

# Endoscopic alterations in a cohort of hemodialysis patients: a cross-sectional study

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**Introduction:** Although the association between chronic kidney disease and dyspepsia is widely known, it remains poorly investigated. Among the types of gastric inflammation that lead to symptoms, erosive antral gastritis is the most common form. A direct correlation between the urea serum levels and the time in hemodialysis with the onset of gastric metaplasia and dyspepsia can be observed. The aim of this study was to report the endoscopic alterations found in hemodialysis patients.

**Methods:** This is a cross-sectional study based on the medical records of 95 patients older than 18 years who were diagnosed with chronic kidney disease. The results of endoscopies performed up to 6 months before the beginning of the study were included.

**Results:** Among the 95 studied patients, 56.84% were male, 60% were Caucasian, and 71.57% used proton pump inhibitors. The endoscopic alteration most frequently observed was erosive gastritis (77% of the cases); however, the frequency of the alteration that caused the symptoms was irrelevant. The antrum was the most common site of involvement (55.79%).

**Conclusion:** Patients with chronic kidney disease often show dyspeptic symptoms. Other abnormalities are common but are not correlated with such symptoms. In conclusion, this study identified the endoscopic alterations that are most often observed in hemodialysis patients; erosive and enanthematous gastritis were the most common forms observed.

**Keywords:** hemodialysis, chronic kidney disease, dyspepsia

## Introduction

Although the association of chronic kidney disease (CKD) with dyspepsia is widely known, its origin is poorly investigated.<sup>1</sup>

The concept of dyspepsia has changed in recent decades, and the lack of a consensus on the theme has hindered a complete understanding of its prevalence. Talley defined dyspepsia as discomfort in the upper abdominal area with a structural or biochemical correlation. The absence of such conditions defines the existence of a functional (nonorganic) disorder.<sup>2</sup>

Endoscopic alterations are common in patients with CKD, especially in those undergoing dialysis treatment. Among such alterations, erosive antral gastritis is the most common form, followed by erosive duodenitis.<sup>2,3</sup> A direct correlation between the onset of these alterations and the length of time patients undergo hemodialysis, urea serum levels, and years spent in kidney replacement therapy can also be observed.<sup>3</sup>

The association between dyspepsia and *Helicobacter pylori* in patients with CKD suggests a correlation between the onset of the former and the genesis of

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ulcerous disease. However, the presence of CKD was not identified as a severity factor.<sup>4</sup>

Patients with CKD have elevated gastrin levels in gastric secretion; however, this is not merely a consequence of the reduction in the clearance of gastrin. There is a compensatory effect caused by the neutralization of gastric juices resulting from an increase in the ammonia levels.<sup>1</sup>

Peritoneal dialysis patients tend to show more gastrointestinal symptoms (eg, dyspepsia) than hemodialysis patients do.<sup>5</sup> Dyspepsia was present in 55% of peritoneal dialysis patients and in only 38% of hemodialysis patients.<sup>5</sup>

The aim of the current study was to report the endoscopic alterations found in hemodialysis patients.

## Methods

This was a cross-sectional study. The project was approved by the Local Ethics Committee (number 067/2011).

Hemodialysis patients with CKD who were older than 18 years were recruited to participate in the study after providing signed informed consent, and the data in their medical records were analyzed. The results of endoscopies performed no more than 6 months before the day of the interview were included in the analysis, and in the absence of such data, a new endoscopy was requested.

The following conditions were considered to be endoscopic alterations for the purposes of clinical correlation: duodenal and gastric ulcer, erosive esophagitis, and acute gastric mucosal injury.

To characterize the CKD, 20 mL of blood was collected before the hemodialysis session so that the creatinine and urea levels could be measured. The samples were processed using the modified Jaffé method for creatinine analysis, and absorbance spectrophotometry for urea analysis. All results were confirmed in duplicate experiments according to good clinical laboratory practices.

There was no calculation of a sample size number, as we intended to include all patients who gave their informed consent. A convenience sample was chosen.

The continuous variables were expressed as the mean and standard deviation, and the categorical variables were expressed as a relative frequency.

