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Cholecystectomy during Laparoscopic Gastric Bypass has No Effect on Duration of Hospital Stay

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Background: Laparoscopic cholecystectomy can be safely performed at the time of laparoscopic Roux-en-Y gastric bypass (LRYGBP). This study was primarily conducted to examine whether there is any difference in the length of hospital stay and duration of operation in patients who undergo concomitant cholecystectomy with their LRYGBP. In addition, the frequency and nature of complications in the two groups were compared.

Methods: Retrospective chart analysis and comparison of 200 patients who underwent LRYGBP *alone* with 200 patients who underwent LRYGBP *with* simultaneous cholecystectomy.

Results: Concomitant cholecystectomy did not increase length of hospital stay (2.04 ±0.20 days vs 2.06 ±0.29 days in the LRYGBP alone group, *P*=0.43). Furthermore, the addition of cholecystectomy only added an extra 29 minutes to the operation (*P*<0.01). In both groups, there was no difference in the rate of postoperative complications (8.5% in both groups, *P*=0.21), the nature of which was more or less equally distributed amongst the two groups.

Conclusion: Laparoscopic cholecystectomy performed at the time of LRYGBP does not alter length of hospital stay or frequency of postoperative complications and only adds an extra half hour to total operation time.

Key words: Morbid obesity, laparoscopy, gastric bypass, cholecystectomy, length of hospital stay

Introduction

Obesity is a major risk factor for cholelithiasis. However, accelerated weight loss, as is seen after gastric bypass surgery, may result in cholelithiasis.[1] Cholecystectomy was found to be necessary within 3 years in 28% of patients who underwent Roux-en-Y gastric bypass.[2] Another study reported that 36% of 105 gastric bypass patients develop gallstones within 6 months of their operation,[3] with 28% subsequently requiring cholecystectomy. Cholelithiasis secondary to weight loss is poorly understood but one concept is that weight loss triggers increased hepatic secretion of cholesterol resulting in supersaturation of bile with cholesterol. Another theory is gallbladder dyskinesia secondary to decreased circulating cholecystokinin levels that occur from the altered anatomy following surgery.

Due to the increased incidence of gallstones after gastric bypass surgery, some surgeons routinely remove the gallbladder at the time of surgery. They have found this practice not to significantly affect operative time or postoperative morbidity.[4,5] Despite this, routine prophylactic cholecystectomy has not gained wide popularity for reasons which remain unclear. Interestingly, most surgeons will perform prophylactic cholecystectomy during the duodenal switch operation.

Hamad et al[6] reported their experience with selective laparoscopic cholecystectomy during laparoscopic gastric bypass (LRYGBP). In their series, all patients with gallstones found on routine preoperative ultrasound underwent concomitant cholecystectomy at the time of LRYGBP regardless of symptoms. They noted adding cholecystectomy neither affected conversion rates to laparotomy nor increased the incidence of biliary-related complications such as bile leaks, bile duct injury or bleeding from the gallbladder fossa. However, they noted adding laparoscopic cholecystectomy increased

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operating time by nearly 50 minutes. Furthermore, a significantly longer hospital stay for those patients undergoing simultaneous cholecystectomy (4.35 days vs 2.69 days, $P<0.05$) was found. They related this to increased postoperative pain, nausea and surgical trauma in a way that adversely affected bowel function and overall recovery in the LRYGBP plus cholecystectomy group.

In our unit, simultaneous LRYGBP and cholecystectomy are performed on those patients with gallstones found on routine preoperative ultrasound. This study was conducted to confirm our suspicion that performing simultaneous laparoscopic cholecystectomy in uncomplicated LRYGBP surgery patients does not increase length of hospital stay nor does it increase operating time significantly. The incidence of postoperative complications (30 day) was also compared in the LRYGBP + cholecystectomy (LC) group with the LRYGBP group.

