

Gastroduodenal findings in pediatric late-stage chronic renal failure

Peptic disease in pediatric renal failure

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Abstract

Aim: In this study, we aimed to determine the characteristics of upper gastrointestinal lesions in children with end-stage chronic renal failure.

Materials and Methods: Late-stage chronic renal failure (CRF) cases and healthy children who underwent endoscopy at two centers from July 2015 to September 2017 were included in this study. Patient data were collected retrospectively from medical records. Clinical characteristics, endoscopic findings, rapid urease test, *Helicobacter pylori* (Hp) presence, and histology were noted and compared. Hp infection is accepted as "present" if both rapid urease test and histopathology were positive. Type of gastritis (chronic active gastritis (CAG), chronic inactive gastritis (CIG), or chronic lymphocytic gastritis (CLG)) was determined by histology.

Results: The CRF group (n: 43, mean age: 11.12±3.63 years, 55,8% girls) and the control group (n:492, mean age: 11.69±3.84 years, 54,1% girls) were age- and gender-matched. Abdominal pain was the most common complaint in both groups. In the CRF group, 30.2% of patients were asymptomatic. Gastropathy and ulcer at bulbus were more common in the CRF group (P<0.05). Hp infection frequency was similar between the groups (37.2% vs 33.3%, P >0.05). CAG was more common than other subtypes significantly in the CRF group than that of controls (62.8% and %44.1, respectively, P<0,05). In asymptomatic CRF patients (n:12), erosive gastritis, CAG, bulbar erosions, and Hp infection were present.

Discussion: Peptic disease and CAG were frequent in the pediatric CRF patients than that of the controls. However, there was no difference in terms of Hp infection frequency. Moreover, GI pathologies were common in asymptomatic CRF patients.

Keywords

Gastritis; *Helicobacter pylori*; Pediatrics; Peptic disease; Renal failure

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Introduction

Uremia is a risk factor for developing chronic gastritis, peptic ulcer, and duodenitis [1]. Although it is known that the frequency of such upper gastrointestinal (GI) system diseases is higher in patients with chronic renal failure (CRF), the reason for this increase is not entirely understood. Possible causes are hypergastrinemia, achlorhydria, medication, and Helicobacter pylori (Hp) infection [1-6]. The increasing incidence of upper GI diseases in CRF is a significant cause of mortality and morbidity [2]. GIS lesions diagnosed before kidney transplantation are important risk factors for peptic diseases that may develop after transplantation. However, kidney transplantation alone may also cause upper GI complications in patients with end-stage CRF [7].

The primary goal of our study is to determine the characteristics of upper GI lesions in children with end-stage CRF by endoscopy and histology to compare CRF patients' data with results of healthy children who underwent upper GIS endoscopy for any reason.

Material and Methods

In this study, late-stage CRF cases (stage 3b and above) aged under 18 years were included. Patients were referred to the pediatric gastroenterology outpatient clinic in two different centers and underwent endoscopy from July 2015 to September 2017. Patient data were collected via reviewing medical records. During the same period, patients with compatible age and gender who underwent gastroscopy for any reason were selected as a control group. The patients' demographic features, complaints, medication history, upper GI endoscopic, and histopathological findings were analyzed retrospectively. The rapid urease test (RUT) result and the presence of erosive gastritis and gastric or bulbar erosion/ulcer were obtained from endoscopic findings. Type of gastritis (chronic active gastritis (CAG), chronic inactive gastritis (CIG), or chronic lymphocytic gastritis (CLG)) and the presence of Hp infection were obtained from histopathological findings. Hp infection is accepted as "present" if both RUT and histopathological findings confirm Hp presence.

Patients were excluded from the study if medical records were incomplete, endoscopy was performed emergently, previous Hp eradication, acid-suppressive or antibiotic therapy was received for at least four weeks before endoscopy. Moreover, patients with any other chronic disease (type 1 diabetes mellitus, inflammatory bowel diseases, early CRF (stage 3a or earlier), metabolic, liver, or heart diseases) were excluded. Ethical approval was not obtained since data in our study were collected retrospectively from patient medical records.

The data were analyzed with SPSS 20.0 (IBM Inc., Chicago, Illinois, USA). All results were presented as mean ± standard deviation (SD) or percentages. The Student's t-test was used to compare the clinical data of the groups. Correlations between 2 variables were evaluated with the Pearson's correlation coefficient. The calculated p-values of less than 0.05 indicated statistical significance.

