Duodenogastric Reflux and its Relationship to Dyspeptic Symptoms of Patients with Cholecystectomy

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Summary

In order to investigate the frequency of duodenogastric reflux (DGR) and its relationship to gastric mucosal changes and post cholecystectomy symptoms, we studied 46 cholecystectomized patients retrospectively (group I), 9 patients with gall stones before and after cholecystectomy (group II) and 9 healthy controls (group III).

In group I, DGR was detected in 28(60.9%) of cases endoscopically and in 10(21.7%) cases scintigraphically. Histological examinations showed bile gastritis in 4(8.7%) cases. DGR was not detected in any case in group II before cholecystectomy and in group III. Postoperative examinations showed endoscopic DGR in 4(44.4%), scintigraphic DGR in 3 (33.3%) and bile gastritis in 1(11.1%) cases in group II. DGR was found to be unrelated to dyspeptic symptoms of cholecystectomized patients was the presence of bile gastritis on histological examination. These results show that DGR frequently occurs after cholecystectomy unrelated to dyspeptic symptoms. Because of the presence of dyspeptic symptoms in all patients who had DGR associated with bile gastritis, it is thought that, bile gastritis may explain the complaints of certain patients.

Özet

Kolesisteptomili Hastalarda Duodenogastrik Reflü ve Dispeptik Yakınmalarla İlişkisi

Kolesisteptomiden sonra duodenogastrik reflünün (DGR) görüleme sikliğini ve bunun mide mukozası değişiklikleri ve post kolesisteptomili semptomları ile ilişkisini araştırmak amacıyla, 46 kolesisteptomili hasta retrospektif olarak (I. grup), safra kesesi taşı olan 9 hasta kolesisteptomili öncesi ve sonrası (II. grup) ve 9 sağlıklı kontrol olgusu (III. grup) çalışmaya alındı.

I. grupta, 28 (%60.9) olguda endoskopik ve 10'unda (%21.7) da sintigrifik olarak DGR saptandi. Histolojik incelemede, 4(%8.7) olguda safra gastrit bulguları görülüd. II. grupta 4(44.4) olguda endoskopik DGR, 3'ünde (%33.3) sintigrifik DGR ve 1 (%11.1) olguda safra gastriti saptandi. DGR nın dispeptik yakınları ile ilişkisi yoktu. Kolesisteptomili hastaların dispeptik yakınlarıyla ilişkisi olan tek bulgu, histolojik incelemede safra gastritini varlığıydı.

Bu sonuçlar, kolesisteptomidir sonra dispeptik yakınları ilişkili olmasının DGR nın sık olarak geliştiğini göstermektedir. DGR ile birlikte safra gastrit olarak tüm olgularda dispeptik semptomları varlığı, safra gastritinin, hastaların bir kısının yakınlarınınızı izah edebileceğini düşündürmektedir.

Introduction

Cholelithiasis is a common disease in almost all parts of the world. Although cholecystectomy successfully relieves symptoms in most patients with cholelithiasis, some dyspeptic complaints persist or new gastrointestinal symptoms develop postoperatively in 15 to 20 percent of them(1,2). Some causes for these symptoms such as common bile duct stones, peptic ulcer and pancreatitis can be detected by various cause can be identified.

Several investigators have provided evidence that duodenogastric reflux (DGR) increases after cholecystectomy and may cause gastric mucosal damage and dyspeptic symptoms. In experimental studies, bile salts have been demonstrated to disrupt the gastric mucosal barrier(3) and, in rats the intragastric instillation of bile resulted in the formation of acute gastric ulcer(4). It is thought that the mucosal barrier to ionic movement of sodium and hydrogen ions is broken by bile salts(5,6). This results in back diffusion of hydrogen ions and loss of hydrogen
ions from lumen, with resultant mucosal damage (6,7).

The purpose of this study was to investigate the frequency of DGR and the possible relationship between DGR, gastric mucosal damage and dyspeptic complaints in cholecystectomized patients.

**Material And Methods**

In this study, three groups were examined. Group I: 46 cholecystectomized patients with or without dyspeptic symptoms were studied. There were 39 women and 7 men with a mean age of 53.2±13.1 years (range 22 to 78). Mean postoperative duration was 78.4±91.5 (1-360) months. 36 cases had dyspeptic symptoms, the others were asymptomatic. Group II: 9 patients with cholelithiasis were studied before and 10-24 (mean:19.4±4.2) months after cholecystectomy. Eight of them were female and 1 was male. Mean age of them was 47.8±17.8 years (20-69).

