Procedures in Practice

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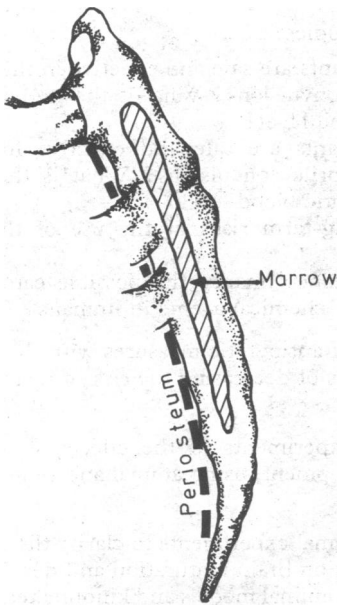
BONE-MARROW ASPIRATION AND TREPHINE BIOPSY (2)

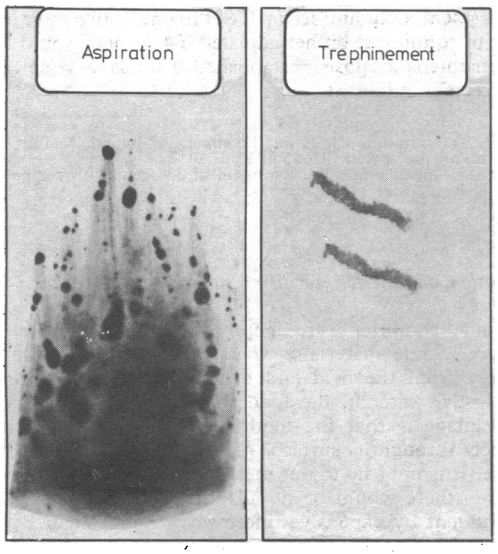
Technique for aspiration



Sedation is not usually needed except for children and apprehensive adults. A clean, no-touch technique should be used, but in patients with neutropenia a mask and gloves are recommended. The patient is positioned appropriately for the site chosen and the area cleaned with chlorhexidine or iodine and surrounded with sterile towels. The bony landmarks are identified and the overlying skin and periosteum infiltrated with up to 5 ml of 2% plain lignocaine. Check that the needle is sharp, the stylet easily removable, and the guard mobile. (For iliac crest and tibial procedures the guard may be removed.) With one hand identifying the landmarks and keeping the overlying tissues taut, push the needle through the skin and subcutaneous tissues. For sternal aspiration the guard should be adjusted when the periosteum is reached, so that only a further 5 mm advancement is possible. The needle is held at right angles to the bone and with firm pressure and a clockwise-counterclockwise action pushed through the outer cortex until a sensation of decreased resistance is felt when the marrow cavity is entered. The stylet is removed, a 10 or 20 ml syringe attached to the needle, and with gentle suction up to 0·5 ml of marrow aspirated into the syringe for morphological examination. Any greater volume will result in increasing contamination with peripheral blood. A second volume may be aspirated into another syringe for ancillary studies.

If no marrow is aspirated the needle is rotated or the stylet replaced and the needle cautiously advanced or retracted. If marrow is still unobtainable, a different site together with a clean needle should be used and possibly a trephine specimen taken.

