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Impact of abdominal obesity on early outcomes after laparoscopic cholecystectomy: a prospective study

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ABSTRACT

Introduction: Obesity is a major health challenge in both the developed and developing countries and associated with increased surgical risk and postoperative complications. Though once considered to be a relative contraindication, laparoscopic Cholecystectomy (LC) in obese patients is considered to be safe in experienced hands. The aim of this study is to assess the short term outcome of LC in obese patients and those with abdominal obesity as compared to the non obese patients. **Materials and Methods**: A prospective analysis of all patients undergoing LC in the King Fahd General Hospital in Hofuf, Saudi Arabia was carried out. The patients were divided into obese, overweight and non obese categories using BMI as the criterion. Patients with abdominal obesity were defined as those having an abdominal girth of more than 102 cms and 88 cms for men and women respectively. **Results**: 1396 patients, 1055 females and 341 males underwent LC during the study period. 76% had LC performed as an elective procedure. 57.45% patients were either overweight or obese. 46.2% patients had abdominal obesity. No significant differences regard to age, sex, co morbidity disease and risk factors. There was no significant difference between the groups and the outcomes of operative mortality and morbidities. **Conclusion:** Obesity is emerging as health problem in Saudi Arabia, parallel with the worldwide within surgical patients. This study is concluded that Laparoscopic surgery can be safely performed in obese patients with short-term results similar to those obtained in non-obese, and obesity does not increase the risk of complications.

Keywords: Laparoscopic Cholecystectomy, obesity, abdominal obesity

Introduction

Obesity has emerged as one of the major health problems in the world. Obese patients are more liable to a variety of co morbid conditions such as diabetes, cardiovascular disease, gall bladder diseases, and cancer [1-5].

In surgery, obesity is one of the risk factors; and is associated with technical problems such as access difficulty, prolonged operative time due to fat accumulation and retraction difficulty of the abdominal wall and viscera.

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Furthermore, operations in the obese patients may increase rate of wound infection, atelectasis, and deep vein thrombosis (DVT) in the postoperative period [6-12].

Many studies in Saudi Arabia have reported high rates of overweight and obesity in both Saudi males and females, this reflect the rapid changes in the lifestyle and improved of socioeconomic conditions [13-16] .

Although laparoscopic Cholecystectomy is now widely accepted as the treatment of choice for symptomatic Cholelithiasis in the majority of patients, but can abdominal obesity patients share these benefits? We have prospectively studied the impact effect of abdominal obesity on the short-term outcome in patients undergoing laparoscopic Cholecystectomy in a single institution in Saudi Arabia using multivariate regression analysis.

Patients and Methods

All patients undergoing laparoscopic Cholecystectomy (1396 patients) in a three year period between January 2009 and December 2011 were prospectively analyzed. Permission to collect patient data was approved by the Hospital Ethics Committee. All patients underwent detailed history, physical examination, and investigations including full blood count, urea and electrolytes, blood glucose, liver function tests, chest x-ray, electrocardiogram and abdominal ultrasound scan. Age, sex, BMI, acute Cholecystitis, co morbid disease , laboratory result , American society of anesthesiologist (ASA) were recorded. The results of operative data as well as Postoperative complications were also recorded.

Body mass index was used to stratify patients into non obese (BMI < 25 kg/m^2); over weight (BMI between 25 kg/m^2 – 29 kg/m^2) and obese (BMI > 30 kg/m^2). Abdominal obesity was defined as having a waist circumference of more than 102 cms and 88 cms for men and women respectively.

Laparoscopic Cholecystectomy was performed under general anesthesia using muscular relaxants. Pneumoperitoneum was induced using the veress needle and the procedure was performed using the four trocar method. For the obese patient group, occasional alterations in trocar sites were found to be helpful.

Postoperatively, these patients were nursed in the general ward and oral liquids allowed once peristalsis returned, usually by the evening of surgery. All patients received three dose antibiotic prophylaxis and DVT prophylaxis. They were discharged once they were fully ambulant. All patients were seen in outpatient's clinic at 1 and 3 weeks, 3 months and one year postoperatively.

