

ORIGINAL ARTICLE

FINANCIAL COST TO INSTITUTIONS ON PATIENTS WAITING FOR GALL BLADDER DISEASE SURGERY

Ahmed Waqas, Shahzad Ahmed Qasmi*, Faran Kiani**, Ahmed Raza***, Khizar Ishtiaque Khan[†], Shazia Manzoor^{††}

Department of Surgery, Heavy Industries Hospital, Taxila, *Combined Military Hospital (CMH) Bahawalpur, **CMH Gilgit, ***CMH Tarbela, [†]CMH Malir, ^{††}Department of Radiology, CMH, Rawalpindi, Pakistan

Background: The aim of this study was to determine the financial costs to institution on patients waiting for gall bladder disease surgery and suggest measures to reduce them. **Methods:** This multi-centre prospective descriptive survey was performed on all patients who underwent an elective cholecystectomy by three consultants at secondary care hospitals in Pakistan between Jan 2010 to Jan 2012. Data was collected on demographics, the duration of mean waiting time, specific indications and nature of disease for including the patients in the waiting list, details of emergency re-admissions while awaiting surgery, investigations done, treatment given and expenditures incurred on them during these episodes. **Results:** A total of 185 patients underwent elective open cholecystectomy. The indications for listing the patients for surgery were biliary colic in 128 patients (69%), acute cholecystitis in 43 patients (23%), obstructive jaundice in 8 patients (4.5%) and acute pancreatitis in 6 patients (3.2%). 146 (78.9%) and 39 (21.1%) of patients were listed as outdoor electives and indoor emergencies respectively. Of the 185 patients, 54 patients (29.2%) were re-admitted. Financial costs in Pakistani rupees per episode of readmission were 23050 per episode in total and total money spent on all readmissions was Rs. 17,05,700/-. **Conclusion:** Financial costs on health care institutions due to readmissions in patients waiting for gall bladder disease surgery are high. Identifying patients at risk for these readmissions and offering them early laparoscopic cholecystectomy is very important.

Keywords: Diseases, gall bladder, cholecystitis, gall stones, patient readmission, health care costs

J Ayub Med Coll Abbottabad 2014;26(2):158–61

INTRODUCTION

Cholecystectomy is one of the commonest operations in every general surgical operation list in Pakistan. A majority of patients is uneducated and poor facing extreme rush in government hospitals. These patients resultantly have to accept extended appointments. Surgeons are also over loaded and prefer to treat these patients initially conservatively. Correspondingly many of these patients keep on visiting hospitals for break through attacks and are treated indoor as well as outdoor. Although many studies have evaluated the burden of morbidity in patients of gall bladder disease waiting for elective surgery¹⁻³ but none have measured the magnitude of financial costs incurred on these patients by Pakistani health system and measures to reduce them.

The aim of this study was to determine the financial costs to institution on patients waiting for gall bladder disease surgery and suggest measures to reduce them.

MATERIAL AND METHODS

This multi-centre descriptive survey was performed on all patients who underwent an elective cholecystectomy by three consultants in Heavy Industries Taxilla Hospital, Combined Military Hospital Bahawalpur and Combined Military

Hospital, Gilgit in Pakistan between Jan 2010 to Jan 2012. These are secondary care hospitals equivalent to civil district hospitals hosting 150–200 beds and have single general surgeon in each of them. The rates of medical treatment in the organization are standardized⁴ and considered cheaper when compared with other organizations and private sector. Sample size for the patients waiting for gall bladder disease surgery was 203 and was calculated by World Health Organization (WHO) software using formula: $n = Z^2_{1-\alpha/s} P (1-P)/d^2$ for estimating a population proportion with specified absolute precision at confidence level [%] of 95, anticipated population proportion of 0.05 and absolute precision required of 0.03. Patients of either sex, from 20–80 years of age were selected for study. All patients with cholangitis, portal hypertension, suspicious of gall bladder malignancy, who were operated on the first admission due to emergency nature of disease and those patients who never needed operation for gall bladder disease were excluded from the study.

Financial costs were defined as the costs specified by the government organization and incurred on each episode of re-admission of patients listed for elective gall bladder disease surgery. The costs included expenditure on medications, disposables, investigations, room/ward and intensive

care (ITC) charges as obtained from hospital receipts and ledgers. Expenditures incurred on initial emergency admissions of patients and not operated during the admission but later on electively were also included in the calculations.

Gall bladder disease included acute cholecystitis, biliary colics, biliary pancreatitis and obstructive jaundice due to choledocholithiasis. Confirmation of these diseases was done on ultrasonography, endoscopic retrograde cholangio pancreatogra-phy (ERCP) when needed and serum amylase for pancreatitis. The criteria used to diagnose acute cholecystitis were acute exacerbation of the abdominal pain, right upper quadrant tenderness, fever and raised white cell count. Biliary colic was identified by right hypochondrial pain less than 12 hours.

Gall bladder disease surgery included open cholecystectomy, mini cholecystectomy, laparoscopic cholecystectomy and converted surgeries from mini/laparoscopic to open cholecystomies.