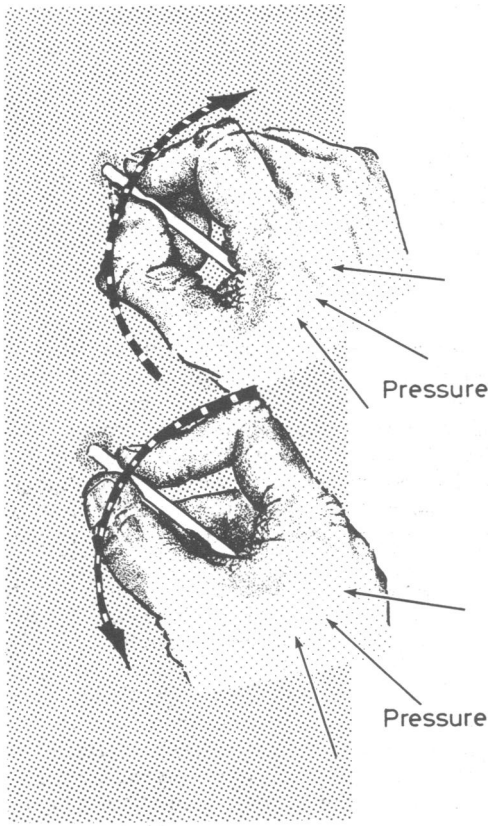
Preparation of bone-marrow slides



Smears must be made promptly before the specimen clots. It is a technique that requires practice, and badly made films render the aspirate uninterpretable. An accompanying technician may be needed to make the films or, if necessary, the sample may be placed into disodium EDTA for a few minutes until the laboratory is reached. A paediatric tube should be used to avoid an excess of anticoagulant.

When marrow films are prepared a drop of the aspirate is placed 1 cm from the end of a clean slide. Excess blood is aspirated with a Pasteur pipette or a second needle and syringe leaving marrow particles behind. Some workers concentrate all the particles on a separate slide or watch glass. By using a second smooth slide or spreader, a 3-5 cm film is made from the particles in the same manner as for peripheral blood. The particles should leave a trail of cells. At least eight slides should be available for staining. Romanowsky (for example, May-Grünwald Giemsa) and iron stains are performed routinely, and cytochemical examination of other slides may be needed. Additional material should be put in the appropriate medium with an anticoagulant for special tests—for example, cytogenetic and biochemical studies, etc—or into a microbiological culture medium.

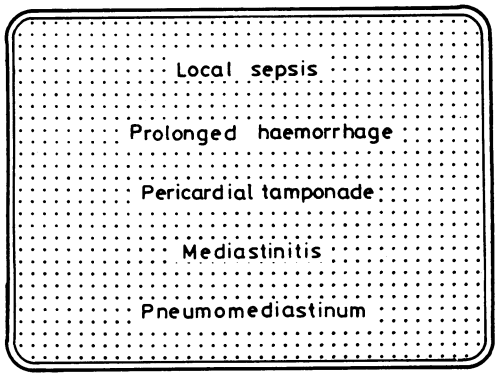
Jamshidi-Swain trephine



The patient is positioned and prepared as for posterior crest aspiration. The skin overlying the crest is incised with a scalpel blade, or the site of entry of a previous aspiration is used. With the handle of the needle grasped in the palm of the hand and the stylet locked in position the needle is pushed through the subcutaneous tissues until it reaches the posterior crest. It is then slowly advanced with firm pressure in an alternating clockwise-counterclockwise motion in the direction of the anterior superior iliac spine until a sensation of decreased resistance is felt. The stylet is removed and the needle further advanced until 2-3 cm of marrow is obtained. The needle is then withdrawn 2-3 mm and with less pressure advanced 2-3 mm further in a different direction, which breaks the specimen at the distal cutting edge of the needle. The instrument containing the biopsy sample is then withdrawn by rotation along its axis with quick full twists.

The specimen is removed from the needle by introducing the probe through the distal cutting end. The biopsy can be dabbed on to or rolled across a slide before being placed into fixative for routine staining. After decalcification sections are stained routinely with haematoxylin and eosin and for reticulin.

Risks and aftercare



In severe coagulation disorders (for example, haemophilia, severe disseminated intravascular coagulation) the procedure should be undertaken only when the defect has been corrected by appropriate plasma fraction replacements. A trephine biopsy in such conditions might give rise to prolonged haemorrhage. Thrombocytopenia alone does not usually present a major problem.

Failure to use the guard when performing sternal aspiration could give rise to complete penetration of the bone with a resultant fatal haemorrhage, pericardial tamponade, mediastinitis, or pneumomediastinum. Local sepsis is extremely rare except in patients with severe neutropenia, for whom sterile precautions should be taken.

After the procedure a plaster is applied, and firm pressure over the site for a few minutes is recommended (for longer if the patient has a haemostatic defect).

This is the second and concluding part of this article; the first part appeared last week.

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