Technique

Technique for suction biopsy of the rectal mucosa

A. P. DICK, J. E. LENNARD-JONES, J. HYWEL JONES,
AND B. C. MORSON *From Addenbrooke's Hospital,
Cambridge, and St Mark's Hospital, London*

Rectal biopsy is useful in the diagnosis of both inflammatory and non-inflammatory conditions of the bowel (Gear and Dobbins, 1968). A forceps technique is of most value in the diagnosis of carcinoma and other circumscribed lesions (Gabriel, Dukes, and Bussey, 1951). For the study of diffuse mucosal lesions a suction biopsy technique is preferable to forceps biopsy because it allows better micro-anatomical orientation of the biopsy specimen. A suction biopsy instrument described briefly by Dick and Grayson (1961) has proved convenient for this purpose and is being increasingly used. A detailed description of this instrument and its mode of use is, therefore, reported here.

Design and Care of the Instrument

The design of the instrument¹ is illustrated in the diagram (Figure 1). It is based on the principle of Wood's flexible gastric biopsy tube (Wood, Doig, Motteram, and Hughes, 1949) but has a rigid tube following the example of Truelove, Horler, and Richards (1955). The head of the instrument, which has a side aperture 3 mm in diameter, contains a cylindrical knife attached to a pull-wire running the length of the instrument. When the knife is drawn proximally it cuts off a knuckle of mucosa drawn into the aperture by suction. To prevent blunting of the cutting edge on metal, proximal movement of the knife is limited by an adjustable screw control near the end of the pull-wire. The total length of the instrument is 34 centimetres.

Suction is applied via the side-arm. The washer

shown in the diagram is essential for keeping the system air-tight and corrosion of this washer may result in inadequate suction and failure to obtain a biopsy specimen. Rubber washers have a longer life than cork washers and are now provided by the manufacturer.

Each knife is specially made to fit the head of its own instrument and loss of the knife which screws on to the pull-wire must be guarded against during cleaning. A spare knife can be purchased with the instrument.

The edge of the knife is hollow ground on its proximal inner surface and it may be sharpened with a conical Kansas stone. This stone must be used only on the inside of the blade and should be drawn from within outwards rather than being applied in a circular motion.

Scrupulous cleaning of the head of the instrument after use is important as traces of blood clot or residual tissue may cause the knife to jam in the cylinder. Fluid stool may be sucked into the body of the instrument during the biopsy procedure and so it is advisable to flush the tube through with water before it is boiled.

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The biopsy is usually taken from an area 10 to 15 cm from the anus. The ample mucosa of a rectal valve is a good site for this purpose. The anal canal should be avoided because biopsy of this region is painful and because its tubules are normally shortened and reduced in number, thus making interpretation of the histology more difficult (Flick, Voegtlin, and Rubin, 1962).

Under visual control the instrument is passed through the sigmoidoscope which is then withdrawn slightly to permit close apposition of the head of the instrument to the rectal wall. Suction of approximately 10 to 20 cm Hg is applied, using a 10 or 20 ml syringe. The negative pressure applied may be measured with a manometer. This is not always convenient and it is simpler to apply suction through rubber tubing selected because it collapses at a certain pressure². The amount of suction necessary to produce an adequate biopsy specimen varies with the state of the mucosa; more suction is needed when the mucosa is inflamed than when it is normal. A relatively large biopsy specimen is desirable when examining the submucosa for ganglion cells as a screening

¹Manufactured by the Genito-Urinary Manufacturing Company, 28a Devonshire Street, London, W.1.

²Tubing S 42—510 Type No. 05 available from Griffin and George, Nivoc House, Ealing Road, Alperton, Wembley, Middlesex.

Fig. 1 Diagram of suction biopsy instrument.

Fig. 2 Section of a suction biopsy specimen from normal rectal mucosa. Weigert's iron haematoxylin, Alcian blue, and Van Gieson $\times 50$.

Fig. 3 Section of a suction biopsy specimen from the rectum in active proctocolitis. Haematoxylin and eosin $\times 36$.

test to exclude Hirschsprung's disease (Dobbins and Bill, 1965).

Bleeding from the biopsy site occurs but is rarely severe and the procedure is used as an outpatient investigation. The site should be repeatedly swabbed to make sure that bleeding has stopped before the sigmoidoscope is withdrawn. Of 500 biopsy specimens taken by one of the authors with this technique, there have been two instances where haemorrhage has necessitated transfusion. It is wise to warn the patient that he may notice a little blood in the stools after the specimen has been taken. Perforation has not been a complication.

PREPARATION OF THE SPECIMEN

After the biopsy specimen has been obtained, it is removed from the instrument using a needle and is placed on the operator's finger so that its submucosal surface, which appears as a central white core, is uppermost. A small square of frosted glass¹ is now lightly applied to the submucosal surface of the specimen which adheres to the rough glass and the specimen, mounted on the slide, is then dropped into the fixative. If the specimen is taken for the diagnosis of amyloid disease, Heidenhain's 'susa' is an unsatisfactory fixative. The importance of proper orientation by the physician has been emphasized by Brandborg, Rubin, and Quinton (1959).

After the specimen has been processed, it is removed from the ground glass slide, turned on its side and embedded in wax. The flattening of the specimen produced by mounting it on the slide allows histological sections to be cut at right angles to the mucosal surface. The best sections, because they are best orientated and include most submucosa, are those obtained from the centre of the specimen. Sections cut at 3 μ thickness and stained with Harris' haematoxylin and eosin give satisfactory histological and cytological results.

Advantages of the Suction Biopsy Technique

A forceps biopsy specimen obtained from flat mucosa tends to be of variable size and depth. The suction biopsy instrument, on the other hand, gives a reproducible specimen which includes mucosa and superficial submucosa. Since the muscular wall is not included in the biopsy specimen, perforation of the bowel is unlikely.

Typical examples of sections prepared from rectal biopsy specimens are shown in Figures 2 and 3. Whereas a forceps biopsy specimen can be difficult to orientate, it will be seen that the suction biopsy specimens are well orientated, so permitting observation of the finer points of histological interpretation. These include mucosal thickness, the distribution of mucosal inflammation, abnormalities of the glandular pattern, and the severity of mucin depletion. Submucosal disease can also be assessed.

Mr N. Mackie kindly provided the photographs.

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¹Cut from TW1-1012 Cyto-slides 3 $\times$ 1 inch, one side frosted all over, obtainable from Arnold R. Horwell Ltd, 2 Grangeway, Kilburn High Road, London, NW6.