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Clinical Experience with Major Hepatic Resections in Ramathibodi Hospital

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Abstract **During 5 years and 10 months period from January 1, 1992 to October 31, 1997, 118 major hepatic resections were performed and 96 medical records were available for retrospective review. There were 63 males and 33 females. Age ranged from 25 to 84 years (average 53.73 years).**

Indications for surgery were 43 hepatocellular carcinomas, 36 cholangiocarcinomas, 10 metastatic cancers, 2 sarcomas and 5 benign lesions. Among 96 operations, there were 43 right lobectomies, 34 left lobectomies, 3 right trisegmentectomies, 9 left lateral segmentectomies, and 7 other segmentectomies. There were 54 operative complications from 29 patients (30.2%). Operative mortality was 8.3% (8 mortality cases). Overall 1 and 3 years survival was 71.05% and 52.93% respectively. The mean survival was 3.25 years. The morbidity, mortality, and long term survival of major hepatic resection in Ramathibodi hospital were comparable to other reported series.

Key words : Hepatectomy, Morbidity, Mortality, Survival

Hepatic resection is used with increasing frequency in the management of metastatic or primary neoplasms of the liver. As a result of advances in surgical techniques, hepatic resection have been performed in recent years with a reduction in the mortality rate. Typically, hepatic resection for benign disease has been reported to have minimal risk of mortality. Mortality following resection for malignant disease has fallen from 15% 30 years ago to 2%-10% today,[1-6] and the risk of resection for benign disease is even less.[7-9] In this study, we reviewed indications for major hepatic resection, morbidity, mortality, and long term survival after operation in Ramathibodi Hospital. We also analyzed factors that affected survival after major hepatic resection.

Materials and Methods

Ninety six patients undergoing major hepatic resection from January1, 1992 to October 31, 1997 were retrospectively reviewed to identifiy indications for surgery, morbidity, mortality after operation. Long term survival was described by Kaplan-Meier method. All variables affecting survival were analyzed univariately using the Log Rank Test.

The anatomical division of liver into segments by Couinad[10] was adopted to define the type of resection. Hepatic resections consisting of formal lobectomies, extended right lobectomy, and segmentectomies were performed. In the lobectomy, hepatic tissue was resected to the Cantle's line. Right extended resec-

tion included segments IV, V, VI, VII, VIII, with or without segment I. Segmentectomies included left lateral segmentectomy (segment II and III resections) and other segmentectomies. Indications for such resections were mainly dictated by the size and extent of tumor to achieve adequate margins. The technique of liver resection was performed with preliminary vascular control (ligating the portal pedicle and / or hepatic vein prior to transecting the parenchyma). Segmentectomies were mainly performed by primary parenchymatous transection technique.

From January 1 1992 until October 31 1997, 118 patients had major hepatic resection performed in the Department of Surgery, Ramatibodi Hospital, Mahidol University. The clinical records of all these patients were reviewed. To analyze a homogeneous group of patients, we excluded patients who underwent hepatic resection for trauma or debulking procedures. The remaining records of 96 patients who underwent major hepatic resection were analyzed in this report.

All patients underwent comprehensive evaluation that included a detailed history and physical examination, computeried tomography of the abdomen, laboratory investigations (liver function test, tumor markers, coagulogram, hepatitis serologic test, etc). The preoperative evaluation allowed determination of resectability, operability, and the presumptive diagnosis. Preoperative biopsies were deliberately avoided. Morbidity was defined as any complication that prolonged hospital stay or affected outcome. Mortality was defined as death occurring in the hospital or within 30 days after operation. Follow-up was obtained at outpatient visits in most cases or by telephone or letter communication with patients or physicians.

Results

A profile of the patient population is shown in Table 1. The average age of the group was 53.73 years (25-84); 65.63 per cent were male and 34.37 per cent were female. Hepatocellular carcinoma (43 cases) represented 44.79 per cent of disease, cholangiocarcinoma (36 cases) 37.50 per cent, metastatic cancer (10 cases) 10.41 per cent, sarcoma (2 cases) 2 per cent, benign lesion (5 cases) 5.21 per cent. In the group of metastatic carcinoma, the primary site was mainly

Table 1 Clinical profiles of 96 patients

Indication	HCC	CholangioCA	Metastatic CA	Sarcoma	Benign lesion	Overall
Number (%)	43 (44.79)	36 (37.50)	10 (10.41)	2 (2.08)	5 (5.21)	96
Age						
mean(yrs)	56.20	50.18	60.80	52.50	44.20	53.73
range(yrs)	34-84	29-68	44-80	25-80	26-59	25-84
Sex						
Male	34	24	4	1	-	63
Female	9	12	6	1	5	33
Underlying diseases						
cirrhosis	16	2	-	-	-	18
HT	4	-	3	1	1	9
Lung diseases	4	2	1	-	1	8
DM	4	3	-	-	-	7
Angina	1	-	-	-	-	7
SLE	-	-	-	-	1	1
Presenting symptoms						
Pain	17	16	5	-	1	39
Discomfort	11	7	-	-	-	18
Mass	5	3	2	-	2	12
Jaundice	3	5	-	1	-	9
Other	5	4	3	1	1	14
No symptom	2	1	-	-	1	4

from colorectal (80%) then breast (10%) and pancreas (10%). Benign lesions included each of the hemangioma, myxoma, focal nodular hyperplasia, solitary liver cyst, and intrahepatic duct stones. Nine patients had hypertension, eight had underlying pulmonary disease, seven had diabetes, one had angina pectoris, another had systemic lupus erythematosus. Pain is the most presenting symptom, 9 patients had jaundice, and 4 patients had no symptom.