Results

In our study, 43 patients with end-stage CRF out of 68 CRF patients underwent endoscopy and constituted the CRF group. Meanwhile, 492 out of 886 healthy children who underwent endoscopy for any reason were enrolled as the control group. The mean age of the CRF group (n:43) was 11.12±3.63 years, and 55,8% were girls. The mean age of the control group (n:492) was 11.69±3.84 years, and 54,1% were girls.

Table 1. Demographic features of patients in the CRF and control group

	CRF group (n=43)	Control group (n=492)	P
Mean age±SD (year)	11.12±3.63	11.69±3.84	>0.05
Gender (girl, %)	55,8	54,1	>0.05
Complaints (n, %) ^a			
Recurrent abdominal pain	29, (67,4)	295, (59,9)	>0.05
Dyspepsia	12, (27,9)	172, (34,9)	>0.05
Nausea/Vomiting	25, (58,1)	156, (31,7)	<0.05
Losing/Not gaining weight	21, (48,8)	142, (28,8)	<0.05
Short stature	14, (32,6)	130, (26,4)	>0.05
Others ^b	23, (53,4)	228, (46,3)	>0.05
Dialysis Method (n, %)			
Peritoneal dialysis	28, (65,1)	-	-
Hemodialysis	15, (34,9)	-	-
Etiology of CRF (n, %)			
Vesicoureteral reflux	14, (32,5)	-	-
Chronic glomerulonephritis	8, (18,6)	-	-
Pyelonephritis	6, (13,9)	-	-
Polycystic kidney disease	3, (7,0)	-	-
Focal glomerulosclerosis	2, (4,7)	-	-
Nephrotic syndrome	2, (4,7)	-	-
Urinary tract stone	2, (4,7)	-	-
Idiopathic	6, (13,9)	-	-

^a Some patients presented with more than one complaint, ^b Other complaints: Abdominal bloating and flatulence, diarrhea, constipation, dysphagia/odynophagia

Table 2. Endoscopic and histopathologic features of patients in the CRF and control group

	CRF group (n=43) (n,%)	Control group (n=492) (n,%)	P
Endoscopic findings ^a			
Normal	8 (18,6)	68 (13,8)	>0.05
Erosive Esophagitis	9 (20,9)	79 (16,1)	>0.05
Endoscopic gastropathy	29 (67,4)	208 (42,2)	<0.05
Erosion/ulcer at stomach	7 (16,3)	16 (3,2)	<0.05
Erosion/ulcer at bulbus	11 (25,6)	61 (12,4)	<0.05
Hp (RUT + Histopathology)	16 (37,2)	164 (33,3)	>0.05
Hp (Histopathology)	16 (37,2)	168 (34,1)	>0.05
Histopathologic gastritis			
No gastritis	0 (0,0)	25 (5,1)	>0.05
Chronic active gastritis	27 (62,8)	217 (44,1)	<0.05
Chronic inactive gastritis	11 (25,6)	166 (33,7)	>0.05
Chronic lymphocytic gastritis	5 (11,6)	84 (17,1)	>0.05

^a More than one finding was present in some patients, Hp: Helicobacter pylori, RUT: Rapid urease test.

Twenty-five patients with CRF were excluded from the CRF group because 19 of them were early-stage CRF and 6 of them were receiving acid suppression therapy. Three hundred ninety-four patients were excluded from the control group because of chronic diseases in 274 patients, lack of complete medical records in 52 patients, previous Hp eradication in 44 patients, and receiving acid-suppressive or antibiotic therapy in the last 4 weeks before gastroscopy in 24 patients. There was no statistically significant difference between CRF and the control group by age and gender. Nephropathy secondary to vesicoureteral reflux was the most common cause of CRF. The most common complaints of patients in the CRF group were recurrent abdominal pain, nausea/vomiting, and losing or not gaining weight. In the CRF group, 30.2% of patients were asymptomatic. The most common presenting complaints of the control group were abdominal pain and dyspepsia. Complaints of nausea/vomiting and losing/not gaining weight were more common in the CRF group, and there was a statistically significant difference ($P < 0.05$). However, there was no statistically significant difference concerning other presenting complaints. The demographic features of the CRF and control group are shown in Table 1.

There were no pathological endoscopic findings in 8 patients (18.6%) in the CRF group and in 68 patients (13.8%) in the control group. Gastropathy and ulceration/lesion at bulbous detected by endoscopy were more common in the CRF group, and the difference between groups was statistically significant ($P < 0.05$). There was no statistically significant difference between the groups in terms of Hp infection incidence (37.2% vs 33.3%, $P > 0.05$). CAG, a histopathological subtype of gastritis, was more common than other subtypes mainly in the CRF group than that of the control group (62.8% and 44.1%, respectively, $P < 0.05$). In asymptomatic CRF patients ($n:12$), endoscopy revealed erosive gastritis in 3 (23.2%) patients, CAG in 8 (61.5%), bulbar lesion/erosion in 4 (30.7%) patients and Hp infection in 5 (38.4%) patients. More detailed data are shown in Table 2.

