

Characterization of Liver Metastases Using Ultrasonography

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ABSTRACT:-

Objectives: The general aims of this study were to characterize liver metastatic lesions using ultrasonography in order to analyze the imaging spectrum of liver metastases by identifying the lesions distribution as number, location, shape, size, and echo texture.

A prospective study was investigate the patient with suspected liver metasases using ultrasound machine Toshiba Xario diagnostic ultrasound system, using 3.5Mhz curvilinear probe in period from 2016 to 2019 at ibn-sina teaching hospital and Dr. Osman abdalwahab private clinic. Abdominal ultrasound of 112 patients with clinical diagnosis of liver metastases was performed. The data collected include all patient ad disease related character which are: gender, age, (metastasetic: size, shape, site, number, and echotextures), liver (size and echotexture.)

Result: Out of 112 patients there were 75 (67%) male and 57 (33%) were female. The most common liver metastases diagnosed by ultrasound were 112 (43%) cases as metastases. The ultrasound appearance of liver metastases among 112 patients were hyper echoic in 62 cases (55,4%), hypo echoic in 36 cases (32,1%), mixed in 5 cases (4,5%), , cystic in case 6 (5,3 %), and iso echoic in 3 cases (2.7%). The majority of cases of live metastases had rounded shape in 104 cases (92.8%), while the remaining 8 cases described as 7 cases (6,3%) was ovale and 1 case (0.9%) was irregular

Conclusion: Ultrasound is a safe and effective method of detecting liver metastases, it is flexibility, easy, availability and lack of dependence on organ function makes it most ideal for imaging the liver and also serves as an object of defining therapeutic decision quickly. The most f liver metastases had hypo echoic echo pattern, rounded shape, multiple in number, and had different sizes. they mainly involve right liver lobe.

Keywords: liver lesions, metastases, ultrasound

I. INTRODUCTION

The liver is the largest organ in the abdomen, weighting about 1800 kg in men and slightly less than in women, classically liver is divided into right and left lobes by the falciform ligament. The liver lies in the right upper quadrant of the abdomen suspended from the right hemi diaphragm. Functionally, it can be divided into three lobes: right, left, and caudate lobes. (Hussain S. M and Semelka R 2005)

Liver is the large organ in the body that cleans the blood and produces bile which helps the body deal with the fats we eat. However, liver tissue is prone to disease such as cyst, alcoholic cirrhosis, and carcinoma (Sugany, R and S. Rajaram 2012).

The liver is one of the commonest sites for metastases and terminal involvement. As the rule in all but CNS malignancies, this can be attributed to its large size and high rate of blood flow and double perfusion by the portal vein and hepatic artery. The route of tumor that spread to the liver is more like hematogenous rather than lymphatic because for the most part of liver's lymphatic drainage is hepatofugal. (Thimmaiah 2013)

A liver metastasis is a cancerous tumor that has spread to the liver from the cancer that started in another place in the body. It is also called secondary liver cancer. (Monica Bien PA 2016)

The most common primary tumors resulting in liver metastases, in decreasing order of frequency, are gallbladder, colon, stomach, breast, and lung. Most metastases to the liver are blood-borne through the hepatic artery or portal vein, but lymphatic spread of tumors from stomach, pancreas, ovary, or uterus may also occur. (Carol M. Romack et al 2011)

Ultrasound is widely accessible, inexpensive, noninvasive, and portable with high spatial and temporal resolution. Ultrasound is the first choice of investigation for screening of patients with suspected liver metastases. (Dr Anirudh Chawla et al 2014)

The sonographic appearance of liver disease is described as echogenic, hypochoic, target, calcified, cystic, and diffuse. (Carol M. Romack et al 2011)

The chogenic metastases tend to arise from gastrointestinal origin or from HCC. The more vascular the tumor the more likely it is that the lesion is echogenic. then for metastases from renal cell carcinoma , neurplastomatumors,carcinoid, also tend to be hyperechoic. (Miollo.D etal1980&Fujita .M. et al1990)

