

Liver Resection for Focal Liver Lesion in the Gastroenterology and Hepatology Teaching Hospital

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ABSTRACT

Background: Focal liver lesions include solid and cystic pathology. Hepatocellular carcinoma and cholangiocarcinoma are the most common primary malignancies of liver. The curative treatment is resection and it's one of the challenging procedures and has not become common until the dramatic improvement in perioperative care in the 1980s.

Objectives: To evaluate the various pathologies causing focal liver mass and extent of surgery done and the short term postoperative complications.

Methods: This retrospective study included forty eight patients presented at the Gastrointestinal and Hepatology Teaching Hospital with a localized liver lesions between June 2008 and February 2014. Data were including demographic characteristic of each patient, investigation including imaging, type of surgery and pathological result were recorded. Early postoperative complications were also recorded.

Results: There were 18 males, 26 females and 4 children. Patient age range was between 12-32 years and < 4 years for child age group, thirty patients were symptomatic. Forty two patients with a positive sonographic study, forty one with positive CT scan and twenty with positive MRI study. Forty seven patients underwent major resection including: 16 patients pericystectomy, 12 patients with right lobectomy, six patients left lobectomy, four patients with left lateral segmentectomy, four patients with enucleation, three patients with right segmentectomy, one patient with bisegmentectomy and one patient with recurrent left liver lobe tumor (previous left lobectomy, 2nd operation was mass in the left side of liver). The histopathological results were (16 hydrated cyst, 15 hepatic cell carcinoma, five cholangiocarcinoma, three hemangioma, hepatoblastoma, one colorectal metastasis, one spindle cell tumor, one giant FNH) and three patients their histopathological result were not found. During the 1st postoperative week, the complications were: 13 patients with (fever and atelectasis), eight patients with (wound infection), five patients with bile leak, two patients with mild jaundice and two patients developed bleeding and three patients passed away .

Conclusion: Major liver resection can be performed in our hospital with an acceptable morbidity and mortality rate.

Keywords: Focal liver lesion, Liver resection, Hepatic cell carcinoma.

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Liver masses are increasingly being identified due to the widespread use of imaging modalities such as ultrasonography (US), computerized tomography (CT) scan and magnetic resonance imaging (MRI). The majority of these lesions are detected incidentally in asymptomatic patients.

An accurate history and physical examination are essential for the diagnosis and treatment of the solid liver masses, for example, the use of oral contraceptive drugs in case of adenoma, while history of hepatitis B, C, and liver cirrhosis might point to hepatocellular carcinoma (HCC), a previous neoplasm or a history of chemotherapy increase the suspicion of metastatic liver lesions^(1,2).

The physical examination may include: liver tenderness, enlarge liver, upper abdominal mass, ascites and stigmata of chronic liver disease.

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Today, sonography is the initial radiological test of choice for hepatobiliary disorder, it is relatively inexpensive, free of ionizing radiation but its operator and machine dependent which could be modified to a color Doppler ultrasound^(3,4).

Nowadays, the new computed tomography is very accurate in defining hepatic anatomy with vascular and biliary tree reconstruction, it gives us detailed information about the architecture of the liver and the three dimensional reconstruction CT scan with iv contrast is an excellent way to identify and characterize hepatic masses^(5,6,7).

MRI is another diagnostic aid which produces an image in a number of planes and provides us with an excellent resolution between tissue containing differing amount of fat and water⁽⁸⁾.

A further option for liver imaging is positron emission tomography. Its clinical application includes detection and staging of primary hepatic malignancies, evaluation of metastasis and differentiation of benign from malignant liver lesion^(9,10).

Benign tumors such as cysts, hemangioma, FNS, adenoma are recognized with the help of ultrasound, CT scan or MRI and positron emission tomography (PET).

The new diagnostic facilities, new tools for liver resection and modern knowledge of liver anatomy, allow surgeon to improve the results in the treatment of liver disease^(6,7,10).

