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Epidemiological and clinical assessment of patients undergoing Videolaparoscopic Cholecystectomy at a Curitiba teaching hospital

Análise do perfil clínico epidemiológico dos pacientes submetidos a Colecistectomia Videolaparoscópica em um hospital de ensino de Curitiba

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ABSTRACT

Objective: to assess clinical and epidemiological factors of patients undergoing video cholecystectomy at the Hospital da Cruz Vermelha do Paraná, Curitiba unit, operated from September 2016 to September 2018, as well as the influence of comorbidities, sex and advanced age on the postoperative prognosis, while in the hospital. **Methods:** Analytic retrospective study. The analyzed variables were obtained by the review of medical records. Statistical analyses were performed considering the significance level $p < 0.05$. **Results:** 389 patients, of whom 265 were women and 124 men, were included. The mean age was 51.5 years, 58.8% of the patients were diagnosed with at least one comorbidity, and 74.6% were overweight or obese. The incidence of intraoperative complications was 1.3%, postoperative 3.8% and, mortality, 0.3%. Some risk factors were identified as worse postoperative prognosis, such as Diabetes Mellitus, hypertension, presence of one or more comorbidities and mainly, advanced age, which was related to longer hospitalization times ($p < 0,001$), need of intensive therapy ($p < 0,001$), conversion to open surgery ($p = 0,003$) and postoperative complications ($p < 0,001$). Furthermore, the male sex was predictive of longer hospitalization times ($p = 0,003$) and need of intensive therapy ($p = 0,01$). **Conclusion:** the presence of comorbidities, male sex, and advanced age are predictive factors of bad prognosis for patients undergoing video laparoscopic cholecystectomy.

Headings: Gallbladder. Cholecystectomy, Laparoscopic. Intraoperative Complications. Gallstones.

INTRODUCTION

Video laparoscopic cholecystectomy (VLC) was first performed in France, in 1987, by Philipe Mouret. It is currently the most common gastrointestinal surgical procedure carried out worldwide; with 700.000 procedures performed per year in the United States of America, alone. In Curitiba, Brazil, cholelithiasis has a prevalence of 9.3% in individuals who are >20 years, and video laparoscopic cholecystectomy is the indicted surgical treatment[1].

Video laparoscopic surgery has multiple clinical benefits over the open technique. It is associated with smaller tissue trauma and confers better aesthetics, leading to enhanced postoperative recovery, with shorter length of hospital stay and decreased risk of operative wound infection. Therefore, it is the treatment of choice for cholelithiasis[2-7].

The improvements in the outcomes can be ascribed to the evolution of the technique, instruments, and surgical teams, which has helped to establish laparoscopy as the chosen approach. Those evolutions can further account for a decrease in mortality rate to approximately 0.1%, or even null, when the cholecystectomy is performed electively in patients with uncomplicated cholelithiasis[1,4,8-10].

Cholecystectomy indications include cholecystitis, cholelithiasis, choledocholithiasis, pancreatitis of biliary origin, or gallbladder tumor, and it is a general procedure in gastrointestinal surgical centers[2,4,7,8].

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Besides, the video technique has presented fewer complications than those observed in conventional surgery, such as biliary fistulas, bleeding, pneumoperitoneum and the dreaded, and often complicated, bile duct injury[3-5,7,8].

Complications of the video laparoscopic technique include vascular injury, lesions of intra-abdominal structures, biliary duct injury, post-cholecystectomy syndrome, biliary effusion, Mirizzi syndrome, venous thromboembolism, among others[10,11].

This study aimed to identify the clinical and epidemiological characteristics of patients undergoing laparoscopic cholecystectomy in a teaching hospital based in Curitiba as well as to assess the risk factors interfering with postoperative outcomes.

METHODS

This cross-sectional study was carried out at the Hospital da Cruz Vermelha de Curitiba (HCV). Medical records of patients undergoing VLC between September 2016 and September 2018 were reviewed. The project was approved by the ethics committee, and the study conducted according to the Resolution number 466/2012 of the National Health Council.

The hospital technology and information service provided a list of all the 546 VLCs performed within the defined study period. Patients >18 years, of all color, race, ethnicity, and sex, were included. Exclusion criteria were pregnancy, <18 years, history of more than three cholecystitis episodes, urgencies/ emergencies, gastroduodenal cancer, bile duct neoplasms, malignant diseases, and incomplete medical records.

