Methods and techniques

Colonic biopsy instrument

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Diseases of the rectum and colon can be diagnosed by biopsy examination with a high degree of accuracy. Mucosal biopsy specimens are usually obtained through a sigmoidoscope under direct visual control. Many biopsy instruments have been used, for example, different types of punch forceps, the Dicks biopsy device, and the Truelove-Salt colonic biopsy tool (Truelove, Horler, and Richards, 1955). Biopsy sampling by punch forceps is a painful procedure and carries the risks of haemorrhage and perforation of the bowel wall, while the other instruments require two persons to use them and are complicated in construction and operation.

We describe here a colonic biopsy instrument which is simple, operated by one man, quick, and highly successful.

Figures 1-4 demonstrate the construction of the device and the principle of its design.

The instrument consists of a thin-walled, stainless steel tube 260 mm. long and 6 mm. internal diameter, closed and rounded off at one end, with a biopsy hole in the side, 4 mm. in diameter and about 30 mm. from the closed end. Into this is inserted a replaceable stainless steel circular cutter (knife), attached by a 10 mm. spacer to the end of a rod 300 mm. long (Fig. 1A). The cutter end of the rod and the cutter itself are arranged to be a good sliding fit in the tube. There are four longitudinal holes in the cutter, and each is 1 mm. in diameter. The tube is clipped, with its biopsy opening on the outside, to a holder which clamps to a sigmoidoscope in a way that keeps the biopsy opening level with the wall of the sigmoidoscope and close to the colonic mucosa (Fig. 4). The biopsy opening can be sited under visual control at the required position by sliding the instrument through its holder with the aid of an adjusted screw (Fig. 1B). If a bigger mucosal specimen is needed the biopsy opening can be made to be 6 mm. in diameter instead of the standard 4 mm. But we feel that specimens obtained from the 4 mm. hole are sufficient to provide reliable histological diagnosis.

The length of the instrument may be more than 300 mm., depending on the length of the sigmoidoscope used and on the mucosal area from which the biopsy specimen is required. Nevertheless, we have found that the device which is 300 mm. long is a convenient one for most cases.

FIG. 1. The different parts of the instrument.

FIG. 2. Diagram illustrating the principle on which the instrument operates.

FIG. 3. Different parts of the instrument: A, sigmoidoscope; B, light; F, lamp; E, biopsy opening; C, solid rod; D, replaceable cutter; G, three biopsy specimens.

FIG. 4. The assembled instrument, ready for use. A, rod and cutter; B, stainless tube with E biopsy opening; D, sigmoidoscope.

THE PRINCIPLE OF OPERATING THE INSTRUMENT

The cutter is inserted in the tube wall until the knife bears against the closed end and is then held for a moment to allow the compressed air to leak away past the rod. If it is now sharply withdrawn the volume at the closed end of the tube is increased and thus a partial vacuum is created at the cutter since it has four small longitudinal holes allowing air to pass from one side to the other and at the same time the biopsy opening is covered by the rod for the first 30 mm. of its movement (Fig. 2B). As the rod moves further down to clear the biopsy opening any loose material bearing against the opening on the outside will tend to be drawn into it and the path of the knife which slices it off (Fig. 2C).

The method of using the device in an actual case is to place the sigmoidoscope and its lamp in position, then insert the instrument, taking care that the biopsy opening bears against that area of the mucous membrane which is to be examined, and then clip to the lamp holder. The cutter is then inserted as far as it will go in the tube, and after a few seconds withdrawn sharply. If the tube has been placed correctly a sample of the mucosa will be sliced off by the knife and can be inspected at once by completely withdrawing the cutter. A second and a third biopsy specimen can be obtained from different areas in one sitting. Usually we get three specimens from every patient. The size of the specimen varies between 2 and 3 mm. in diameter and about 1 and 2 mm. in thickness. One hundred and sixty-two biopsy specimens have been taken from 56 patients suffering from various colonic

diseases without any sort of complication and the post-biopsy bleeding was negligible.

IMMEDIATE EXAMINATION OF THE SPECIMEN

We have found that immediate examination of the biopsy specimen has provided a reasonable guide to the histological state of the colonic mucosa.

The thin specimen, fixed in 50% ether alcohol for 10 minutes, is placed on a slide and then mounted with a cover-slip and examined by microscope under low power ($\times 40$). It can be stained with Leishman's stain and then examined by conventional microscopy.

The architectural pattern of the surface epithelium and the mucous glands is shown clearly and any deviation from the normal will be detected. In addition cellular inflammatory reactions, crypt abscesses, and parasitic infection are clearly demonstrated. Diagnostic agreement between this preliminary examination and the following conventional histology reached 76%.

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REFERENCE

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