

EPIDEMIOLOGICAL AND CLINICAL PROFILE OF PATIENTS UNDERGOING CHOLECYSTECTOMY: A NARRATIVE REVIEW

PERFIL EPIDEMIOLÓGICO E CLÍNICO DOS PACIENTES SUBMETIDOS À COLECISTECTOMIA: UMA REVISÃO NARRATIVA

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ABSTRACT

Objective: Therefore, the present study aims to identify the epidemiological and clinical profile of patients undergoing cholecystectomy with the aim to facilitate early diagnosis and treatments. **Methodology:** This is a narrative review of a qualitative and descriptive nature, using articles from 2018 to 2023 that provided information about the epidemiological and clinical profile of patients undergoing cholecystectomy, searched in the following databases: VHL, Embase, Pubmed. **Results:** Were found 303 articles, 25 of which were in the VHL; 98 Embase, 180 in Pubmed, after applying the exclusion criteria, remaining 20 articles. **Conclusion:** The epidemiological profile of patients undergoing cholecystectomy consists of women with an average age of 53 years, who are overweight and smokers. Regarding the clinical profile, the main manifestation is abdominal pain in the right upper quadrant, followed by nausea and vomiting; with cholelithiasis being the main indication for performing cholecystectomy, followed by cholecystitis, also the main complication encountered.

Keywords: acute cholecystitis; biliary tract diseases; cholelithiasis; clinical epidemiology.

RESUMO

Objetivo: O presente estudo possui como objetivo identificar o perfil epidemiológico e clínico dos pacientes submetidos à colecistectomia a fim de facilitar o diagnóstico e tratamentos precoce. *Metodologia:* Trata-se de uma revisão narrativa de caráter qualitativo e descritivo, utilizando artigos de 2018 a 2023 contendo informações acerca do perfil epidemiológico e clínico dos pacientes submetidos à colecistectomia, pesquisados nas seguintes bases de dados: BVS, Embase, Pubmed. *Resultados:* Foram encontrados 303 artigos, sendo 25 na VHL; 98 Embase, 180 no Pubmed, após aplicar os critérios de exclusão, restaram 20 foram incluídos

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no presente estudo. *Conclusão: O perfil epidemiológico dos pacientes submetidos à colecistectomia é composto por mulheres com idade média de 53 anos, com sobrepeso e tabagistas. Quanto ao quadro clínico, a principal manifestação é dor abdominal no quadrante superior direito, seguida de náuseas e vômitos; sendo a colelitíase a principal indicação para a realização da colecistectomia, seguida da colecistite, também a principal complicação encontrada.*

Palavras-chave: *colecistite aguda; colelitíase; epidemiologia clínica; doenças biliares.*

INTRODUCTION

Cholecystectomy is one of the most performed abdominal surgeries in Brazil, with several causes leading to this surgical procedure, such as cholelithiasis, choledocholithiasis and biliary pancreatitis. Cholelithiasis is the main cause for surgical indication, which consists of the presence of gallstones in the gallbladder and which, due to obstruction, can cause inflammation thereof. The incidence of these stones in the Brazilian population is 9.3%, however, due to the modern lifestyle that favors weight gain, the prevalence of this condition tends to increase. This is because overweight and obesity are risk factors for stone formation, in addition to female sex, multiple parity and age (De Souza Coutinho, 2022; Irigonzê *et al.*, 2020; Ribeiro, 2020).

Most patients with cholelithiasis are asymptomatic, with the stone being found by chance on ultrasounds, but in symptomatic cases, the main complaint is abdominal pain in the right hypochondrium (RHC) accompanied by nausea and vomiting. These symptoms can be cyclical, resolving within 30 minutes, lasting up to 6 hours and returning after days, especially after fatty meals, when the pain becomes constant and there is fever, there is a case of acute cholecystitis, which demands intervention within the next 72 hours of admission due to the risk of complications. Therefore, it is urgent to diagnose cases before they progress to the acute inflammatory form, in order to avoid complications, which can lead to death (Irigonzê *et al.*, 2020; Ribeiro, 2020).