For data collection, a self-developed questionnaire was used to acquire the following variables related to the patient's characteristics: sex, age, body mass index (BMI), time since diagnosis till the date of the operation, comorbidities, intraoperative time, intraoperative and postoperative complications. Data assessment encompassed rate of conversion to open surgery, intraoperative and postoperative complications, hospital stay, intensive care unit (ICU) admissions, and postoperative mortality. Analyses were restricted to the outcomes that occurred within the same hospitalization related to the surgical treatment.

RESULTS

546 patients underwent VLC during the study period. One hundred fifty-seven patients were excluded due to the exclusion criteria. Thus, the final sample size included 389 patients, of whom 265 (68.1%) were women, and 124 (31.9%) were men. The mean age was 51.5 years.

Comorbidities were reported for 229 patients, 128 with systemic arterial hypertension (SAH), 54 with dyslipidemia (DSLP), and 47 with diabetes mellitus (DM). History of previous bariatric surgery was reported in 16 cases. Information regarding body composition was obtained from 246 medical records, and 81 patients had a BMI ≥ 30kg/m².

The time between disease diagnosis and the operation date was less than 15 days in 101 cases (26%). 55 (14.1%) patients underwent surgery between 15 to 89 days after disease diagnosis, 111 (28.8%) patients between 3 months to one year after diagnosis, and 33 (8.5%) patients one year after diagnosis.

This information was not reported in 89 (22.9%) medical records. The mean time between disease diagnosis and surgical treatment was 178.3 days.

The mean intraoperative time was 88.4 minutes. Surgery duration was less than 75 minutes in 103 (26.5%) cases, in 113 (29.0%) cases the surgical procedure lasted between 75 to 89 minutes, in 111 (28.5%) cases the duration was between 90 to 120 minutes, and 62 (15.9%) procedures lasted longer than 120 minutes.

The mean hospital stay was 37.2 hours. 274 (70.4%) patients had hospital stay inferior to 24 hours, 56 (14.4%) patients had hospital stay between 24 to 72 hours, and 59 (15.2%) patients stayed for more than 72 hours.

Five patients had intraoperative complications, including 4 cases of bleeding and 1 of liver injury. Regarding postoperative complications, 15 (3.8%) were reported. The most common complications included 4 wound infection, 3 patients with wound bleeding, and 2 cases of acute pancreatitis. Single cases of choledocholithiasis, biloma, subcapsular hepatic hematoma, pleural effusion, acute renal failure, hypertensive crisis, and pneumonia were also reported. The laparoscopic procedure was converted to open surgery in 7 (1.8%) patients, and 23 (5.9%) patients needed ICU admission. The complications are described in table 1.

A 70-year-old patient, operated in February 2018 due to acute pancreatitis, with a previous history of biliary crises in the two previous months, died on postoperative day five. The patient history included a laparotomic excision of a benign abdominal tumor in 2008, and several comorbidities such as epilepsy, SAH, insulin-dependent DM, unexplained cardiopathy, generalized anxiety disorder, and in addition polypharmacy. There were no complications during the VLC, and the procedure lasted more than 120 minutes. After the operation, the patient was referred to the ICU due to the associated risk factors. On the first postoperative day, the patient presented with severe abdominal pain in the right hypochondrium. On the second postoperative day, the patient developed mental confusion, decreased level of consciousness, and worsening of the kidney function, being diagnosed with abdominal septic shock, progressing to asystolic cardiorespiratory arrest and death, on the following day.

Table 1. *Intraoperative and postoperative complications related to videolaparoscopic cholecystectomy.*

Complications	Frequency (N/%)
Intraoperative complications:	5 (1.3%)
Bleeding	4 (1.0%)
Liver injury	1 (0.3%)
Postoperative complications:	15 (3.8%)
Wound infection	4 (1.0%)
Wound bleeding	3 (0.7%)
Acute pancreatitis	2 (0.5%)
Death	1 (0.3%)
Conversion to open surgery	7 (1.8%)
ICU admission	23 (5,9%)

DISCUSSION

Elective cholecystectomy is the most common surgical procedure performed in the country for the treatment of gallbladder diseases, and the introduction of laparoscopic techniques led to dramatic changes in the surgical field[10,12-15].

The variable sex assumes particular importance when assessing vesicular lithiasis, considering there is a higher frequency, ranging from 61.9 to 90%, of female patients undergoing cholecystectomy, as reported in the literature[4,7,11,12]. This epidemiological characteristic was confirmed in our study, in which 68.1% of patients were women. The higher occurrence of vesicular lithiasis in women is due to estrogens, which increase the uptake of dietary cholesterol and its secretion in the bile, and it is also related to pregnancy, which unites the estrogen and progesterone effects, reducing biliary emptying[4,7,12,16].

