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Clinical impact of laparoscopic cholecystectomy to chronic calculous cholecystitis: A retrospective study

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Abstract

Persistent inflammation with recurrent episodes of biliary colic or pain from cystic duct obstruction is referred to as chronic cholecystitis. The aim of the retro-prospective clinical study was to compare these two methods of laparoscopic and classical cholecystectomy, in operated patients, from January 2017 to December 2019 in the abdominal surgery ward in Gjilan. Important data for the study are taken from the operative list, history of the disease, adequate list compiled specifically for this study. The study included 389 patients with chronic calculous cholecystitis. According to the results obtained for calculous diseases of the biliary system are predisposed persons with blood group O, Rh-positive, with 44.2%, followed by group A + with 29.5%, group B + with 14.7%. Other blood groups and Rh factors are below 6.5%. Statistical point of view is significant ($p < 0.05$). The study analyzed, C-reactive protein (CRP) values in both Research Group (RG) and Control Groups (CG); CRP by gender; and by age group. RG recorded 76.9% of females with increased CRP values> 6, while 23.1% of males. The percentage difference in statistical terms is significant $p < 0.05$. The results obtained have shown that there are no significant differences in the presentation of intra-operative complications in terms of gender and age, to both methods. Patients operated on by the laparoscopic methods; they were physically faster rehabilitated. Continuing education in laparoscopic surgery is important for successful management.

Keywords: Chronic calculus cholecystitis, Classic cholecystectomy, Laparoscopic cholecystectomy

Introduction

Persistent inflammation with recurrent episodes of biliary colic or pain from cystic duct obstruction is referred to chronic cholecystitis (1,24). Historically, chronic cholecystitis is characterized by increased sub-serosa, sub-epithelial fibrosis, and mononuclear cell infiltration (2,23). Diagnostic imaging with ultrasonography or CT should be performed in patients with signs of chronic calculous cholecystitis as well as adequate preclinical laboratory examinations (3,25). C-reactive protein is known in laboratory diagnosis as the most studied plasma protein, which serves as a marker of inflammation, which is an important indicator of inflammation, tissue necrosis and trauma, etc. The best treatment for patients with symptomatic cholelithiasis is laparoscopic cholecystectomy (4,22). Laparoscopic cholecystectomy is an advanced method that is preferred for patients with chronic calculous cholecystitis, acute calculous cholecystitis, sub-acute calculous cholecystitis, gallbladder hydrops, gallbladder empyema, and gallbladder and inflammatory bowel gangrene, hinders the clear view of important structures. It is believed that between 10-15% of the adult population in the world has stones in the gallbladder. Contemporary surgical literature shows that 3-10% of patients who undergo cholecystectomy have stones in the extrahepatic bile duct (5,18). Many studies conducted by Catena with a collaborator showed that the laparoscopic method is the first option for intervention of chronic calculus cholecystitis, it is an effective and safe method in the hands of an experienced surgeon and the patient stay in the hospital is significantly shorter in compared to the open method (6,21). We have most often used the Hasson technique. Nowadays, minimally invasive surgical intervention is the trend in world surgery (7,17).

Material and Methods

The aim of the paper is to show the medical rationale of laparoscopic cholecystectomy alongside the open method; determining the frequency of cholelithiasis by gender and age, highlight the most common etiological factors. As well as comparison with the results of other authors from the literature. Data were obtained from the protocol of patients from January 2017 to December 2019 in the surgery of the regional hospital of Gjilan, where the intervention is

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performed with laparoscopic surgery with the endoscopic method and from the protocol of classical surgery with the open method. For this paper will be processed 389 patients with chronic calculous cholecystitis aged 21 years to 82 years, who were examined, diagnosed, and operated and followed 2 years after surgery, of the work is prospective. In terms of treatment, they are divided into two groups: the research group (RG) where laparoscopic treatment was applied to 190 patients and the control group (CG) with open treatment which included 199 patients. The sick will be divided into two groups (female and male).

The female group consists of 312; while males are 77 sick. 152 women underwent laparoscopic surgery; while 160 were operated by the open method. Laparoscopic method operated on 38 males; and 39 males with the open method. Here we are dealing with a homogeneous research study group. Anamnesis was taken from all the patientes, objective examination was performed and routine and specific hematological-biochemical examinations were performed for patients preparing for bile duct surgery.