Thus, early diagnosis is essential to avoid complications which can be fatal. The definitive treatment is surgical, consisting of removal of the gallbladder (cholecystectomy), which is performed via laparoscopy or laparotomy. The first is the surgical route indicated because it is minimally invasive and with less risk of surgical wound infection and length of stay, as well as greater comfort for the patient (De Souza Coutinho, 2022; Ribeiro, 2020).

Therefore, it is necessary to evaluate the epidemiological and clinical profile of patients recommended for cholecystectomy, for the purpose of contribute to early diagnosis and treatment, which is the objective of the present study.

METHODOLOGY

FEATURE OF THE STUDY

The present study consists of a narrative review, of a qualitative and descriptive nature, focusing on studies with the epidemiological and clinical profile of patients undergoing cholecystectomy.

CONDUCTING THE INVESTIGATION

The search was carried out in November 2023 in the following databases: Virtual Health Library (VHL), Embase and Public Medlines (PubMed) of the National Library of Medicine, from 2018 to September 2023 without any language restrictions.

The descriptors were selected from the Health Sciences Descriptors (DECS), in English for all bases, as follows: ((Epidemiological) AND (clinical)) AND (Cholecystectomy); epidemiological AND ('clinical'/exp OR clinical) AND ('cholecystectomy'/exp OR cholecystectomy) AND [2018-20; epidemiologically][All Fields] OR "epidemiology"[MeSH Terms] OR "epidemiology"[All Fields] OR "epidemiologic"[All Fields] OR "epidemiological"[All Fields]) AND ("ambulatory care facilities"[MeSH Terms] OR ("ambulatory"[All Fields] AND "care"[All Fields] AND "facilities"[All Fields]) OR "ambulatory care facilities"[All Fields] OR "clinic"[All Fields] OR "clinics"[All Fields] OR "clinical"[All Fields] OR "clinically"[All Fields] OR "clinicals"[All Fields] OR "clinics"[All Fields]) AND ("cholecystectomy"[MeSH Terms] OR "cholecystectomy"[All Fields] OR "cholecystectomies"[All Fields])) AND ((y_5[Filter]) AND (ffrft[Filter]) AND (fft[Filter]))

SELECTION CRITERIA

The criteria used for selection were: articles in portuguese, english or spanish; providing in the abstract and/or full text information about the clinical and epidemiological profile of patients undergoing cholecystectomy; patients over 18 years old; be available free of charge; have been published between the years 2018 and 2023. Duplicates were excluded.

RESULTS

In total, we found 303 articles, of which 25 in VHL; 98 Embase, 180 on Pubmed. Of these, 57 were duplicates, leaving 246 for selection by title and summary, with 57 texts selected for full reading. Finally, 20 articles were included in the study.

Of these 4 were from 2019, 1 from 2018, 5 from 2020, 4 from 2021, 3 from 2022, 3 from 2023. Regarding the study model, 3 consisted of cross-sectional articles, 13 retrospective cohort, 1 case series, 2 prospective cohorts, 1 clinical study.

In relation to the epidemiological profile, as shown in table 1, there was a predominance of females (65.94%) and the average age was 53.7 years. Regarding BMI, the average was 28.21 kg/m², characterizing it as overweight (table 1).

Table 1 - Epidemiological profile of patients undergoing cholecystectomy.