Hypo echoic metastases are generally hypo vascular and may be monocellular or hyper cellular without interstitial stormahypoechoic lesion represent the typical pattern seen inuntreated metastatic breast or lung cancer, as well as gastric ,pancreatic and esophageal tumors . (Ccarol. M .Rrumack 2011)

The bull`s-eye or target pattern is characterized by peripheral hypo echoic zone , the appearance is non-specific and common ,although it is frequentlyidentified in metastases from bronchogenic carcinoma.(Yohino.Metal 1987)

Calcified metastases are distinctive by virtue of their marked echogenicity and distal acoustic shadowing. Mucinous adenocarcinoma of the colon is most frequently associated with calcified metastases. Other primary malignancies that give rise to calcified metastases are, endocrine pancreatic tumor,liomyosarcoma, adenocarcinoma of the stomach, neuroblastoma, estrogenic sarcoma and ovarian cyst adenocarcinoma. (Caromella E et al 1982)

Cystic metastases are uncommon and generally exhibit features that distinguish them from the ubiquitous benign hepatic cyst include mural nodules , thick wall , fluid filled , and internal septations. Primary neoplasm`s with a cystic component ,such as cyst adenocarcinoma of the ovary and pancreas and mucinous carcinoma of the colon , may produce cystic secondary lesion.(Goldstein H M1978)

II. METHODOLOGY

This is was a three years prospective study conducted at Ibn Sina teaching hospital and DrOsman Alwahab private clinic included 112 patients (75 males 57females) aged from 4years to 90 years, with 112 liver metastases diagnosed by ultrasound..ethical approval would be granted from the hospital and private clinic as well as informed consent from the patients would be taken that no patients identifications would be disclosed.requestedabdominal ultrasound was done using Toshiba Xario, Diagnostic ultrasound system Model SSA-666A,with 35 curve-linear transducer probe and Sony printer and also using general Electric Ultrasound ,Machine,Model 2104587 with curve linear transducer probe and Sony printer. Liver was scanned in various planes ,varios ultrasonographic features of liver lesions were observed which include: number of metastases ,(single or multiple) location within the liver, lobar distributions (right lobe, left lobe, both lobes), Echogenicity (by comparing with that of normal liver parenchyma) ,hyper echoic ,hypo echoic, an echoic,or mixed echo genic. size and shape like round ,oval or irregulars also were observed. the data would be collected in questionnaire which were coded before entering data into computer using Statistical Package for Social Science (SPSS) for analysis

	Frequency	Percent
Male	75	67
Female	57	33
Total	112	100

III. RESULT

This study comprise of 112 cancerous patients developed of liver metastases evaluated by ultrasound for a period of three years from 2016to April 2019at Ibsnia Hospital in Khartoum State and Dr Oman Abdelwahabcentre.

Table.1 sex distribution of liver metastases

Out of 112 patients included in this study, 75(67) were male and 57(33) were female. the age ranged from 4 to 90 years old. male had increased predilection for liver metastases than women. (table .1)

Table no 2 Echo textures of liver metastases

		ECHOGENICITY					Total
		HYPOECHOIC	HYPERCHOIC	MIXED	cystic	isoechoic	
	METS	62	36	5	6	3	112
Total		62	36	5	6	3	112

The ultrasound appearance of liver metastases among 112 patients were hypo echoic in 62cases (55,4%), hyper echoic in 36 cases (32,1%), mixed in 5cases(4,5%), cystic in case 6 (5,3 %), and iso echoic in 3

cases(2.7%).(Table2.) These findings are in a accordance with study done by Bruncton et al who found that about 70% of liver metastases had hypo echoic appearance on ultra sonography. (Bruncton et al 1982)

Tabl3. Distribution of liver metastases based on the shape

Shape of metastases	Frequency	Percent
Round	104	92.8
Ovale	7	6.3
Irregular	1	0.9
Total	112	100.0