Statistical processing

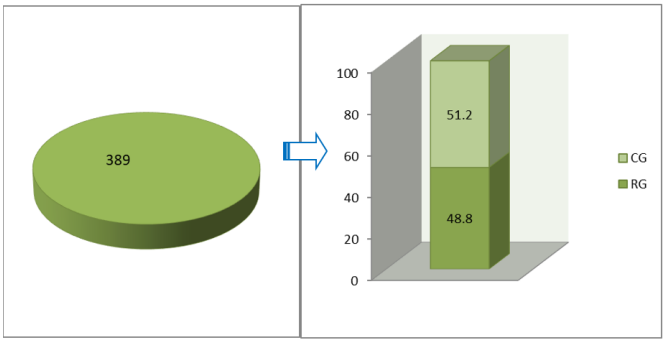
Statistical analysis was performed with the statistical program: SPSS 17.0, the collected data were processed with the help of the following statistical methods: Databases are formed using specific software for this purpose. Their processing is performed with the help of standard descriptive and analytical methods. Mean and standard deviation were analyzed. Significant difference was tested with t-test as well as Mann-Whitney U test. 95% CI, the statistical significance of the error level less than 0.05 (p) is defined. The results are presented in tabular and graphical form.

Results

In the prospective study participate 398 patients with chronic cholecystitis at the Regional Hospital in Gjilan. In terms of treatment, they are divided into two groups: research group (RG) where laparoscopic treatment - 190 was applied and control group (CG) with classical open treatment - 199 (Tab. 1). The percentage difference recorded between laparoscopy - 48.8% and classical open treatment - 51.2% according to the differentiation test, statistically it is not significant p> 0.05 (p = 0.5034). It is a homogeneous research study group.

Table 1. Overview of patients involved by gender and treatment groups

Gender	Total		RG		CG	
	N	%	N	%	N	%
M-♂	77	19,8	38	20,0	39	19,6
F-♀	312	80,2	152	80,0	160	80,4
Total	389	100.0	190	100,0	199	100,0



Graph 1. Overview of the group of patients included in the study by treatment

In this study, 80.2% of patients are female (F), while 19.8% are male (M). The percentage difference recorded between the sexes according to the differentiation test, in statistical terms is significant p <0.05, (Tab. and Graph. 1).

Table 2. Overview of the average age of patients of both groups

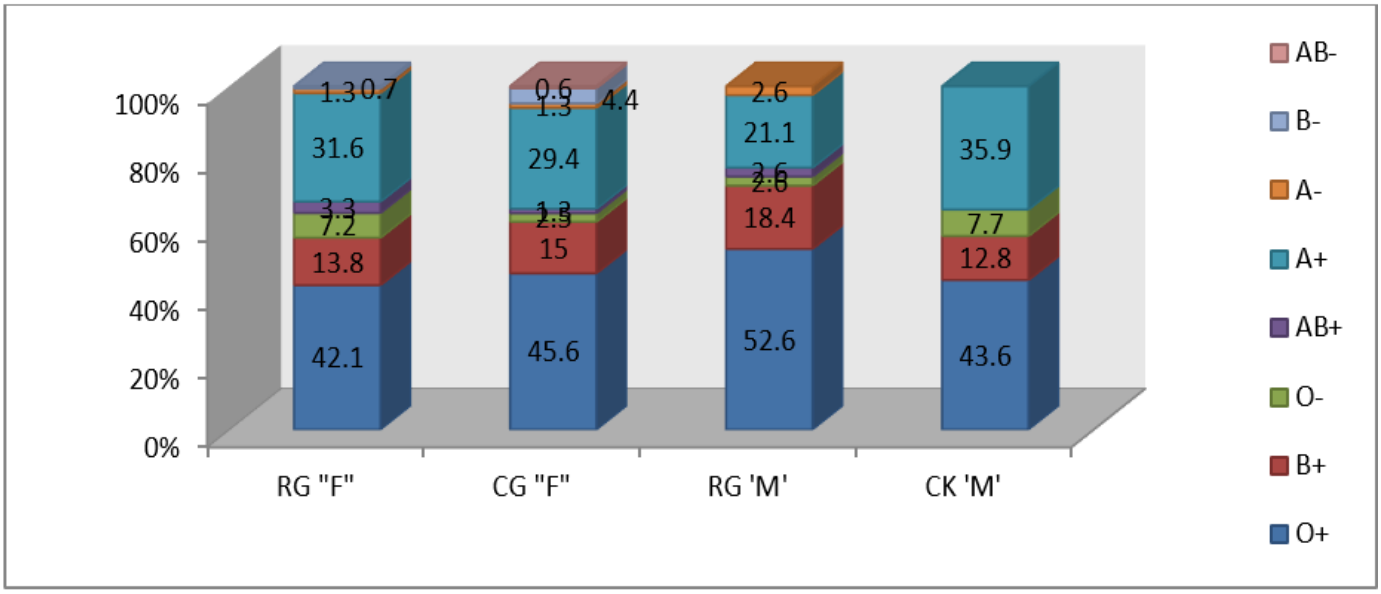
Group	$\bar{X}$	N	Standard Deviation	Minimum	Maximum
RG	50,4	190	13,67428	21,0	84,0
CG	51,7	199	13,88341	21,0	85,0