Author	Year	Study	Gender	Average Age	Average IMC	Comorbidities
Irigonhê <i>et al.</i>	2020	Study Transversal	68.1% F 31.9% M	51.5	35.84% > 30	32.9% SAH; 13.88% Dyslipidemia 12% DM; 8.8% CD 38.7% DM
Balasubramanian <i>et al.</i>	2018	Cohort Retrospective	85% F 14.9% M	45	-	8.8% AKD 2.4% CKD 50.4% Obesity 28.6% Morbid Obesity
Qandeel <i>et al.</i>	2021	Cohort Retrospective	83% Functional 66.7% Polyp 74% Lithiase (F)	51 Lithiase 49 Polyp 44 Functional	-	-
Thunnissen <i>et al.</i>	2023	Study Transversal	75.7% F 24.3% M	49.4	28.6	-
Ramírez-Giraldo <i>et al.</i>	2023	Cohort Retrospective	61.8% F 38.2% M	65	25.7	10.5% DM 39.7% SAH 12% COLD 4.5% CKD 11.3% CD 1.2% LD
Lee	2019	Cohort Retrospective	48.8% F 51.2% M	46.48	25	-
Bass <i>et al.</i>	2022	Cohort Prospective	53.8% F 46.2% M	64.5	28,5	48.8% Smoker 34.9% Ex-smoker 28.2% SAH 17.1% DM
Chen	2020	Cohort Retrospective	54% F 46% M	56.9	-	7.22% ACD 0.3% Obesity 1.57% Alcoholism
Granel-Villach <i>et al.</i>	2020	Cohort Prospective	42.3% F 57.7% M	61	-	-
Milone <i>et al.</i>	2019	Series of Cases	66.6 F 33.3 M	62	26.2 26.7 34.2	33.3% SAH 33.3% DM
Johansson <i>et al.</i>	2021	Cohort Retrospective	65.7% F 34.3% M	51	-	-
Cochrun <i>et al.</i>	2023	Retrospective Clinical Study	69.18% F 31.2% M	48	32.8	-

Wennmacker <i>et al.</i>	2019	Cohort Retrospective	58.4% F 41.6% M	5.6	30.3	-
						39.3% OBESITY 8.6% CD 3.3% COLD 4.7% Obstructive Sleep Apnea 6.7% Asthma 26% Smoker 15.3% DM
Giles <i>et al.</i>	2020	Cohort Retrospective	60.7% F 39.3% M	51.5	-	-
Lindqvist <i>et al.</i>	2021	Cohort Retrospective	66.6% F 33.3% M	50.6-biliary colic 55- complications	-	-
Sandblom <i>et al.</i>	2022	Cohort Retrospective	63.8% F 36.2% M	73.4% < 80 23.8% 65-80 2.8% > 80	-	-
Olijnyk <i>et al.</i>	2022	Study Transversal	80% F 20% M		-	-
Pujante Menchó <i>et al.</i>	2021	Cohort Retrospective	-	63	-	-
Gach <i>et al.</i>	2020	Cohort Retrospective	74.7% F 25.3% M	53.9	-	-
Zhao <i>et al.</i>	2019	Cohort Retrospective	53.7% F 46.3% M	53.6 F 55.6 M	24.5	-

Source: Own authorship (2024).

Legend: M-Male; F-Female; SAH-Systemic Arterial Hypertension; DM-Diabetes Mellitus;
COLD-Chronic Occlusive Lung Disease; CD-Cardiovascular Disease; ACD-Atherosclerotic Cardiovascular Diseases;
LD-Liver Disease; CKD-Chronic Kidney Disease; AKD-Acute Kidney Disease.

The predominant comorbidity among the studies was obesity (39.57%), followed by smoking (37.4%), high blood pressure (33.5%) and type II diabetes mellitus (22.98%).

Regarding the clinical profile, the predominant symptoms were: pain in the right hypochondrium (RHC) (93.15%), followed by biliary colic (50.23%), nausea and vomiting (52.95%), and flatulence (48.5%) . Regarding the reasons that led to cholecystectomy, we have: symptomatic cholelithiasis (44.15%), acute cholecystitis (40.60%), and pancreatitis of biliary origin (11.10%). However, 03 studies dealt only with patients with cholelithiasis, 04 with cholecystitis, 01 with choledocholithiasis (table 2).

Table 2 - Clinical profile of patients undergoing cholecystectomy.

