Small Bowel Biopsy (Per Oral)

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1. Purpose

Per oral small bowel biopsy is a procedure in which a tube or capsule is passed through the mouth in the small bowel and a piece of tissue is obtained from lumen of small intestine for histological examination to evaluate mucosal structure in patients with malabsorption and or diarrhoea whose disease is suspected to involve the mucosal surface. Since endoscopic biopsies are generally smaller, more superficial, more difficult to orient and traumatized therefore suction biopsies are usually preferred.

A variety of instruments are available for obtaining suction biopsies of small bOwel. Most commonly used are:-

1) Carey capsule.
2) Crosby capsule.
3) Rubin tube or Qumton multi-purpose biopsy tube.

2. Preparation of the Patient

i) Generally a patient should be fasting from midnight before the procedure but a clear liquid may be allowed during the intubation.
ii) Patient is reassured and the procedure explained in simple words.
iii) Sedation is not necessary for majority of patients however a gargle or spray with 4 % xylocaine may facilitate the passage and allay anxiety.

3. Equipments Required

i) A small bowel biopsy capsule or a tube.
ii) A biopsy bottle with 10% formalin as fixative.
iii) Magnifying glass.
iv) A piece of newspaper or monofilament mash about 1 inch square.
v) A 100 ml glass or plastic luerlock syringe.
vi) A 10 ml renograph in or gastrografin in a syringe.
vii) Small beaker with saline.

Carey Capsule

This capsule is assembled simply by inserting spring into inner part of capsule to which mercury bag is tied and then the outer capsule is slided over it and twisted in such a way that the two holes are lined together and two holes of capsule can freely slide over each other (Fig.l).

