

To the Editors:

Outcome of hepatic resection: First five-year experience in elderly and younger patients

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Introduction

Hepatic resection offers the best curative treatment for most surgical liver diseases [1,2]. However, liver surgery is demanding. It requires meticulous technique, careful planning, supportive care and infrastructure. Over the years advances in liver surgery has made it possible to carry it out safely even in extreme cases [3].

Hepatobiliary surgery is rapidly developing in Sri Lanka. Increasing number of patients are referred with surgical liver disease. Managing these patients are challenging in newly established centers. This study analysed the outcome of the first 150 patients who underwent liver resection at the professorial surgical unit of the North Colombo Teaching Hospital, Ragama from 2012 to 2017. Patients with hepatocellular carcinoma, cholangiocarcinoma, colorectal liver metastases, non-colorectal liver metastases and benign liver lesions who underwent curative resection were included. Emergency hepatic resection following trauma were excluded. All data were collected prospectively. Demographic, clinical, laboratory data and comorbidities were recorded. Outcome measures analysed were, intraoperative details such as total operative time, hepatic transection time and intraoperative blood loss. Post-operative outcomes were duration of intensive care unit (ICU) stay, duration of hospital stay, major and minor postoperative complications and mortality rate. Patients were divided in to two groups for comparison. Elderly group was defined as patients aged 65 years or more ($n=49$) and younger group was defined as patients below 65 years ($n=101$).

Diagnosis of liver pathology was primarily made on cross sectional imaging. All images were reported by two radiologists. Liver biopsy was performed in selected cases, where diagnoses were inconclusive. All patients were discussed in a dedicated multidisciplinary meeting including a hepatobiliary surgeon, hepatologist, oncologist and two specialist radiologists.

Selection for surgery was based on patient's general condition, performance status, liver status, location of liver lesion, functional liver reserves and patient's consent. Advanced age itself was not a limiting factor for surgery. Patients who were not selected for surgery were offered ablation therapy, transarterial chemotherapy (TACE) or palliative care accordingly.

Hepatic resections were done according to standardized anaesthesia protocols and advanced intraoperative monitoring. Harmonic scalpel and Cavitron Ultrasonic Surgical Aspirator (CUSA) were primarily used for hepatic transections. CVP was maintained close to zero. Pringles maneuver was used selectively. Patients were closely followed up at a dedicated clinic after the surgery.

Data was analyzed using SPSS software version 17. Data were presented as mean with standard deviation (SD), median with interquartile range (IQR) and frequencies with percentages (%). The differences between groups were evaluated using Pearson's Chi-square test, Mann Whitney U, Kruskal-Wallis test as appropriate. A P value of less than 0.05 was considered statistically significant.

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Out of 150 patients who underwent hepatic resections, elderly group consisted of 49 patients. Of them 71.4% were males, median age was 69 years (range 65-79). There were 101 patients in the younger group, 59.4% were males, median age was 54 years (range 12-64].

Preoperative base line investigations and comorbidities were compared between the two groups. Serum creatinine ($p=0.034$), renal disease ($p=0.011$) and respiratory diseases ($p=0.015$) were significantly higher in the elderly group.

Seventy five resections (50%) were done for hepatocellular carcinoma, eight (5.3%) were for cholangiocarcinoma, twenty five (16.6%) for colorectal liver metastases, twelve (8%) for non-colorectal liver metastases and thirty (20%) for benign liver lesions.

Hundred and twenty five (83.3%) of the hepatic resections were done as open procedures. Others were laparoscopic resections. One case was converted to open.

Right hepatectomy was the commonest type of

resection ($n=51$; 34.6%), followed by wedge resection (21.3%) and monosegmentectomy (14.6%). The types of resection in the two groups were similar.

Median operating time in the elderly was 240 minutes (range 70-600) compared to 285 minutes (range 24-630) in the younger group ($p=0.55$). Hepatic transection time in the elderly group was 90 minutes (range 30-240) and in the younger group 77.5 minutes (range 30-210) ($p=0.81$). Median intraoperative blood loss was 350 ml (range 20-2000) in the elderly compared to 300 ml (range 10-2800) in the younger group ($P=0.696$). Median hospital stay was 8 minutes in the elderly group and 7 days in the younger group ($p=0.229$). Median ICU stay was 2 days in both groups (Table 1).

Postoperative complications were categorized as major and minor. Of the elderly group 7.2% had major complications and 24.2% had minor complications. In the younger groups 5.5% had major complications, and 17.16% had minor complications (Table 1).

Table 1. Comparison of pre-operative MELD score, percentages of comorbidities, types of hepatic resections, intraoperative and perioperative outcome and mortality between elderly and younger groups

	Elderly (n=49)	Younger (n=101)	p Value
Preoperative MELD score			
MELD score	8.0	9.0	0.938
Comorbidities			
Diabetes mellitus	38.8% (n=19)	18.5% (n=19)	0.773
Hypertension	7.2%	8.7%	0.673
Ischemic heart disease	2.4%	5.4%	0.721
Ischemic heart disease and hypertension	4.8%	5.4%	
Renal disease	-	1.1%	0.011
Respiratory disease	2.4%	2.2%	0.015
Type of hepatic resection			
Major resection	26	50	
Minor resection	23	51	
Intraoperative and perioperative outcome			
Total operating time (minutes)	240 (70-600)	285 (24-630)	0.55
Hepatic transection time (minutes)	90 (30-240)	77.5 (30-210)	0.81
Intraoperative blood loss (ml)	350 (20-2000)	300 (10-2800)	0.696
Total hospital stay (days)	8 (2-31)	7 (3-30)	0.229
Total ICU stay (days)	2 (1-5)	2 (1-10)	0.509
Perioperative complications and mortality			
Major complications	7.2%	5.5%	
Minor complications	24.2%	17.16%	
No complications	68.6%	77.34%	
Perioperative mortality	6.12%	3.26%	

INR – International normalized ratio; MELD score – Model for End-Stage Liver Disease score

Studies have reported varied complication rates following hepatic resections. Overall morbidity of 22.5% was reported in a study which analyzed 1500 consecutive cases over 20 years. Perioperative mortality ranges from 2-5% [4]. Interestingly some studies report higher operative mortality in younger (9.6%) patients compared to elderly (3.1%) patients [2]. In our series perioperative mortality in the elderly group was 6.12 % and 3.26% in younger group. The difference was not statistically significance ($p=0.47$). These rates are comparable to those in other studies.

Safety of hepatic resection has improved dramatically during the last few decades [1,2]. Careful preoperative evaluation, assessment of functional liver reserves, advancement of surgical techniques and perioperative management has shown a better outcome in surgical candidates [1]. High volume hepatobiliary centers embark on more advanced hepatic resections with experience and show notable improvement in peri-operative outcomes [5].

Even though this clinical service was started recently, a well organized system has resulted in outcomes which are comparable with other centers, with an overall mortality of 6.12% in the elderly and 3.26% in the younger group. Though laparoscopic resection may have been tolerated well we are still in the early stage of the learning curve.

In conclusion, in a recently started clinical service multidisciplinary input, careful patient selection, advanced preoperative optimization, improved anaesthesia, surgical techniques and meticulous perioperative care in a high volume center has achieved comparable outcome in elderly patients after hepatic resection.

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Conflicts of interest

There are no conflicts of interest.

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