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Ultrasonographic Assessment of Liver in Leprosy

Dermatology

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ABSTRACT

Involvement of liver in leprosy is well documented which is reflected in the serological investigations however liver biopsy was the only source to interpret the pathology of liver in leprosy. Noninvasive techniques like ultrasonography have shown gross inhomogenous echotexture of the hepatic parenchyma in lepromatous leprosy and milder involvement of liver in tuberculoid leprosy. Tuberculoid granulomas in the liver of leprosy patients during the reactive phase have been well described on ultrasonography. Our aim is to study and compare the structural abnormalities of liver during various stages of leprosy using a safe and non-invasive procedure like Ultrasonography. In this study we observed that echogenicity and echotexure is grossly affected in multibacillary than paucibacillary leprosy patients but liver size enlargement and fatty changes were seen in Type I and type II reactions respectively in very few cases. We conclude that Ultrasonography is noninvasive, handy and easily available technique in resource limited settings to detect gross hepatic involvement in patients of leprosy and to some extent replace the invasive liver biopsy technique for the same purpose but with certain limitations.

INTRODUCTION:

Ultrasound (US) has vast potential in the field of infectious diseases, especially so in resource-limited settings. Recent technological advances have increased availability and access to ultrasound in low-resource settings, where the burden of infectious diseases is greatest. This paper collates the evidence for the utilization of ultrasound and evaluates its effectiveness in the diagnosis and management of a range of infectious diseases[1]. Leprosy is chronic infectious disease of man, caused by mycobacterium leprae, affecting peripheral nerves, skin and sometimes other tissues.[2] In individuals having no cell mediated immunity against mycobacterium leprae, a widespread clinical form of leprosy is seen. The form is called lepromatous leprosy. The continuous bacillemia of lepromatous leprosy, estimated at 105 organisms/ml blood, ensures the constant bombardment of internal organs by mycobacterium leprae. The reticuloendothelium system acts as a filter to the circulating bacteria which accumulate in macrophages in the liver, spleen, bone marrow and several groups of lymph nodes especially in lepromatous patients.[3]

The liver lesions in mycobacterium leprae are fairly common and are well described.[4,5] Histopathological examination shows prominent kupffer cells and numerous miliary leprmas[3]. Also modern methods like ultrasonography have made it possible to see the changes in liver in leprosy. Abnormal ultrasound findings in the liver of lepromatous leprosy patients included an inhomogenous echotexture of the hepatic parenchyma[6]. Involvement of liver, of a milder nature and degree is also seen in other types of leprosy such as tuberculoid leprosy. Tuberculoid granulomas in the liver of leprosy patients are known to occur especially during the reactive phase and have been well described[7,8]

Many of the studies done to assess structural abnormalities of liver in leprosy were based on the histopathological reports of liver biopsies, a procedure which has many disadvantages and risks. The present study is undertaken to study structural abnormalities of liver in leprosy using a safe and non-invasive procedure, viz ultrasonographic imaging of liver and to compare the structural abnormalities of liver between various stages of leprosy (paucibacillary , multibacillary and lepra reactions).

MATERIALS AND METHODS:

The present study was conducted over a period of two years in 60 patients attending outpatient department of Skin and Sexually Transmitted Disease (STD) in a government hospital, Kolhapur. After ethical consideration and written consent, patients without prior history of leprosy or prior history of leprosy treatment i.e. freshly diagnosed leprosy cases were chosen from the outpatient department depending on their willingness to undergo investigations.

A detailed history was taken to rule out chronic alcoholism, recent history of jaundice, liver disease or recent intake of any hepatotoxic drugs. Patients with such history were excluded from the study. Remaining patients were then subjected to careful clinical examination to determine the extent of the disease. The clinical type of the disease was determined according to Ridley and Jopling's classification[9] and findings were entered in proforma. After that, patients were subjected to special investigation called "skin clip".

Skin clip

The skin clip was done by 'Slit and Scrape' method of Wade. Smears were made from suspected lesions as well as from sites commonly affected in lepromatous leprosy – forehead, ear lobules, chin, extensor aspect of forearm, buttocks, nasal cavity etc. The smear was stained by Ziehl-Neelsen method for staining for acid fast bacilli.

Recording of smear reports

About 50 to 100 fields were examined with oil immersion lens and results were noted as positive or negative. In cases of positive finding, results were recorded as follows:

6+ Very numerous – more than 1000 bacilli; or globi per oil immersion field.
5+ Numerous – 100 to 1000 bacilli per oil immersion field.
4+ Moderate – 10 to 100 bacilli per oil immersion field.
3+ Few – 1 to 20 bacilli per oil immersion field.
2+ Very few – 10 to 100 bacilli per entire slide (100 fields).
1+ Rare – 1 to 10 bacilli per entire slide (100 fields).

Bacteriological Index (BI) was calculated by adding the degree of positivity of all smears and dividing the total by number of smears examined. Those patients with positive bacteriological index were

grouped under multibacillary group and those with negative bacteriological index in paucibacillary group. In each group, 30 patients were included to make a total of 60 patients for our study. Abdominal ultrasonography was done to examine the liver with a view to assess any alteration in live size and shape, to observe any change in echo pattern of liver, to observe any evidence of focal lesion. The scanning was done by the same team of radiologists with ALOKA prosound α 6LT machine with power 200-240 V and 50-60 Hz, 900VA.