Author	Symptoms	Complementary Exams	Indication for Surgery
Giles <i>et al.</i>	-	-	Cholecystitis 58% Symptomatic Cholelithiasis 18.7% Acute Cholecystitis
Lindqvist <i>et al.</i>	58% Biliary Colic	-	3.23% Biliary Pancreatitis 8.3% Choledocholithiasis/ Increased Bilirubin
Sandblom <i>et al.</i>	48.2% Biliary Colic	-	48.2% Symptomatic Cholelithiasis 49.3% Acute Cholecystitis/ Pancreatitis/ Cholangitis Cholelithiasis
Olijnyk <i>et al.</i>	-	-	Cholelithiasis Biliary Pancreatitis Choledocolithiasis
Pujante Menchó <i>et al.</i>	-	-	Cholecystitis
Zhao <i>et al.</i>	-	-	Cholelithiasis
Wennmacker <i>et al.</i>	15.7% Fever 42.2% Murphy+ 22.2% Biliary Colic	Average Leukocytes: 11000 leukocytes/field Average Total Bilirubin: 15 µmol/L ALP: 91 /L GGT: 62 U/l USG +:47.6% Thickening of the biliary wall on USG (>4mm): 47% Diagnosis of Acute Cholecystitis on USG: 47.6%	8.9% Acute Cholecystitis 22.2% Symptomatic Cholelithiasis 8.1% Biliary Pancreatitis 5.4% Choledocholithiasis 3.2% Cholangitis 2.2% Biliary Sepsis
Johansson <i>et al.</i>	21.7% Symptoms From Choledocholithiasis	-	Choledocolithiasis
Milone <i>et al.</i>	100% Murphy+ 100% Fever 66.6% N/V 100% Pain in RHC 33.3% Postprandial Pain	Case 1: 16300 leukocytes/field Case 2:13460 leukocytes/field Case 3: 15180 leukocytes/field	Acute Lithiasic Cholecystitis
Granel-Villach <i>et al.</i>	Symptomatic Cholelithiasis	-	Symptomatic Cholelithiasis and Complications
Bass <i>et al.</i>	92.3% Pain in HCD 53.8% N/V 24.3% Fever 17.5% Anorexia 2.7% Pruritus 11.8% Juandice	-	45.6% Cholecystitis 21.0% Biliary pancreatitis 13.9% Cholangitis 18% Cholelithiasis 1.5% Common bile duct fistula
Lee	52.1% Symptoms	-	39.7% Cholecystitis 22.3% Polyps 34.7% cholelithiasis 3.3 Gallbladder Adenomyosis

Ramírez-Giraldo <i>et al.</i>	36.3% Biliary Colic	Average Leukocytes: 11300 leukocytes/field Average Total Bilirubin: 1.0 mg/dL Average ALP: 119 mg/dL Average TGO: 31.5 mg/dL Average TGP: 39.0 mg/dL	36.3% Symptomatic cholelithiasis 12.3% Biliary pancreatitis 14.5% Choledocholithiasis 48.5% Acute cholecystitis
Thunnissen <i>et al.</i>	74.1% Biliary Colic 94% Pain in HCD 75.4% Irradiation to Back 55% Dyspepsia 35% Nausea 58.7% Food Limitation 17.1% Vomiting 48.5% Flatulence 39.1% Burps	-	Cholelithiasis
Qandeel <i>et al.</i>	Functional: - 93.1% Chronic Biliary Symptoms - 6.9% Acute Biliary Pain Polyp: -100% Chronic Biliary Symptoms	-	1.26% Functional 0.74% Polyp 97.9% Cholelithiasis
Balasubramanian <i>et al.</i>	42.33% Biliary Colic	-	42.33% Symptomatic Cholelithiasis 32.25% Acute Cholecystitis 10.88% Biliary Pancreatitis 4.83% Acalculous Cholecystitis 8.0% Choledocholithiasis 1.61% Choledochoduodenal Fistula

Source: Own authorship (2024).

Legend: ALP-Alkaline Phosphatase; GGT-Gamma Glutamyl Transferase; TGP-Pyruvic Transaminase; TGO-Glutamic Oxaloacetic Transaminase; USG-Ultrasound.

Finally, only 03 articles provided these data, which indicate mild leukocytosis (11000). Regarding imaging findings, the average number of vesicles with thickened walls on USG was 46.57%.

DISCUSSION

EPIDEMIOLOGICAL PROFILE

Gender

The female sex prevailed among those undergoing cholecystectomy, with an incidence that varies between 61.9% and 90% in the literature (De Souza Coutinho, 2022). This aspect was evidenced in the results of this research, as it was found that, on average, 65.94% of people undergoing cholecystectomy are women. This can be explained through the action of estrogens, which promote

the uptake of dietary cholesterol and its excretion in the bile, in addition to reducing the elimination of bile acids, favoring the formation of stones (Irigonhê *et al.*, 2020; Lemos, 2019).