Group III (control group): 9 healthy volunteers with no history of upper gastrointestinal disease or surgery were studied. There were 7 women and 2 men with a mean age of 48.2±15.9 years (21-67)

All cases underwent upper gastrointestinal endoscopy after a topical pharynx anesthesia. The presence or absence of bile in stomach and DGR were noted. The cases who belched during endoscopy were excluded. Two biopsy specimens from antrum, body and fundus of the stomach were taken for histological examination and rapid urease test. A case was regarded as Helicobacter pylori (Hp) positive, when characteristic spiral shaped microorganisms were seen on histological examination and/or urease test was positive in any of the biopsy specimens.

In addition to endoscopic examination, DGR was also investigated by cholecintigraphy. After an overnight fast, the subjects were positioned supine under the camera. 5mCi Tc 99m HIDA was injected intravenously and serial camera images of the upper abdomen were obtained at 1 minute intervals for 60 minutes (Figure-1). Data were also stored in the computer for further analysis and quantification. In order to outline the stomach while avoiding overlap of the left lobe of the liver, the subjects were asked to swallow an oral solution of 500 uCi Tc 99m sulfur colloid (SC) at the end of the dynamic study while lying supine without changing position. Two static images were recorded before and after administration of Tc 99m SC (Figure 2-3). Time-activity curves were carried out by defining areas of interest over the stomach, liver and background. If an activity was detected in the region of the stomach and a rise stomach time-activity curve, DGR was accepted as positive, scintigraphically.

Chi-square test was used to compare the results between the groups and p values greater than 0.05 were regarded as nonsignificant.

**Results**

Group I: 36 (78.3%) of 46 cholecystectomized patients in group I had dyspeptic complaint. DGR was detected endoscopically in 24(66.7%) of cases with dyspeptic complaints and in 4(40%) of those without dyspepsia. 28(60.9%) cases had endoscopic DGR in group I totally. There was no significant difference in the presence of endoscopic DGR between cholecystectomized subjects with and without dyspeptic symptoms.

DGR was detected scintigraphically in 10(21.7%) of 46 cases in group I, being 7(19.4%) of 28 dyspeptic cases and 3(30%) of those without dyspepsia. No statistical difference was found in the presence of scintigraphic DGR between the cases with and without dyspepsia.

In 7(15.2%) cases, DGR was detected in both endoscopic and scintigraphic examinations.

Histological evidence of nonspecific chronic gastritis were found in 24(76.9%) of 31 cases in whom DGR was detected endoscopically and/or scintigraphically, and in 12(80%) of those in whom DGR was not detected with the both methods (p<0.05). Nonspecific chronic gastritis was also found in 28 (77.8%) of 36 dyspeptic cases and in 8 (80%) of those without dyspepsia (p>0.05). Histological examination showed bile gastritis in 4(14.3%) cases with endoscopic DGR and 1(10%) case with scintigraphic DGR. All cases with bile gastritis had dyspeptic complaints.

Hp was positive in 24(66.7%) of cases with dyspepsia and in 6(60%) of those without dyspeptic symptoms (p>0.05) (table 1). Group II: Before cholecystectomy, DGR was not detected in any of 9 cases neither endoscopic nor scintigraphically. In 6
(66.7%) cases, dyspeptic symptoms were present postoperatively. Postoperative examinations showed endoscopic DGR in 4(44.4%) and scintigraphic DGR in 3(33.3%) cases, unrelated to dyspeptic complaints. In one (11.1%) case, DGR was detected by both of the methods (Table 2).

Nonspecific chronic gastritis was present in 5 (55.6%) cases before cholecystectomy. Postoperative examinations showed nonspecific chronic gastritis in 6(66.7%) cases and bile gastritis in one (11.1%) case (Table 2).

3(50%) of cases with nonspecific chronic gastritis were symptomatic and remained 3(50%) cases were asymptomatic. The case with bile gastritis had dyspeptic symptoms. In this case, DGR was detected endoscopically and Hp was found to be negative. Hp was positive in 6(66.7%) cases preoperatively and did not change in any case after cholecystectomy (Table 2).

Group III: DGR was not detected in any of 9 control cases neither endoscopically nor scintigraphically. Histological examination did not show bile gastritis in any case, either. Nonspecific chronic gastritis was present in 5(55.6%) of them. Hp prevalence was found to be 66.7% (Table 2).

There were no significant differences between the frequency of chronic nonspecific gastritis and the prevalence of Hp in the three groups.