Materials and Methods

Patients aged between 19 and 63 years of age having undergone LRYGBP *alone* or LRYGBP *with* laparoscopic cholecystectomy (LRYGBP+LC) at Strong Health Bariatric Center, Highland Hospital between Jan 01 2003 and May 01 2006 formed the study population. Any patients who were converted from laparoscopic to open surgery for whatever reason were excluded from this study. Two hundred consecutive patients were selected from each group and a retrospective chart analysis was performed. Medical charts were reviewed for: (1) total length of hospital stay (number of days) – recorded from hospital admission / discharge dates; (2) duration of operation (minutes) – recorded from intra-operative records and taken to be from incision time to procedure end time (time at which skin closure was achieved); and (3) the incidence and nature of any peri- or postoperative (up to 30 days) complications during hospital stay – details of which were obtained from patients' medical charts.

Operations were performed by WO and TB as primary surgeons, although some parts of the operations were performed by residents. A standard 150-cm Roux-en-Y gastric bypass was performed using 4 ports and, in the cholecystectomy group, dissection was performed following the bypass (with the addition of two more ports) starting at the triangle of Calot.

The two groups were analyzed for differences in: (1) length of hospital stay, and (2) duration of operation using the unpaired *t*-test. A *P*-value <0.05 was deemed to be statistically significant. Secondary analysis was performed to ascertain the nature of postoperative complications in the two groups.

Results

Two hundred patients in each group were compared. Patient characteristics in the two groups were comparable, with equal distribution of age, gender and BMI (Table 1). The year of surgery differs in the two groups in that the LRYGBP group entirely consists of patients having operations in 2005 whereas the LRYGBP+LC group covers a wider range of dates of operation between 2003 to 2006. Also, WO performed most of the operations in the LRYGBP +LC group (94%), whereas in the LRYGBP group, TB performed 32% of cases and WO 68%.

Length of hospital stay is not different in the two groups (Figure 1). The mean length of stay in the LRYGBP group was 2.06 ±0.29 days vs 2.04 ±0.20 days in the LRYGBP+LC group ($P=0.43$). Furthermore, the addition of cholecystectomy only adds an extra 29 minutes to the operation ($P<0.01$) (Table 2). In both groups, there was no difference in the rate of postoperative complications (8.5%, $P=0.21$), the nature of which was more or less equally distributed amongst the two groups (Table 3) apart from one biloma in the LRYGBP+LC group

Table 1. Patient demographic data

	LRYGBP (n=200)	LRYGBP+LC (n=200)
Year of operation	2005: n=200	2003: n=59 2004: n= 50 2005: n= 63 2006: n= 28
Average age (range)	42 (20-60)	44 (19-63)
Gender	Female: 168 Male: 32	Female: 171 Male: 29
Surgeon	TB: 63 WO: 137	TB: 13 WO: 187

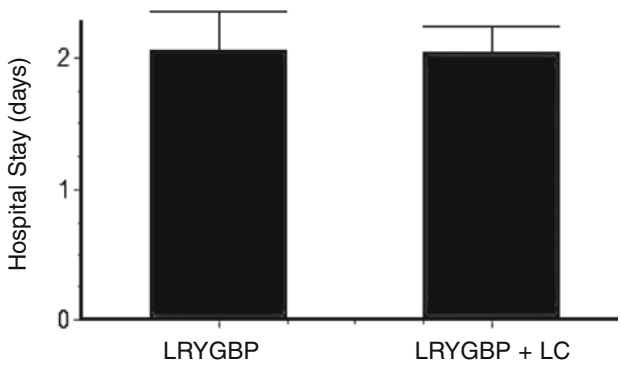

Figure 1. Comparison of length of hospital stay between LRYGBP and LRYGBP + LC groups (*P*=0.43).

which represents a complication directly related to the cholecystectomy. There were no postoperative deaths in either group.