Furthermore, previous gestational history also plays an important role, as progesterone reduces gallbladder motility and emptying. In this sense, the risk of stone disease is proportional to the number of pregnancies, so that it increases from 1% in nulliparous women to 3.2% in women with 4 or more pregnancies (Irigonhê *et al.*, 2020; Lemos, 2019). Finally, we can mention the use of oral contraceptives and hormone replacement therapies, which increase hormonal levels of estrogen and progesterone (Araujo, 2022).

Age

According to the epidemiological profile identified in the research, patients undergoing cholecystectomy are predominantly above the fifth decade, with an average age of 53.7 years, considering that age is a risk factor for the development of cholelithiasis and cholecystitis, increasing the risk by up to 10 times. This occurs due to the decrease in the activity of the enzyme cholesterol 7- α -hydroxylase, required in the formation of bile acids, increasing the concentration of cholesterol in the bile fluid, which, combined with the reduction in bladder motility, delays bile emptying, facilitating stone formation (Linsbinski Pereira *et al.*, 2020; Pak, 2016).

Furthermore, the age group shows a relationship with sex, given that greater exposure to estrogen hormones can stimulate the production of gallstones, subsequently developing a condition that requires surgical intervention (Yoshimasa Shimabukuro, 2017). The study carried out by Koshiol *et al.* (2021) also proves this relationship, in which, through a regional survey, it was noted that 26% of women aged between 50-74 years have already undergone cholecystectomy.

Comorbidities

The main comorbidities that constitute a risk factor for cholelithiasis and, consequently, its complications are: obesity and overweight, dyslipidemia, diabetes mellitus (DM), systemic arterial hypertension (SAH), cardiovascular diseases (CVD). Moreover, genetic factors may also predispose to the condition, accounting for 25% of the overall risk (Silva *et al.*, 2023; Sun *et al.*, 2022).

Obesity and overweight, as well as dyslipidemia, can cause supersaturation of cholesterol in bile by increasing hepatic synthesis without compensatory increase in bile salts and phospholipids, leading to supersaturation, reduced motility and stasis of bile flow, which favors the formation of pronucleation proteins, among which mucin stands out, which binds to cholesterol crystals (Kebkalo *et al.*, 2020). Such an event is crucial for the constitution of biliary sludge - a precursor of cholesterol stones (90% of cholelithiasis cases) (Silva *et al.*, 2023).

Besides, an association was noted between adiposity, especially in the central region of the body, with the precipitation of stones, with overweight women having twice the risk of having symptoms of cholelithiasis, while those with morbid obesity (BMI ≥ 45 kg/m²) have a seven times greater risk of presenting such symptoms, compared to lean women with BMI < 24 kg/m² (Pak, 2016).

Thus, in view of the above, the study carried out detected that the average BMI of people undergoing cholecystectomy was 28.13%, classifying it as overweight, however, two authors brought in their articles an average classified as obesity (Lemos, 2019). Also, Irigonhe (2020) describes 35.84% of patients with a BMI above 30.

However, rapid weight loss, as occurs after bariatric surgery and low-calorie diet, also increases the risk of cholelithiasis and its complications, given that, in these cases, cholesterol stores in adipose tissue are mobilized into the bloodstream, increasing the hepatic uptake and favoring the supersaturation of cholesterol in bile (Araujo, 2022; Sun *et al.*, 2022).

Furthermore, Diabetes Mellitus (DM) is also associated with cholelithiasis, as the greater demand for insulin causes accentuated production of cholesterol and hypomotility of the gallbladder, which is caused by damage to the autonomic nervous system (Lemos, 2019; Silva *et al.*, 2022). According to Aldana *et al.* (2018) and Irigonhê *et al.* (2020), there is an incidence between 7.9% and 8.6% of cholelithiasis in diabetics, which is reflected in the considerable number of diabetic patients undergoing cholecystectomy.

Among the comorbidities most observed in the studies analyzed, systemic arterial hypertension (SAH) was one of those that stood out, with an average percentage of 33.5%. This aspect can be explained using thiazide or loop diuretics, as they cause an increase in serum levels of total cholesterol and LDL-c (Araujo, 2022).

