Transition from Open to Laparoscopic Cholecystectomy at a Public and Private Hospitals in Nairobi

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Backgound: ***It is almost two decades since laparoscopic surgery was first introduced in Kenya. This study was aimed at evaluating the transition to laparoscopic cholecystectomy (LC) with analysis of patient demographics and other relevant data.***
Methods: ***This was a retrospective cross-sectional study of records of 448 patients who underwent cholecystectomy in Nairobi from 2001 to 2010. Data entry was done using epidataV 1.4.2 and analyzed using STATA version 11.0 and comparative analysis performed.***
Results: ***80% of all cholecystectomies performed in Nairobi were laparoscopic, 80% of the patients were females and40% of allpatients were under 40years of age. Ultrasound (USs) is well established for diagnosis and with detailed reporting but laboratory investigations at the public hospital(PH), were rare, especially Liver Function Tests (LFT), done in only 55% of the patients. The conversion rate of 4% was similar to that in other studies.***
Conclusion: ***Laparoscopic cholecystectomy is now established in Nairobi with good USs reporting. However the lack of adequate laboratory investigations noted in the records needs improvement.***

Key Words: Transition, Open, Laparascopic, Cholecystectomy

Introduction

Operations on the biliary tree are among the most common abdominal procedures performed in the United States, with more than 600,000 cholecystectomies performed annually[1]. Cholecystectomy remains a common operation in the rest of the world and is becoming increasingly common in Kenya. Laparoscopic management of symptomatic gallstones has rapidly become the new standard for therapy throughout the world. In 1985, the first laparoscopic cholecystectomy was performed by Mühe of Böblingen, Germany. Although meeting early skepticism from the academic surgical community, laparoscopic cholecystectomy (LC) was adopted rapidly around the world, and has subsequently been recognized as the new "gold standard" for the treatment of gallstone disease[2,3]. In Kenya LC has been available since the 90's and before this the traditional open cholecystectomy (OC) was the standard operation for symptomatic gall stones.Young general surgeons find laparoscopic surgery exciting and this together with the patient drive, has resulted in the transitionfrom OC to LC in Nairobi.Currently it is estimated that 90% of cholecystectomies are performed by the laparoscopic approach in the west[4].

The advantages of laparoscopic cholecystectomy over open cholecystectomy include less postoperative pain, improved cosmesis, shorter length of hospital stay, earlier return of bowel function, earlier return to full activity, and decreased overall cost[5-9]. Most patients undergoing LC were females (74.7%) with a mean age of 50.5 years[10]. Conversion from LC to OC should be encouraged especially in centers starting LC. The worldwide conversion rates (CRs) to OC have plateaued at 5-10%[11]. CRs are noted to differ amongst high volume and low volume surgeons.The CRs ranged from 1% to 6.5% in the high-volume group and 0% to 15.3% in the low-volume group with the overall CR reported as 4.9%[10]. A local study done almost 12 years ago noted a conversion rate of 5%[12].

Common indications for conversion to open in the world literature are adhesions (40.4%), technical difficulties (22.9%), iatrogenic injury (11%), severe acute inflammatory process (11%), hemorrhage (6.4%), variant biliary anatomy (2.8%), bile leaks (2.8%), common bile duct stone (1.9%) and choledochal fistula (0.9%)[10]. For LC to be performed successfully, it is important that adequate

training, facilities and equipment are available. Since the training, facilities and equipment differ at public and private hospitals, we decided to evaluate the transition and compare cholecystectomies performed at a public with private hospitals.

Patients and Methods

This was a retrospective study of patients who underwent a cholecystectomy over the last 10 years at Kenyatta National hospital, a public and National referral hospital and 3 selected private hospitals in Nairobi. The patients who underwent cholecystectomy from 2001 to 2010 were identified from the theater register and their medical records reviewed. The records of 448 patients who had cholecystectomy in Nairobi, from 2001 to 2010 were analyzed. Data entry was done using epidataV 1.4.2 and analysis using STATA version 11.0 and comparative analysis performed.

