

Cholecystectomy in the bariatric patient: before, during, or after gastric bypass?

Colecistectomía en el paciente bariátrico: ¿antes, durante o después de bypass gástrico?

Ana Paulina Pimienta-Sosa,* Carlos E Medina-Sánchez†

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ABSTRACT

Vesicular lithiasis is a frequent pathology and involves significant costs to health systems; moreover, it is the primary gastroenterological diagnosis in hospitalized patients. The incidence of cholelithiasis is one of the leading health problems affecting the adult population in Mexico and the world. Among the risk factors for biliary pathology are female sex, age, overweight and obesity, and rapid weight loss. Many of these factors are present in patients undergoing bariatric surgery. Some studies report up to 20% of cholelithiasis or a cholecystectomy history in patients who will undergo bariatric surgery. Patients undergoing bariatric surgery have a low incidence rate of biliary complications, and cholecystectomy at the same surgical time increases the risk of postoperative complications and operative time. If cholecystectomy is not indicated, patients should be followed carefully, with particular attention to the development of biliary complications. In this review, we searched the different times when laparoscopic cholecystectomy can be performed in a bariatric patient.

RESUMEN

La litiasis vesicular es una patología muy frecuente e implica grandes costos a los sistemas de salud; además, es el principal diagnóstico gastroenterológico en los pacientes hospitalizados. La incidencia de colelitiasis es uno de los problemas principales de salud que aquejan a la población adulta en México y el mundo. Dentro de los factores de riesgo de la patología biliar se encuentran el sexo femenino, la edad, el sobrepeso y la obesidad, así como la pérdida rápida de peso. Muchos de estos factores se presentan en pacientes sometidos a cirugía bariátrica. Algunos trabajos reportan hasta 20% de colelitiasis o antecedentes de colecistectomía en sus pacientes que serán sometidos a cirugía bariátrica. Los pacientes sometidos a cirugía bariátrica tienen una tasa de incidencia baja de complicaciones biliares y la colecistectomía en el mismo tiempo quirúrgico aumenta el riesgo de complicaciones postoperatorias y el tiempo operatorio. Si la colecistectomía no está indicada, se debe hacer un seguimiento cuidadoso de los pacientes con atención especial a desarrollo de complicaciones biliares. En esta revisión efectuamos una búsqueda en los distintos tiempos en los que se puede realizar la colecistectomía laparoscópica en el paciente bariátrico.

* Fellow. Bariatric surgery.

† Anesthesiology.

National Institute of Medical Sciences and Nutrition "Salvador Zubirán". Mexico.

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INTRODUCTION

Vesicular lithiasis is a frequent pathology and involves great costs to health systems; it is also the primary gastroenterological diagnosis in hospitalized patients.¹ The incidence of cholelithiasis is one of the

leading health problems affecting the adult population in Mexico and the world. In the United States, 10-15% of the adult population is estimated to suffer from cholelithiasis, and approximately 800,000 new cases are diagnosed yearly.² The prevalence of biliary pathology in morbid obesity has not

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been well-studied. Some studies report up to 20% of cholelithiasis or a history of cholecystectomy in patients who will undergo bariatric surgery.³

Because of bariatric surgery, the decrease in body weight is also considered a risk factor for the development of cholelithiasis. Different epidemiological studies in different populations have demonstrated this effect;^{4,5} a decrease between 4 and 10 kg in two years is associated with a 44% increase in the risk of developing cholelithiasis compared to those who only decreased less than 4 kg, even in those whose decrease was more significant than 10 kg the risk increased by 94%.⁶

Follow-up studies have shown that body mass index (BMI) is associated with the likelihood of having undergone cholecystectomy, particularly among women with a BMI > 30, in whom the likelihood is increased up to threefold.⁷

There is still controversy about whether cholecystectomy should be performed prophylactically at the same surgical time as Y-de-Roux gastric bypass (YRGB). Some have advocated a selective approach using intraoperative ultrasound and selective cholecystectomy followed by prophylactic ursodeoxycholic acid, but compliance with ursodiol was only 41%.⁸ Laparoscopic cholecystectomy in obese patients usually has a similar conversion rate, complication rate, and length of stay as in non-obese patients. It can be performed after YRGB surgery if clinically indicated.⁹ It appears that laparoscopic YRGB combined with cholecystectomy is safe and feasible without altering port placement; however, it increases operative time and hospital stay.¹⁰

