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Original Article

Study of long-term outcomes of cholecystectomy at cholelithiasis

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ABSTRACT

Currently, publications on the stage-by-stage progression of complications of cholecystocholedocholithiasis suggest that after cholecystectomy, the gastrointestinal tract also undergoes stage-by-stage disorders. It is these causal relationships about changes in the gastrointestinal tract after cholecystectomy that remain insufficiently studied. Therefore, this study aimed to improve the results of treatment of cholelithiasis complications in the postoperative period. 65 patients previously operated on for cholelithiasis (group A) were examined. For comparison, a group of patients who did not undergo cholecystectomy (group B) was taken - 54 people. Group A is divided into two subgroups, taking into account the duration of the long-term postoperative period: up to 1 year and after 3 years. Then the frequency of clinical signs and fibrogastroduodenoscopy data were compared with histological examination of the esophageal mucosa, stomach, and duodenum. When comparing the subgroups, it was found that with an increase in the duration of the long-term postoperative period, the pain syndrome changes, and some dyspeptic disorders increase. The consequence of cholecystectomy is changes in the morphological structure of the stomach and duodenum, which are manifested by mucosal erosions and reflux gastritis, which worsen the quality of life of patients in the long-term postoperative period.

Keywords: Cholelithiasis, Cholecystectomy, *H. pylori*, Fibrogastroduodenoscopy

Introduction

Currently, the incidence of cholelithiasis is high all over the world. The growth of this pathology continues. At the same time, the number of various complications does not decrease [1-3]. In such cases, when performing surgical intervention, minimally invasive operations are always preferred [4]. Although there are still attempts to treat cholelithiasis using laparotomy and medicinal methods [5, 6].

At the same time, performing cholecystectomy, even in a minimally invasive way, is not a guarantee against the subsequent development of various pathologies associated with digestive disorders. After performing surgery on the biliary tract, pain may develop, localized in the upper floors of the abdominal cavity [7-9]. Moreover, they are not uncommon and can be observed in 5-40% of cases [10]. According to other literature data, performing cholecystectomy leads to the development of pathology of the gastrointestinal tract even more often, reaching 84.6% of observations [11-13].

The pathogenesis of these disorders can be explained by the loss of the gallbladder and changes in the dynamics of bile intake into the duodenum [14]. As a result, there is an increased content of microorganisms in the duodenum [15, 16]. Inflammation of the

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mucous membrane of the upper gastrointestinal tract leads to the development of dyskinesia [17]. At the same time, there is a decrease in the functional ability of the gastrointestinal sphincters on the one hand and intestinal disorders on the other [18]. This can contribute to the development of diarrhea, which is also caused by the appearance of deconjugated bile acids in the intestine [19-21].

Publications on the stage-by-stage progression of complications of cholecystocholedocholithiasis suggest that after cholecystectomy, the gastrointestinal tract also undergoes stage-by-stage disorders [22-25]. It is these causal relationships about changes in the gastrointestinal tract after cholecystectomy that remain insufficiently studied. This study aimed to improve the results of treatment of cholelithiasis complications in the postoperative period.

Materials and Methods

The data of 65 patients (group A) obtained by random sampling were analyzed in the Republican Clinical Hospital of the Ministry of Health of Kabardino-Balkarian Republic. The age ranged from 38 to 72 years (average 55±3.4 years). There were 14 men (21.5%) and 51 women (78.4%). Thus, female patients were operated on more than 3 times more often.

The criteria for inclusion in the study were the presence of cholecystectomy for cholelithiasis, and a history of chronic calculous cholecystitis in adult patients (over 20 years old). A similar approach was proposed by Cha *et al*. [26].

The exclusion criteria were met by those patients whose terms of surgical intervention exceeded 1 year but did not reach 3 years. Thus, those patients who were operated on "at the exit" from postoperative rehabilitation and those who were in the "final", long-term postoperative period were included in the analysis. Their age range consisted of persons under 20 years of age and over 75 years of age with concomitant somatic diseases occurring in severe form or at the stage of exacerbation [27].

For comparison, we formed group B consisting of 54 non-operated patients with chronic calculous cholecystitis. The average age of patients in group B was 54±4.9 years. There were 41 (75.9%) females and 13 (24.1%) males. That is, both groups were comparable.