**Discussion**

In most previous studies, DGR has been reported as occurring only after gastric surgery, such as Billroth I, II, vagotomy and pyloroplasty(8-11). In 1973, Schudamore et al. (12) reported 189 cases of bile gastritis in which half of them had gallbladder disease or cholecystectomy. Warshaw (13) also reported severe bile gastritis in 10 cases occurring after cholecystectomy and established a connection between gastritis, biliary reflux and cholecystectomy.

The major physiopathological mechanism responsible for DGR after cholecystectomy is believed to be the loss of the bile reservoir, resulting in constant flow of bile into the stomach (14). Other factors could be speculated about such as hormonal changes, motility disturbances, neurogenic influences, postoperative anatomical changes and changes in the quality and quantity of bile (15).

Several investigators have also described that DGR and bile gastritis occur after cholecystectomy. Buxbaum (16) reported that, of 107 cases of bile gastritis, 51% occurred after cholecystectomy only, and 11% occurred after both a cholecystectomy and gastric surgery. Stahiber et al. (17) studied 20 patients with postcholecystectomy syndrome and 18 asymptomatic cases after cholecystectomy. They found that cholecystectomy was associated with increased DGR and that the symptomatic patients had the greatest changes. Brough et al. (18) also found a significant increase of fasting DGR after cholecystectomy in 20 patients with cholelithiasis. Svensson et al. (19) reported that the average bile acid reflux increased from 153±57 to 202±58 umol, 3.4±0.4 months after cholecystectomy in 23 patients with cholelithiasis and 1 with a polyp in gallbladder.

Although DGR is not an uncommon phenomenon after cholecystectomy, it does not necessarily cause gastritis and not all gastritis patients are invariably symptomatic (20-22). In a few patients, the gastric mucosa may be extremely vulnerable to the damaging effects of bile and bile gastritis occurs (20). Lee (20) studied 349 patients with endoscopically proved gastric ulcers or mucosal lesions and 349 age and sex matched asymptomatic controls. He found no statistical difference between the groups in the frequency of cholecystectomy. Hyvarinen et al. (21) also found no statistical difference in the prevalence of chronic antral and body gastritis between 106 cholecystectomized patients and 131 control cases. They concluded that there was no positive correlation between chronic gastritis and prior cholecystectomy.

We have previously reported preliminary results of 16 cholecystectomized patients and found that DGR was present in 13(81.2%) of them endoscopically and in 1 case (6.2%) scintigraphically. 15(93.8%) patients had histological evidence of chronic gastritis (23).

In the present study, it is shown that DGR is a frequent finding in cholecystectomized patients unrelated to their dyspeptic complaints. Although some investigators reported that DGR could be detected in some patients with cholelithiasis, DGR was not found in any of the patients in group II before cholecystectomy. Svensson et al. (19) reported that, among gallstone patients, bile acid reflux was seen...
more often in patients with a reduced opacification of the gallbladder on the cholecystogram than in those with stones in a gallbladder with a normal filling. This finding may explain the absence of DGR in our patients with cholecystitis before cholecystectomy. Although 78.3% of the cases in group I and 66.7% of cholecystectomized cases in group II had histological evidence of nonspecific chronic gastritis, bile gastritis was observed only in rates of 8.7% and 11.1%, respectively. The presence of nonspecific chronic gastritis was not related to DGR and dyspeptic symptoms of cholecystectomized cases. But, all patients with bile gastritis had DGR and dyspeptic complaints.

No statistical difference was found in the prevalence of Hp between cholecystectomized cases with and without DGR (table 4). It was also similar in cholecystectomized cases with and without dyspeptic symptoms and in the controls.

**As a result, this study shows that:**

- DGR frequently occurs in cholecystectomized patients, but it is usually unrelated to their dyspeptic symptoms.

- In certain patient, DGR is associated with bile gastritis and may explain their dyspeptic symptoms. But the cause(s) of the symptoms of the other cases remain(s) unclear.

- Hp infection does not seem to be a cause of post cholecystectomy symptoms.

