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Original Article

Laparoscopic versus open inguinal hernia repair on patients over 75 years of age

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Abstract: Aim: In this prospective study, we aimed at comparing the laparoscopic and conventional open inguinal hernia repair procedures in the population over 75 years of age. Materials and methods: The medical data of 108 patients over 75 years of age who presented with inguinal hernia and underwent surgical treatment between July 2008 and December 2012 in Safa Hospital, General Surgery Department were prospectively recorded. Results: The mean age of patients in the open procedure group (n=75) and in the laparoscopic group (n=33) was 82 and 81 years, respectively. The mean American Society of Anaesthesiologists score was 2-7 in the open group and 2-4 in the laparoscopic group (P<0.005). There was no statistically significant difference between the groups with respect to perioperative complications. There was no mortality. Conclusion: Similar to the outcome of open procedure, laparoscopic inguinal hernia repair can safely be performed without an increase in morbidity and mortality in the advanced age population.

Keywords: Inguinal hernia, complications, herniorrhaphy, over 75 years of age

Introduction

Whereas the risk of developing an inguinal hernia is 1.7% in the general population, this risk rises to about 4% after the age of 45 [1, 2]. The incidence of inguinal hernia in the population between the ages of 16 to 24 years is 11/10,000 person-years. This rate rises to above 200/10,000 person-years in the population aged above 75 years [2, 3]. Elective inguinal hernia repair is generally associated with an estimated mortality rate below 0.01% [4].

Elderly patients who present with minimal symptoms that do not affect their daily activities are advised to postpone surgical intervention to avoid possible complications [5].

In developed countries, people over the age of 85 comprise 2% of the general population; by the year 2050, it is estimated that this percentage will double [6]. This implies that the rate of presentation to the hospitals of inguinal hernias will also increase [2, 3, 7]. The conventional approach for inguinal hernia repair is open procedure [8, 9]. Since 1993, when Watson and colleagues first published their report on laparoscopic hernia repair and bowel resection, there have been controversial reports concerning the advantages and disadvantages of this approach, especially in the elderly age group [9, 10]. Velasco and colleagues advocated a preference for laparoscopic herniorrhaphy for patients above the age of 65 years owing to their findings of associated lowered morbidity, acceptable recurrence rates, shorter hospital stays and an earlier return to normal activities [11]. The aim of the current study is to determine the optimal approach to inguinal hernia repair in the population over 75 years of age by retrospectively comparing the surgical outcomes of patients in this age group who underwent conventional open repair or laparoscopic repair.

Materials and methods

Medical data from patients who underwent inguinal hernia repair in Safa Hospital, General Surgery Department between July 2008 and December 2012 were prospectively recorded. Emergency cases were excluded from the study.

Table 1. Characteristics of patients

	Open	Laparoscopic	*P*-value
Mean age (years)	82.9	82.4	NS
Male (%)	85.4	89.2	
Bilateral (%)	1.3	53.9	<0.01
Comorbidity (%)			
Coronary artery disease	36.8	28.8	NS
Diabetes	16.2	9.5	NS
Hypertension	65.9	38.5	<0.01
Myocardiac infarction	11.9	0.0	<0.05
Congestive heart failure	9.4	6.3	NS
Atrial fibrillation	14.9	28.8	NS
Cerebrovascular disease	10.8	0.0	NS
Benign prostate hyperplasia	17.4	31.9	NS
Mean ASA score	2.7	2.4	<0.05
Elective (%)	100.0	100.0	
Alcohol use (%)	38.8	31.1	NS
Smoking (%)	26.9	34.4	NS
Body mass index	23.9	23.3	NS
Recurrence (%)	22.2	37.9	NS

Table 2. Operative data

	Open	Laparoscopic	*P*-value
General anaesthesia (%)	33.1	100.0	<0.01
Mean operation time	72.1	77 .0	NS
Estimated mean blood loss (ml)	19.9	20.7	NS
Mean intravenous (ml)	750.3	1,150.5	<0.01

NS: No significant.