ACUTE CHOLECYSTITIS AND OBESITY

Acute cholecystitis in 90-95% of cases corresponds to a complication of cholelithiasis, usually due to cystic duct obstruction, distension and inflammation, and secondary bacterial infection. The clinical presentation is characterized by abdominal pain in the right upper quadrant, hypersensitivity, and

resistance to palpation, classically described as Murphy's sign. Diagnosis is based on clinical, laboratory findings, and imaging studies.

Acute cholecystitis can result in significant morbidity and mortality, especially in older and immunocompromised adults, so the treatment of choice is laparoscopic cholecystectomy. Regarding the timing of this surgery, it is currently recommended to perform it in the same episode of cholecystitis (or up to seven to 10 days) to avoid progression to complications such as empyema, necrosis, cholangitis, and sepsis.¹¹

We know that obesity is associated with an elevated risk of cholelithiasis, and several studies have shown a correlation between body mass index (BMI) and the risk of cholelithiasis.¹²

In women, a strong positive correlation exists between body mass index and the relative risk of gallstones. In one study, the age-adjusted relative risk in mildly overweight women was 1.7 compared to normal-weight individuals and increased to 6.0 in markedly overweight women.¹³

The association of gallstones with obesity in men has been more challenging to demonstrate. Some studies indicated that body mass index was not different in men with or without gallstones, regardless of age.^{14,15} However, in extensive epidemiological studies, men and women observed a positive association between body mass index and gallstones.

Gallstone disease has been associated with central adiposity with a positive correlation between waist-to-hip ratio and observed in obese individuals; this often appears symptomatic.¹⁶

Most gallstones in obese individuals are cholesterol stones. Three main factors have been implicated in forming cholesterol stones: supersaturation of bile with cholesterol, a nucleation defect, and impaired gallbladder motility.¹⁷

Morbid obesity is often considered a risk factor for laparoscopic cholecystectomy due to increased operative time morbidity and conversion rate to open cholecystectomy. Laparoscopic cholecystectomy (LC) in obese

patients can be a generally more demanding technique, as illustrated by the experience of Angrisani et al.¹⁸ and Nies and his team,¹⁹ who reported significantly longer operative times. And to the significantly higher conversion rates (4.5% versus 1.8%) in the series published by Champault et al.²⁰ There may be difficulties with exposure to Calot's triangle due to a fatty omentum, bulky transverse colon and enlarged fatty liver.²¹

However, it has recently been proven that laparoscopic cholecystectomy can be safely performed in obese and overweight patients with increased operative time, complications such as surgical site injury, or risk of conversion. If adequate equipment and skilled surgeons are available, symptomatic patients should be offered the benefits of laparoscopic cholecystectomy regardless of body mass.

Laparoscopic cholecystectomy and gastric bypass at the same operating time

Rapid weight loss after bariatric surgery is one of many known risk factors for gallstone development, along with age, female gender, parity, race, obesity, genetics, very low-calorie diets, short bowel syndrome, gallbladder motor dysfunction, diabetes, medications, and gastrointestinal surgery, among many others.²²

Sustained weight loss after gastric bypass is achieved by a combination of gastric restriction and a variable degree of mismanagement and therefore has a higher risk of gallstone development than purely restrictive procedures such as adjustable gastric banding. The appropriate management of gallstones and gallbladder disease in these patients is still under debate. Several therapeutic modalities are used, including simultaneous cholecystectomy to all patients at the time of gastric bypass regardless of the presence or absence of gallstones and symptoms (prophylactic approach), simultaneous cholecystectomy only to patients with gallstones (elective or selective approach), and expectant management with or without prophylactic administration of ursodeoxycholic acid.²³⁻²⁵

Prophylactic approach

It consists of performing simultaneous cholecystectomy on all patients during gastric bypass, regardless of the presence or absence of gallstones or symptoms.

The rationale for this approach is based on the high incidence of gallstone development after gastric bypass secondary to rapid weight loss and the low sensitivity and specificity of ultrasound for detecting gallstones in morbidly obese patients.