**Kaynaklar**

6- Ritchie WR, Shearburn EW. Acute gastric mucosal ulcerogenesis is dependent on the concentration of bile salt. Surgery 1976, 80: 98-104.
22- Watson RGP, Love AM. Intragastric bile acid concentrations are unrelated to symptoms of flatulent dyspepsia in patients with an without gallbladder disease and post cholecystectomy.
Table 1: Results of cases in group 1

<table>
<thead>
<tr>
<th></th>
<th>Dyspeptic symptom (+) (n=36)</th>
<th>Dyspeptic symptom (-) (n=36)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Endoscopic DGR (+)</td>
<td>24 (66.7%)</td>
<td>4 (40%)</td>
<td>28 (60.9%)</td>
</tr>
<tr>
<td>Scintigraphic DGR (+)</td>
<td>7 (19.4%)</td>
<td>3 (30%)</td>
<td>10 (21.7%)</td>
</tr>
<tr>
<td>End. and/or scint. DGR (+)</td>
<td>24 (66.7%)</td>
<td>7 (70%)</td>
<td>31 (67.4%)</td>
</tr>
<tr>
<td>End. and scint. DGR (+)</td>
<td>7 (19.4%)</td>
<td>0 (0%)</td>
<td>7 (15.2%)</td>
</tr>
<tr>
<td>Nonsp. chronic gastritis</td>
<td>28 (77.8%)</td>
<td>8 (80%)</td>
<td>36 (78.3%)</td>
</tr>
<tr>
<td>Histological bile gastritis</td>
<td>4 (11.1%)</td>
<td>0 (0%)</td>
<td>4 (8.7%)</td>
</tr>
<tr>
<td>Helicobacter pylori (+)</td>
<td>24 (66.7%)</td>
<td>6 (60%)</td>
<td>30 (65.2%)</td>
</tr>
</tbody>
</table>

Table 2: Results of cases in group II ve and IIIp

<table>
<thead>
<tr>
<th></th>
<th>Group III (control) (n=9)</th>
<th>Group II Preoperative (n=9)</th>
<th>Group II Preoperative (n=9)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Endoscopic DGR (+)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>4 (44.4%)</td>
</tr>
<tr>
<td>Scintigraphic DGR (+)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>3 (33.3%)</td>
</tr>
<tr>
<td>End. and/or scint. DGR (+)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>6 (66.7%)</td>
</tr>
<tr>
<td>End. and scint. DGR (+)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>1 (11.1%)</td>
</tr>
<tr>
<td>Nonsp. chronic gastritis</td>
<td>5 (55.6%)</td>
<td>5 (55.6%)</td>
<td>6 (66.7%)</td>
</tr>
<tr>
<td>Histological bile gastritis</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>1 (11.1%)</td>
</tr>
<tr>
<td>Helicobacter pylori (+)</td>
<td>6 (66.7%)</td>
<td>6 (66.7%)</td>
<td>6 (66.7%)</td>
</tr>
</tbody>
</table>
**Table 3:** Results of cases in group II according to presence or absence of dyspeptic symptoms after cholecystectomy.

<table>
<thead>
<tr>
<th></th>
<th>Dyspeptic symptom (+)</th>
<th>Dyspeptic symptom (-)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(n=6)</td>
<td>(n=3)</td>
</tr>
<tr>
<td>Endoscopic DGR (+)</td>
<td>4 (66.7%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Scintigraphic DGR (+)</td>
<td>1 (16.7%)</td>
<td>2 (66.7%)</td>
</tr>
<tr>
<td>End. and/or scint. DGR (+)</td>
<td>4 (66.7%)</td>
<td>2 (66.7%)</td>
</tr>
<tr>
<td>End. and scint. DGR (+)</td>
<td>1 (16.7%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Nonspr. chronic gastritis</td>
<td>3 (50%)</td>
<td>3 (100%)</td>
</tr>
<tr>
<td>Histological bile gastritis</td>
<td>1 (16.7%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Helicobacter pylori (+)</td>
<td>4 (66.7%)</td>
<td>2 (66.7%)</td>
</tr>
</tbody>
</table>

**Table 4:** The prevalence of Hp in patients with dyspeptic symptoms according to presence or absence of DGR.

<table>
<thead>
<tr>
<th></th>
<th>Helicobacter pylori (+)</th>
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<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>End. and/or scint. DGR (+)</td>
<td>18 / 28 (64.3%)</td>
</tr>
<tr>
<td>End. and scint. DGR (-)</td>
<td>10 / 14 (71.4%)</td>
</tr>
</tbody>
</table>

**Figure - 1.** Dynamic cholescintigraphic images of a patient without DGR.

**Figure - 2.** Static scintigraphic images of a patient without DGR, before and after administration of Tc 99m SC.

**Figure - 3.** Static scintigraphic images of a patient with DGR, before and after administration of Tc 99m SC.