## Results

A total of 97 patients were included. From that number, two refused to undergo a new endoscopic exam and were therefore excluded from the study, leaving a sample of 95 patients. Table 1 shows the demographic and clinical characteristics of this group of patients, with a higher number of men (56.84%),

**Table 1** Clinical and demographic data of patients (N=95)

Variable	Value
Age, years	49.78±11.85
Caucasian, %	60
Male, %	56.84
Diabetes, %	25.26
Hypertension, %	100
Smoking, %	3.15
Urea, mg/dL	154.37±42.58
Creatinine, mg/dL	11.37±3.72
Proton pump inhibitor, %	71.57
Salicylic acid, %	78.94
Glomerular filtration rate, mL/minute/1.73 m <sup>2</sup>	5.87±4.90
<i>Helicobacter pylori</i> , %	30.52
Time in hemodialysis, months	40.92±41.86

**Note:** All values are provided as mean and standard deviation, or percentage.

Caucasians (60%), proton pump inhibitor users (71.57%), and *Helicobacter pylori*-infected subjects (30.52%).

About 82 patients had to perform an endoscopy, as they had not performed one in the last 6 months. Another 13 could retrieve their results from the file records.

Table 2 shows the gastric region in which the endoscopic alterations were found. The most common site of involvement was the antrum (55.79%), followed by the gastric body (28.42%).

Table 3 highlights the endoscopic alterations, with erosive gastritis being the most frequent form of the condition (77.08%), followed by enanthematous gastritis (50%). Regarding the endoscopic alterations considered to cause symptoms, a low frequency was observed, with only 4.17% of the cases having gastric ulcer and 14.58% of the cases having erosive esophagitis. There were no cases of acute gastric mucosal injury in this cohort.

## Discussion

Patients with CKD receiving dialytic treatment often have dyspepsia and symptoms related to this disorder.<sup>1</sup>

One of the reasons for this association is the lower clearance of gastrointestinal peptides, such as gastrin, motilin, cholecystokinin, glucagon, substance P, and gastrin-releasing peptide, in patients with CKD.<sup>6</sup> Gastrin, motilin and cholecystokinin, and glucagon play essential roles in gastrointestinal motility regulation.<sup>6</sup>

**Table 2** Gastric regions affected

Gastric region	N	%
Antrum	53	55.79
Body	27	28.42
Antrum and body	15	15.79
Total	95	100

**Table 3** Endoscopic alterations

Alteration	N (%)
Erosive esophagitis	14 (14.58)
Nonerosive esophagitis	20 (20.83)
Erosive gastritis	74 (77.08)
Enanthematic gastritis	48 (50)
Hemorrhagic gastritis	3 (3.13)
Erosive bulboduodenitis	12 (26.67)
Enanthematic bulboduodenitis	6 (6.25)
Gastric ulcer	4 (4.17)
Duodenal ulcer	1 (1.04)

In patients with angiodysplastic lesions, high blood pressure, coronary insufficiency, and congestive cardiac insufficiency, the risk for digestive bleeding is higher in the event of CKD. This risk can consequently lead to acute gastric mucosal injuries and peptic ulcers.<sup>1</sup>

Another involved factor is delayed gastric emptying as a result of gastric dysmotility, a disorder that favors the onset of dyspepsia in CKD patients. The predisposition for dysmotility is higher in men than in women, and it is related to differences in the emptying of liquids, solids, and semisolids.<sup>6,7</sup>

Interestingly, a recent study showed that the worsening of renal function had no correlation with the presence of functional or organic dyspepsia and gastroesophageal reflux disease, as previously hypothesized.<sup>8</sup>

The prevalence of endoscopic duodenitis is also higher in hemodialysis patients than in those undergoing conservative treatment.<sup>9</sup> This finding diverges from the results obtained in the current study, in which we found that the frequency of erosive and enanthematic gastritis was high and the frequency of endoscopic duodenitis was low.

Although such endoscopic alterations were found, they did not exclusively justify the presence of the symptoms by themselves. Abnormalities such as enanthematic gastritis, enanthematic bulboduodenitis, and erosions are common, but they have no correlation with the existence of dyspeptic symptoms.<sup>9,10</sup>

The finding of the antrum and body regions of the stomach as the main sites of involvement is consistent with the previously studied series.<sup>9</sup>

Another issue to be accessed is that serum urea levels are not correlated with the duration of CKD but with the progression of the loss of kidney function. In hemodialysis patients, its predialytic levels are correlated with a higher ingest of protein, worse dialysis adequacy, and nutritional status.<sup>11</sup>

In conclusion, this study has identified the endoscopic alterations that are most frequently observed in hemodialysis patients. Enanthematic and erosive gastritis were the most common forms observed among these patients.

## Disclosure

The authors report no conflicts of interest in this work.

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