Operative data were detailed in Table 2. Right lobectomy was performed in 43 patients, left lobectomy in 34 patients, extended right lobectomy in 3 patients, left lateral segmentectomy in 9 patients and other segmentectomies in 7 patients. The operative time averaged 4.1 hours and a mean postoperative hospital stay was 13.3 days. Estimated blood loss which was determined by anesthesiologists and correlated with the amount of blood transfused was 2.68 litres in average. The size of tumor frequently found was 5-10 cm. in the largest diameter. Perioperative mortality and morbidity were presented in Table 3 and Table 4 respectively. Total 54 postoperative complications from 29 patients (30.2%) and 8.33 per cent of perioperative mortality were found in this study. Analysis by Kaplan-Meier method revealed 1-year survival of 71.05 per cent, 3-year survival 52.93 per cent, and mean survival 3.25 years (Table 5). Among the factors of cirrhosis, tumor size, tumor margin, presenting symptoms, and lymph node, none was found to affect long term survival by Log-Rank Test (Table 6).

Discusson

Hepatic resection is now performed more frequently because operative mortality have fallen over the last 30 years. In the 1970s improvement of the operative mortality rate was associated with the development of techniques allowing major hepatic resection.[12,13] Then in the 1980s, systemic anatomical resection of the cirrhotic liver was established in association with the development of perioperative management of cirrhotic patients. Scheele et al[14] reported that the operative mortality rate was 5 per cent in 226 patients who underwent hepatic resection due to hepatic metastasis from colorectal carcinoma. Al-Hadeedi et al[15] reported that the operative mortality rate of 169 patients, including 100 with cirrhosis who underwent hepatic resection, was 12 per cent. Despite these re-

Table 2 Operations.

Procedures	number	Mean operative time (min)	Average blood loss (ml)	Mean post op hospital stay (day)
Right lobectomy	43	263	3300	13.6
Left lobectomy	34	265	2893	12.91
Extended right lobectomy	3	271	1950	37.3
Left lateral segmentectomy	9	116	561	8.8
Other segmentectomies	7	182	1164	9.9
Total	**96**	**244**	**2675**	**13.3**

Table 3 Perioperative Complications in 29 patients (30.2%).

Intraoperative complications	Number	Postoperative complications	Number
Tear IVC	3	Subphrenic collection or abscess	9
Tear left hepatic vien	1	Wound complication	6
Uncontrolled retroperitoneal bleeding	1	Intraabdominal bleeding	2
Uncontrolled hepatic parenchymal bleeding	1	Bile duct obstruction	2
Tear CBD	1	Pulmonary complication	17
Tear branch of left intrahepaticduct	1	Hepatic failure	8
Tear duodenum and left hepatic artery	1	Other complications	10
Total	**9**		**54**

Table 4 Perioperative mortalitiy (8.33%).

Sex	Age (yrs)	Diagnosis	Underlying disease	Procedure	Causes of death
Male	61	HCC	DM,cirrhosis	Right lobectomy	Post - op bleeding
Male	34	HCC	None	Right lobectomy	Uncontrolled retroperitoneal hemorrage
Male	41	HCC	Cirrhosis	Right lobectomy	Liver failure
Female	48	HCC	none	right lobectomy	Tear IVC
Female	68	HCC	hypertension	right lobectomy	Tear IVC
Male	59	HCC	cirrhosis DM, hypertension	right lobectomy	Liver failure
Female	40	Cholangio CA	none	left lobectomy	Sepsis form subphrenic collection
Female	71	CA pancreas with liver metastasis	none	right lobectomy, Whipple's operation, transverse colectomy	Sepsis form subphrenic collection and necrotizing pancreatitis

Table 5 Long - term survival after operations.

Diagnosis	N	Median survival (years)	Mean survival (years)	1 year-survival (%)	3 year-survival (%)
HCC	43	2.66	2.29	58.33	46.67
CholangioCA	36	2.32	3.39	77.78	46.67
Metastasis	10	-	5.86	87.50	65.62
Total	**96**	**2.66**	**3.25**	**71.05**	**52.93**

ductions in mortality, the morbidity of the procedure remains high, with a 27 per cent to 47 per cent postoperative complication rate.[8] In this report, the morbidity and mortality of major hepatic resection in Ramathibodi hospital were 8.33 per cent and 30.2 per cent respectively which are comparable to other worldwide reports (Table 7).