OBSERVATIONS:

Table I: Distribution of lerpropsy patients into paucibacillary and multibacillary groups based on bacillary index and, their reactional status.

GROUP OF LEPROSY PATIENTS	IN REACTION		NOT IN REACTION	TOTAL
	Type 1	Type 2		
Paucibacillary	4	-	26	30
Multibacillary	2	5	23	30
Total	6	5	49	60

Table II: Ultrasonographical findings in lever in leprosy in patients not in reaction

Type of leprosy		Pauci bacillary	Multi bacillary	Total
No. of cases		26	23	49
Liver size increased		0	0	0
Surface altered		--	--	--
Echogenicity increased		2	8	10
Echotexture	Course	1	8	9
	Fine	0	-	0
Fatty change		-	2	2
Focal lesions		-	-	-
No change		24	15	39

Table III: Ultrasonographical findings in lever in leprosy in patients in reaction

Type of leprosy		Type 1 reaction	Type 2 reaction	Total
No. Of case		6	5	11
Liver size increased		0	1	1
Surface altered		--	--	--
Echogenicity increased		2	--	2
Echotexture	Course	1	–	1
	Fine	1	–	1
Fatty change		1	--	1
Focal lesions		--	--	--
No change		4	4	8

RESULT AND DISCUSSION:

In this study sixty cases of freshly diagnosed patients of leprosy were included. The ratio of male to female patients was 2.33: 1 which corresponds to normally found 2: 1 ratio of male leprosy patients to female leprosy patients in our population. Out of 60 cases, 42 were male patients and 18 were female patients. Majority of the patients were belonging to age group of 20 to 40 years. The youngest patient was 16 years old while the oldest was 75 years.

The two groups studied include 30 paucibacillary leprosy patients in first group and 30 multibacillary leprosy patients in the second group. In the 30 cases of paucibacillary leprosy 29 were borderline tuberculoid (BT) and I was of tuberculoid tuberculoid (TT) leprosy. In second group of 30 cases of multibacillary patients, 2 were borderline borderline (BB), 21 were borderline lepromatous (BL), 7 were lepromatouslepromatous (LL) patients.

Out of these 60 patients, 11 patients were undergoing lepra reaction – 6 undergoing type 1 and 5 undergoing lepra reaction – 6 undergoing type I and 5 undergoing type 2 lepra reaction. In type I reaction, 4 were BT and 2 were BL leprosy cases. In type 2 (erythema nodosumleprosum) reaction, 5 cases of BL leprosy were studied.

In the present study, out of 26 paucibacillary cases 1 patient showed increased echogenicity of liver while yet another patient showed increased echogenicity as well as coarse echotexture of liver after scanning the liver using ultrasonography. In multibacillary group, out of 23 patients 8 showed changes in liver architecture on scanning liver using ultrasonography. All 8 patients showed increased echogenicity as well as coarse echotexture of liver, 2 out of these 8 patients also exhibited fatty change in liver after scanning the liver using ultrasonograhpy. In 6 patients undergoing type 1 reaction, only 2 patients showed increased echogenicity of liver after scanning liver using ultrasonography. Out of these 2 patients, 1 patient had coarse echotexture of liver while another patient had fine nodular echotexture as well as fatty change in the liver. Out of 5 patients undergoing type 2 reaction, no change except mild hepatomegaly in 1 patient was found on ultrasonography.

Deohring et al[10] found increase in the median size of levers of patients with lepromatous leprosy. 4 out of 7 patients they studied had rounded caudal edges of the liver. The echotexture of the hepatic parenchyma in all the 7 patients was inhomogeneous with characteristic echogenic areas in 6 patients. This corresponds with our findings.

Taneja K. et al[11] studied 39 patients of borderline and lepromatous leprosy. They reported no abnormality on ultrasonography of liver. Also Teresa C. A[12] et al in their case report of single lepromatous leprosy patient did not notice any remarkable changes in liver on ultrasonography.

Noninvasive study of liver using ultrasonography has become popular, in other disorders of liver. The same ultrasonography, can be used to assess gross hepatic involvement in patients with leprosy though subtle change cannot be detected by ultrasonography. It can be used as an early, safe, noninvasive procedure before going directly for invasive technique like liver biopsy to assess hepatic involvement in leprosy, a procedure which has many disadvantages and risks. Those patients who show gross abnormalities in liver on ultrasonography can be later studied in detail for liver involvement by using liver biopsy technique. Polat E.A. et al[13] also documented that ultrasound can be used either for the diagnosis or for monitoring relevant complications of the leprosy. Taneja K. et al[11] quoted that ultrasonography, though noninvasive has its own limitation in assessment of subtle changes in liver architecture. It is possible that newer imaging techniques like contrast enhanced computerized tomography scanning and Magnetic Resonance Imaging (M.R.I), which provide better tissue characterization, may be more accurate in evaluation of liver changes in leprosy.

CONCLUSION:

Ultrasonography is helpful to detect gross hepatic involvement in patients of leprosy. It is noninvasive, handy and easily available technique in resource limited settings which can to some extent replace the invasive liver biopsy technique for the same purpose but with certain limitations.

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