Guadalajara et al. performed simultaneous cholecystectomy in 89 patients undergoing open gastric bypass and observed a postoperative incidence of gallstones of 24%, while the incidence of preoperative ultrasound was only 16%.²⁶

Cholecystectomy during laparoscopic YRGB has been extensively studied, but the results are inconclusive. Many reports have shown that the combined procedure can be performed safely but is not complication-free. Additional ports may be required, increased operative time and length of hospital stay, and specific adverse events such as wound infections, gastrointestinal leakage, pneumonia, and renal failure have been reported.^{10,27}

A large study using the ACS NSQIP database from 2005 to 2009 showed that cholecystectomy at the same surgical time increased the risk of adverse events in laparoscopy but not in open YRGB. That same study suggested that it should be reserved for patients with previously symptomatic disease because access to the biliary system after YRGB would not be possible by endoscopic retrograde cholangiopancreatography (ERCP).²⁸

Expectant management

Several studies have suggested that the prophylactic use of ursodeoxycholic acid may prevent gallstone formation after different bariatric procedures.

Sugerman et al.²⁹ concluded that a daily dose of 600 mg of ursodiol is an effective prophylactic agent for gallstone formation following gastric bypass. However,

compliance and dosage of the medication are variable, and data on the effect of ursodeoxycholic acid on symptomatic gallstones requiring cholecystectomy are limited. One study with cost-effectiveness analysis reported that the additional cost of prescribing ursodiol does not justify its use after YRGB.³⁰

More extensive controlled studies are needed to establish the effective use of ursodeoxycholic acid in the bariatric patient.

Laparoscopic cholecystectomy following gastric bypass

The incidence of cholecystectomy is higher during the first six months after bariatric surgery but is generally low (4%). Gastric bypass patients are more likely to require cholecystectomy than band and sleeve patients.³¹ An estimate of the standardized incidence rate (SIR) for cholecystectomy for the period 1987-2008 in Sweden, based on data from the National Patient Registry, showed a 10-fold peak in the SIR for cholecystectomy during the first seven to 24 months after bariatric surgery.^{32,33}

The increased risk of cholesterol gallstones after bariatric surgery involves several determinants, including altered biliary cholesterol homeostasis during weight loss. Also, gallbladder hypomotility, increased pro-nucleating factors, and altered intestinal motility appear to contribute to cholesterol gallstone formation.³⁴

Preoperative use of statins is a protective factor for cholecystectomy. In theory, statins may reduce the risk of gallstones by lowering hepatic cholesterol levels, but the effect has yet to be consistently demonstrated in the literature.³⁵ If the association between the use of higher doses of statins and gallstone formation is confirmed, the effect of prescribing statins in moderate or high doses on gallstone formation, biliary symptoms, and cholecystectomy should be investigated.

One study showed that patients who undergo cholecystectomy after YRGB rather than before experience twice as many complications.³⁶ A multivariate analysis determined a higher risk of perioperative and aggregate postoperative

complications at 30 days when cholecystectomy is performed after YRGB compared with before. There was a higher risk of reoperation when cholecystectomy was performed after YRGB compared with before YRGB ($p = 0.034$) when acute cholecystitis was the indication for cholecystectomy.

In addition, complications experienced after the first procedure independently increased the risk of complications in the subsequent procedure ($p < 0.001$); and 61.7 minutes ($p < 0.001$) was added to the surgical time.³⁶

CONCLUSION

Symptomatic gallstone disease and cholecystectomy risk increase in the first years after bariatric surgery. Different strategies have been used to reduce the risk of symptomatic gallstones, including postoperative pharmacological treatment with ursodeoxycholic acid and concomitant cholecystectomy in patients with ultrasound-verified cholelithiasis with or without symptoms.

Therefore, how to address this potential complication is an ongoing discussion in the bariatric community.

The patient and surgeon should have an open and shared decision-making conversation to discuss together the risks and benefits of the timing of bariatric and gallbladder surgery. These decisions should be individualized, considering the patient's symptoms, anatomy, and other risks of surgery.

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Correspondence:

Ana Paulina Pimienta-Sosa, MD

E-mail: paulina.pimientas@incmnsz.com