Depending on the time elapsed from the moment of the operation, the operated patients of group A were divided into subgroups 1 and 2 **(Figure 1)**. Group A more often consisted of patients of subgroup 1, whose history of cholecystectomy did not exceed one year – 34 (52.3%) people. In subgroup 2, the duration of the operation in the anamnesis was three years or more, there were slightly fewer of them – 31 (47.7%).

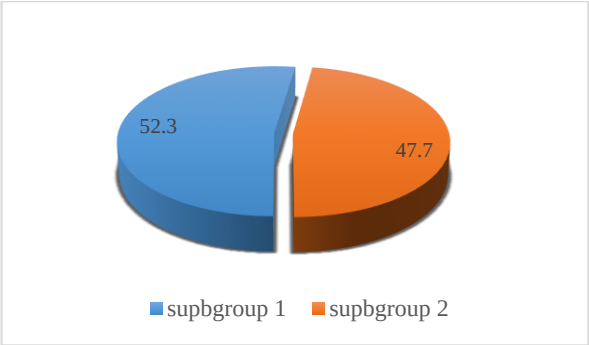

Figure 1. Distribution of group A patients depending on the duration of the postoperative period (%)

In addition to the generally accepted clinical and laboratory studies, fibrogastroduodenoscopy (FGDS) was mandatory, in which not only a visual assessment of the upper parts of the digestive system was performed, but also, regardless of the presence of endoscopic changes in the mucosa, a targeted biopsy was performed [28, 29]. The staining of the preparations was carried out with hematoxylin-eosin [30]. To determine *H. pylori*, a histo-bacterioscopic method was used, which was supplemented by a rapid urease test [31].

The study was carried out with the permission of the local ethics committee of the Kabardino-Balkarian State University named after Kh. M. Berbekov. The patients were given an explanation of the goals and objectives of the study; after which they gave written consent.

The obtained results were subjected to statistical processing, which included the determination of the Student's reliability criterion.

Results and Discussion

In group A, a clinical study in 29 (44.6%) cases showed the presence of isolated and rare complaints of gastrointestinal pain after cholecystectomy. Although the remaining 36 (55.4%) people in the postoperative period presented distinct complaints of moderate intensity pain syndrome. This was either indistinctly localized in the upper abdomen, in the right hypochondrium, or the epigastrium [32]. It is worth noting that all persons in group A had flatulence, belching, bitterness in the mouth, nausea, and periodic vomiting, which is dyspepsia [33, 34].

In group A patients, more than half – 34 (52.3%) of the examined patients had non-localized pain in all parts of the abdomen **(Figure 2)**. Less often - in 21 (32.3%) patients, moderate pain was observed in the right hypochondrium. In the epigastric region, pain syndrome was observed much less frequently – in 10 (15.4%) cases. In group B, there were other results. In 36 (66.7%) patients, the pain was localized in the right hypochondrium, in 12 (22.2%) – in the epigastrium, and only in 6 (11.1%) – non-localized pain in all parts of the abdomen.

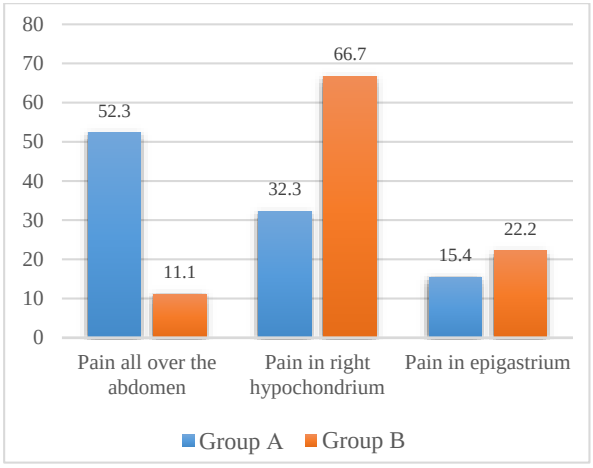

Figure 2. Localization of pain syndrome in patients in groups A and B (in %)

The types and frequency of dyspeptic disorders in both groups are shown in **Figure 3**.

