TABLE IV.
Ascorbic Acid Values in mg. per cc. Plasma.

| Subject | D.N. | I.L. | V.W. | J.D. | J.F. |
|---|---|---|---|---|---|
| Tungstic Acid Filtrate Ascorbic Acid in reduced form | 0.422 | 1.346 | 1.010 | 1.262 | 0.926 |
| Trichloracetic Acid Filtrates after $H_2S$ reduction Total Ascorbic Acid | 0.802 | 1.683 | 1.978 | 1.569 | 1.123 |

These data show no constant relationship between reduced and total ascorbic acid values in the various plasma samples.

In conclusion, we wish again to state that this method is presented with full knowledge that it estimates only that portion of ascorbic acid occurring in plasma in the reduced form. It requires but small amounts of blood, and as far as we have been able to determine to date, accurately indicates the nutritional state of the body relative to Vitamin C.

We wish to acknowledge our indebtedness to Merck and Co., Inc., for a grant supporting this investigation, and to Miss Elizabeth Smith for technical assistance.

## 8206 P

## Studies on Non-bacterial Cholecystitis. A Non-Traumatizing Technique for Study of Chemical Cholecystitis.*

H. G. ARONSOHN AND E. ANDREWS.

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To produce an experimental cholecystitis from which conclusions can be drawn concerning human cholecystitis, 3 basic postulates must be fulfilled. First, the cholecystitis must be a direct result of the material used, and not even partially due to an inherent defect in the technique. Second, the material introduced must be such as is normally found either in the body fluids or in the ingested food, and should not be artificial and foreign to the body. Third, the reaction produced in the gall-bladder by this material must be similar in appearance to human cholecystitis.

The ideal method for introducing any substances into the gall bladder is by way of its natural passages, *e. g.*, the common duct.

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This is possible by leading a catheter up into the gall bladder through an opening in the common duct as close to the duodenum as possible, to avoid any manipulation of the gall bladder. To reestablish a rather normal flow of bile, a glass cannula can be fixed in place in the common duct at the point of the opening.

The detailed technique is as follows: The experiments were performed on dogs under ether anesthesia. The abdomen is opened by a midline incision, and the duodenum lifted aside, exposing the common duct. The latter is freed from the surrounding tissue and an untied ligature put around the distal end. An unfolded sponge is inserted under the duct, thus isolating it from all surrounding structures and preventing any bile from flowing on to the peritoneum through the opening which is made. A longitudinal incision about 1 cm. long is now made in the common duct about 1.5 cm. from its entrance into the duodenum, the margins of this opening then being clamped on each side by a moskito forceps. A soft, French rubber catheter, 2.5 to 3.5 mm. in diameter, depending on the width of the duct, is introduced through this opening into the gall bladder. As much bile as possible is then aspirated by means of a syringe attached to the end of the catheter, and an equal amount of material is injected. To prevent a back flow of bile through the opening in the common duct while the catheter it being drawn out and the glass cannula inserted, it is necessary to clamp off the common duct for a short time during this process. This can be done very gently by making use of a rubber-protected clamp, placed as close as possible to the gall-bladder, to allow room for the cannula to be inserted.

The glass cannula which was used is 3 cm. in length and 4 mm. in diameter, tapering at each end and grooved a short distance from the tips on each side. The cannula is gently introduced through the duct opening and is so set in place that the central bulging portion, between the 2 grooves, is visible through the opening. The previously inserted ligature is then tied in place over the distal groove of the cannula and another ligature tied around the proximal grooved surface. The cannula is now held tightly in place. After unclamping the duct and observing a normal flow of bile towards the duodenum, the edges of the opening are sutured together above the cannula.

The above procedure is carried out without any difficulty in 60-70% of the cases. The entire process, including the introduction of the cannula, can be accomplished in 20-25 minutes, without even bringing the gall bladder into view, thus assuring freedom from

traumatization. In about 20% of the cases, however, it is not possible to introduce the catheter successfully into the gall bladder without special manipulation. If the catheter encounters any great resistance about 6-8 cm. from the opening in the duct, it is fairly certain that it has entered one of the hepatic ducts. The catheter should then be withdrawn, and the particular hepatic duct clamped off. This procedure usually allows the catheter to proceed in the right direction, *i. e.*, into the gall bladder.

Control experiments were run to show that the technique of this operation does not produce any reaction or traumatization in the gall bladder. In some cases, bile was aspirated and nothing was injected, while in others saline was injected through the catheter as a control. In all instances, there was a complete absence of reaction in the gall bladder.

In summary, this operation can be accomplished in 60-70% of the cases without any traumatization, as the technique is quite simple. In 20% of the cases, there is necessary a special skill on the part of the surgeon which, too, can be quite readily mastered. The operation cannot be accomplished in only a very few per cent of cases, in which the common duct is too fine for even the smallest catheter to be introduced.

8207 P

## Studies on Non-Bacterial Cholecystitis. Protein Injection into Gall Bladder and Reaction of Gall Bladder in Anaphylaxis.*

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In spite of the previous failure to find a correlation between the nitrogen content of the gall bladder and cholecystitis, it was thought advisable to approach the matter experimentally by increasing the nitrogen content and observing the effects. This was done by the injection of egg albumen.

Fifteen dogs were operated upon. The egg albumen solutions used were first the undiluted white of egg and second, a 6% solution in Ringer's of crystalline purified egg albumen. They were injected either directly into the gall bladder cavity or into the wall. In 9 of

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