The mean age of patients in RG is 50.4 ± 13.7 years, minimum 21, and maximum 84 years. The mean age of patients in CG is 51.7 ± 13.9 years, minimum 21, while maximum 85 years (Tab. 2).

Table 3. Overview of the average weight of patients in both groups and by gender

RG	$\bar{X}$ - M	$\bar{X}$ - F	t-test	P	No - M	No - F	Stad. Dev. - M	Stad. Dev. – F
Weight	81,73684	77,75658	1,621201	0,106650	38	152	15,98764	12,86506
CG	$\bar{X}$ - M	$\bar{X}$ - F	t-test	P	No - M	No - F	Stad. Dev.- M	Stad. Dev.- F
Weight	82,2307	75,1687	3,152168	0,001874	39	160	11,56779	12,76799
P	0,87675	0,07559						

The difference between the mean weight in CG in males and the weight of males from RG according to t-test, statistically is not significant p> 0.05, (p = 0.876753). The difference between the mean weight in CG in females and the weight of females from RG, according to t-test, statistically is not significant p> 0.05, (p = 0.07559), (Tab.3).



Graph. 2. Overview of patients by blood group and gender

The percentage difference of the representation of blood groups and Rh factors that is recorded between RG and CG by sex, is statistically not significant p> 0.05, (Graph.2).

Table 4. Statement of average duration of hospitalization by gender and group and t-test overview

	$\bar{X}$ – M	$\bar{X}$ – F	t-test	p	No - M	No - F	Stand.Dev. – M	Stand.Dev. – F
RG	2,1	1,5	1,650373	0,100536	38	152	2,469155	1,748861
CG	9,3	9,2	0,472696	0,636953	39	160	0,510352	0,531847
t-test	-17,7691	-53,2002						
P	0,000000	0,00						

The difference recorded in relation to the average duration of hospitalization between males in both groups RG and CG, is statistically significant p <0.05 (p = 0.000000), while the difference between females in both groups RG and CG, statistically significant is p <0.05 (p = 0.00) (Tab.4).

Table 5. Mirror the average temperature in both groups

Group	$\bar{X}$	No	Stand.Dev.	Minim.	Maxim.
RG	36,3	190	0,431906	36,1	38,1
CG	36,5	199	0,553672	35,8	38,0

The mean temperature of patients in GH was 36.3 ± 0.4, minimum 36.1, and maximum 38.10C. The average temperature of patients in GK was 36.5 ± 0.6, minimum 35.8, while maximum 38.00C. (Tab. 5). According to the Mann-Whitney U-test, the two groups is statistically is not significant p> 0.05.

Table 6. Overview of mean duration of antibiotic therapy by group, gender, and t-test overview

	$\bar{X}$ - F	$\bar{X}$ - M	t-test	P	No – F	No – M	Stand.Dev. - F	Stand.Dev.- M
CG	8,2	8,2	0,110596	0,912049	160	39	0,731131	0,683328
RG	1,5	2,0	-1,85070	0,065782	152	38	1,513029	2,330605
t-test	-50,4847	-15,8076						
p	0,00	0,000000						

The average duration of antibiotic therapy in GH in males is 2.0. 2.3, while in females it is 1.5 ± 1.5. The difference recorded between the mean values between the sexes, according to the t-test, statistically is not significant p> 0.05, (Tab. 6).

