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Methods and techniques

Single intubation test for investigation of malabsorption and diarrhoea

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SUMMARY A one session multipurpose intubation method for the investigation of diarrhoea and malabsorption is described. It enables tests for bacterial colonisation, infestations, and luminal cytology of the small intestine to be combined with a pancreatic exocrine function test and a jejunal biopsy during the same intubation. The technique has proved acceptable, reliable, diagnostically valuable, and convenient for use on outpatients.

Investigation of patients with diarrhoea and malabsorption often requires the use of a number of tests involving intubation of the upper gastrointestinal tract. Such tests are unpleasant for the patient and time consuming for the investigator. The technique described here provides the maximum of information from a single intubation with the minimum of inconvenience to both patient and investigator.

The method has been devised to incorporate those tests requiring intubation that are used most commonly in the investigation of diarrhoea and malabsorption of uncertain aetiology. In our past experience these are a small intestinal biopsy, a test of pancreatic exocrine function, and the aspiration of small intestinal resting juice for microbiological and cytological examination. Culture using aerobic and anaerobic techniques reveals significant intestinal colonisation.[1 2] Microscopy using bacteriological and cytological stains will also show the presence of small parasitic organisms such as *Giardia lamblia*[3] and amoeba as well as abnormal desquamated cells associated with pancreatic and biliary pathology.[4] These tests have been combined in a single intubation method.

Method

TUBE DESIGN

A specially designed double lumen tube 115 cm long is used. It consists of a 2 mm diameter radio-opaque tube lying in the lumen of a 6 mm diameter clear plastic tube which has multiple perforations in its distal 5 cm. The outer tube is made from an Andersen AN10 sump aspiration tube (HW Andersen Products Ltd, Clacton-on-Sea, Essex) with the side vent tube, the distal tip, and the aspiration ports removed. The inner tube is attached to a 9·5 mm diameter × 18 mm long adult jejunal biopsy capsule (TC Components (Engineers) Ltd, Hampton, Middlesex) at its distal end. The proximal ends of both tubes fit on to a purpose made L-shaped adaptor (TC Components Ltd) which allows them to be aspirated independently through Luer-fitting taps. Details of the tube and its fittings are shown in the Figure.

PREPARATION FOR USE

The complete tube is sterilised before use by immersion in activated glutaraldehyde (Totacide 28, Tenneco Organics Ltd, Bristol) for 15 minutes. Using sterile disposable gloves and a sterile syringe with a conventional aseptic technique, the outer tube is flushed thoroughly with sterile distilled water and the biopsy capsule is assembled using a sterile diaphragm. Special care is taken to prevent contamination of the distal perforations in the outer tube up to the moment of swallowing.

METHOD OF USE

The patient fasts overnight. The throat is anaesthetised with a lignocaine spray or gargle and the tube passed down into the stomach. From there it is

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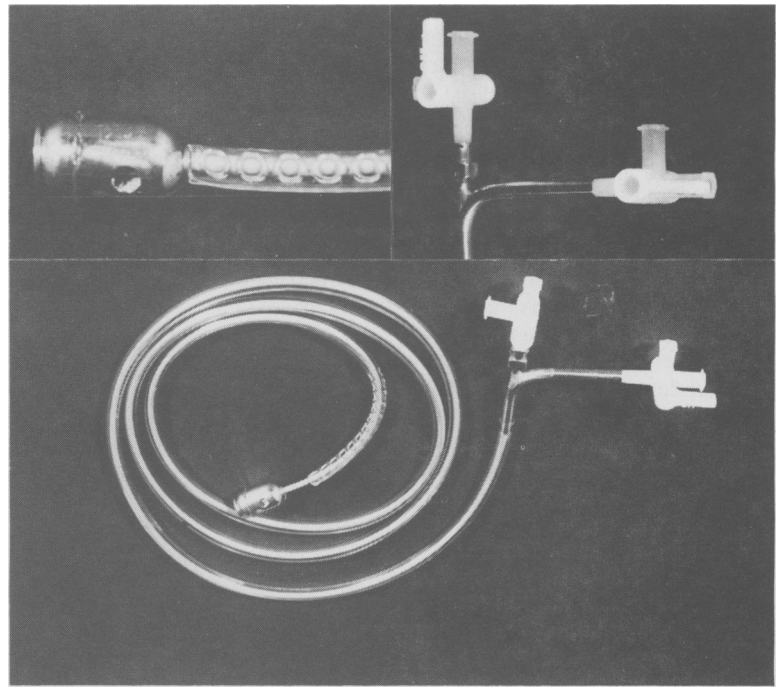