Waiting time for gall bladder disease surgery meant the time from initial placement of patients on operation list till the date of elective surgery.

After taking permission from concerned hospital's ethical committee, data was collected on demographics, the duration of mean waiting time, specific indications and nature of disease for including the patients in the waiting list, details of emergency re-admissions while awaiting surgery, the investigations, treatment given and expenditures incurred on them during these episodes. Data regarding financial costs was collected from hospital receipts and ledgers. Type of elective surgery performed was also recorded. Data was analysed using SPSS-16. Descriptive statistics were obtained for demographics, waiting time, specific indications and nature of disease for including the patients in the waiting list, details of emergency re-admissions while awaiting surgery, and expenditures incurred on them during these episodes. *p*-value of ≤ 0.05 with a confidence interval of 95% was considered as significant.

RESULTS

A total of 185 patients underwent elective cholecystectomy of which 152 (82%) were females. The mean age of the patients was 43±8.8 years. The indications for listing the patients for surgery were biliary colic in 128 patients (69%), acute cholecystitis in 43 patients (23%), obstructive jaundice in 8 patients (4.5%) and acute pancreatitis in 6 patients (3.2%). 146 (78.9%) and 39 (21.1%) of patients were listed as outdoor electives and indoor emergencies respectively. The

mean duration of the waiting time for cholecystectomy was 10±2.1 weeks. All the patients under went open cholecystectomy. Data regarding readmissions is shown in figure-1. In addition to routine blood tests, 31 abdominal radiographs, 45 chest radiographs, 59 ultrasonograms, 9 computed tomogram and 7 ERCPs were carried out in these patients. Total of 4 patients underwent internal biliary stenting on ERCP to relieve obstruction. The mean duration of each episode of admission was 6.6±2.3 days.

Financial costs were calculated per episode of readmission. Average cost per episode of readmission in rupees was 1500 for baseline investigations, 1500 for imaging done, 1850 on ITC stays, 5700 on ward stays and 12500 on treatments. The total cost incurred on each episode of readmission was 23050 PKR. The total money spent on all readmissions was 1705700 RKR. The additional money spent on definite operation of these 54 readmitted patients was 18000 PKR per patient (972000 in total). The rest of the patients who did not need readmission consumed 3085050 PKR till they were operated by cholecystectomy on their scheduled appointment (23550 PKR per patient) (Table-1).

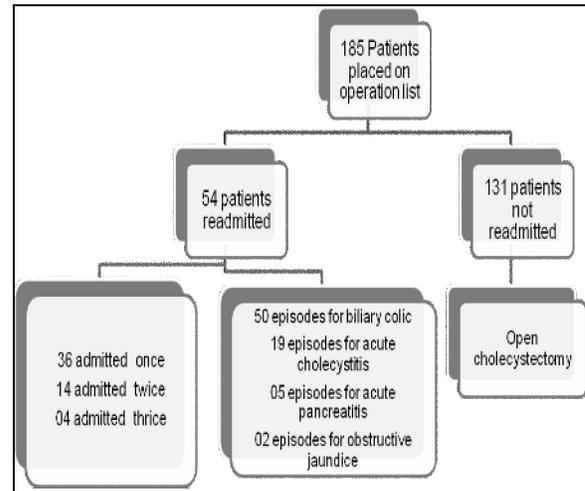


Figure-1: Summary of results

Table-1: Cost of surgery and Radiological investigations

| Imaging/Procedure | Cost in Pakistani Rupees |
|--------------------------------|--------------------------|
| Open Cholecystectomy | 18000 |
| Laparoscopic cholecystectomy | 20000 |
| Chest radiograph | 300 |
| Abdominal radiograph | 300 |
| Ultrasound of abdomen | 500 |
| Computed tomography of abdomen | 4000 |
| ERCP* | 3000 |
| Internal biliary stenting | 6000 |

*ERCP=Endoscopic retrograde cholangiopancreatography

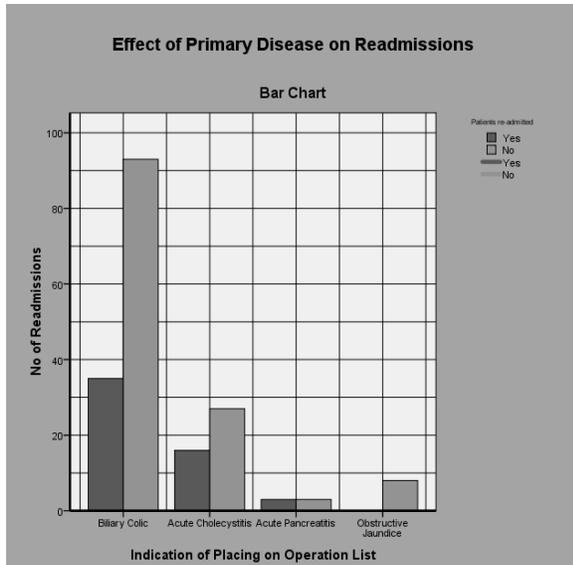


Figure-2: Effect of primary disease on readmission

DISCUSSION

Providing good health care by governments comes at great financial costs.⁵ Therefore need arises to slash the pointless expenses and divert them to better services for patients. Studies have proved that patients of same disease being readmitted recurrently raise the financial costs of a health care system more than single prolonged admission or single costly intensive care stay.⁶ Hospitalizations account for about half of all health care expenses, and it has been estimated that 13% of the inpatients in the United States use more than half of all hospital resources through repeated admissions.⁷ 29.2% patients who faced readmissions in our study consumed 46.4% of the entire expenses done on all 185 patients. This is a considerable share of expenditures which can be spent on creating working environment helping to operate these patients early.^{8,9}