Cholangiocarcinoma continues to present an enormous technical challenge to abdominal surgeons. Although the resectability rate of cholangiocarcinoma has increased[9] the optimal therapeutic strategy for this disease remains controversial. Whenever possible, resection remains the treatment of choice. Survival rates after hepatectomy in our report are comparable with other worldwide reports.[6,9,16-18]

Hepatic resection offers the best chance at cure for patients with hepatocellular carcinoma. The high association between hepatocellular carcinoma and cirrhotic liver disease makes surgical resection, even in favorable tumor types, to be a difficult task based on decreased hepatic reserve. The results of hepatectomy, however are still far from satisfactory because of the high incidence of recurrence and the low rate of long term survival, although the rates of operative death and morbidity have decreased dramatically during the last 10 years. In Ramathibodi Hospital long term survival of hepatocellular carcinoma after major hepatic resection are slightly poorer than Japan[18-21] and Western contries[3,4,22,23] but comparable with other Asian countries.[24,25] Reports of survival of patients with

Table 6 Factors affecting survival in HCC cases

Factors	P - value
Cirrhosis (yes/no)	.9168
Tumor size (<=5cm/>5cm)	.9018
Margin (+ / -)	.7270
Symptom (+ / -)	.6144
Lymph node (+ / -)	.7270

Table 7 Literature survey for mortality and survival.

Authors	No.of pts	Mortality	1-year survival	3-year survival	5-year survival
Literature Survey for mortality and survival (HCC)					
Lin[24] 1976	118	11.8 %	35.0 %	20.0 %	19.5 %
Wu[25] et al.1980	181	8.8 %	55.9 %	38.9 %	16.0 %
Yamanaka[21] et al.1990	210	*	76.0 %	44.0 %	29.0 %
Fortner et at.[22] 1978	42	16.7 %	85.0 %	50.0 %	37.0 %
Iwatsuki[4] et al.1983	43	9.3 %	77.8 %	55.7 %	46.0 %
Tani etal[20]1997	90	4.4 %	87.2 %	63.8 %	37.8 %
Naguchi et al[19]1997	20	11.1 %	77.8 %	55.6 %	55.6 %
Present study	43	13.9 %	58.33 %	46.67 %	*
Literature survey for mortality and survival (metastasis)					
Fortner[32] et at. 1981	25	8 %	88.0 %	48.0 %	*
Adson[33] et al.1980	34	5.9 %	82.0 %	41.0 %	*
Bengmark[34] et al.1982	32	6.3 %	*	20-25 %	*
Wilson[35] et al. 1976	60	1.7 %	*	*	28.0 %
Iwatsuki[4] et al.1983	43	0 %	85.3 %	66.7 %	57.25 %
Present study	10	10 %	87.5 %	65.62 %	*
Literature survey for mortality and survival (Cholangiocarcinoma)					
Uttaravichien[16] 1983	29	*	65.52 %	24.14 %	17.24 %
Nimura et al.[17] 1991	24	*	48 %	29 %	6 %
Tsuzuki et al.[18] 1991	25	*	*	*	19 %
Miyagawa etal[16] 1995	24	0 %	78.6 %	65.8 %	*
Pichlmayr et al[9] 1996	95	10.5 %	65 %	33.4 %	27.1 %
Present study	36	2.8 %	77.8 %	46.67 %	*

**No available data*

resected hepatocellular in various series were presented in Table 7.

Although a variety of metastatic tumors to the liver are subjected to resection, metastases of colorectal cancer are the most common. Most patients with untreated colorectal cancer secondaries in the liver are dead within a year of their detection.[26] It is disputed whether factors such as the interval between the resection of the colonic primary and the liver resection, the involvement of local colonic lymph nodes by tumor, the size of the liver metastasis, or whether the liver metastases are solitary or multiple affect survival following liver resections.[27-29] Recent studies[30,31] showed a significant difference in survival according to the number of metastasis and surgical margin. Patients with single lesion had a 5-year survival of 47 per cent compared with 16 per cent for a lesion with satellite nodules, and 17 per cent for multiple lesion. They recommended as a surgical standard striving for a 2 cm margin but also settling for a 1-cm hepatic resection margin. After resection, 1 and 3-year survival were 87.5 per cent and 65.62 per cent respectively which were comparable to other reports.[4,32-35]

By univariate analysis of 43 patients with hepatocellular carcinoma in this report, no factor was found to affect long term survival (Table 6). Previous studies[20,21,36] have reported that survival after hepatic resection for hepatocellular carcinoma was greater in association with the followings: absence of vascular invasion, absence of symptoms, solitary tumor, negative margin, small tumor (≤5 cm), and present of tumor capsule. Significant univariate prognostic factors for survival after liver resection for cholangiocarcinoma were lymph node involvement, tumor stage, tumor free margins, and vascular invasion.[6]

In conclusion major hepatic resections in Ramathibodi Hospital performed safely and the results were comparable with other worldwide reports.

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