Discussion

In our study, peptic diseases (gastropathy, peptic erosions/ulcers) and CAG were common in pediatric CRF patients. However, there was no difference between the groups in terms of Hp infection incidence. It is remarkable that asymptomatic CRF patients also had findings at upper GI endoscopy. Upper GI lesions were reported in 25 to 75% of CRF patients of all ages [2-8]. Although underlying mechanisms were not clearly identified, hypergastrinemia, achlorhydria, and chronic use of an ulcer/gastritis predisposing medication, besides an increase in bile reflux secondary to uremia [10] and decrease in basal bicarbonate secretion of the pancreas were blamed [11].

It is neither always possible, nor ethical to select a completely healthy control group in endoscopy studies. Therefore, control groups constituted by patients who underwent endoscopy for any reason are usually preferred. The frequency of specific complaints like recurrent abdominal pain and dyspepsia was equal in both groups. As suggested in previous studies, nausea/vomiting and losing/not gaining weight were common in the CRF group, possibly secondary to uremia [3, 8, 9, 12].

In a study comprising 355 voluntary healthy male adults, endoscopy revealed that 15% of volunteers had at least one gastroduodenal lesion [13]. On the other hand, previous studies showed that 30-81% of asymptomatic CRF patients had at least one gastroduodenal lesion [4, 8, 14]. In our study, 8 out of 12 asymptomatic CRF patients had at least one gastroduodenal lesion. Therefore, both symptomatic and asymptomatic patients with CRF require careful evaluation of GI diseases.

In previous studies, the incidence of esophagitis was 3-8.8% in patients with CRF and not different from the control group [4,14]. In our study, the incidence of erosive gastritis was 18.6% and higher than the control group and previous studies. However, the difference between the groups in our study was not statistically significant. The incidence of endoscopic gastropathy and histopathological CAG was high and similar to the literature [4, 8, 14]. Recently, the incidence of peptic ulcers in CRF patients has been increasingly reported [8, 15]. Erosions/ulcers at both stomach and bulbous were found in one-fourth of patients in our study, and they were more common in the CRF group. Other than uremia, medications used by CRF patients, such as non-steroidal anti-inflammatory drugs and irritant agents (potassium chloride), also contribute to the risk of having an ulcer and gastritis. Additionally, psychological stress experienced during dialysis and preparation for transplantation is commonly encountered [16] and may cause gastritis and erosions.

Hp infection is the most common cause of peptic ulcers. The prevalence of Hp infection is decreasing all over the world [17]. Since a decrease in the prevalence of Hp infection may increase the frequency of certain autoimmune diseases, the latest pediatric gastroenterology guideline recommends absolute eradication therapy only in the presence of an erosion/ulcer and cautiously decide whether to treat or not [18]. In the absence of erosion/ulcer, the guideline recommends evaluating all the risks and benefits of eradication before starting therapy. In our study, the incidence of Hp infection was more common in the CRF group, but it was not statistically significant (37.2% vs. 33.3%, $P > 0.05$). Similar to our study, some other studies have shown the incidence of Hp infection as 9-65% [2, 4, 6-8, 15]. Certain studies suggest that the incidence of Hp infection is higher in patients with CRF than in healthy population [19-21]. A recent meta-analysis stated that the risk of having Hp infection was lower in hemodialysis patients than healthy controls; however, the difference was not statistically significant [22].

Our results must be carefully evaluated due to the retrospective and cross-sectional design of the study, where the relationship between exposure and outcome is at risk of bias. The high frequency of Hp infection in patients with low socioeconomic status and a family history of Hp is the expected result. Due to the design of our study, we had no data on the socioeconomic status and family history of Hp infection.

As a result, peptic diseases and CAG frequencies were higher in the pediatric CRF group than in the control group. However, there was no difference in terms of Hp infection frequency. It is remarkable that asymptomatic CRF patients commonly had upper GI endoscopy findings. Both symptomatic and asymptomatic patients with CRF require a careful and detailed evaluation of GI problems.

Scientific Responsibility Statement

The authors declare that they are responsible for the article's scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

Animal and human rights statement

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. No animal or human studies were carried out by the authors for this article.

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Conflict of interest

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