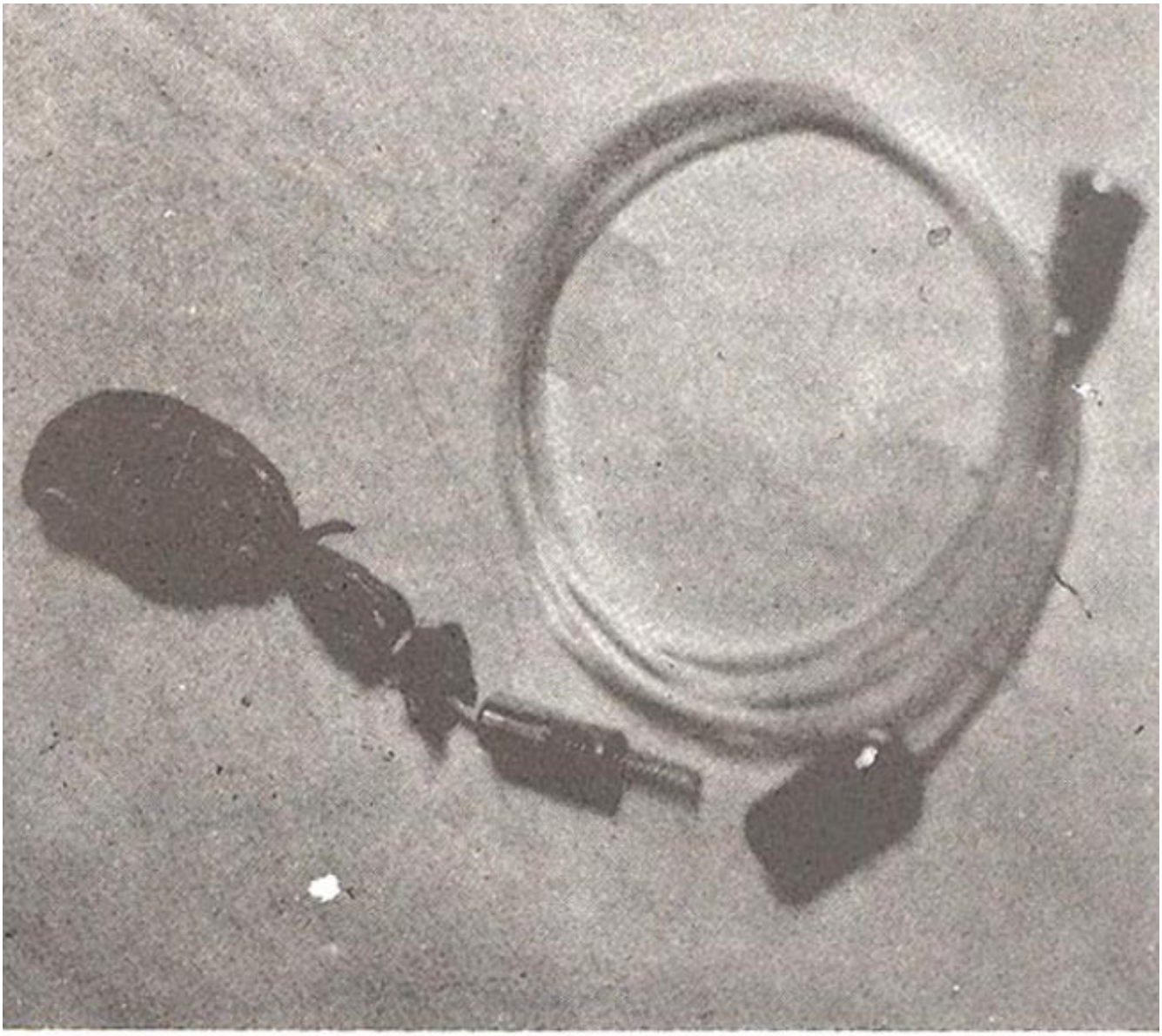

Fig. 1. Carey Capsule.

Biopsy is done while mucosa is sealing the hole and sucked into by suctioning with a syringe. Inner capsule which has a knife sharp edge slides inside the outer capsule over a slot and thus sucked mucosa is sliced with closure of capsule.

Intubation

1. Patient is seated on edge of the bed.
2. Patient is asked to open mouth with his tongue protruding out; then moistened bag of murcury and capsule are guided with a tip of the finger to the back of the tongue and patient is asked to swallow. If there is excessive gaging while attempting to swallow capsule, a local anaesthetic may be used to gargle or spray to make easier. Patient may be allowed to drink sips of water through a straw to facilitate passage of the capsule.
3. Have the patient swallow approximately 50 cm. of tubing. The intra gastric position of the capsule can be confirmed by listening to the stomach while injecting air through the end of the tubing.
4. The end of the tubing is tied to the patient's clothing at the shoulder with a safety pin,and not by fixing it or taping it to the face.

5. Have the patient lie on left side and advance the tube approximately 20 cm. more at the rate of 2.5 cm. every five can be further facilitated by encouraging the patient to take sips of water or tea. Then allow the patient to sit up for few minutes and then intubation continued with patient on right side. This can be greatly facilitated by injecting 5 to 10 mg. of metaceoprarnide intravenously.
6. Patient is then transported to x-ray department where the position of the capsule and mercury bag is checked fluoroscopically, to see whether the capsule had advanced out of stomach to ligament of treitze or not. Tubing may be made visible by injecting 5 ml. of gastrografin or renographin. After using the contrast the tube must be flushed immediately with 10 ml. of water to prevent clogging of the tube.
7. Usually capsule is positioned at the liganient of treitze.
If the capsule and mercury bag have not passed through the pylorus into the small intestine return the patient to lying on right side and sipping clear liquid. At times it helps to make the patient walk for several minutes.

II Biopsy

After the capsule has reached the desired location, patient is asked to lie in supine position with the head resting conifortably on a pillow, a 100 ml. syringe with 20 ml. of normal saline is attached to the end of the tube and capsule is irrigated with saline to push out any debris.