Although divergent, recent research indicates that due to the delay in seeking medical assistance, in men, patients undergo treatment at a time of greater severity, worsening their prognosis. However, other authors do not support the association between sex and clinical outcomes. In our study, men had a predictive factor regarding longer hospital stay and ICU admission, but there was no association with other clinical outcomes, as described in table [29,17,18].

A significant advance allowed by the evolution of the video technique. Was undoubtedly the shortened surgical length and hospitalization. In this study, the mean surgical length was 88.4 minutes, and the mean postoperative hospital stay was 37.2 hours, which is comparable with the average time described in the literature[2,5,7,12]. The high variability in the surgery length can be attributed to factors such as changes in surgeons and assistants, changes in the hospital's clinical staff during the data collection period, epidemiological differences between patients, and the learning curve.

An age > 60 years old was shown to be a predictive factor for hospital stay, ICU admission, conversion from laparoscopy to open procedure, and postoperative complications, as shown in table 3, which is in accordance with Coelho et al.[14]. There was no statistical difference regarding intraoperative complications and death.

Table 2. *Association between age and operative outcomes in patients undergoing laparoscopic cholecystectomy.*

Outcome	Sex		p
	Men (n = 124)	Women (n = 265)	
	N (%)	N (%)	
Length of stay	-	-	0,003
Less than one day	75 (60.5%)	199 (75.1%)	-
More than one day	49 (39.5%)	66 (24.9%)	-
ICU admission	13 (10.5%)	10 (3.8%)	0.010
Intraoperative complications	2 (1.6%)	3 (1.1%)	0.511
Need for conversion	2 (1.6%)	5 (1.9%)	0.604
Postoperative complications	4 (3.2%)	11 (4.2%)	0.450
Death	0 (0.0%)	1 (0.4%)	0.681

Table 3. *Association between age range and operative outcomes in patients undergoing laparoscopic cholecystectomy.*

Outcome	Age range		P
	< 60 years (n = 275)	> 60 years (n = 114)	
	n (%)	n (%)	
Length of stay	-	-	<0.001
Less than one day	211 (76.7%)	63 (55.3%)	-
More than one day	64 (23.3%)	51 (44.7%)	-
ICU admission	5 (1.8%)	18 (15.8%)	<0.001
Intraoperative complications	2 (0.7%)	3 (2.6%)	0.153
Need for conversion	1 (0.4%)	6 (5.3%)	0.003
Postoperative complications	4 (1.5%)	11 (9.6%)	<0.001
Death	0 (0.0%)	1 (0.9%)	0.293

According to recent studies, advanced age is an independent predictive factor for increased surgical length and worse clinical outcomes, as in this population vesicular diseases presents itself in a more complex way[19,20].

In this study, obesity prevalence was 32.9%, and it was not associated with intraoperative and postoperative outcomes. According to the literature, such comorbidity is a risk factor for conversion to open procedure and worse postoperative prognostic[12,20].

The mean time between disease diagnosis and surgical treatment was 179.6 days, showing that immediate surgical intervention is not necessary for most of VLC indications.

Conversion to open surgery is an inherent risk of video laparoscopy, and there are several determining factors, such as the technical difficulty in dissecting the structures of the gallbladder pedicle due to anatomical abnormalities. In our sample, conversion was needed in 07 (1.8%) patients, comparable to data in the literature (0.09 to 11%) for elective procedures[2-4,7]. In this study, no bile duct injury was reported. The rates, reported in the literature for such complication, are about 0.2% for open procedures, demonstrating the importance of the surgeons' improved techniques and increasing experience[1,20].

The incidence of postoperative complications was low (3.9%), and it was associated with advanced age, the presence of DM, and SAH, which is in accordance with literature data, highlighting that the presence of comorbidities increases not only the risk of postoperative complications but also for conversion to open surgery. The association between at least one comorbidity and clinical outcomes is registered in table 4, the association between DM and clinical outcomes is described in table 5, and the association between SAH and clinical outcomes in table 6[9,20].

The only death case (0,3%) was observed in a patient with a high surgical risk, in accordance with the world statistics[1].

Table 4. *Association between the presence of at least one comorbidity and operative outcomes in patients undergoing laparoscopic cholecystectomy.*

Outcome	Presence of at least one comorbidity		p
	Yes (n = 160)	No (n = 229)	
	n (%)	n (%)	
Length of stay	-	-	0,343
Less than one day	115 (71,9%)	159 (69,4%)	-
More than one day	45 (28,1%)	70 (30,6%)	-
ICU admission	4 (2,5%)	19 (8,3%)	0,012
Intraoperative complications	2 (1,3%)	3 (1,3%)	0,664
Need for conversion	3 (1,9%)	4 (1,7%)	0,606
Postoperative complications	3 (1,9%)	12 (5,2%)	0,073
Death	0 (0,0%)	1 (0,4%)	0,589

Source: the authors (2019).