The data analysis was carried out using SPSS for Windows, Release 18.0 (SPSS, Chicago, IL). Univariate analyses for categorical variables were calculated with the w2 test and for continuous variables with the Mann-Whitney U test. $P<0.05$ was regarded as significant for both tests.
The odds ratio served as an approximate estimate of relative risk for postoperative complications. Factors associated with postoperative complications were determined in Univariate and multivariate binary logistic regression models with a forward selection process.

Results

A total of 1396 patients underwent LC during the three year period. Of these, 1055 were females and 341 males. The mean age was 32.2 years (15 – 76 years). In 1075 patients (76.01%), the LC was elective while in 321 (22.99%) it was performed for acute Cholecystitis. Twenty one patients (1.5%) had previous abdominal surgery.

Out of 1396 patients, 594 (42.55%) were non obese while 528 (37.82%) patients (448 females and 80 males) were overweight, and 274 (19.63%) were obese. A total of 645 patients (169 males and 476 females) had abdominal obesity. Patient details are shown in Table 1.

It was observed a positive relationship between the body mass and the American Society of Anesthesiologists (ASA) grades. The ASA grade increased with increasing body weight, and the obese patients were younger than non-obese.
Coexisting diseases (diabetes and respiratory problems) occurred more frequently in obese patients than in non-obese, while in reverse (hypertension and coronary heart disease) is more common in non obese patients because the age. (Table 2).

Obesity was associated with increased operative time compared with non-obese, but no difference of the conversions rate, as well as the post-operative complications.

Laparoscopic Cholecystectomy was completed in all but two patients. One was a 29 year old man with a BMI of 40.51 kg/m^2 needed conversion due to inability to establish Pneumoperitoneum due to adhesions from previous abdominal surgery while the second was a 55 year old man with a BMI of 25 kg/m^2 converted due to unclear anatomy.

The average postoperative stay was 0.7 days with a total hospital stay of 1.8 days (2days to 5 days); the post operative and total hospital stays were similar in all groups. No operative mortality (i.e., mortality within 30 days of operation) in any group.

Table 1: Patients details

	Total patients (1396) (100%)	Non-obese (594) (42.55%)	Overweight (160) (11.46%)	Overweight+ Abdominal Obesity (368) (26.36%)	Obese (86) (6.16%)	obese + Abdominal Obesity (188) (13.46%)
Gender	Male: 341 Female: 1055	119(35%) 475 (45%)	27(10%) 133(12%)	73(21%) 295(28%)	37(10%) 49(5%)	85(24%) 103(10%)
Mean Age	32.2 years (15-76 years)	53.1 years (22-76 years)	22.7 years (15-36 years)	24.2 years (15-38 years)	23.4 years (17-34 years)	28.4 years (17-32 years)
Mean BMI (Kg/m^2)	31.3	23.7	27.8	29.1	34.8	41.5
ASA grade:						
ASA I	76%					
ASA II	21%					
ASA III	3%					
Co-morbidity%						
Diabetes	17.8	14.9	17.9	18.3	18.1	18.8
Hypertension	18.4	29.7	14.4	14.7	14.9	15.3
Coronary Heart	3.6	7.8	1.3	1.7	1.6	2.1
Respiratory problem	2.4	2.2	2.4	2.5	3.4	3.7
Blood disease	3.2	2.4	3.1	3.2	3.4	3.5

Table 2: Operative Data, complications, and Outcome

	Non-obese (*n*=594)	Overweight (*n*=160)	Overweight+ Abdominal Obesity (*n*=368)	obese (*n*=86)	obese + Abdominal Obesity (*n*=188)
Mean operative time (min±SD)	64±32	76±12	80±23	84±14	89±21
Intra operative complications:					
Gallbladder bed bleeding	5	2	4	1	2
Trocar wound bleeding	0	1	1	0	2
Gallbladder rupture, stone spillage	10	3	7	2	4
Postoperative complications:					
Wound infection	4	2	5	1	3
Wound hematoma	2	3	4	0	2
Chest infection	1	3	2	0	1
Median hospital stay (days)	4	4.5	4.6	4.6	4.8
Average post operative stay (days)	0.8	1.1	2.2	2.2	2.1