The liver surgeon should have an accurate knowledge of liver anatomy and equipped with the new tools for liver resection, old techniques such as finger fracture have been replaced by ultrasonic dissectors, harmonic scalpel, and water jet⁽¹⁰⁾.

Normally the liver can tolerate a resection which results in a reduction of up to 80% of its volume⁽¹¹⁻¹⁴⁾, conversely, cirrhotic liver can't tolerate even a small hepatic resection. Good selection of patients is the largest contributor to improve

survival rate after hepatectomies. Careful identification of each patient's overall risk factors, hepatic functional reserve and the volume of the remaining parenchyma is essential for the prevention of post-resection liver failure with the improvement of morbidity and mortality^(15,16).

The aim of this study is to evaluate the various pathologies causing focal liver mass and extent of surgery done and the short term postoperative complications.

Methods

This study was designed in a single center; which was the Gastroenterology and Hepatology Teaching Hospital in Baghdad from June 2008 to Feb. 2014.

Retrospective reviews was used to analyze 48 patients referred to our tertiary center, some of them were already diagnosed while other were sent for further evaluation and management.

Inclusion Criteria: Patient with a focal liver lesion involving one lobe. Patient who can tolerate a major surgery. Patient with a solid and a cystic liver lesion. Pediatric age group with a liver mass and elevated Alpha-fetoprotein.

Exclusion Criteria: Patient with an end-stage advanced cancer beyond intervention. Those who refuse treatment or their general condition were not suitable. Those with wedge resection. Those with bilobar liver masses.

All patients were investigated by laboratory: Complete blood count and erythrocyte sedimentation rate, liver function test, renal function test, coagulation study, virology study, alpha-fetoprotein level (if above 100ng/ml consider malignancy) and carcino-embryonic antigen (CEA). Radiological study included US for all patients, CT scan (new generation 64 slices) and MRI. Further diagnostic workup included upper and lower endoscopy and PET (done in one patient outside our country)

Results

There was more female patients than male. There were 4 children (< 4 years) presented with liver mass.

Twenty one had abdominal pain as main feature of their disease. The pain was vague with discomfort mostly located at right upper quadrant (RUQ) of abdomen, at epigastric or at the periumbilical region range from mild to severe in intensity.

Nineteen patients presented with abdominal mass, which was discovered either by the patient, the doctors or by mother as in children.

Ten patients presented with jaundice, seven had fever, eight had nausea and vomiting, and eight had loss of weight and appetite.

Eighteen patients were asymptomatic whom were discovered accidentally.

Table 1: Distribution according to the age and gender.

	Female	Male	Children
Gender	26	18	4
Age (year)	30 ±12	36 ±12	<4

Table 2: Patients symptoms and their referrals.

	Female patients	Male patients
Asymptomatic	11	4
Symptomatic	16	14
Referred by doctor	20	16
Referred by hospital from different governorate	6	5

Table 3: Clinical presentation in patients with liver lesion.

Symptom	No. of patients
Abdominal pain	21
Abdominal mass	19
Jaundice	10
Fever	7
Loss of weight and appetite	8
Nausea and vomiting	8
Other symptoms	7

N.B. many patients presented with one or more symptoms.

Thirty two patients presented with abnormal liver function test (high direct bilirubin, elevated sGPT and sGOT), three patients presented with coagulation abnormality, five patients had positive virology study in the form of HBV or HCV.

Tumor marker were elevated in five patients (elevated alpha-fetoprotein and CEA), (Table 4).

The CT scan was done for 41 patients with approved diagnosis in 38 patients. MRI was done for 20 patients.

The overall imaging results of the 48 patients revealing 18 cystic and 30 solid lesions.

For patients who were suspected to have liver masses as secondaries, upper endoscopy (5 patients) and colonoscopy (4 patients) were done to exclude intestinal primaries, one patient did PET-scan outside our country.

Eight patients underwent endoscopic retrograde cholangio-pancreatography (ERCP) due to painful jaundice all these patients had intra-biliary rupture of the

hepatic hydrated cyst for whom therapeutic ERCP was an effective option.