Regarding cardiovascular diseases, it is known that cholelithiasis is intrinsically related to their occurrence, since their pathophysiology is linked to excess cholesterol. Another explanation may be linked to the inflammatory process generated by cholelithiasis, which favors atherosclerosis, vascular lesions in the cerebrovascular system and increases the risk of cardiovascular diseases (Irigonhê *et al.*, 2020; Sun *et al.*, 2022).

Furthermore, the use of medications, such as Ceftriaxone or Octreotide, can also predispose to the condition, given that around 40% of them are eliminated via the bile, reaching high concentrations and leading to the formation of biliary sludge (Lavor *et al.*, 2020).

Regarding lifestyle habits, a correlation was noticeable between smoking, alcoholism and cholelithiasis. Alcoholism increases the chances of gallstone disease by favoring the development of liver cirrhosis, which is associated with an increase in estrogen levels and an increase in unconjugated bilirubin resulting from intravascular hemolysis (Silveira, 2016). Regarding smoking, studies suggest

that smoking alters lipid metabolism and causes abnormal bile synthesis, which can cause cholesterol supersaturation, so the risk for cholelithiasis is directly proportional to the number of cigarettes smoked per day (Bay *et al.*, 2022).

Finally, the genetic factors involved in the formation of gallstones, the ABCG5 and ABCG8 genes are the main genes involved. Both encode proteins expressed in hepatocytes and intestinal cells, in order to regulate the excretion of cholesterol in the bile, so that their inactivation makes serum levels more sensitive to the amount ingested in the diet, favoring hypercholesterolemia; and its over-expression increases cholesterol levels in bile, favoring the precipitation of crystals (Sun *et al.*, 2022).

CLINICAL PROFILE

Symptoms

Although conditions related to the gallbladder are frequent causes of surgical procedures, the majority of cases are benign diseases. The most common of these is cholelithiasis, which consists of stones inside the gallbladder, predominating cholesterol stones (90%) (Gary Alan Bass *et al.*, 2020; Lee, 2019; Linsbinski Pereira *et al.*, 2020; Milone *et al.*, 2019). This tends to be asymptomatic, however it can present as biliary colic which consists of abdominal pain in the right upper quadrant, characterized by colic, lasting from around 30 minutes to 5 hours, it can also be accompanied by nausea, vomiting, and food intolerance, especially to fatty foods (Linsbinski Pereira *et al.*, 2020; Thunnissen *et al.*, 2023), this being the main indication for cholecystectomy found (44.15%).

This information is consistent with that of the present study, with biliary colic being the most common symptom (54.85%) followed by nausea and vomiting (43.12%), which may be associated with colic. The prevalence of abdominal pain in the right hypochondrium (RHC) exceeds biliary colic, due to the study by Thunnissen (2023) using the ROMA criteria for the inclusion of patients in the study, which considers isolated symptoms of biliary colic, such as pain (100%) and localized pain in HCD (94%).

Furthermore, Bass *et al.* (2020) excluded from their study patients who present only biliary colic, selecting patients with complications of cholelithiasis, which are seen in around 20% of patients with cholelithiasis, increasing their incidence with age. The most frequent complication is acute cholecystitis, which in the present study accounts for 40.60% of indications for cholecystectomy, with 04 studies involving only cholecystectomy indicated for cholecystitis (Camilo Ramírez-Giraldo *et al.*, 2023; Giles *et al.*, 2020; Lindqvist *et al.*, 2020; Milone *et al.*, 2019).

The main cause of this disease is cholelithiasis, which obstructs the bladder neck, and is a clinical condition that demands early treatment, especially when associated with bacterial infection, as it can progress to necrotizing cholecystitis, gallbladder perforation, peritonitis and sepsis (Junior *et al.*, 2021; Linsbinski Pereira *et al.*, 2020; Milone *et al.*, 2019).

Therefore, early diagnosis and treatment are imperative (Linsbinski Pereira *et al.*, 2020; Wennmacker *et al.*, 2019). This diagnosis is made based on signs of local and systemic inflammation and characteristic imaging findings, which are described in the Tokyo 2018 Guideline (Giles *et al.*, 2020; Junior *et al.*, 2021).