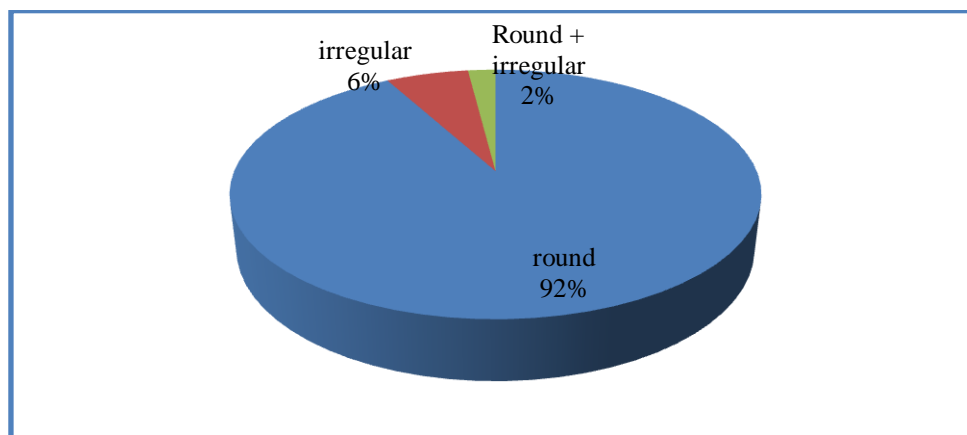


Fig.2 Shape of liver metastases

The study showed that the majority of cases of live metastases had rounded shape in 104 cases (92.8%),while the remaining 8 cases described as 7cases (6,3%) was ovale and in one case(0.9%) was irregular. **table.3&Fig2**these fiding was similar as those found by Hohmann et al 2013 whom found that the most metastase were round with well defined margins

Table 3 distribution of liver metastases based on Lobar involvement				
	SITE	Total		
		Rt lobe	Lt lobe	Both lobes
METS		59	7	46
Total		59	7	46

According to distribution of liver metastases based on Lobar involvement there were of 112 patients studied, 59cases(52.6%) involved right lobe, 7cases(6,3%)involved left lobe,46cases,(41.1%) involved both lobes of cases. (Table.3) .

The highest incidence of right lobe involvement due to the rich blood supply and much greater volume of right liver lobe. Which supported by Thiamiah et al 2013 ,studied the evaluatoion f liver lesion by ultrasound which showed that the majority of liver metastases involved the right livet lobe .

Table no 4 LESION TYPE * NUMBER

	NUMBER	Total		
		single	two	multiple
METS		41	3	68
Total		41	3	68

As a distribution of liver lesion number there were of 122 patients, 68 cases (60,7%) were multiple, these finding supported those of Li D and Hann, whom found that 98 % of liver metastases were multiple features. (Li D and Hann2005). And close correlate with study conducted by Yoshida Tet al 1987 41 patients (63.6%) were single and 3(2.7%) patients were two in number

Table. 5 size of liver metastases

Size of metastases spot	Frequency	Percent
small	20	17.8
middle	6	5,4
large	29	25.9
Different sizes	57	50.9
Total	112	100.0

The size of liver metastases on ultrasound was small in 20 cases (17.8 %), moderate in 6 cases (5,4%), large in 29 cases (25.9%), and 57 cases (50.9%) had different sizes of cases. (Table 5)

IV. CONCLUSION

Liver metastatic disorders usually occur in patients with stomach, pancreas, colon, breast, and etc... tumors. Ultrasound is a safe and effective method of detecting liver metastases, its flexibility, ease, availability, and lack of dependence on organ function makes it most ideal for imaging the liver and also serves as an object of defining therapeutic decision quickly. The liver can be scanned in multiple planes enabling us to know the exact location of the metastases and study their echopattern, apart from detecting metastases, other valuable information like ascities, vessel involvement, primary source of malignancy in abdomen and pelvis can be easily obtained.

The study concluded that the most of liver metastases had hypo echoic echo pattern, rounded shape, multiple in number, and had different sizes. they mainly involve right liver lobe.

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