Eighteen patients had major liver resection right hepatectomy, left hepatectomy, thirteen patients had segmental resection, sixteen patients had partial pericystectomy, one patient had irresectable lesion, (Table 7).

For the solid masses, hepatocellular carcinoma was the commonest pathology of liver mass followed by cholangiocarcinoma. For the cystic lesion hydatid cyst was the commonest pathology, (Table 8).

During surgery 22 patients required blood transfusion, (Table 9).

Atelectasis was the most frequent complication followed by surgical site infection, bile leak occurred in 5 patients, (Table 10).

Three patients died postoperatively, one child in day 2, one patient who had right hepatectomy for large HCC died in 1st postoperative day and the 3rd patient died at day 4 postoperatively.

Table 4: Distribution of abnormal hematological, biochemical and tumor marker test.

Type of investigation	Number of patients	Percentage
CBP and ESR	12	25
Liver function test	32	68
Virology	5	10
Tumor markers	5	10
Coagulation study	3	7
Renal function test	2	5
Normal laboratory	12	25

Table 5: Imaging Study.

Type of imaging	No. of patients	Positive	Negative
US	48	42	6
CT	41	38	3
MRI	20	20	0

Table 6: Characteristic of lesion (solid or cystic).

Nature of lesion	No. (%)
Cystic	18 (33.3)
Solid	30 (76.7)

Table 7: Distribution of patients according to the type of hepatic resection.

Type of resection	No. (%)
Right hemihepatectomy (segments 5, 6, 7 and 8)	12 (25)
Left hemihepatectomy (segments 2, 3, and 4)	6 (12.5)
Left Lateral sectionectomy (segments 2 and 3)	4 (8.1)
Pericystectomy	16 (33.3)
Bisegmentectomy (segments 5 and 6)	1 (2.2)
Enucleation of the cyst	4 (8)
Resection of recurrent mass	1 (2.2)
Segmentectomy (segment 6)	3 (6.25)
Biopsy Only right lobe (segment 6)	1 (2.2)
Total	48 (100)

Table 8: The histopathological distribution of the resected lesion.

Histopathology	Number of patients
HCC	15
Cholangiocarcinoma	5
Hemangioma	3
Colorectal Metastasis	1
Malignant Spindle Cell Tumor (Liomyosarcoma)	1
Giant FNH	1
Hepatoblastoma	3
Hydatid Cyst	16
(Not Found)	3

Table 9: Distribution of blood transfusion inquired during hepatic resection:

Number of blood units	Number of patients
< 3 Units	4
3 Units	10
> 3 Units	8

Table 10: Post-operative complications during 1st week.

Complication	Number of patients (%)
Fever and atelectasis	13 (27.2)
Wound infection	8 (16)
Bile leak	5 (11)
Bleeding	2 (4.4)
Mild Jaundice	2 (4.4)

Table 11: Distribution of early post operation complication following hepatic resection.

Complications	Number of patients (%)
General	
Anemia need blood transfusion	4 (8)
Pulmonary embolism	1 (2.2)
Local	
Bile leak	3 (6.6)
Deep venous thrombosis	3 (6.6)
Mild elevated liver enzyme	2 (4.4)
Pleural effusion	2 (4.4)
Ascites	1 (2.2)

Discussion

The incidence of focal liver lesion is 7% with female predominance, and this percentage may reach 10% in some areas (south east of Asia, sub-Saharan of Africa and the united states), due to the of presence of endemic infectious disease (e.g. hydatid cyst and hepatitis C and B) in addition to drug abuse⁽¹⁷⁾.

In the present study, focal liver lesions were silent in 18 (36%) patients, while 30 patients were symptomatic.

The most common presentation was abdominal pain, followed by abdominal mass including pediatric age group, discovered incidentally by their parents. While in a certain studies 63% of patients had incidental asymptomatic liver lesion^(11,12).