Another complication, also derived from cholelithiasis, is biliary pancreatitis, which is the second cause of hospitalizations for gastrointestinal diseases (Camilo Ramírez-Giraldo *et al.*, 2023; Lindqvist *et al.*, 2020; Linsbinski Pereira *et al.*, 2020; Sandblom *et al.*, 2022). It affects up to 8% of patients with cholelithiasis, a result lower than that found in the study (11.10%), as the studies in which the prevalence was high, selected patients at extreme ages, or excluded symptomatic cholelithiasis from the sample (Balasubramanian *et al.*, 2018; Camilo Ramírez-Giraldo *et al.*, 2023; Gary Alan Bass *et al.*, 2020; Lindqvist *et al.*, 2020; Wennmacker *et al.*, 2019;).

Other less frequent indications for cholecystectomy found were: choledocholithiasis, cholangitis, polyp and gallbladder dysfunction of functional origin (Giles *et al.*, 2020 ; Lee, 2010; Wennmacker *et al.*, 2019). The first consists of the presence of gallstones in the bile duct, leading to inflammation of these ducts, called cholangitis, which can lead to jaundice, which is consistent with the study by Bass *et al.* (2022), where 13.9% of patients were diagnosed with cholangitis and 11.8% with jaundice.

Biliary dysfunction of biliary origin consists of abnormal muscular movements of the gallbladder, possibly related to hypertrophy of the wall, associated with chronic inflammatory processes. Diagnosis is based on two main criteria, biliary colic and absence of gallstones or other structural pathologies. Finally, gallbladder polyps are projections of the wall towards the lumen, the majority of which are cholesterol, unrelated to neoplasms, while adenomas are considered pre-neoplastic lesions (Qandeel *et al.*, 2021). However, despite the malignancy, the latter are uncommon, found in 1% of cholecystectomies or in 10% of polyps, a statistic similar to that observed in Lee (2019).

COMPLEMENTARY EXAMS

Imaging exams

Ultrasonography is one of the main imaging tests used because its findings help when associated with the patient's clinical condition, with a specificity of 99%, the gold standard for extrahepatic biliary diseases (Junior *et al.*, 2021; Kreimer *et al.*, 2016). Characteristic findings are: ultrasound Murphy's sign, thickening of the gallbladder walls (equal to or greater than 4 mm); presence of liquid, gallstones, enlarged gallbladder, and in the study by Wennmacker *et al.* (2019), 80.73% of patients with acute cholecystitis had diagnostic findings compatible with the pathology (Junior *et al.*, 2021).

Comparing the imaging findings carried out in the studies evaluated, it was identified that 46.57% of the vesicles had thickened walls. However, it is worth emphasizing that studies used in this

analysis, such as Ramírez-Giraldo *et al.* (2023), present symptomatic patients or patients with complications as a sample space, which could be a justification for the high prevalence of ultrasound changes. Wennmacker *et al.* (2019), for example, highlight a 64% prevalence of wall thickening in complicated cases and only 23% in uncomplicated cases.

Laboratory findings

Regarding the laboratory profile, it is known that the results can be non-specific, however, leukocytosis and changes in liver tests stand out as the most prevalent, mainly in acute cholecystitis. Of the research used, 03 articles addressed laboratory aspects, indicating mild leukocytosis, with neutrophilia present in 70 to 85% of cases (Camilo Ramírez-Giraldo *et al.*, 2023; Milone *et al.*, 2019; Wennmacker *et al.*, 2019).

Gluhovschi *et al.* (2023) describe that changes in liver enzymes are one of the main changes in the liver profile, as well as an increase in alkaline phosphatase and GGT, which are canalicular enzymes, and which rise as a result of partial or complete obstruction of the bile duct (Gluhovschi *et al.*, 2023). Bilirubin may be slightly increased in cholecystitis and cholangitis, with the cause of jaundice being the accumulation of bilirubin in the skin (Junior *et al.*, 2021).

CONCLUSION

After collecting the data, it is possible to conclude that the epidemiological profile of patients undergoing cholecystectomy consists of women with an average age of 53 years who are overweight and smokers. Regarding the clinical profile, the main manifestation is abdominal pain in the right upper quadrant, followed by nausea and vomiting; with cholelithiasis being the main indication for performing cholecystectomy and cholecystitis been the main complication encountered.

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