

A METHOD OF TEMPORARY ISOLATION OF THE GALL BLADDER AFTER FORMATION OF A FISTULA IN CHRONIC EXPERIMENTS *

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To study absorption in the gall bladder in chronic experiments on animals, a fistula is made from the gall bladder and the organ is isolated from the biliary passages. Metal (silver, neusilber, aluminum), or hard plastic tubes are usually used for forming the fistula. All these methods have disadvantages, the most important of which is that these cannulae require the gall bladder to be brought close to the abdominal wall, so that the organ has to be taken from its natural bed and its neurovascular and lymphatic connections with the liver disturbed. If hard cannulas remain in the gall bladder for long periods, they ulcerate the tissues and cut out.

Reports have recently been published [4] of the use of soft plastic tubes for the fistula (PVC, polythene).

During the study of absorption from the gall bladder after formation of a fistula, the organ is isolated in one of two ways: by ligating the cystic duct (total isolation) or by introducing an obturating catheter through the fistula tube into the cystic duct (temporary isolation [1,3]).

Both methods have their disadvantages. In the first method the entry of bile into the gall bladder is completely halted, so that functional and morphological changes may develop in its walls. This method, moreover, is unsuitable for studying absorption of the components of the bile, for it is essential to have a donor animal. The second method, in our opinion, is unreliable, for during a contraction of the gall bladder, or after introduction of a test fluid into it, pressure is created and may be sufficient to push the contents of the gall bladder past the obturating catheter into the duodenum.

We therefore attempted to develop an improved method of forming a fistula in the gall bladder and isolating the organ in dogs during chronic experiments.

There are reports in the literature of the presence of accessory cystic ducts in dogs, which must be ligated when the gall bladder is isolated [3]. We accordingly investigated the existence of these ducts. In the course of numerous anatomical and roentgenological investigations we found no case of accessory cystic duct, confirming the observations of other writers [2, 5, 6]. We therefore avoided displacing the gall bladder from its bed.

The combined cannula which we developed for the study of the processes taking place in the gall bladder consists of a fistula tube, a loop-shaped obturator, and an outer aluminum or Plexiglas container with a screw cap (Fig. 1).

Instead of a metal or hard plastic fistula tube, we used a PVC tube (mark PM-1) with an internal diameter of 3-4 mm, having a disk at one end. These tubes are elastic, chemically inert, and nontoxic. During the operation the disk of the elastic cannula is introduced into the fundus of the gall bladder and fixed by a double purse-string suture, which ensures secure fixation of the tube to the bladder wall. The length of the fistula tube depends on the distance between the gall bladder and the abdominal wall.

The loop of the obturator, made of thin (1.0-1.5 mm) PVC tube, is passed with a ligature needle beneath the cystic duct 1.0-1.5 cm from the neck of the gall bladder. The obturator lies freely around the duct. The ends of the

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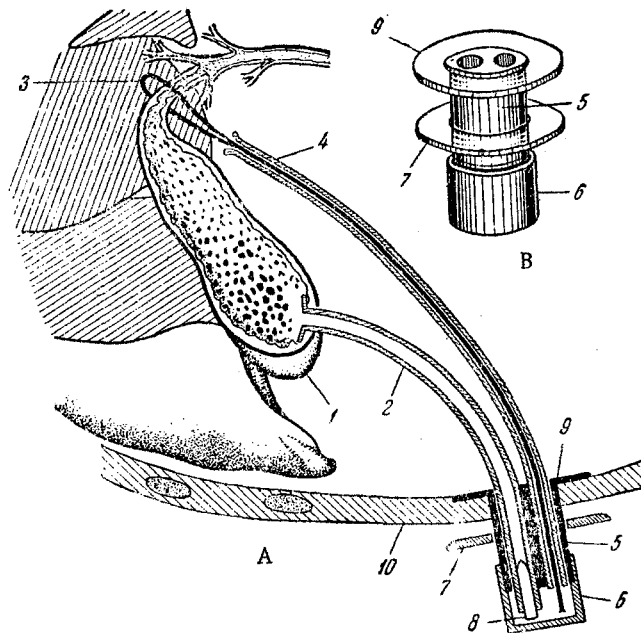


Fig. 1. Scheme of the position of the cannula in the abdominal cavity and general view of the outer container. 1) Gall bladder; 2) fistula tube; 3) loop of the obturator; 4) obturator tube; 5) outer container; 6) screw cap; 7) outer Plexiglas disk; 8) stopper, closing the fistula tube; 9) inner Plexiglas disk; 10) abdominal wall.

obturator are placed into a PVC tube with a diameter of 4-5 mm, so that they cannot move freely about in it. The obturator is slightly longer than the distance between the cystic duct and the abdominal wall. The fistula tube and the obturator, by virtue of their elasticity, lie in a convenient position in the abdominal cavity and stimulate proliferation of connective tissue.

The fistula tube and obturator tube are placed in a metal (aluminum with a Plexiglas disk at its inner end) or entirely Plexiglas container, which has two separate channels for this purpose. The external diameter of the container is 14-16 mm, and its length 35-40 mm. The outer part of the container is brought out through an additional incision below the right costal margin. This part of the container is threaded and is covered with a cap to prevent the fistula tube and the obturator from damage by the animal. A cylindrical bile receiver, which we made from celluloid, can also be screwed on to the same thread.

The cannula may be sterilized by boiling or by placing it in disinfectant solutions.

Experiments are started 12-14 days after the operation. The gall bladder may be isolated at any time for the period required by the experiment, by kinking the cystic duct by pulling on the obturator. Except when the cystic duct is kinked by the obturator, bile flows freely into the gall bladder.

This method of temporary isolation of the gall bladder after fistula formation has been proved in special experiments under roentgenological control (Fig. 1), and it may be recommended for the study of absorption in the gall bladder, excretion from the gall bladder, etc.

In our opinion, the advantages of the suggested method include the preservation of the connections between the gall bladder and the liver, and the provision of reliable isolation of the gall bladder. In addition, bile may be obtained from the same animal as is being used for the study of absorption, and the use of a screw-on bile receiver means that bile can be collected from a dog that is not confined to the laboratory bench.

SUMMARY

A combined cannula for the gall bladder fistulization and its temporary isolation in chronic experiments on dogs is suggested. It may be recommended for studying absorption, excretion, etc. The cannula consists of elastic polyvinyl-chloride tube and a looplike obturator placed into an external protective aluminum or Plexiglas casing

with a screwed-on cap. Temporary isolation is carried out by flexion of the duct by pulling the obturator. During the rest of the time, the bile flows into the gall bladder without any obstruction. To collect the bile a cylindrical celluloid bile-receiver is screwed-on the protective casing.

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All abbreviations of periodicals in the above bibliography are letter-by-letter transliterations of the abbreviations as given in the original Russian journal. *Some or all of this periodical literature may well be available in English translation.* A complete list of the cover-to-cover English translations appears at the back of this issue.