The diagnoses and repairs were confirmed by the operation records.

For each patient included in the study, gender, comorbidity, American Society of Anaesthesiologists (ASA) score, the use of alcohol and smoking habits, the site of hernia and the body mass index (BMI) were recorded. The mean operation time, mean blood loss during operation, intraoperative intravenous fluid infusion, type of anaesthesia employed and intraoperative urine output were reviewed from the operative anaesthesia records. Complications and hospital stay time were taken to be clinical outcomes. Postoperative morbidity and mortality within 30 days were reviewed from the emergency clinic and outpatient department records. For continuous variables, an analysis of variance was utilised, and for group variables, a chi square test was used for statistical analysis. Multivariate linear regression models were used for mean hospital stay times, and logistic regression models were used for the complications. Both backward stepwise elimination and forward stepwise inclusion methods were used to include variables into the final model.

The Statistical Program for Social Sciences (SPSS) version 15.0 (SPSS, Chicago, Il) was used for data processing and analysis. All probability values were obtained from two-dimensional tests, and values less than 0.05 were recorded as statistically significant.

Results

One hundred and eight patients who underwent elective inguinal hernia repair were included in the study. Of these patients, 75 underwent open repair and 33 underwent laparoscopic repair. In the open and laparoscopic groups, the mean ages were 82 and 81, respectively, and the male patients constituted 85.4% and 89.2%, respectively (P=ns).

The overall comorbidities were similar in both groups (**Table 1**). In the open and laparoscopic groups, the mean ASA scores were 2.7±0.6 and 2.4±0.08, respectively. Fifty-six per cent of the laparoscopic procedures were bilateral.

All patients that underwent the laparoscopic procedure and 33% of patients that underwent the open procedure received general anaesthesia. There was no statistically significant difference in mean operation time between the two groups (72.1±13.3 minutes in the laparoscopic group versus 74.0±5.6 minutes in the laparoscopic group, P=ns). The laparoscopic group received a significantly higher mean volume of intraoperative intravenous fluid infusions (laparoscopic group 1,150 ml versus 750 ml in the open group, P<0.01) (**Table 2**).

There was no difference in the unadjusted complication rates between the groups (10.6% in open group versus 27.2% in laparoscopic group, P=ns). The most frequently encountered complication was urinary retention, which occurred in 6.6% of the open group and 21.2% of the laparoscopic group. Other postoperative

Table 3. Postoperative outcomes

	Open (N=75)	Laparoscopic (N=33)	*P*-Value
Post-op complications	8 (10.6%)	9 (27.2%)	NS
Arrhythmia	2 (2.6%)	2 (6.0%)	NS
Urinary retention	5 (6.6%)	7 (21.2%)	NS
Pain	0	1 (3.0%)	NS
Altered state of conscience	1 (1.3%)	1 (3.0%)	NS
Hospital stay time	0.6	0.7	NS
Hypotension	0	1 (3.0%)	NS

Table 4. Multivariate logistic regression for complications

	OR	*P*-value
BPH	1.59	0.47
Open	1.54	0.59
Bilateral	2.77	0.22

OR: Odds ratio. BPH: Benign prostatic hypertrophy.

Table 5. Multivariate linear regression for length of stay

	Beta	*P*-value
Bilateral	0.45	0.13
Open	-0.02	0.91
ASA score	0.19	0.18
Benign prostatic hyperplasia	-0.2	0.29
Intravenous fluids	0.17	0.13

ASA: American Society of Anesthesiologists.

complications included pain, arrhythmia, changes in the state of consciousness and hypotension (**Table 3**). There was no statistically significant difference in the unadjusted hospital stay time between the two groups. After adjusting for patient risk factors, independent variables were tested for postoperative outcome relations. Surgical procedure, benign prostate hypertrophy, bilateral repair or other variables were not found to be related to prolonged hospital stay times (**Tables 4** and **5**). There was no mortality in either group.