Table 7. Overview of patients in relation to analgesic therapy

CG	Total		F - ♀		M - ♂	
	N	%	N	%	N	%
Non-opoide	152	76,4	124	77,5	28	71,8
Opoide	47	23,6	36	22,5	11	28,2
Total	199	100.0	160	100.0	39	100.0
RG						
Non-opoide	169	88,9	139	91,4	30	78,9
Opoide	21	11,1	13	8,6	8	21,1
Total	190	100.0	152	100.0	38	100.0

Analgesics as therapy are recorded in patients of both groups. In RG, analgesics-analgesics are registered in 88.9% of patients, while opioids in 11.1%. In CG, analgesics are registered in 76.4%, while opioids in 23.6% (Tab. 7). According to the differentiation test, the percentage difference that is recorded between analgesic analgesics between the two groups and opioids between the two groups, statistically significant is p <0.05.

Table 8. Overview of postoperative complications in both groups and by gender

RG /Complication	Total		F		M	
	N	%	N	%	N	%
Grade I	6	3,2	4	2,6	2	5,3
Grade IIA	13	6,8	7	4,6	6	15,8
Absent	171	90,0	141	92,8	30	78,9
CG						
Grade I	3	1,6	3	1,9		
Grade IIA	19	9,5	16	10,0	3	7,7
Absent	177	88,9	141	88,1	36	92,3

Grade I is registered in 3.2% of RG patients, while in 6.8% Grade IIA is registered as a postoperative complication. In CG, 1.6% is registered Level I, while in 9.8% Level IIA (Tab. 8). The percentage difference recorded between Grade IIA in RG and CG is statistically significant p <0.05.

Table No. 9. Presentation of average CRP values, by gender and t-test overview

	$\bar{x}$ - M	$\bar{x}$ - F	t-test	P	No - M	No - F	Stand.Dev. - M	Stand.Dev. - F
RG	10,8	8,2	1,811150	0,071740	38	149	10,21003	7,375663
CG	12,3	9,3	1,823121	0,069801	39	160	10,77832	8,691852
t-test	-0,596179	-1,18965						
p	0,552851	0,235105						

The difference recorded between the mean CRP values between the sexes in both groups according to t-test, statistically it is not significant p> 0.05 (p = 0.071740; p = 0.069801) (Tab. 9).

Table 10. Presentation of the average size of calculi in both groups

Group	$\bar{x}$	N	Stand. Dev.	Minim.	Maxim.
RG	1,8	190	0,723699	1,0	3,3
CG	1,6	199	0,410828	1,1	2,7

Rank Sum - RG	Rank Sum - CG	U	Z	p-level	No - RG	No – CG
36498,00	39357,00	18353,00	-0,497960	0,618513	190	199

The average calculus size in RG is 1.8 ± 0.7, minimum 1.0, while maximum 3.3. The average calculus size in CG is smaller and reaches 1.6 ± 0.4, minimum 1.1, while maximum 2.7. According to the Mann-Whitney U-test, the difference between the mean size of calculi from RG and CG is statistically not significant p> 0.05, (Tab. 10).

Discussion

The standard surgical method in the operative treatment of chronic calculous cholecystitis is laparoscopic and open cholecystectomy. Laparoscopic procedures today represent the "gold standard" in the treatment of these diseases. 389 patients with hospitalized chronic calculous cholecystitis were included in this prospective study. In terms of treatment, they were divided into two groups: the research group (RG) where laparoscopic treatment was applied to 190 patients; and the control group (CG) with classic open treatment where 199 patients were treated. In this study were included patients of both sexes: 80.2% of female (F) and 19.8% of male (M). The percentage difference between the two sexes according to the differentiation test is statistically significant (p <0.05). Al so in other authors in the studied diseases have dominated female patients. In one study, 400 patients with chronic calculous cholecystitis were included. The female patients were 72%, while the male patients were 28%. The gender structure of patients is therefore consistent with other authors on the prevalence of gallbladder disease (8, 9). The mean age of patients in the research group (RG) is 50.4 ± 13.7 years. The mean age of patients in the control group (CG) is 51.7 ± 13.9 years. According to the Mann-Whitney U-test, the difference in mean age between RG and CG is statistically insignificant (p> 0.05). Whereas some authors have used middle-aged patients operated with laparoscopy 56.70 years, while in patients operated with the classical method it is 61.5 years. Research by Swedish authors, Rosa A., et al., Has shown that the age structure is the same in patients with open cholecystectomy (14,18). Similar results have been presented by Leo J., et al. (10, 12). The average weight in the research group (RG) is 78.6. 13.6, while in the control group (CG) is 76.6. 12.8 kg. According to the t-test, the difference in statistical terms is not significant p> 0.05 (p = 0.136276). Leo J., et al. The same conclusions have been reached (12,19).