Results

A total of 207 (46%) were operated at the public hospital (PH) and the rest were operated in the 3 private hospitals (PrHs). Majority of the patients who had a cholecystectomy were females 347 (77.5%). A large number (43.4%) of the patients operated at the Public Hospitals and 41.2% of those operated at the Private Hospitals were aged under 40 years (Table 2). There were 2 patients in the age group 1-10 years in the public facility that had cholecystectomy for sickle cell disease related complications.

Table 1. Sex Distribution in Public and in Private Hospitals

Gender/Hospital	PH (%)	PrH (%)	Total (%)
Male	40 (19.3)	61 (25.3)	101(22.5)
Female	167 (80.7)	180 (74.7)	347(77.5)
Total	207 (100)	241 (100)	448 (100)

Table 2. Age Distribution groups

Age /Hosp	PH (%)	PrH (%)	Total (%)
1-10	2 (0.9)	0	2 (0.4)
11-20	6 (2.9)	6 (2.5)	12 (2.7)
21-30	35 (16.9)	36 (15)	71 (15.8)
31-40	47 (22.7)	57 (23.7)	104 (23.2)
41-50	38 (18.4)	59 (24.5)	97 (21.7)
51-60	40 (19.3)	35 (14.5)	75 (16.8)
61-70	20 (9.7)	29 (12.0)	49 (10.9)
>71	19 (9.2)	19 (7.9)	38 (8.5)
Total	207 (100)	241 (100)	448 (100)

Key: PH = Public Hospital. PrH = Private Hospital

Table 3. Symptomatology

Nausea	**PH (%)**	**PrH (%)**	**Total (%)**
Yes	147 (71.0)	84 (34.9)	231 (51.6)
No	55 (26.6)	109 (45.2)	164 (36.6)
Not noted	5 (2.4)	48 (19.9)	53 (11.8)
Total	**207 (100)**	**241 (100)**	**448 (100)**
Vomiting	**PH (%)**	**PrH (%)**	**Total (%)**
Yes	99 (47.8)	58 (24.1)	157 (35.0)
No	105 (50.7)	135 (56.0)	240 (53.6)
Not noted	3 (1.5)	48 (19.0)	51 (11.4)
Total	**207 (100)**	**241 (100)**	**448 (100)**
Fever	**PH (%)**	**PrH (%)**	**Total (%)**
Yes	29 (14.0)	49 (20.3)	78 (17.4)
No	176 (85.0)	174 (72.2)	350 (78.1)
Not noted	2 (1.0)	18 (7.5)	20 (4.5)
Total	**207 (100)**	**241 (100)**	**448 (100**
RUQ Pain	**PH (%)**	**PrH (%)**	**Total (%)**
Yes	205 (99.0)	221 (91.7)	426 (95.0)
No	2 (1.0)	9 (3.7)	11 (2.5)
Not noted	0 (0.0)	11 (4.6)	11 (2.5)
Total	**207 (100)**	**241 (100)**	**448 (100)**
Murphy's Sign	**PH (%)**	**PrH (%)**	**Total (%)**
Present	95 (45.9)	56 (23.2)	151 (33.7)
Absent	102 (49.3)	63 (26.1)	165 (36.8)
Not noted	10 (4.8)	122 (50.6)	132 (29.5)
Total	**207 (100)**	**241 (100)**	**448 (100)**

Most patients were operated as elective cases and their symptomatology was as shown in Table 3. More than 90% of patients presented with right upper quadrant pain in both the groups.
The diagnosis of gallstones was routinely made on abdominal ultrasound (US) examination, with 97.6% of the patients at the PH and 92.1% in the PrH setup having had an ultrasound. 3 patients in the PrH had no documentation in the records if an abdominal ultrasound had been done.The details of the USs reports were analyzed and features of gallbladder inflammation were noted to be present in 42.5% of the PH patients as compared with 33.1% of the PrH group. There was no mention of the CBD diameter and intra hepatic duct dilation in the US reports in only 0.5% of the PH reports as compared to 9.2% at the PrH.

