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EVALUATION OF FOCAL LIVER LESIONS ON ULTRASOUND IN POST-TREATMENT PATIENTS OF HEPATITIS C

Shahab Uddin
Superior University Lahore, Pakistan.
Email: shahabuddin3744@gmail.com
Hina Gul
Superior University Lahore, Pakistan.
Email: hinagulswat2000@gmail.com
Faryal*
Superior University Lahore, Pakistan. Corresponding Author Email: fariikhan7876@gmail.com
Saad Ullah
Superior University Lahore, Pakistan.
Email: saadrana568@gmail.com

Author Details

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Corresponding E-mails & Authors*:
Faryal
fariikhan7876@gmail.com

Abstract

Background: Hepatitis C virus (HCV) infection is a major cause of cirrhosis and hepatocellular carcinoma. Patients may still develop focal liver lesions (FLLs) after antiviral treatment, and ultrasound is the usual first-line imaging tool for detecting them. To evaluate the ultrasound features of focal liver lesions in patients who had been treated for hepatitis C. **Methods:** This descriptive study was conducted at Al Razi Diagnostic Center over four months. Thirty treated HCV patients aged 18 years or older with single or multiple FLLs on ultrasound were enrolled by convenience sampling. Scanning was performed on a Toshiba Aplio ultrasound machine. Age, gender, lesion location, margins, echogenicity, echotexture and vascularity were recorded on a structured proforma and analysed in SPSS version 24 and R. **Results:** Mean age was 43.5 ± 16.1 years (range 20–81); 20 patients (66.7%) were male and 10 (33.3%) female. Twenty-one patients (70.0%) were aged below 50 years. Lesions were located in the right lobe (including segmental involvement) in 20 patients (66.7%), diffusely in 8 (26.7%) and in the left lobe in 2 (6.7%). Margins were irregular in 15 (50.0%). Most lesions were hypoechoic (19; 63.3%), the most frequent echotexture was coarse (13; 43.3%), and 26

lesions (86.7%) showed no vascularity on Doppler. **Conclusion:** In this sample, FLLs after HCV treatment were more frequent in men and in the right lobe, and were mostly hypoechoic with irregular margins and no detectable vascularity. Because these findings can overlap with malignancy, treated patients with such lesions need regular ultrasound follow-up and further characterisation where indicated.

Keywords: Focal liver lesion; hepatitis C; ultrasonography; post-treatment; echogenicity; Doppler.

INTRODUCTION

Focal liver lesions (FLLs) are solid or cystic masses that are distinct from the normal liver parenchyma. They range from common, harmless findings to malignant tumours.[1] Benign hepatic nodules have been reported in up to 9% of people,[2] while hepatocellular carcinoma (HCC) accounts for roughly 75–85% of primary liver cancers.[3] Hepatitis C virus (HCV) is an international health burden, with an estimated 71 million infected people worldwide and a prevalence of 0.6% to 10% depending on geography. It is a leading cause of end-stage liver disease, cirrhosis and liver cancer.[4] Direct-acting antiviral treatment can clear the virus, but patients may still carry or develop liver lesions afterwards, so imaging follow-up remains important.

Evaluating an FLL requires a careful history, examination, imaging and sometimes pathology; for example, a lesion in a patient with chronic liver disease and portal hypertension should raise suspicion of HCC.[5] Ultrasound is usually the first imaging test because it is inexpensive, safe, non-invasive and free of ionising radiation, although image quality can be limited by bowel gas, the rib cage and subcutaneous fat.[5,6]

There is little local data on the sonographic appearance of FLLs in patients who have completed HCV treatment. This study therefore aimed to describe the demographic profile and the ultrasound characteristics (location, margins, echogenicity, echotexture and vascularity) of FLLs in this group.

METHODOLOGY

This descriptive study was carried out at Al Razi Diagnostic Center, Lahore, over four months after approval of the synopsis. Thirty patients were selected by convenience sampling.

Inclusion and exclusion criteria

Patients were included if they were 18 years or older, of either gender, symptomatic, had been diagnosed with hepatitis C and had completed treatment, and had single or multiple focal liver lesions on ultrasound. Patients who had not been treated for hepatitis C, or who could not cooperate with the ultrasound examination, were excluded.