Discussion

Obesity is fast becoming a major health problem in developing and middle income countries like Saudi Arabia due to of improvement in living conditions and changing lifestyle [13-16]. It was reported by Al-Nozha in 2005 that the overall prevalence of obesity has increased from 22.1% to 35.6% in Saudi Arabia [13]. Recently, *Al-Othaimeen* observed that obesity was prevalent in all age groups in Saudi Arabia [16], with the prevalence ranging from 11.7% to 33.9%. This has lead to more surgical procedures being performed in the obese Saudi patients.

Obese patients at more risk for surgical procedures due to associated cardiac and respiratory diseases and are more likely to be diabetic and hypertensive [17, 18]. A number of studies have found that obesity increases the risk of complications and length of hospital stay and is independently associated with increased mortality after surgery [19- 23]. Furthermore, operations in the obese are also associated with technical problems such as difficulty with access and retraction of the abdominal wall and viscera.

Earlier, obesity, acute Cholecystitis and previous abdominal surgery were considered to be relative contraindications for Laparoscopic Cholecystectomy (LC). However, increasing experience with LC has made it a golden standard for the treatment of symptomatic gall stones [24]. It has been reported that postoperative complications, especially anastigmatic leaks were higher in obese patients though no reasons were assigned to explain this [10]. Other investigators found the rate of wound infections to be significantly higher in obese patients and concluded that wound complications were an unresolved issue in the obese and have suggested the use of subcutaneous drains and retention sutures to reduce the incidence of wound infections in the obese [5, 10, 15, 16] .

Obesity is considered to be a factor that contributes to a longer operating time due to: longer time need to inserting the Veress needle, the fatty omentum obscure the Calots triangle anatomy, and the gallbladder retraction is insufficient because of the enlarged fatty liver [25]. and this is comparable to our study (longer operating time).

to overcome these difficulties , we placing the trocar above the level of the umbilicus and in some cases increase the insufflations pressure to >15mm Hg to lift up the large abdominal wall sufficiently.

Our experience showed that laparoscopic Cholecystectomy was a safe procedure in obese with and without abdominal obesity.

Some authors demonstrate that acute Cholecystitis, old age, male sex, and obesity are independent predictive factors for conversion to open. In our study abdominal obesity associated with an increased conversion rate also.

Many recent studies have reported there is no difference in the length of hospital or postoperative stay, postoperative complications among obese and non obese patients, and this is our observation in this study [25, 26]. In our study, we found that either obesity in general or abdominal obesity in particular did not offer any technical difficulty in completing LC. The time taken for the induction of pneumoperitoneum and dissection were similar in the obese, abdominal obesity patients and the non obese.

There are no prospective randomized studies comparing laparoscopic Cholecystectomy in the obese patient with and without abdominal obesity.

The conversion rates were low and did not differ between the obese and the non obese patients. Intra-operative blood loss, postoperative complications and length of hospital stay too were not different in the three groups.

Conclusion

A prospective analysis of Laparoscopic Cholecystectomy in patients with obesity and abdominal obesity as compared to non obese patients has shown LC to be a safe procedure in patients with obesity and abdominal obesity with very low incidence of postoperative complications and comparable length of hospital stay.

References

1. World Health Organization (WHO). Obesity and overweight. http://www.who.int/dietphysicalactivity/publications/facts/obesity/en/.
2. WHO expert consultation. Appropriate body-mass index for Asian populations and its implications for policy and intervention strategies. *Lancet* 2004; 363:157-63.
3. Young VR. Good nutrition for all: challenge for the nutritional sciences in the new millennium. *Nutrition today*, 2001, 36(1):6–16.
4. Hill JO, Melanson EL. Overview of the determinants of overweight and obesity: current evidence and research issues. *Med Sci Sports Exer* 1999;31 (suppl 11):S515-21.