Functional residual liver is commonly recorded as 30% of the whole liver volume and at least 40% of liver exposed to chemotherapy, or at least two segments^(18,19). In cirrhosis, the accepted

hepatic parenchymal resection are 55-65% in Child A, 25% in Child B and 17% in Child C⁽²⁰⁾.

In the present study, 32 patients had abnormal liver function test, all patients who had liver resection were child A score, in other center, liver resection can be done for patient with child B, and due to good facilitated perioperative care, with an effective selection of patients, when a post liver resection liver failure patient can be referred for liver transplantation^(12,20).

There are four main indications for liver resection; treatment of symptomatic benign liver lesions, eradication of primary or secondary malignant neoplasm, liver transplantation and traumatic liver lesion^(17,18).

In our center liver resection was done for liver masses whether benign or malignant.

In this study, hepatocellular carcinoma was the most common cause of the solid liver lesion that need resection, it was more common in women with an age range between (33±12 years). Ferlay J et al, showed that HCC was the 2nd cause of solid liver lesion, and it's more common in men than women in a ratio of 4:1 and it is rarely occur before the age of 40 years with peak incidence 70 years, while in Herszényi and Tulassay study the colorectal cancer was the most common cause of solid liver lesion⁽¹⁷⁾.

Robert W et al, study showed that surgical resection is the best management of solitary liver tumors in patients without cirrhosis, with a post resection 5-year survival rates of 41-74%⁽¹⁸⁾. In this study, survival for patient who had undergone liver resection for solid tumor was about 90% and 53% for 2- years and 5-years, subsequently.

Cholangiocarcinoma was the second common resected solid tumor following HCC for which 5 patients underwent surgical resection.

Zenich M et al, showed that intrahepatic cholangiocarcinoma is the 2nd primary liver cancer after hepatocellular carcinoma,

accounting for 5-10% of the malignancies of the liver⁽¹⁹⁾.

Cholangiocarcinoma surgical resection is the only curative treatment with a 5-year survival rate of around 30%⁽¹⁹⁾. This was copping with the present study in which liver resection were done for 5 patients.

The liver is the most common first site for hematogenous metastasis from colorectal cancer, one quarter of the patients with primary colorectal carcinoma presented with synchronous hepatic metastasis, and nearly half of patients got resected of their colorectal primary tumor will eventually develop metachronous liver metastasis^(14,16,20).

H Isoniemil, P Osterlund et al showed that metastasis in the liver is the most common cause of solid liver lesion, before HCC with the colorectal cancer as the main etiology, and a lot of patients were referred for surgical resection, while in this study we had only one patient with colorectal cancer was suitable for resection, and this might due to a late presentation and detection of the primary and secondary tumor. Also, many surgeons in our country consider the tumor beyond cure if there was a metastasis to the liver.

In patients with isolated hepatic metastasis, the extend of liver disease is the principal determinant of survival, and when left untreated, survival is less than 4% for 3 years^(19,20).

In the present study, liver resection for colorectal metastasis, was done in one patient, who died one year later due to a pulmonary embolism.

in the present study, three patients with liver hemangioma presented with abdominal pain required surgery in form of enucleation, and it is the most benign liver lesion needed resection in this study, twenty one patients presented with hepatic hydatid cyst, sixteen patients treated with partial pericystectomy while five patients radically treated by hepatectomy.

Postoperative complications in this study were divided into the 1st 7 days and 8-

30day, (general and local), in the 1st period the most common complications were fever and atelectasis while in the 2nd period the most common complication was anemia that need blood transfusion, while in other study the most common complication for 30 days postoperative was infection including (e.g. pneumonia, cholangitis, intra-abdominal abscess)⁽²¹⁾.

The mortality rate was 5.6% in our center, while the mortality for liver surgery in tertiary center of developed country was 1-2%^(14,15,18,21), this may be because of high pre-, intra- and post-operative standard care.

In conclusions: Most of solid liver lesion were HCC followed by cholangiocarcinoma and most of benign lesions were hydatid cyst followed by hemangioma. Variable types of liver resection were done with accepted rate of complication relatively compared to other known centered in the world.

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