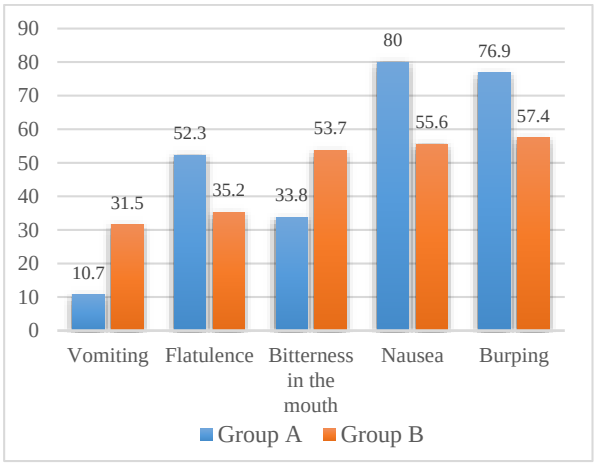

Figure 3. Types and frequency of dyspeptic disorders in groups A and B (%).

In group A, vomiting complaints were rare – in 7 (10.7%) patients, and in group B, such symptoms were 3 times more than 17 (31.5%). Flatulence was more common in group A – 34 (52.3%) cases than in group B – 19 (35.2%). Bitterness in the mouth became less frequent in group A – 22 (33.8%) cases than in group B – 28 (53.7%). Nausea was observed more often in group A – 52 (80.0%) cases than in group B – 30 (55.6%). Belching in patients of group A was observed more often – in 50 (76.9%) cases than in group B – in 31 (57.4%) cases.

In FGDS, changes in the upper gastrointestinal tract of different localization were combined but differed in groups. Patients after cholecystectomy (group A) had more than 2 times more patients with chronic duodenitis – 18 (27.7%), compared with non-operated (group B) - 7 (12.9%) **(Figure 4)**.

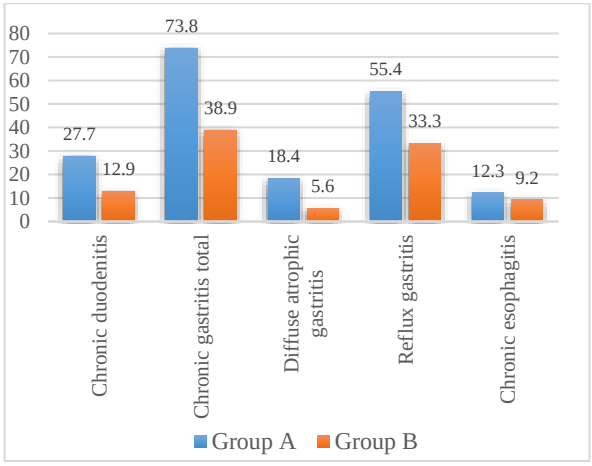

Figure 4. The nature and frequency of endoscopic changes in the upper gastrointestinal tract in groups A and B.

In group A, there were almost 2 times more patients with gastritis – 48 (73.8%) cases than in group B – 21 (38.9%). Among them, diffuse atrophic gastritis in group A began to be observed 3 times more often: group A – 12 (18.4%) cases, group B – 3 (5.6%). The frequency of reflux gastritis associated with biliary reflux after surgery increased from 18 (33.3%) cases in group B to 36 (55.4%) in group A. The frequency of chronic esophagitis in group A also increased: group A – 8 (12.3%) cases, group B – 5 (9.2%).

When examining the morphological picture of the obtained biopsies of the esophagus, stomach, and duodenum, there was also a spread of inflammatory and dysplastic changes to all upper gastrointestinal tracts [35] **(Figure 5)**.

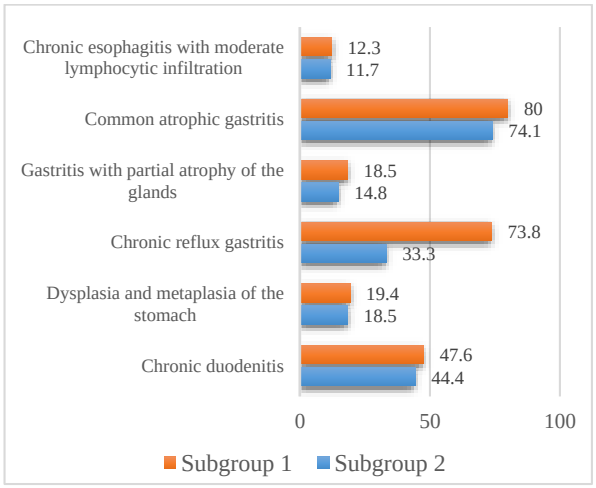

Figure 5. Morphological picture of the obtained biopsies of the esophagus, stomach, and duodenum