The term readmission has been defined as a spectrum of repeated hospitalizations within 1, 2, 4 or 12 months of discharge.⁷ The readmissions which can be prevented occur in immediate post discharge period.⁷ Hospital readmission, for any reason, is disruptive to patients and caregivers, costly to the healthcare system, and puts patients at additional risk of hospital-acquired infections and complications.¹⁰ In our study 21 (28.4%), 13 (17.6%), 12 (16.2%) and 10 (13.5%) of all readmissions occurred at 3, 6, 4 and 2 weeks respectively after primary admission of the patients while waiting for their scheduled operation. The mean time of readmission was 4 weeks after the primary admission. The number of readmissions decreased as the number of weeks increased after the primary admission (1, 2, 2 and 3 patients at 8, 9, 10 and 7 weeks respectively). Therefore, if a patient at high risk for

readmissions can be identified and operated within 04 weeks or preferably 03 weeks, then number of readmissions can be markedly reduced.¹⁰

An observation from our study was that the patients who were included in the waiting list after an episode of acute cholecystitis and acute pancreatitis were admitted more frequently (37.2% & 50% respectively) with recurrent symptoms when compared with patients who were listed after an episode of biliary colic (27.3%) ($p=0.10$,) (Acute cholecystitis versus biliary colic $RR=0.37/0.27=1.37$) (Acute pancreatitis versus biliary colic $RR=0.50/0.27=1.85$). The reason for obstructive jaundice patients not being admitted again was that they had a standardized initial treatment of ERCP with or without internal biliary stenting for those not responding followed by cholecystectomy within 02 weeks. Hence, patients with primary disease of acute cholecystitis should be offered early cholecystectomy. We have to operate acute pancreatitis patients during the same admission. In this way number of readmissions as well as expenditures can be decreased distinctly (Figure-2).

Out of all patients initially placed on operation list, 22 (56.4%) of indoor patients and 32 (22%) of outdoor patients had to be readmitted before their scheduled cholecystectomy ($p=0.001$) (indoor patient versus outdoor patients $RR=0.56/0.21=2.6$). Therefore, indoor patients being diagnosed with gall bladder disease and scheduled for cholecystectomy should be given priority in calendar dates for cholecystectomy.

As mentioned already study was conducted in secondary care hospitals with a single surgeon in place. Recruitment of more surgeons can rationalize outpatient and operation lists load resulting in more early cholecystectomies. Even gall bladder clinics run by a senior nurse (under supervision of a consultant) trained in initial history taking, investigations and counselling of gall bladder diseases can be instituted without requirement of huge resources. These nurses can work with checklists, gall bladder pathways¹¹ and flowcharted protocols. It will further give direction to waiting times of patients for operations, regular and easy follow-ups for patients resulting in early identification of patients for recurrent episodes and better admission and discharge counselling/education of patients.

All of cholecystectomies done in our study were open which compelled surgeons in study to place patients not in day care lists. Importance of laparoscopic surgeries should be recognized and laparoscopic equipment should be provided to surgeons even at small hospitals making cholecystectomies a daycare surgery. This will result in more early cholecystectomies.^{11,12} Good laparoscopic equipment set costs on average 300,000–350,000 PKR in Pakistan nowadays. While total money spent on 54 patients was 267,7700 PKR.

The additional money spent on those patients can easily be diverted for laparoscopic equipment to gain immediate and long-term constructive results.

Most important is identification of modifiable risk factors for gall bladder diseases making patients prone to readmissions⁷ like gender, age group, duration of disease/symptoms, initial severity of episode, stone characteristics (size, site & number), transitional care which includes patient assessment and education, pre-discharge reviews, good post-discharge instructions, regular follow-ups and adjustment in post-discharge medications.^{7,10}

CONCLUSION

Unexpected readmissions in patients waiting for gall bladder disease surgery are common due to recurrence of disease and symptoms. Financial costs on health care institutions due to these readmissions are high. Identifying patients at risk for these readmissions and offering them early laparoscopic cholecystectomy is very important. Improvements in logistics and protocols at small hospitals in Pakistan are also necessary to improve environment for day care early cholecystectomies.

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Address for Correspondence:

Dr .Ahmed Waqas, 21.A, Askari 1, Chaklala Scheme 3, Rawalpindi Cantt, Rawalpindi, Pakistan.

Cell:+92-3129053287

Email: awaqas74@gmail.com