Figure *Assembled tube with detail of distal part (inset, top left) and the adaptor (inset, top right).*

guided under fluoroscopic control until the capsule and distal perforations are positioned beyond the ligament of Treitz.

The patient lies comfortably in the right decubitus position on a bed. Resting jejunal fluid is then aspirated through the outer tube using a sterile syringe. The volume which can be aspirated is usually 5–20 ml. The first few millilitres are discarded and the remainder of the aspirated fluid is divided into two portions and sent directly for cytological and microbiological examination, including a portion in a CO_2-containing vial for anaerobic bacterial culture. Bacterial growth is considered significant if more than 10^5 organisms/ml of any single organism are present in the jejunum.[1 2 5]

The patient then takes a Lundh test meal[6] through a straw and the jejunal fluid is allowed to drain freely through the outer tube into a dependent measuring cylinder surrounded by ice for two hours. An aliquot is analysed for mean tryptic activity (MTA).[7] Pancreatic exocrine insufficiency is diagnosed at an MTA level of less than 6IU/l.[8] Any other standard stimulus to pancreatic exocrine secretion could be substituted for the Lundh meal. At the end of this collection, the inner tube tap is opened and the tube is flushed with water to clear any refluxed jejunal juice, and with air to expel the water. The biopsy capsule is then fired in the usual way and the tube removed.

Apart from the fluoroscopic screening, the test can be done by a gastroenterology trained nurse. The time taken for the complete test is about two and a half hours.

Discussion

This technique has been used in the investigation of over 500 patients aged from 11 to 89 years, over the last five years. It has been well tolerated by these patients.

Technical failures have been few. Two patients refused to swallow the tube and one could not tolerate its passage. In three patients, two of whom were found to have pyloric stenosis, the capsule failed to pass the pylorus. On seven occasions, mainly in the early stages, the capsule failed to fire. These patients subsequently had a jejunal biopsy alone, taken using the same tube.

The clinical and diagnostic value of each of the component parts of this test are well established and documented.[1–6 8] The Lundh test is performed in the standard way. The tube has the same cross-sectional area as that in Lundh's original description.[6] Collection volumes have been as in our previous experience of the test. Results of microbio-

logical culture have fallen into three groups: firstly, those with zero or very low counts ($<10^2$ organisms/ml) of various organisms; secondly, those with intermediate counts (10^3–10^4 organisms/ml) of mixed upper respiratory and oral flora, which are considered to be contaminants; and thirdly, those with a large growth ($>10^5$ organisms/ml) of one or more organisms normally found in the colon. This last group are considered to have significant jejunal colonisation and represent about 20–25% of the patients investigated. Incidence will vary according to disease patterns and referral criteria. Contaminant flora were found in 10–15% of patients and there was neglible growth in the remainder. Independent measures of bacterial colonisation are not possible and indirect tests are generally unreliable.[9] Response to treatment with antibiotics in those with jejunal colonisation, however, has been useful clinical confirmatory evidence.

Where some parts of the test are obviously not indicated they can be omitted, but we have found a number of completely unsuspected abnormalities by the routine use of the full test.

The combination of these diagnostic tests into a single investigative technique has proved simple to use and acceptable both to patients and clinicians. In addition it has resulted in considerable savings in investigation time and reduced the numbers of invasive procedures required.

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