Table 5. *Association between diabetes mellitus and operative outcomes in patients undergoing laparoscopic cholecystectomy.*

Outcome	Diabetes Mellitus		p
	Presence (n = 47)	Absence (n = 342)	
Length of stay	-	-	0,111
Less than one day	29 (61,7%)	245 (71,6%)	-
More than one day	18 (38,3%)	97 (28,4%)	-
ICU admission	10 (21,3%)	13 (3,8%)	<0,001
Intraoperative complications	1 (2,1%)	4 (1,2%)	0,477
Need for conversion	0 (0,0%)	7 (2,0%)	0,403
Postoperative complications	5 (10,6%)	10 (2,9%)	0,025
Death	1 (2,1%)	0 (0,0%)	0,121

Source: the authors (2019).

Table 6. *Association between systemic arterial hypertension and operative outcomes in patients undergoing laparoscopic cholecystectomy.*

Outcome	Systemic arterial hypertension		p
	Presence (n = 128)	Absence (n = 261)	
	n (%)	n (%)	
Length of stay	-	-	0,036
Less than one day	82 (64,1%)	192 (73,6%)	-
More than one day	46 (35,9%)	69 (26,4%)	-
ICU admission	15 (11,7%)	8 (3,1%)	0,001
Intraoperative complications	3 (2,3%)	2 (0,8%)	0,202
Need for conversion	3 (2,3%)	4 (1,5%)	0,419
Postoperative complications	10 (7,8%)	5 (1,9%)	0,007
Death	1 (0,8%)	0 (0,0%)	0,329

Source: the authors (2019).

CONCLUSION

In our study, the population who underwent elective cholecystectomy was predominantly female, and older than sixty years. The prevalence of comorbidities was 58.8%, and the most common were SAH, obesity, and DM. A low rate of intraoperative and postoperative complications, conversion to open surgery, ICU admission and death was observed, demonstrating the low risk of this elective procedure when performed under safe conditions. Among the predictive factors associated with worse outcomes, advanced age was associated with a prolonged hospital stay, higher need for ICU admission, increased rate of conversion to open surgery, and an increased rate of postoperative complications. Regarding other factors, the presence of SAH, DM, male sex were risk factors for postoperative complications.

Finally, the authors highlight the need for a more intensive monitoring, by the clinicians, towards patients at higher risk for complications such as those with older age and underlying diseases, as well as males in order to reduce the global morbidity and mortality related to the procedure.

R E S U M O

Objetivo: *Analisar o perfil clínico e epidemiológico de pacientes submetidos a colecistectomia por vídeo no Hospital da Cruz Vermelha do Paraná, unidade de Curitiba, operados no período de setembro de 2016 a setembro de 2018, assim como a influência de comorbidades, sexo e idade avançada no prognóstico pós-operatório, durante o mesmo internamento.* ***Métodos:*** *Estudo retrospectivo analítico, com dados coletados por revisão de prontuários. Análises estatísticas realizadas, considerando nível de significância p < 0,05.* ***Resultados:*** *389 casos foram incluídos, sendo 265 mulheres e 124 homens. A média de idade foi de 51,5 anos, 58,8% dos pacientes eram portadores de pelo menos uma comorbidade e 74,6% dos doentes tinham sobrepeso ou eram obesos. A incidência de complicações intraoperatórias foi de 1,3%, pós-operatórias de 3,8% e, a mortalidade, de 0,3%. Foram identificados fatores clínicos relacionados a pior prognóstico pós-operatório, como DM, HAS, presença de uma ou mais comorbidades e, destacadamente, idade avançada, que relacionou-se com maior tempo de internamento (p < 0,001), necessidade de UTI (p < 0,001), conversão para operação aberta (p = 0,003) e risco de complicações pós-operatórias (p < 0,001). Além disso, o sexo masculino foi preditivo para maior tempo de internamento (p = 0,003) e maior necessidade de UTI (p = 0,01).* ***Conclusão:*** *o perfil clínico-epidemiológico corresponde àquele exposto na literatura e a presença de comorbidades, o sexo masculino e a idade avançada são fatores preditivos de mau prognóstico na evolução pós-operatória de pacientes submetidos a colecistectomia videolaparoscópica.*

Descritores: *Vesícula Biliar. Colecistectomia. Laparoscopia. Complicações Intraoperatórias. Colelitíase.*

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