Discussion

This study shows that laparoscopic inguinal hernia repair can be safely performed in the advanced age population. Langeveld and colleagues proposed laparoscopic hernia repair for the general population based on their study of patients with a mean age of 55 years and ASA score [12]. The study shows that the laparoscopic approach led to more favourable results in terms of less postoperative pain and an earlier return to normal daily activities. A meta-analysis of randomised control studies performed by Schmedt and colleagues advocated the advantages of the laparoscopic approach versus Lichtenstein repair based on local complications and pain-related parameters [13].

Eklund and colleagues performed a cost-reduction analysıs on 5 follow-up cases and reported no significant difference in general cost between open and laparoscopic procedures [14].

The majority of the patients in the open repair group had past histories of myocardial infarction and high ASA scores. Between the open and laparoscopic groups, there were no significant differences in ASA scores and the prevalence of hypertension. There appeared to be a tendency to choose open surgery in cases with more risk factors. Yet, the above findings did not differ when variables were adjusted for risk factors.

There were no significant differences between the open and laparoscopic groups with respect to the incidence of complications. The most frequently encountered complication in the laparoscopic group was urinary retention. This finding enticed us to analyse in detail the factors that might be affecting this complication. Looking at the intraoperative data, there were significant differences between the two groups with respect to the mean volume of intraoperative intravenous fluid infused and the type of anaesthesia employed. In the laparoscopic group, there was a higher rate of urinary retention. This finding may be due to the fact that all patients in this group underwent general anaesthesia, and higher volumes of intraoperative intravenous fluid were given. These factors were attributed to urinary retention [15-17].

Bilateral repair was predominantly more frequent in the laparoscopic group than in the open repair group. This difference was due to the approach preferred by the surgeon. This preference, in turn, also affected the number of patients receiving general anaesthesia. However, there was no significant difference between the two groups with respect to hospi-

tal stay times or complication rates. In our clinic, the general policy is that laparoscopic repair is advised for patients with bilateral hernias who desire swift healing. Feliu and colleagues also prosed laparoscopic repair for bilateral inguinal hernias and reported a shorter mean operation time, a shorter mean healing time and fewer complications with this approach [18]. Interestingly, we found no significant difference in the mean operation time between the two groups in our study, which reflects as an advantage for the laparoscopic approach.

According to the multivariate analysis, surgical approach, age, gender, hernia site (unilateral or bilateral), ASA score and mean volume of intraoperative intravenous fluid infused were found to have no significant effect on the mean hospital stay time. Even subsequent to adjustment for comorbidities like benign prostate hypertrophy and other intraoperative characteristics, there was no significant effect on the mean hospital stay time. These findings are consistent with those of Koch and colleagues, who did not find an increase in postoperative urinary retention rates, even in patients with benign prostate hyperplasia [15].

The major drawbacks of this study include its small sample size and uneven number of patients in the two groups. Moreover, the vast majority of bilateral repair cases were in the laparoscopic group. This reflects the fact that surgeons tend to stick to the conventional approach. In our study, there was no discrimination with respect to the laparoscopic technique chosen by the surgeon or the employment of mesh. Surgical techniques were up to the surgeons. For this reason, there might have been a bias in the ASA scores and other characteristics of the patients. However, to minimise the effect of confounding factors on the two surgical techniques, we focused on the operative techniques from the same institution. All postoperative outcomes were evaluated in a multivariate regression model before and after adjustment for patient risk factors.

There was no mortality, morbidity or significant complication in the elderly patients who underwent open or laparoscopic inguinal herniorrhaphy. Our study advocates laparoscopic inguinal hernia repair as a safe alternative procedure for patients over 75 years of age, regardless of whether the case is bilateral. Results from studies with larger samples and longer durations are still needed.

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Disclosure of conflict of interest

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