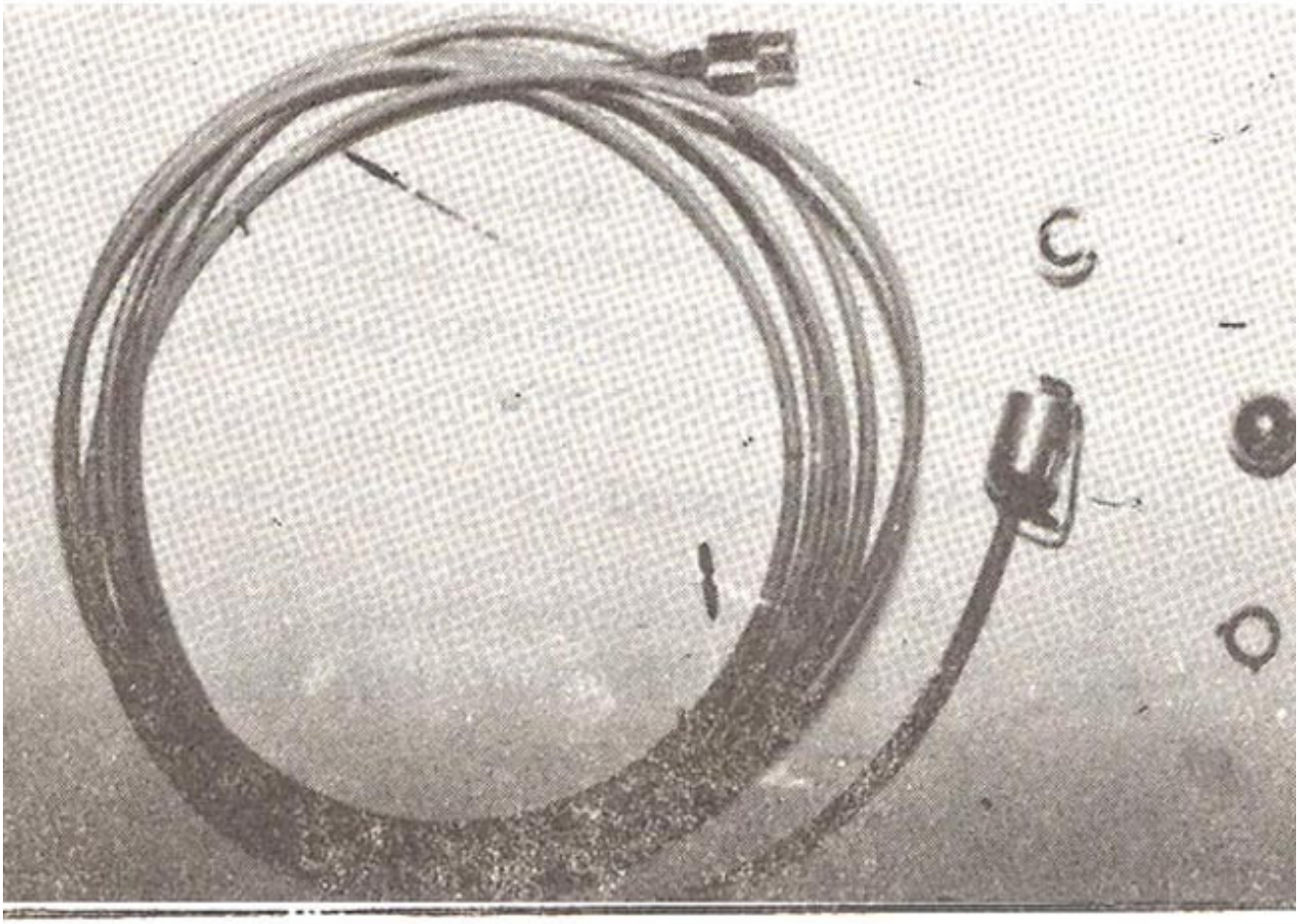

Fig.2. Crosby Capsule.