The presence of chronic esophagitis with signs of moderate lymphocytic infiltration was detected in subgroup 1 in 8 (12.3%) of the examined patients and in group 2 in 6 (11.7%). Morphological signs of widespread atrophic gastritis in group 1 were observed in 52 (80%) patients, and in subgroup 2 – in 40 (74.1%); gastritis with signs of partial glandular atrophy in subgroup 1 was observed in 12 (18.5%) patients and subgroup 2 – in 8 (14.8%). Signs of duodenal bile discharge into the stomach with the development of reflux gastritis were often found in

subgroup 1 in 48 (78.8%) patients and less often in subgroup 2 in 18 (33.3%). Dysplasia and metaplasia of the gastric mucosa were also observed equally frequently: in subgroup 1 – in 13 (19.4%) patients and subgroup 2 – in 10 (18.5%) [36]. The histological pattern characteristic of chronic subatrophic duodenitis was observed in subgroup 1 in 31 (47.6%) patients and in subgroup 2 in 24 (44.4%) patients. In subgroup 1, after cholecystectomy, the urease test for the determination of *H. pylori* was negative in 22 (33.8%) patients, and in subgroup 2 – in 30 (55.5%). The presence of *H. pylori* in the coccal form in subgroup 1 was detected in 17 (26.1%) cases, in group 2 – in 9 (35.2%).

As a result of the conducted studies, various changes in the upper gastrointestinal tract were found in patients after cholecystectomy, both in nature and localization. They have clinical manifestations in the form of pain, disorders of the gastrointestinal tract, as well as endoscopic symptoms of inflammation of the esophagus, stomach, and duodenum, confirmed histologically [37]. This coincides with the literature data, which also established a link between the removed gallbladder and changes in the gastrointestinal mucosa after surgery [38, 39]. Thus, recent studies describe that gastroenterologists can identify and histologically identify the following changes: erosive lesions of the gastric mucosa, atrophic lesions of the stomach and duodenum, reflux gastritis, dysplasia, and metaplasia in the stomach [40-43]. Notably, all these issues were observed in this study [44].

Since more than half – 34 (52.3%) patients who underwent cholecystectomy in the long-term postoperative period, reaching up to 1 year, had pain in the upper abdomen, and a third – 21 (32.3%) patients had moderate pain in the right hypochondrium, this indicates such gastrointestinal disorders, which, apparently, will require postoperative medication and correction. They affect the quality of life after cholecystectomy [45-47].

Although periodic vomiting and bitterness in the mouth after cholecystectomy has become less common, removal of the gallbladder often leads to such functional disorders of the gastrointestinal tract as dyspepsia. After surgery, compared with non–operated individuals, the frequency of some of these symptoms increased: nausea – from 55.6% to 80%, flatulence – from 35.2% to 52.3%, belching - from 57.4% to 76.9%. Compared with non-operated patients, after cholecystectomy, the number of chronic duodenitis increased more than 2 times, reflux gastritis increased from 33.4% to 55.5%, the percentage of diffuse atrophic gastritis increased from 5.6% to 10.8%, catarrhal esophagitis – from 9.3% to 12.3%.

It should be noted that the frequency of negative urease tests after cholecystectomy decreased, which may indicate a high probability of infection of the stomach with *H. pylori* [48-50]. With an increase in the duration of the recovery period after cholecystectomy, an increase in the frequency of inflammatory changes in the upper gastrointestinal tract is confirmed by histological changes in the mucous membrane of the esophagus, stomach, and duodenum [51, 52].

Conclusion

The long-term postoperative period after removal of the gallbladder for GI is accompanied by dysfunction of the digestive tract, which is manifested by pain and dyspeptic phenomena. The consequences of cholecystectomy are changes in the morphological structure of the esophagus, stomach, and duodenum, which is manifested by inflammation, mucosal erosions, and reflux. With an increase in the time that has elapsed since cholecystectomy, there is an increase in the frequency of pathological manifestations in the gastrointestinal tract, that is, the removal of the gallbladder performed for the gastrointestinal tract leads to an increase in macro- and microendoscopic changes in the upper gastrointestinal tract.

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Ethics statement: The study was carried out with the permission of the local ethics committee of the Kabardino-Balkarian State University named after Kh. M. Berbekov. The patients were given an explanation of the goals and objectives of the study; after which they gave written consent.

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