Discussion

This study shows that performing simultaneous cholecystectomy in obese patients who undergo LRYGBP does not result in an increased length of hospital stay. This finding lends support to removal of the gallbladder at the same time as gastric bypass. Despite our results, it is our opinion that concomitant cholecystectomy in the absence of gallstones should not be performed as a routine. Only a few patients will go on to develop symptomatic cholelithiasis after surgery, and, furthermore, ursodeoxycholic acid is used in our unit to decrease *de novo* gallstone formation in the first 6 months after surgery. This practice is based on previous studies.[3,7,8] The results from this study are significantly different from those of Hamad et al[6] who demonstrate a significantly increased duration of hospital stay (4.35 days, $P<0.05$). This may be secondary to the higher proportion of patients with cholecystitis and also the increased frequency of postoperative complications noted in their LRYGBP + LC group.

Concomitant cholecystectomy only adds another half hour to the operative time. This is different from the 50 minutes extra operative time noted previously by Hamad et al.[6] One reason for this could be that the patients undergoing simultaneous cholecystectomy in their study had more technically challenging gallbladders due to acute inflammation (all specimens were noted on histology to have cholecystitis, although preoperatively only patients with sonographic cholelithiasis were included in their study population), unusual anatomy and the fact that they were performing other procedures in addition to the cholecystectomy such as liver biopsies and hernia repairs. Hamad et al[6] may also have been on the early part of their learning curve; thus, operations could have taken more time and patients may have been kept longer in hospital for 'observation'.

The frequency of 30-day postoperative complications is identical in the two groups. The nature of complications is also similar, although, the LRYGBP + LC group had one biloma subsequent to the cholecystectomy. This patient presented to the Emergency Department 2 weeks after his surgery with abdominal pain and elevated bilirubin. Investigations revealed a biloma for which he underwent open exploration. At surgery, cystic duct stump leak secondary to clip slippage was noted and repaired, intraoperative cholangiogram was normal and a washout was performed. He made an uneventful recovery

Table 2. Comparison of LRYGBP and LRYGBP+LC groups

	LRYGBP (n=200)	LRYGBP+LC (n=200)	*P*
Length of hospital stay	2 days: n= 190 3days: n= 7 4 days: n= 3 Average: 2.06 ±0.29	2 days: n= 192 3 days: n= 8 Average: 2.04 ±0.20	*P*=0.43
Duration of operation in minutes (range)	96 ±23 (61-204)	125 ±28 (76-266)	Mean diff: 29 min (*P*< 0.01; 95% CI: 24-34)
No. of postoperative complications (30 days)	17	17 (inc. 1 biliary)	*P*=0.21

Table 3. Nature of peri- and postoperative 30-day complications

Nature of postop complications	LRYGBP N(%)	LRYGBP+LC N(%)
Cardiovascular:		
Persistent tachycardia	3 (1.5%)	2 (1%)
Atrial fibrillation	1 (0.5%)	0
Infectious Disease: Pyrexia	1 (0.5%)	3 (1.5%)
Respiratory: Dyspnea / Low O_2 saturation	1 (0.5%)	4 (2%)
Chest pain	2 (1%)	1 (0.5%)
Endocrine: Poor diabetes control	1 (0.5%)	0
High drain output	1 (0.5%)	0
Wound: Abdominal wall echymoses	2 (1%)	0
Gastrointestinal:		
Persistent nausea	2 (1%)	3 (1.5%)
GI tract bleeding	3 (1.5%)	1 (0.5%)
Dehydration	0	1 (0.5%)
Other	0	2 (1%) : - biloma from cystic duct stump leak - intraabdominal abscess from small bowel perforation
Total	17 (8.5%)	17 (8.5%)

from this. The incidence of this complication in the standard laparoscopic cholecystectomy population is reported to be 0.85%.[9] It is therefore not surprising that this occurred in our study group.

