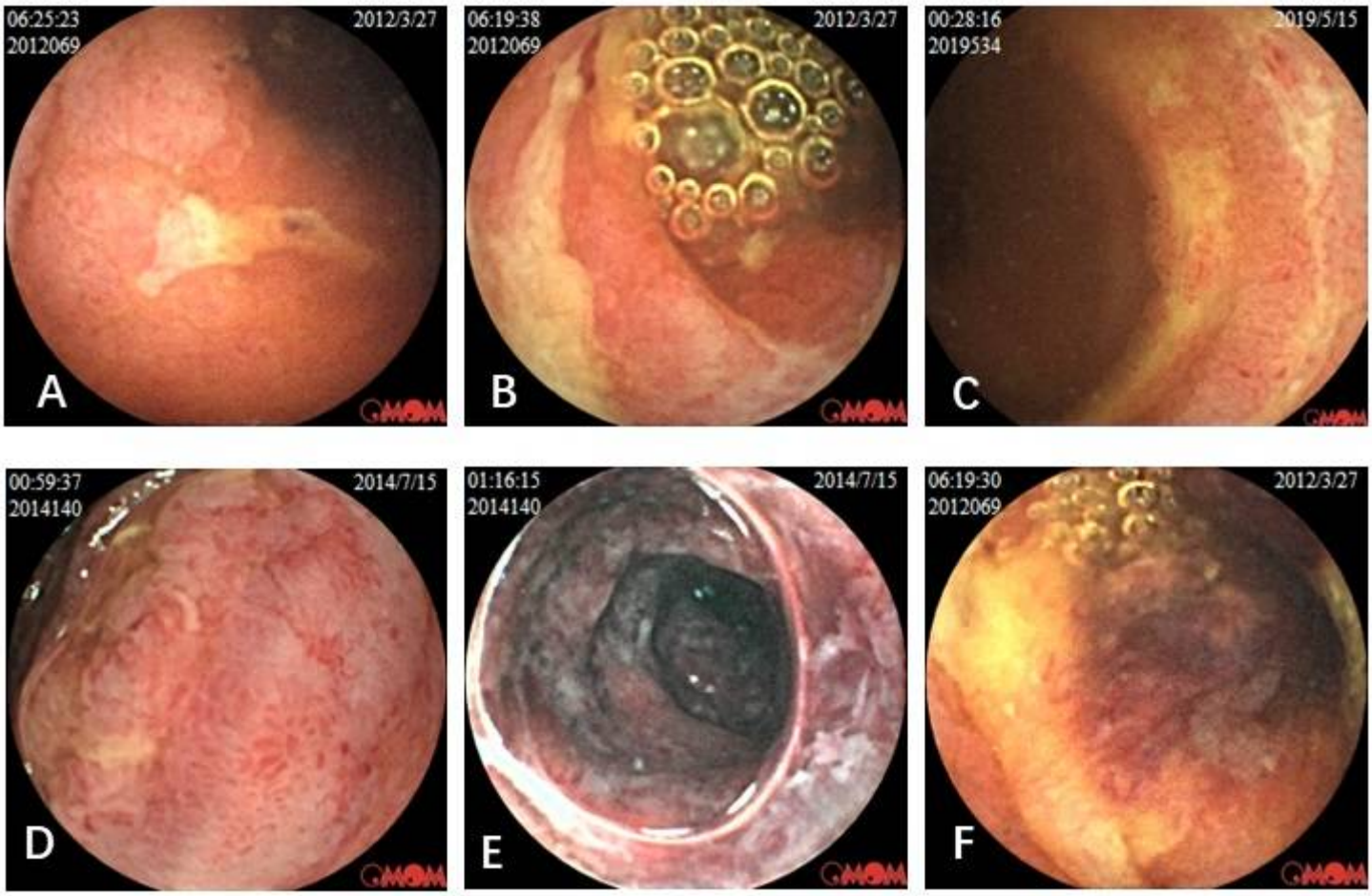

Figure 1

The video capsule endoscopy showed mucosal edema, congestion, erythema, petechia, diffuse erosion and multiple irregular superficial ulcers at small bowel in pediatric HSP patients.