A total of 80% of all cholecystectomy were laparoscopic. The overall conversion rate was 3.35%; 7 out of the 201 LC's at the PrH were converted to open, giving a conversion rate of 3.48% and 8 out of the 157 LCs at the PH were converted giving a conversion rate of 5.09%. Most patients were operated as elective cases and their symptomatology was as shown in Table 3. More than 90% of patients presented with right upper quadrant pain in both the groups. The diagnosis of gallstones was routinely made on abdominal ultrasound (US) examination, with 97.6% of the patients at the PH and 92.1% in the PrH setup having had an ultrasound. 3 patients in the PrH had no documentation in the records if an abdominal ultrasound had been done.

Table 4. Abdominal Ultrasound for gallstones

Gall stones on US	**PH (%)**	**PrH (%)**	**Total (%)**
Yes	202 (97.6)	220 (92.1)	422 (94.6)
No	3 (1.5)	6 (2.5)	9 (2.0)
Not reported	2 (0.9)	13 (5.4)	15 (3.4)
Total	**207 (100)**	**239 (100)**	**446 (100)**
Gallbladder Inflammation	**PH (%)**	**PrH (%)**	**Total (%)**
Yes	88 (42.5)	79 (33.1)	167 (37.5)
No	115 (55.6)	130 (54.4)	245 (54.9)
Not reported	4 (1.9)	30 (12.5)	34 (7.6)
Total	**207(100)**	**239 (100)**	**446 (100)**
Dilatation of CBD (>1cm)	**PH (%)**	**PrH (%)**	**Total (%)**
Yes	22 (10.6)	23 (9.6)	45 (10.1)
No	184 (88.9)	194 (81.2)	378 (84.7)
Not reported	1 (0.5)	22 (9.2)	23 (5.2)
Total	**207 (100)**	**239 (100)**	**446 (100)**
Dilatation of intra hepatic ducts	**PH (%)**	**PrH (%)**	**Total (%)**
Yes	9 (4.3)	9 (3.8)	18 (4.0)
No	197 (95.2)	208 (87.0)	405 (90.8)
Not reported	1 (0.5)	22 (9.2)	23 (5.2)
Total	**207 (100)**	**239 (100)**	**446 (100)**

Key: PH = Public Hospital. PrH = Private Hospital

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A total of 80% of all cholecystectomy were laparoscopic. The overall conversion rate was 3.35%; 7 out of the 201 LC's at the PrH were converted to open, giving a conversion rate of 3.48% and 8 out of the 157 LCs at the PH were converted giving a conversion rate of 5.09%.

The most common complication was surgical site infection noted in 4% and 20% of the open cholecystectomy group at the KNH and the private hospitals respectively. Other complications noted in the records included septic shock, pneumonia, diaphragmatic perforation and diarrhea. Six patients were re-admitted after discharge, for reasons which included bile leak, wound sepsis, and T-tube removal

Table 5. Results of Liver function tests

ALP	**PH (%)**	**PrH (%)**	**Total (%)**
Normal	62 (30.0)	181 (75.7)	243 (54.6)
Elevated	30 (14.5)	32 (13.4)	62 (14.0)
Not done	115 (55.5)	25 (10.5)	140 (31.4)
Total	**207 (100)**	**239 (100)**	**446 (100)**
AST	**PH (%)**	**PrH (%)**	**Total (%)**
Normal	70 (33.8)	177 (73.8)	247 (55.3)
Elevated	22 (10.6)	37 (15.6)	59 (13.2)
Not done	115 (55.5)	25 (10.5)	140 (31.4)
Total	**207 (100)**	**239 (100)**	**446 (100)**
ALT	**PH (%)**	**PrH (%)**	**Total (%)**
Normal	71 (34.3)	159 (66.7)	230 (51.7)
Elevated	21 (10.1)	54 (22.8)	75 (16.9)
Not done	115 (55.5)	25 (10.5)	140 (31.4)
Total	**207 (100)**	**239 (100)**	**446 (100)**
Total Bilirubin	**PH (%)**	**PrH (%)**	**Total (%)**
Normal	62 (30.0)	177 (74.0)	239 (53.6)
Elevated	30 (14.5)	37 (15.5)	67 (15.0)
Not done	115 (55.5)	25 (10.5)	140 (31.4)
Total	**207 (100)**	**239 (100)**	**446 (100)**