5. Bianchini F, Kaaks R, Vainio H. Overweigh, obesity and cancer risk. *Lancet Oncol* 2002;3: 565-74.
6. Angrisani L, Lorenzo M, De Palma G, Sivero L, Catanzano C, Tesauro B, *et al* . Laparoscopic cholecystectomy in obese patients compared with nonobese patients. *Surg Laparosc Endosc* 1995; 5:197-201.
7. Al-Mulhim AA. Male gender is not a risk factor for the outcome of laparoscopic cholecystectomy: A single surgeon experience. *Saudi J Gastroenterol* 2008;14:73-9
8. Mary T, John B, Ruth R, Gilbert R, Nechol A, Kirby I. *et al* .Impact of Obesity on Resource Utilization for General Surgical Procedures. *Ann Surg.* 2005; 241(5): 821–828.
9. Ninh T. Nguyen and Bruce M. Wolfe. The Physiologic Effects of Pneumoperitoneum in the Morbidly Obese. *Ann Surg.* 2005 February; 241(2): 219–226.
10. Choban PS, Flancbaum L: The impact of obesity on surgical outcomes: a review. *Journal of the American College of Surgeons* 1997;185:593-603.
11. Calle EE, Thun MJ, Petrelli JM, Rodriguez C, Heath CW Jr: Body-mass index and mortality in a prospective cohort of U.S. adults. *New England Journal of Medicine* 1999;341:1097-1105.
12. Bamgbade OA, Rutter TW, Nafiu OO, Dorje P: Postoperative complications in obese and nonobese patients. *World Journal of Surgery* 2007, 31:556-560.
13. AL-Nozha M, AL-Mazrou Y, AL-Maatouq M, Arafa M, Khalil M, Khan N, et al. Obesity in Saudi Arabia. *Saudi Med J* 2005;26(5):824-829.
14. EL-Hazmi M, Warsy A. The Prevalence of Obesity and Overweight in 1-18 year old Saudi Children. *Ann Saudi Med* 2002; 22(5-6):303-307.
15. AL-Rukban M. Obesity among Saudi male adolescents in Riyadh, Saudi Arabia. *Saudi Med J* 2003; 24(1):27-33.
16. Al-Othaimeen A, Al-Nozha M, and Osman A. Obesity: an emerging problem in Saudi Arabia. Analysis of data from the National Nutrition Survey. *Eastern Med Health Jou* 2007;13 (2):441-448.
17. Pi-Sunyer XF. Medical hazards of obesity. *Ann Intern Med*. 1993;119:655–660
18. Al-Turki Y. The prevalence of overweight and obesity among hypertensive and diabetic adult patients in primary health care. *Saudi medical journal*, 2000;21(4):340–3.
19. Choban PS, Flancbaum L: The impact of obesity on surgical outcomes: a review. *Journal of the American College of Surgeons* 1997;185: 593-603.
20. Calle EE, Thun MJ, Petrelli JM, Rodriguez C, Heath CW Jr: Body-mass index and mortality in a prospective cohort of U.S. adults. *New England Journal of Medicine* 1999;341:1097-1105.
21. Bamgbade OA, Rutter TW, Nafiu OO, Dorje P: Postoperative complications in obese and nonobese patients. *World Journal of Surgery* 2007;31:556-560.
22. Dindo D, Muller MK, Weber M, Clavien PA: Obesity in general elective surgery. *Lancet* 2003; 361:2032-2035.
23. Klasen J, Junger A, Hartmann B, Jost A, Benson M, Virabjan T, Hempelmann G: Increased body mass index and peri-operative risk in patients undergoing non-cardiac surgery. *Obesity Surgery* 2004, 14:275-281.
24. Bittner R. Laparoscopic surgery: 15 years after clinical introduction. *World J Surg* 2006;30:1190-203
25. Sidhu R S, Raj PK, Treat RC, Scaripino MA, Tarr SM. Obesity as a factor in laparoscopic Cholecystectomy. Surg Endosc. 2007:21:774-776
26. Simopoulos C, Polychronidis A, Botaitis S, Perente S, Pitiakoudis M. Laparoscopic Cholecystectomy in obese patients. *Obes Surg*, 2005:15:243-246

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