Various authors have shown subjective values by measuring pain with analog visual scale (VAS), (16,20) and it has been found that in laparoscopic cholecystectomy they had twice lower values, compared to the classical operated method. In order to clarify the etiopathogenesis of gallstone formation, blood groups were also analyzed. According to the results obtained from the genetic aspect for calculous diseases of the biliary system, persons with blood

group O, Rh-positive are predisposed, which in the literature we have not encountered in such an analysis. Further research is needed to investigate this predisposition of patients with Rh Rh-positive blood type. The aim of the study was to look at CRP values in the preoperative serum phase in both groups (RG and CG); CRP by gender; CRP according to indications; and by age group. Further studies are needed to verify the role of CRP in the occurrence of gallstones. The results obtained are in full accordance with the studies of, (12, 13). The average value of CRP in RG in males is 10.8. 10.2, while in females it is 8.2. 7.4. Both values are above the reference values (<6). The mean CRP value is highest in CG and in males it is 12.3 ± 10.8, while in females it is 9.3. 8.7. Both values are above the reference values (<6). The difference recorded between the mean CRP values between the sexes in both groups according to t-test, statistically it is not significant p> 0.05, (Tab. 9). In RG, the largest percentage are patients with intraoperative complications (Cuschnier scale) in grade I - mild grade - 84.2%, followed by grade II - moderate grade with 7.9%, with 0.7% grade III - severe grade and only in this group with 7.4% is registered the IV degree - conversion. The percentage difference recorded between grade I and other complication grade modalities is statistically significant p <0.05.

The average hospitalization of patients in the RG lasted 1.6 ± 1.9 days, minimum 1, and maximum 10 days. The average hospitalization of patients on CG lasted 9.2 ± 0.5 days, minimum 7 and maximum 10 days. According to the Mann-Whitney U-test, the difference between the mean values between the two groups is statistically significant p <0.05 (p = 0.00). According to the differentiation test, the percentage difference recorded between mild pain between the two groups and moderate pain between the two groups is statistically significant p <0.05. In RG, analgesics - non-opioids are registered in 88.9% of patients, while opioids in 11.1%. In CG, non-opioids are recorded at 76.4%, while opioids at 23.6%. According to the differentiation test, the percentage difference recorded between non-opioid analgesics between the two groups and opioids between the two groups is statistically significant p <0.05. Laparoscopic cholecystectomy also provides improved cosmetics and improved patient satisfaction compared to open cholecystectomy (13, 14). Small wounds on laparoscopic interventions are of insignificant pain, so a number of patients do not even require analgesics. Laparoscopic cholecystectomy is a faster, less cost-effective method than incisional cholecystectomy due to a shorter hospital stays (15, 16).

Conclusions

The results obtained have shown that there are no significant differences in the presentation of intraoperative complications in terms of gender, age in both methods. Patients operated with the laparoscopic method, as they have significantly less pain and recover faster physically, so the total hospitalization of these patients is shorter. According to the Mann-Whitney U-test, the difference between the mean size of cholecystitis from RG and CG is statistically significant (p <0.05). Study group (SG) with blood groups - O Rh factor - positive 44.2% (p <0.05). The highest RG percentage of patients in the study group (SG) who have CRP> 6 registered with chronic form 67.7% (p <0.05). Based on this it has been concluded that Laparoscopic Cholecystectomy is the "gold standard" in the treatment of patients with cholelithiasis. There has been no conversion because good education and ongoing training in laparoscopic surgery is very important for the final course of the operation successfully.

Conflict of interest

The authors declare no conflicts of interests.

Author's contributions

Both authors have made an equal contribution and share the first authorship.

Ethics approval

Approval was obtained for using patients' data in the present study and informed consent was obtained from all the patients who underwent surgery in our institution.

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