

## ASPECTS OF DIAGNOSIS\*

# An assessment of ultrasound scanning in the recognition of colorectal liver metastases

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### Summary

*The preoperative detection of visible liver metastases in patients with colorectal cancer is important in determining a rational treatment policy. The accuracy of hepatic ultrasound scanning was assessed in 100 patients with primary colorectal cancer. Each patient had a  $^{99m}\text{Tc}$ -sulphur colloid scan, ultrasound scan, and liver function test. All patients came to laparotomy and the liver was carefully palpated. With very few exceptions the combination of isotope and ultrasound scanning gave accurate information on the state of the liver in all patients in this series. Alkaline phosphatase was the only enzyme whose serum activity was consistently elevated in the presence of liver metastases. Ultrasound scanning of the liver is a simple, safe, accurate, and non-invasive method for preoperative assessment of the state of the liver in patients with primary colorectal cancer.*

### Introduction

Colorectal cancer has a well-recognised affinity for metastasising to the liver. Indeed, not only are liver metastases present in approximately 20% of patients at the time of initial laparotomy (1,2), but 40–50% of patients dying with colorectal cancer have established liver secondaries (1). Once liver metastases have developed the outlook is bleak, with a mean survival of between 6 and 9 months (3,4).

The object of this investigation was to determine prospectively whether ultrasound scanning of the liver, which is both safe and non-invasive, was sufficiently sensitive for the preoperative recognition of colorectal liver metastases. The study was felt to be necessary because recent reports have indicated encouraging results for the treatment of synchronous liver metastases in selected patients (5,6).

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*The Editor would welcome any comments on this paper by readers*

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### Materials and methods

One hundred patients presenting with primary colorectal cancer who came to laparotomy were studied. There were 63 males and 37 females. At laparotomy careful inspection and palpation of the liver was carried out in all cases by one surgeon and wherever possible biopsy was performed on visible metastases. In each patient the diagnosis of colorectal cancer was confirmed histologically.

The following investigations were performed on each patient before surgery specifically to determine whether liver metastases were present.

#### ULTRASOUND SCAN

This was performed with commercially available units (Picker 80L or Nuclear Enterprises Diasonograph), both with grey scale. Longitudinal scans in the paramedian plane were made at 1-cm intervals in deep inspiration. Examination of both lobes of the liver was performed. Any suspicious areas were scanned transversely or obliquely to confirm or refute the presence of a lesion.

#### ISOTOPE LIVER SCAN

This was carried out with  $^{99m}\text{Tc}$ -sulphur colloid and imaging was performed by gamma camera. The scans were reported independently and one of the following assessments was made: normal liver; abnormal appearance (probably not metastases); or liver metastases. They were not compared until the total series was reviewed.

#### LIVER FUNCTION TESTS

Serum alkaline phosphatase activity was measured in all cases.

### Results

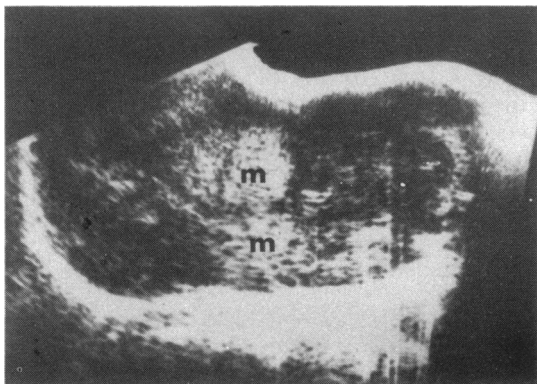
#### LIVER METASTASES

At laparotomy 15 of the 100 patients had palpable

liver metastases. These were confirmed histologically in 13. In all cases metastases were present in both lobes. Of the 85 patients without macroscopic metastases (1 of whom had cirrhosis) 8 (9.4%) had Dukes' A, 52 (61.2%) Dukes' B, and 25 (29.4%) Dukes' C tumours. In contrast 11 (73.3%) of the 15 patients with liver metastases had histological evidence of lymph node involvement.

#### ULTRASOUND/ISOTOPE SCANS

Liver ultrasound correctly diagnosed multiple liver metastases (see figure) in 13 (86.7%) of the 15 patients with positive findings at laparotomy. Isotope scanning was positive or suggestive of the presence of metastases in 14 patients (93.3%). There was 1 false positive diagnosis by ultrasound and 1 by isotope scanning.



*Longitudinal ultrasound scan of the liver showing several echogenic metastases (m) in an enlarged liver*

Of the 85 patients without palpable metastases at laparotomy liver ultrasound predicted the absence of metastases in 84, with 1 false positive. Isotope scanning predicted the absence of palpable metastases in 83 patients, with 2 false positives (1 being in the patient with cirrhosis).

#### LIVER FUNCTION

In 13 patients (86.7%) with multiple liver metastases the serum alkaline phosphatase activity was elevated (median 218.1 (range 89–370) U/l — normal 28–90 U/l). In addition the level was elevated in 13 patients without palpable liver metastases.

#### Discussion

In recent years emphasis has been directed towards accurate pretreatment assessment of the extent of spread in several malignancies — for example, breast cancer, Hodgkin's disease, and

malignant melanoma — and this in turn has led to more rational treatment regimens. However, in the management of gastrointestinal cancer and, in particular, large-bowel cancer little importance has been placed on preoperative recognition of hepatic metastases. Two reasons are frequently quoted for this: firstly, that accurate non-invasive investigations are not available for the diagnosis of small liver metastases, and secondly, that the treatment of liver metastases is in any case unsatisfactory. While these contentions may be true, there have nevertheless been encouraging results in the treatment of selected patients with synchronous liver metastases (5,6). In addition, there have been technological advances in ultrasound equipment, and ultrasound facilities are becoming more widely available. Accordingly the object of this study was to compare the appearance of the liver at laparotomy with both ultrasound and isotope scans in a group of patients with colorectal cancer.

In this series ultrasound and isotope scanning were both effective in recognising the presence of colorectal liver metastases. The positive isotope scans in this series included those reported as definitely abnormal and possibly abnormal and this may account for the overall accuracy being slightly higher than the typical figure of 85%.

It is generally accepted that bowel gas will interfere with or completely prevent ultrasound scanning in approximately 10–15% of patients, but the wider use and improved resolution of real-time scanners may help to reduce this problem.

The ultrasound appearances of liver metastases are variable and several different patterns have been described (7). In our series the majority of the deposits appeared as discrete areas of increased echo strength and density (echogenic) (see figure). This is similar to the experience of others (8) in that gastrointestinal primaries often give rise to echogenic liver metastases on ultrasound. Ultrasound scanning may be useful for following the response of metastases to drug treatment and may also be helpful when the isotope scan is equivocal (10) or target biopsy is indicated.

In conclusion, ultrasound scanning was found to be as effective as isotope scanning in the detection of colorectal liver metastases and thus has a role in the accurate preoperative staging of the disease.

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