Ultrasound technique

All scans were performed on a Toshiba Aplio ultrasound machine using a curved-array or sector probe (2–5 MHz); a higher-frequency linear probe was used for superficial lesions. The left lobe was imaged by a sub-xiphoid approach with the patient supine. The right lobe was imaged by subcostal and intercostal approaches, the former in the left lateral decubitus position during deep inspiration and the latter in the supine position during quiet respiration or expiratory breath-hold. For each lesion, location, margins, echogenicity, echotexture and vascularity (colour Doppler) were recorded.

Data collection and analysis

After written informed consent, data were recorded on a structured proforma covering history, previous hepatitis C treatment, symptoms and ultrasound findings. Data were analysed with SPSS version 24.0 (IBM Corp., Armonk, NY) and Microsoft Excel 2016; figures were produced in R. Continuous variables are presented as mean ± standard deviation and categorical variables as frequencies and percentages.

RESULTS

Thirty patients with FLLs after treatment of hepatitis C were included. The mean age was 43.5 ± 16.1 years (median 41.5; range 20–81). Twenty patients (66.7%) were male and 10 (33.3%) were female (male-to-female ratio 2:1). The largest age groups were 30–39 and 40–49 years (8 patients each, 26.7%) (Table 1, Figure 1). Gender distribution is shown in Figure 2.

Table 1: Demographic characteristics of patients (n = 30)

Variable	n	%
Age group (years)		
20–29	6	20.0
30–39	8	26.7
40–49	8	26.7
50–59	2	6.7
60–69	4	13.3
⩾ 70	2	6.7
Gender		
Male	20	66.7
Female	10	33.3

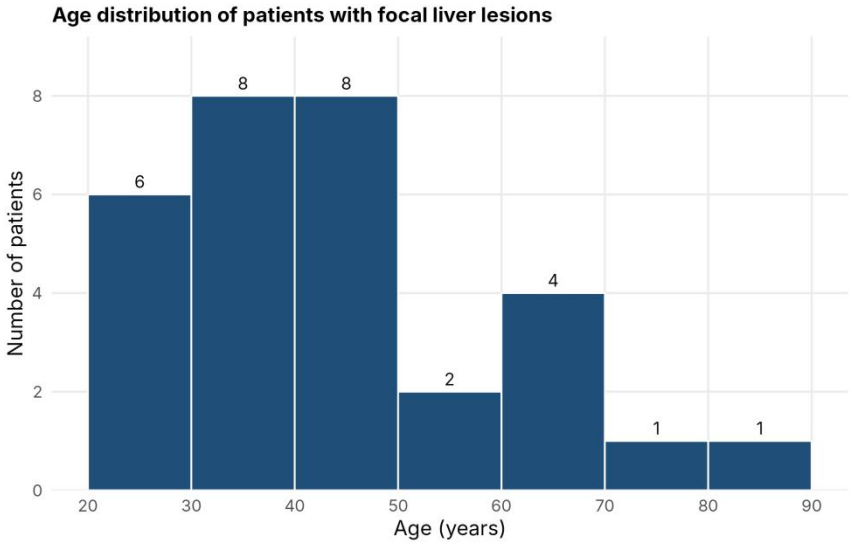


Figure 1: Histogram of age distribution (mean 43.5 ± 16.1 years).

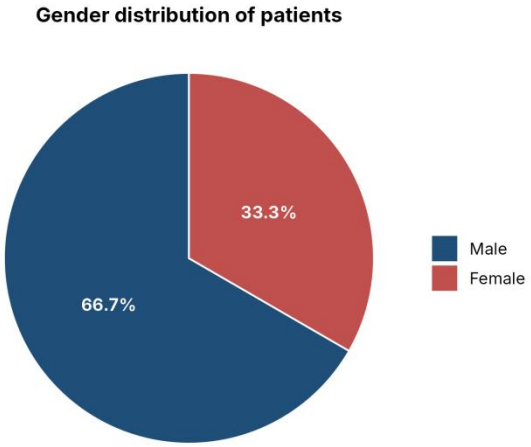


Figure 2: Gender distribution of patients.

Location of lesions

Lesions involved the right lobe in 20 patients (66.7%) when segmental right-lobe sites were combined (right lobe not otherwise specified 13, 43.3%). Eight patients (26.7%) had lesions throughout the liver and two (6.7%) had left-lobe lesions (Table 2, Figures 3 and 4).

