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Ultrasound surveillance for hepatocellular carcinoma: service evaluation of a radiology-led recall system in a tertiary-referral centre for liver diseases in the UK

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AIM: To review the radiology-led ultrasound (US) surveillance programme for the detection of hepatocellular carcinoma (HCC) in cirrhotic patients in a UK tertiary-referral centre.

MATERIALS AND METHODS: The radiology information system was searched for patients who had undergone US for surveillance of cirrhosis from September 2009 to May 2013. Patient demographics and cirrhosis aetiology were documented. Data including numbers of surveillance scans, abnormal findings suspicious for HCC, subsequent radiological investigations, numbers of HCC and survival for HCC patients were recorded. Service performance data, such as rates of attendance and rebooking, were also recorded.

RESULTS: Eight hundred and four patients entered surveillance and 2,366 surveillance US examinations were performed; 368 (46%) underwent follow-up (6-monthly US). Abnormalities leading to further radiological investigations were found in 81 patients. Reasons for incomplete surveillance included non-attendance and radiology failure to re-book appointments. HCC was diagnosed in 22 patients. Fourteen had HCC diagnosed on a surveillance scan, eight had HCC diagnosed on a scan performed for other reasons. Patients diagnosed with HCC on a surveillance scan were more likely to be treated with curative intent and had longer survival.

CONCLUSION: Even with a radiology-led recall service for HCC surveillance, the proportion of patients receiving scans 6-monthly was low, due in part to the lack of organisational support that is available for other screening programmes. This study gives a realistic representation of the implementation of surveillance in a UK hospital at the current time and of the rates of HCC proceeding to treatment.

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Introduction

Hepatocellular carcinoma (HCC) incidence is rising in the UK and globally, constituting part of a wider trend of increased mortality from chronic liver disease.[1,2] The majority of HCC cases occur in patients with cirrhosis. The rise in cirrhosis has been attributed to an increased prevalence of chronic hepatitis B (CHB) and chronic hepatitis C (CHC) infections in addition to non-alcoholic fatty liver disease (NAFLD) and alcoholic liver disease (ALD).[3,4] Globally, HCC is the third leading cause of cancer death, due to the impact of CHB infection in Africa and Asia.[5]

The prognosis of HCC is related to the stage of disease at presentation and is dependent on several variables including: tumour size; the number of cancerous nodules; extra-hepatic disease; portal vein invasion by tumour; and underlying liver function. Patients with cancers that are potentially amenable to curative treatment (transplantation, resection, or ablation) have a 3-year survival rate between 60–80%.[6] In comparison, the prognosis for patients presenting with advanced HCC remains poor with 3 year survival rates as low as 10%.[7,8]

Small tumours are asymptomatic and the aim of surveillance is to identify patients with early, curable tumours using ultrasound (US) screening followed by cross-sectional imaging (Figs 1–2). HCC surveillance, in selected high-risk patient groups, is recommended by several international liver associations (e.g., the American Association for the Study of Liver Diseases [AASLD], the European Association for the Study of the Liver [EASL], and the British Society of Gastroenterology [BSG]).[9–11] The most common surveillance regimen is US with or without alpha-fetoprotein (AFP) measurement every 6 months in patients with compensated cirrhosis.

Robust evidence supporting the benefit of surveillance is lacking.[12] This was acknowledged in a Royal College of Radiology (RCR) position statement published in September 2014.[13] In the UK, there is currently no specific funding for surveillance, nor is there the organisational support that is available in other screening programmes such as for breast and colon cancer. Yet, both patients and clinicians have an expectation that surveillance will be offered. The provision of US surveillance for HCC in the UK is inconsistent and poorly performed. This was confirmed by a recent survey of current practice amongst British and Irish gastroenterologists and hepatologists (A.H., unpublished data).

The Royal Liverpool Hospital is a tertiary-referral centre for liver diseases. In September 2009, the Radiology Department implemented a 6-monthly recall protocol for US surveillance of all cirrhotic patients who were referred by the hepatology and infectious diseases teams for HCC surveillance. It had been observed that US booked as part of clinic attendances were haphazard and results had the risk of being overlooked. In addition, the US examinations were frequently not performed in the recommended 6-monthly time frame.

The present study originated as an internal service evaluation of performance of the recall surveillance programme. The primary aim was to evaluate the detection rate of HCC in surveillance. Secondary objectives were to determine type and number of follow-up imaging investigations required, stage of disease at the time of

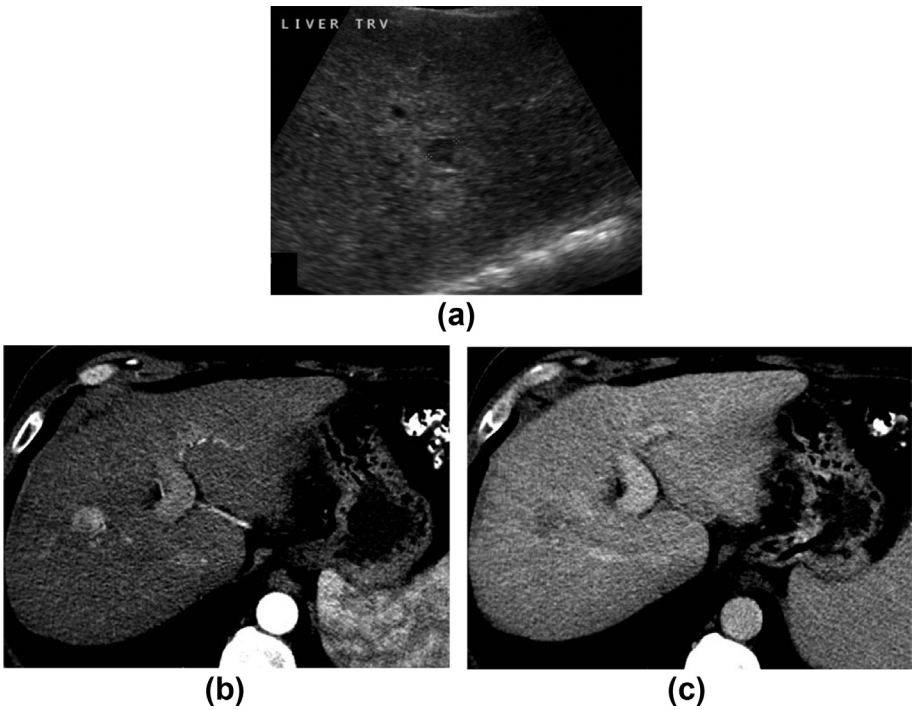

Figure 1 (a) US image of a cirrhotic patient shows a nodule in the right lobe of the liver. (b) Arterial-phase CT. The liver lesion identified at US shows avid arterial enhancement. (c) Portal venous phase CT shows washes of the lesion, diagnostic of HCC.

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