ULTRASOUND ECHO PATTERNS FROM NORMAL HUMAM AND ANIMAL LIVER RELATION TO DETECTION OF PATHOLOGICAL STATES OF LIVER

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Ultrasonic visualization techniques for scanning the intact human liver are proving to be a valuable adjunct to some of the standard medical methods. However, there are fundamental limitations to this method as it is now applied. To a large degree, these limitations are associated with the concept that normal liver is essentially an acoustically homogeneous medium which, under proper instrumentation settings, during an ultrasonic scan, will return either no echoes or a few scattered echoes from its internal structure, or, alternately, echoes are only received from the internal structure of liver if an abnormal condition exists. Some of the present authors have shown in basic studies on cat liver (morphologically similar to the human) that echo pattern representing structural tissue data (i.e., not "snow patterns" or "fill in" phenomena) can be elicited by ultrasound visualization techniques. It was predicted that these results are directly applicable to human liver visualization studies. The present paper will discuss the continuing aspects of this research, including the extension of the studies to human liver and to rat liver. The rat is of interest because of the feasibility of maintaining and transferring tumors in this species.

The experiments have been carried out as previously described with B-mode sector scan ultrasound visualization system. A simpler linear scan is also being used for these studies. Several transducers of different design characteristics have been used, but most have been in the frequency range of 1.7 to 2.2 MHz. Normal and pathological excised human livers have been scanned. In order to confirm our findings on animal livers, in vivo scans were made on normal human subjects. Studies on the livers of normal rats, and rats with Walker carcinoma, are under way. Earlier predictions regarding echo patterns from normal human liver have been confirmed. This is of significance from a number of viewpoints.

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