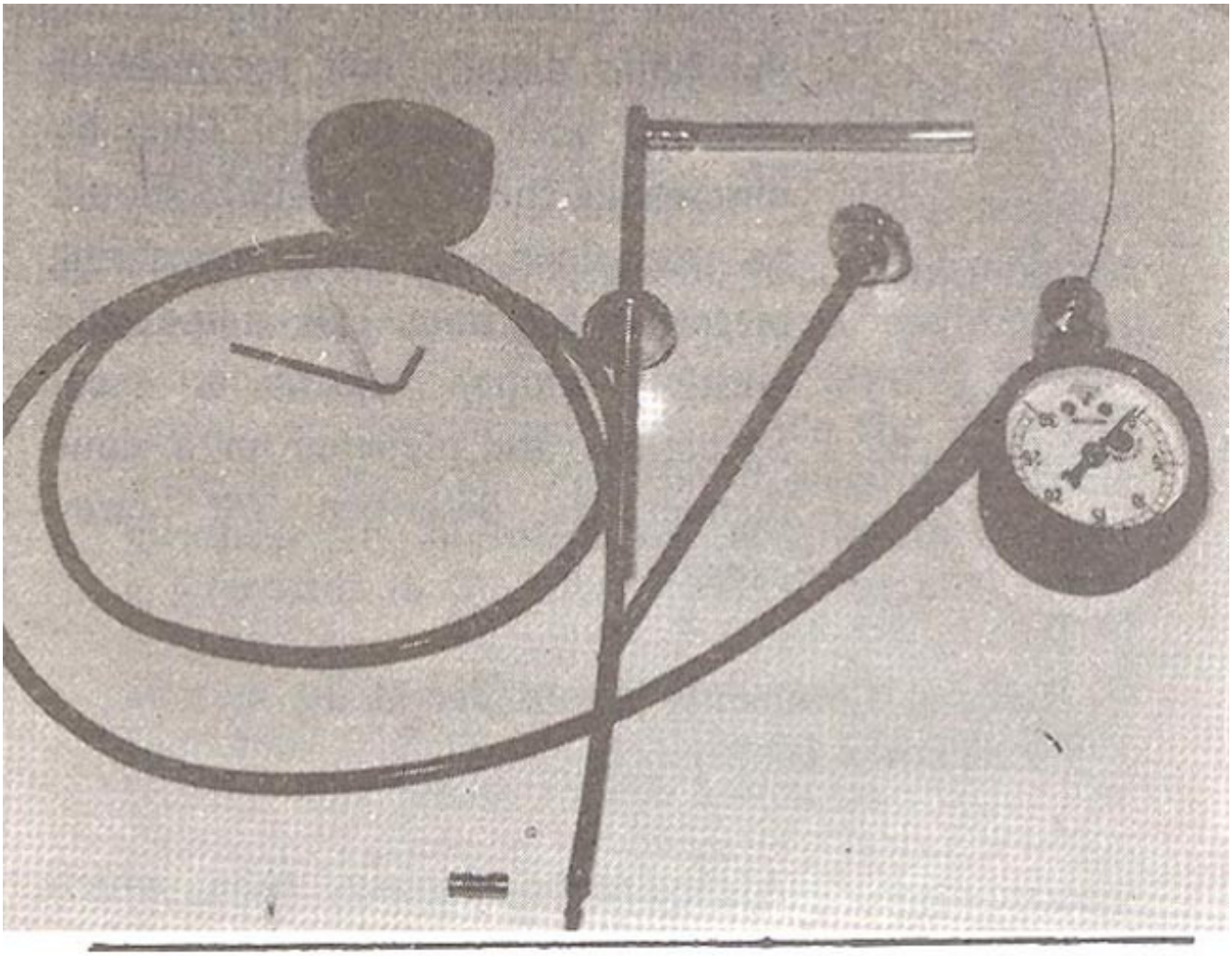

Fig. 3. Multi-purpose (Rubin) biopsy tube.

3. Now physician applies suction with 100 ml. syringe while suction is still maintained; assistant withdraws the tubing and capsule. As capsule is retrieved, it is quickly dried with blotting paper and twisted open exposing the syringe, biopsy is usually seen adhering to it. Specimen is washed with a jet of water from a syringe into a cup and then by placing it at the tip of finger it is oriented with the help magnifying glass and then adhered to piece of paper with cut surface stuck against it and villi facing up. Great care must be exercised to avoid any damage to villous surface of the biopsy specimen.

