Procedures in Practice

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LIVER BIOPSY

Percutaneous needle biopsy of the liver is a simple bedside procedure that provides a core of tissue for laboratory investigation and so is valuable in many types of liver disease and systemic illness. Several different instruments are available, each with its own technique. The general principles apply to all, but our discussion of procedure is confined to the disposable Tru-cut needle. Liver biopsy may also be carried out at laparotomy and laparoscopy and transvenously, but we do not propose to discuss these methods.

A blind procedure in an organ as vascular as the liver can be hazardous, so physicians should be well prepared and rehearsed. Practice with the appropriate instrument may be got in the necropsy room, but there is no substitute for learning by watching and copying someone who performs liver biopsies every week.

Indications

Cirrhosis
Hepatitis
Tumours
"Difficult" jaundice
Drug effects
Hepatomegaly

- (1) Confirmation of a clinical diagnosis of cirrhosis.
- (2) Investigation of chronic hepatitis and assessment of the effects of treatment.
- (3) Histological confirmation of primary and secondary tumours.
- (4) Investigation of "difficult" jaundice.
- (5) Investigation of the effects of drugs, including alcohol, on the liver.
- (6) Occasionally in acute hepatitis and hepatomegaly, and when liver function tests give abnormal results that remain unexplained.
- (7) As an aid to diagnosing pyrexia of undetermined origin, granulomatous disease, and lymphomas.

Considerations

Can the patient understand the procedure and hold his breath for five seconds?—A violent cough or gasp when the needle is in position may tear the liver, with disastrous bleeding. A general anaesthetic is usually required in children.

Is the patient likely to bleed excessively?—The prothrombin time is the best indication: if it is prolonged more than three seconds and biopsy is considered to be essential then fresh-frozen plasma should be given (one unit before, one during, and one after the biopsy); if it is over six seconds the procedure should not be carried out. When the prothrombin time is abnormal 10 mg of vitamin K may be given parenterally for a few days. The platelet count is less important, but if it is below $50 \times 10^9/l$ ($50\,000/mm^3$) care should be taken; platelet concentrates may be used. The patient's blood group should be known, and one unit of cross-matched blood should be available.

Is the path to the liver normal?—Biopsy is best postponed when there is a skin or chest infection. Ascites causes the liver to float away from an advancing needle and when appreciable should be treated first.

Is biopsy likely to do more harm than good?—Patients with deep jaundice, especially from extrahepatic obstruction, risk biliary peritonitis as well as haemorrhage, and if cholangitis is present the infection may be spread. Consider the possibility of a hydatid cyst, when anaphylaxis may result, or a vascular tumour including hepatoma, when angiography may be a better investigation.

Procedure

The patient lies along the edge of the bed with his right arm behind his head, which is turned to the left. A pillow placed firmly along the left side of the body will keep it horizontal. Palpate the abdomen and percuss the liver in the mid-axillary line: remember that it is largely intrathoracic. Mark the rib space which is below the top of the liver dullness on full expiration. It may be helpful to mark the xiphisternum and liver edge as well.

Sedation is not usually necessary, but plenty of local anaesthetic is. Draw up 10 ml of 1% lignocaine. Clean the skin with methylated spirit, and anaesthetise through a 25-gauge needle with a few drops of lignocaine in the appropriate space just above the rib. Then, using a 21-gauge needle, anaesthetise the deeper tissues with the patient breathing quietly, and advance slowly until a scratchy sensation or a gasp of pain indicates the sensitive tissues overlying the liver. Infiltrate this area with large amounts of anaesthetic. Remove the needle and, if you wish, measure the approximate distance to the surface of the liver on the biopsy needle.

Instruct the patient on how to take several deep breaths in and out and how to hold his breath in deep expiration for as long as he can. When you are satisfied that he understands, nick the skin with the point of a scalpel blade, introduce the biopsy needle, and advance slowly with the patient breathing quietly. If you are not sure of the depth of the liver surface, continue advancing until the needle begins to swing with respiration, then withdraw slightly until it stops swinging.

Repeat the breathing instructions with the patient following you. As soon as the breath is held in expiration thrust the *closed* needle about an inch into the liver. Advance the inner trocar, holding the outer cutting sheath still. Fix your right elbow against your side (to prevent the instinctive desire to withdraw the needle), advance the outer cutting sheath to cut the liver in the biopsy notch, and quickly withdraw the whole needle from the patient. With practice this sequence should take only a second or two. We prefer it to the one recommended by the manufacturer, as do others we have consulted, because it ensures that the specimen is taken from within the liver rather than from under the capsule.

Cover the skin incision with a plaster and instruct the patient to lie on the right side for four hours and to remain in bed for 24 hours. Pulse rate and blood pressure should be recorded hourly, and nurses instructed to report at once any alteration in condition or any complaint of pain.

Remove the biopsy specimen from the notch and divide it if specimens are needed for bacterial culture, biochemical examination, or electron microscopy in addition to histological examination. Place the histological specimen in formal saline on a piece of card to prevent fragmentation. Record the procedure in the notes, together with the texture and naked-eye appearance of the biopsy specimen: fat, pigmentation, tumour, and cirrhosis can sometimes be recognised.

What can go wrong

No liver tissue is obtained—This occurs most commonly when the sequence of movements is incorrectly performed, the inner trocar being withdrawn when the outer sheath should have been advanced. Incorrect positioning (as in very fat people, when it may be difficult to outline liver dullness), inadequate expiration, or a small or mobile liver are other reasons. The experienced performer permits himself no more than two attempts at biopsy.

Severe pain may be caused by bleeding or leakage of bile. Shoulder-tip pain and discomfort over the site of biopsy when the effect of the local anaesthetic wears off may require simple analgesia. Anything more than this should always be reported and patient and nurses instructed accordingly. Biliary peritonitis is fortunately rare, but if in doubt seek a surgical opinion.

Shock is usually caused by rapid loss of blood from a large vessel or vascular tumour, less often by Gram-negative septicaemia. Bleeding may be more insidious, and blood transfusion should be started if there is unexplained tachycardia or hypotension, and fresh-frozen plasma or platelets given if indicated. Rarely, surgical intervention will be needed.

Septicaemia may result from needling an infected bile duct or liver abscess and may be the first indication of infection.

Rarer complications include haemoptysis or pneumothorax owing to biopsy of the lung, and biliary or bacterial peritonitis owing to puncture of gall bladder or colon respectively.

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