Table 2: Location of focal liver lesions (n = 30)

Location	n	%
Right lobe (not otherwise specified)	13	43.3
Whole liver (diffuse)	8	26.7

Location	n	%
Left lobe	2	6.7
Segment 4	1	3.3
Segments 4, 5	1	3.3
Segments 6, 7	1	3.3
Segments 5, 8	1	3.3
Segment 4a	1	3.3
Segment 7	1	3.3
Segments 4a, 5	1	3.3

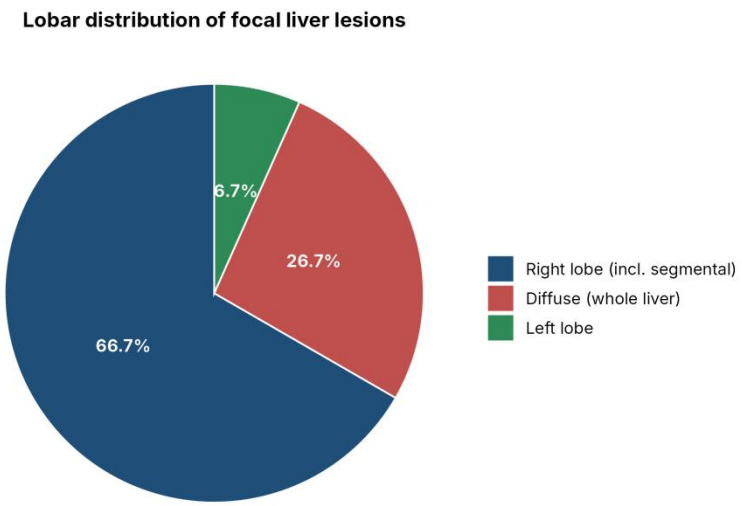


Figure 3: Lobar distribution of lesions (segmental right-lobe sites grouped as right lobe).

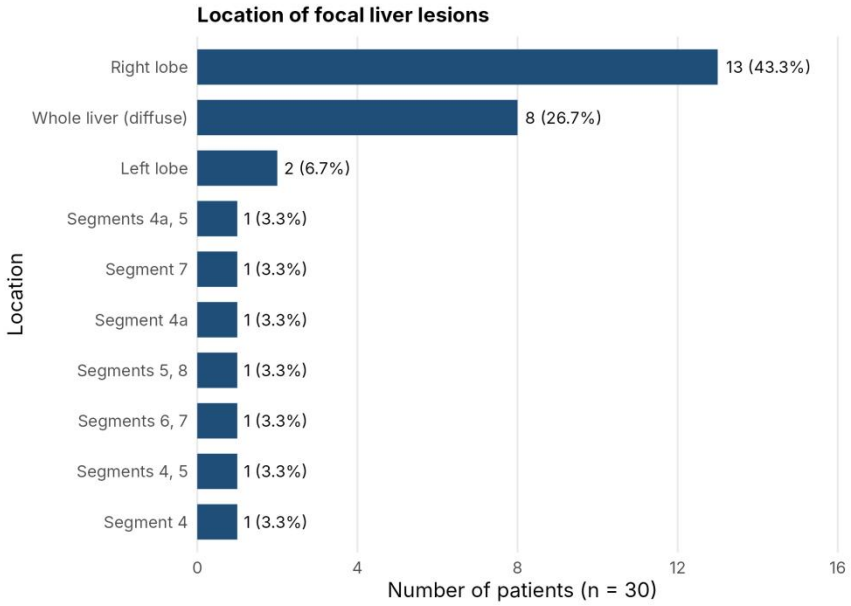


Figure 4: Detailed location of focal liver lesions.

Ultrasound characteristics

Irregular margins were the most common finding (15; 50.0%), followed by smooth margins (6; 20.0%) (Figure 5). Hypoechoic lesions predominated (19; 63.3%), followed by hyperechoic (4; 13.3%) and anechoic lesions (3; 10.0%) (Figure 6). Coarse echotexture was the most frequent pattern (13; 43.3%) (Figure 7). Twenty-six lesions (86.7%) showed no vascularity on Doppler; peripheral vascularity was seen in 2 (6.7%), minimal flow in 1 (3.3%) and increased vascularity in 1 (3.3%) (Figure 8). Details are given in Table 3.