(C)vsby Capsule

(A) Instrument

1. Crosby capsule is very similar in appearance and action to the Carey capsule.
2. However, it is more complex and difficult to assemble.
3. It has same disadvantage of a single hole.
4. It contains a spring activated knife block. Like carey capsule it is triggered by suction that draws the,biopsy specimen into the capsule. Once the knife has been triggered further attempt at biopsy is not possible until the capsule has been removed and spring mechanism re-set.

B) Intubation

Intubation procedure is identical to that described for carey capsule.

(C) Biopsy

The biopsy specimen is obtained by suctioning the end of the capsule tubing with to 20 ml..syringe and

then withdrawing the capsule. Specimen is similarly handled and placed in a fixative, after orientation (as described above) immediately.

Multi purpose biopsy tube which is available in variable sizes and number of holes in its capsule can be used to do biopsy of esophagus, stomach, small bowel or rectum.

(A) Advantages

1. This multi-purpose biopsy tube can take multiple biopsies at the same time thus increasing chances of diagnosis in diseases with patchy involvement.
2. Tube is radio-opaque so it can be seen easily on fluoroscopy.
3. Multiple attempts at biopsy can be made without removing the tube.

(B) Disadvantage

Tube has to be passed under fluoro guidance.

(C) Instrument and Its Preparation

1. Instrument utiises suctioning by a syringe to grow mucosal biopsy specimen into the capsule. The knife blade is attached to a pin wire which runs through flexible vinyl cover tube. To the side of stationary handle is attached a pressure gauge to which a syringe is applied to attain optimum suction pressure. A mercury bag is tied at the tip of the capsule like other capsules. Further detail of assembly of this multiple purpose tube is described in its manual that comes alongwith it.

(D) Intubation

1. Knife blade should be pulled close and handle taped in this position before intubating the patient. Intu bation procedure is same as for Carey capsule however less dependent upon gravity and paristalsis. Thus instrument may be advanced at a faster rate specially under .fluoroscopy to the gastric antrum and then guided directly into the duodenum. Radio opaque vinyl tubing needs no gastrographin to visualized position of the capsule.

(E) Biopsy

1. Patient lies on side with head resting comfortably on a pillow.
2. A 50 or 100 ml. luerlock syringe is attached to calibrated vacuum gauge; this is attached to the lateral arm on stationary handle.
3. The knife blade is push open and few ml. of air is pushed to ensure tube patency. Then suction is applied with syringe and the desired suction pressure is maintained for four seconds, and knife is gently but briskly closed.
4. Instrument is withdrawn with knife closed.
5. Capsule aperture is open by pushing the knife distally and specimen is removed with needle tip. Then by unscrewing the capsule inside should be examined for any remaining pieces of specimen this is specially multiple biopsy capsule is used.
6. Specimens are prepared in a same manner as described for carey capsule.

General Comments About Per Oral Small Bowol Biopsy

1. A hydraulic biopsy tube which permits retrieval of specimen while the tube remains in place in small intestine and which, unlike other tubes can be passed into distal small intestine is available. However biopsy with this tube has been associated with substantially great incidence of complications including bleeding and perforation specially after ileal biopsy, as reported by Dobbins and Trier[2].
2. Before suction biopsies are obtained, a careful history to exclude bleeding tendency, prothrombin time, partial thromboplastin time, platelet count should be obtained.
3. Patient should be instructed to avoid aspirin for 4 to 5 days before the procedure.
4. Small bowel biopsy can be of diag. nostic value in following conditions:

(i) Celiac sprue (ii) Whipple's

(iii) Abetalipoproteinemia.

(iv) Agammaglobulinemia[3,4]

5. In following conditions since the disease is not uniformly involving lumen, if biopsy includes the

effected tissue it may be diagnostic.
(a) Intestinal lymphoma
(b) Intestinal lymphangiectasia
(c) Eosinophilic enteritis
(d) Amyloidosis
(e) Regional enteritis if croasting granuloma is
(f) Parasitic infestation
(g) Systemic mastocytosis[3,4].

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