Table 6. Type of cholecystectomy Performed

Type of cholecystectomy	PH (%)	PrH (%)	Total (%)
Open Cholecystectomy	50 (24.2)	40 (16.6)	90 (20.1)
Laparoscopic Cholecystectomy	157 (75.8)	201 (83.40)	358 (79.9)
Total	207 (100)	241 (100)	448 (100)

Table 7. Complications following cholecystectomy

Complication	Laparoscopic		Open		Total (%) (n=448)
	PH (%) (n=157)	PrH(%) (n=201)	PH(%) (n=50)	PrH(%) (n=40)	
Bleeding	0 (0.00)	3 (1.5)	0 (0.00)	7 (7.5)	10 (2.2)
SSI	0	3 (1.5)	2 (4)	8 (20.0)	13 (2.9)
Bile leaks	1 (0.6)	2 (5.0)	0 (0.00)	2 (5.0)	5 (1.1)
CBD injury	1 (0.6)	0 (0.0)	1 (2.0)	0 (0.0)	2 (0.4)
DVT	0 (0.00)	0 (0.0)	0 (0.00)	1 (2.5)	1 (0.2)
Death	0 (0.000	0 (0.00)	0 (0.00)	1 (2.5)	1 (0.2)
Others	2 (1.3)	1 (0.5)	1 (2.0)	2 (5.0)	6 (1.3)

Discussion

It has been almost two decades since laparoscopic surgery was first introduced to Kenya and laparoscopic cholecystectomies were the first documented laparoscopic procedures practiced in Kenya[12]. The excitement noted among young general surgeons with LC and the patient drive to have LC have resulted in a notable transition from OC to LC. A study done in one of the private hospitals in Kenya demonstrated the gradual rise of laparoscopic cases from 7 a month in 2000 to 22 in 2001[13].

In the developed world, 90%of all the cholecystectomy is documented to be laparoscopic[4] while this study shows that 80% of all cholecystectomy were laparoscopic and that it took almost 2 decades to get to this level. A reasonable explanation being the limited number of trained laparoscopic surgeons and limited training facilities and equipment. In Kenya the use of dry and wet labs has slowly gained popularity with more dry labs now available for surgical trainees resulting in the increase in laparoscopic surgery.

From this study it is seen that a large number of our patients are young with a median age for a cholecystectomy being 43 years and the modal age group being 31-40 years. The age distribution was similar in both the PH and the PrH. Western studies describe a mean age of 50.5 years for LC. This may be explained by the overall lower life expectancy in Kenya. Gallstones mainly affect women and a retrospective review of laparoscopic cholecystectomy showed a female preponderance of 74.7%[10], and our results are similar with 77.5% females.

Abdominal ultrasound is proven to be the most useful examination and in this study all the patients who had a cholecystectomy in the public hospital had an abdominal ultrasound done. Meanwhile 2 patients in the private hospital setting had no records of an ultrasound and this may be due to filing errors. Gallstones were visualized in 422(94.6%) of the study population and most of the ultrasound reports also described the pattern of the biliary tree. Common bile duct dilatation and intrahepatic duct dilatation was not documented in only 34 (5.2%) of the reports. Evidence of gallbladder inflammation was not reported in only 34 (7.6%) of the patients. This shows good ultrasound reporting and most likely due to increasing availability of this investigation.

Laboratory tests, especially liver function tests are essential together with the radiologic tests in assisting the surgeon to rule out the presence stones in the biliary tree. In this study liver function tests were done in only about one third of the patients 247 (31.4%). Majority of this figure was contributed by the public hospital where 55.5% had no LFTs performed vs. 10.5% in the private sector. The general poor availability of investigative facilities at the public hospitals is highlighted with these figures and this deficiency demands urgent remedy.

With better training and increasing experience, the conversion rates from LC to OC should be minimal. Conversion rates in this study were 3.48% and 5.09% in private and public hospitals respectively, with an overall conversion rate 3.35%. These figures are similar to the rest of the world[10].

Surgical site infection (SSI) was the commonest overall complication at 2.9%. This was mainly seen with open cholecystectomy, with an 8% rate in the PH. The LC SSI rate was 1.5%. Studies have shown an overall surgical site infection rate of 1% to 4.4%[14,15]. The low number of OC cases may explain this.

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