Table 3: Ultrasound characteristics of focal liver lesions (n = 30)

Feature	n	%
Margins		
Irregular	15	50.0
Smooth	6	20.0
Normal	4	13.3
Slightly irregular	1	3.3
Regular	1	3.3
Well defined	1	3.3
Capsule invasion	1	3.3
Smooth and regular	1	3.3

Feature	n	%
Echogenicity		
Hypoechoic	19	63.3
Hyperechoic	4	13.3
Anechoic	3	10.0
Echogenic	2	6.7
Normal echogenicity	1	3.3
Mixed echogenicity	1	3.3
Echotexture		
Coarse	13	43.3
Normal	4	13.3
Nodular	4	13.3
Homogeneous	3	10.0
Heterogeneous	3	10.0
Internal debris	1	3.3
Granular	1	3.3
Coarse and nodular	1	3.3
Vascularity		
No vascularity	26	86.7
Peripheral vascularity	2	6.7
Minimal flow	1	3.3
Increased vascularity	1	3.3

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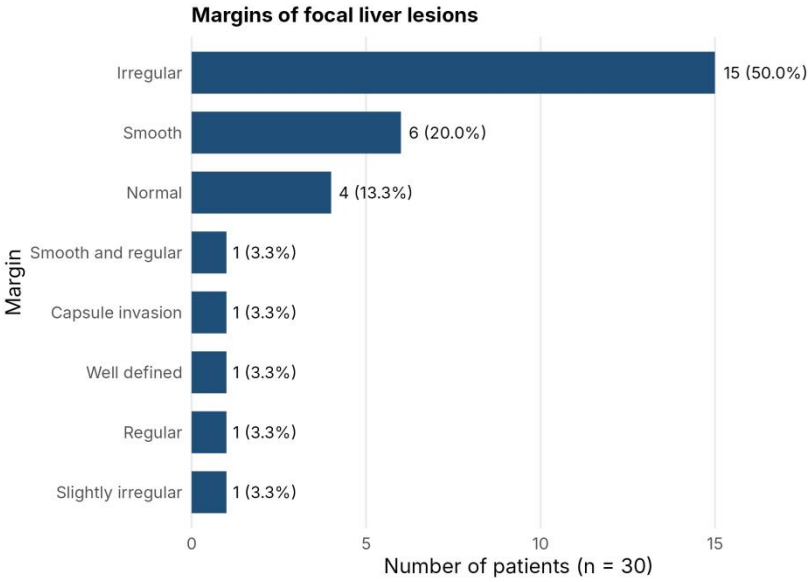


Figure 5: Margins of focal liver lesions.

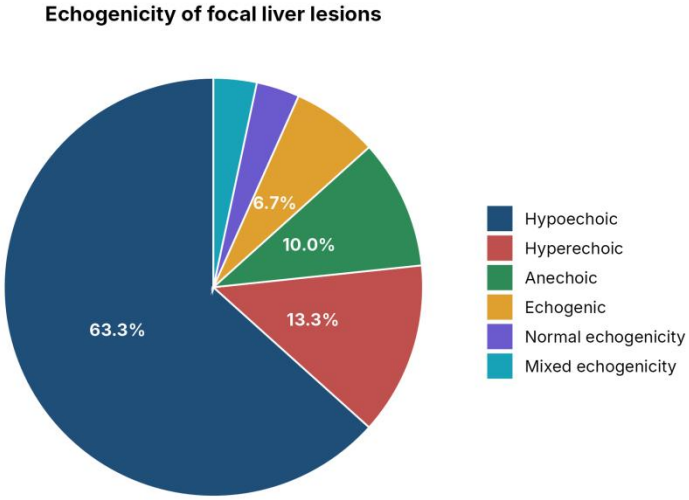


Figure 6: Echogenicity of focal liver lesions.

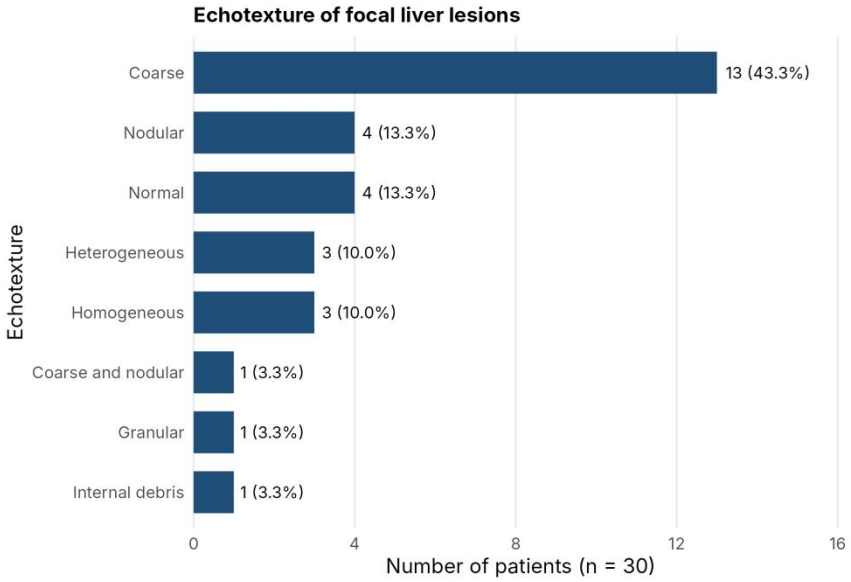


Figure 7: Echotexture of focal liver lesions.