Another patient in the LRYGBP + LC group required open surgery 2 weeks after her initial operation. This was for an intraabdominal abscess walling off a small bowel perforation which was presumed to be secondary to an iatrogenic laparoscopic injury at the primary operation. Once again, this complication could have easily occurred in the LRYGBP alone group and is highly unlikely to be related to the patient having undergone concomitant cholecystectomy. Hamad et al[6] noted a postoperative complication rate of 8.6% (comparable to the 8.5% found in this study) in the LRYGBP alone group but 19.1% in the LRYGBP + LC group. Interestingly none of their patients in this group had any biliary complications. They relate the difference found to the LRYGBP + LC group being older and having a greater proportion of additional procedures (eg. liver biopsy, hernia repair) at the same time as LRYGBP + LC.

Table 1 demonstrates that patients who underwent LRYGBP alone were concentrated within 1 year (2005) while the LRYGBP + LC group covered a wider period. This is a reflection of the lower incidence of gallstone postitive patients undergoing LRYGBP. It took us 4 years (2003-6, more or less evenly distributed at 50-60/year) to accumulate 200 consecutive patients in the LRYGBP + LC group, but we managed to capture 200 consecutive patients (without gallstones) all in the same year (2005) for the LRYGBP alone group. There was no particular reason why 2005 was chosen for capturing the latter group. It could be argued that our learning curve had significantly improved in 2005 (say compared to 2003), making operations faster and discharges quicker which, if anything, would have favored a result showing LRYGBP alone operations to be faster with patients leaving the hospital earlier than the LRYGBP + LC group.

Another interesting finding from Table 1 is that WO performed the majority of LRYGBP + LC compared to TB. This is a random effect and not WO's preference. The decision whether cholecystectomy is performed or not at the time of LRYGBP is 'protocol' driven regardless of surgeon. If patients had gallstones on preoperative ultrasound, they underwent cholecystectomy at the time of surgery.

There are two major criticisms to this study. In accordance with the primary objective of this study which is to compare uncomplicated cases of LRYGBP with LRYGBP + LC, we excluded any conversions from laparoscopic to open surgery from analysis. The reason for this is that we wanted 'clean' data for the purposes of comparing length of hospital stay and duration of operation without adding confounding factors which would inevitably have occurred if conversions were included. For instance, a common cause of converting from laparoscopic to open surgery is the presence of adhesions. Thus, if the LRYGBP + LC group happened to have more adhesions (requiring conversion to open) than the LRYGBP group, this would confound the results by demonstrating increased operative times and length of hospital stay in the LRYGBP + LC group. This could be misinterpreted as concomitant cholecystectomy being the cause for increased length of hospital stay. Interestingly,

Hamad's study[6] demonstrates an increased rate of conversion to open in the LRYGBP group (1.7% vs 1.1% in the LRYGBP + LC group).

This study is retrospective and therefore suffers from all of the problems and biases associated with a retrospective design. It is obvious from the nature of this study that the results are based on the degree of accuracy found in the medical charts. With that being said, it should be noted that two of the parameters being investigated in this study do not easily lend themselves to subjective interference. Duration of hospital stay is by necessity accurately noted for billing purposes, and dates of admission and discharge are probably least likely to suffer from errors in recording, especially as they are referred to in different parts of the chart. Similarly, length of operation is an objective parameter that is routinely recorded for each and every operation at our institution and is defined by the time from skin incision to skin closure. Furthermore, when these operations were performed at our institution, there was no intention that the outcomes of the LRYGBP + LC group were going to undergo scientific scrutiny at a later date and so they reflect 'real' day-to-day practice. On the other hand, if the outcomes were knowingly recorded as part of prospective non-blinded study, there may be 'pressure' on the surgical team to demonstrate a benefit of one group over another.

This study demonstrates that laparoscopic cholecystectomy can be safely and efficiently performed simultaneous to laparoscopic gastric bypass. There was no difference in length of hospital stay, postoperative complication rate and it only added an extra half hour to the operative time. This lends support to those who opt for routine prophylactic cholecystectomy in patients who are undergoing uncomplicated gastric bypass.

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