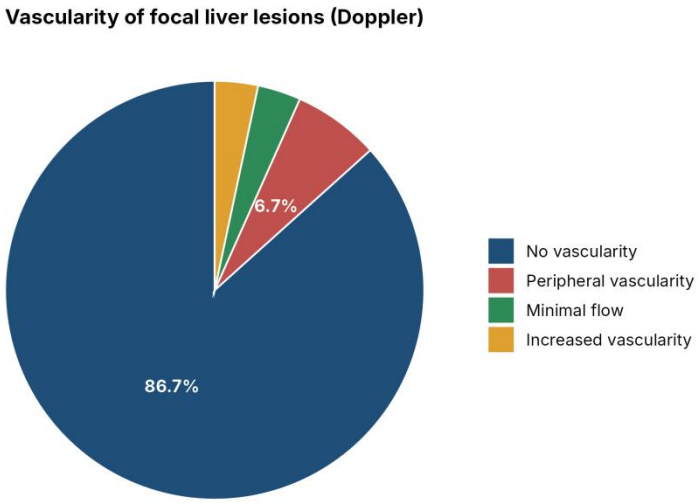


Figure 8: Vascularity of focal liver lesions on Doppler.

DISCUSSION

This study describes the ultrasound appearance of FLLs in patients who had completed treatment for hepatitis C. The mean age was 43.5 years and 70% of patients were younger than 50 years, which is broadly consistent with Thimmaiah, who found the highest incidence of focal liver lesions at 41–50 years.[7] Men made up two-thirds of our sample. Alhyari et al. likewise reported that HCC and other malignant lesions in cirrhotic patients were more frequent in males and in those with hepatitis B or C aetiology.[8]

The right lobe was the commonest site, involved in two-thirds of patients, with diffuse involvement in about a quarter. Alhyari et al. also found HCC more often in the right lobe,[8] whereas Wu et al. reported lesions spread across all liver segments, with a predominance in segments 4 and 5.[9] Differences in the lesion types studied and in the way location was recorded probably explain this variation.

Hypoechoic lesions were the most frequent echogenicity in our series (63.3%). Nisenbaum and Rowling note that HCC smaller than 3 cm is often hypoechoic, and that metastases may be hypoechoic or hyperechoic.[10] Half of our lesions had irregular margins and almost half had a coarse echotexture, features that raise concern for a significant lesion and should prompt further characterisation. We did not have histology or follow-up to say which lesions were malignant.

On colour Doppler, 86.7% of lesions had no detectable internal flow. Nino-Murcia et al. found no internal vascularity in 24% of HCCs, 67% of metastases and 75% of benign lesions,[11] so absence of flow does not separate benign from malignant lesions. Our small sample and the lack of reference diagnoses prevent any such comparison.

Ultrasound is usually the first test for FLLs, but it cannot characterise many lesions with confidence. Contrast-enhanced ultrasound improves diagnostic accuracy and is now part of guideline-based work-up,[12] and surveillance ultrasound is recommended in patients with cirrhosis because HCC arises in that setting.[13] Our findings support continued ultrasound surveillance of treated HCV patients, with contrast-enhanced ultrasound, CT or MRI for indeterminate lesions.

Limitations

The sample was small (n = 30), collected from a single centre by convenience sampling, so the results cannot be generalised. Only patients with FLLs were enrolled, so no prevalence or risk of FLL after treatment can be estimated and no comparison with untreated patients was possible. Lesion size, sustained virological response, cirrhosis status and the final diagnosis (histology or contrast imaging) were not analysed. Percentages are reported per patient, assuming one principal lesion each.

CONCLUSION

In this sample of treated hepatitis C patients, focal liver lesions were more common in men and in the right lobe, and were mostly hypoechoic with irregular margins, coarse echotexture and no detectable Doppler flow. Regular ultrasound follow-up, every 6–12 months, is recommended for such patients, and larger multicentre studies with a confirmed final diagnosis are needed.

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