10 per cent. ; in 346 operations with local anaesthesia it was only 2 per cent.

In operations on the gall-bladder general narcosis was still preferred by most surgeons ; if the patient demanded narcosis the operation was begun under nitrous oxide, while a regional anaesthesia of the abdominal wall and an injection of the hepato-duodenal ligament was made, or splanchnic anaesthesia was used. In all other patients the operation was begun under local anaesthesia of the abdominal wall and paravertebral or splanchnic anaesthesia added. In eighty-nine plain cholecystectomies under general narcosis there were seven fatalities (two from gastro-intestinal atony), whereas in 333 under local anaesthesia the mortality was 0.6 per cent. Cases of common duct obstruction were always operated on under local anaesthesia. There was no death from liver insufficiency.

In cases of acute intestinal obstruction deep narcosis lowered the blood pressure, and therefore easily caused collapse, while the intestinal paralysis was increased. Spinal anaesthesia counteracted intestinal paralysis, and had been recommended for the treatment of ileus, but it produced a dangerous fall in blood pressure. In every case he opened the abdomen under local anaesthesia and used a short ether narcosis at the moment of searching for the obstruction ; the further operation was done under local anaesthesia. In all cases the blood pressure was raised by pituitrin and intravenous saline infusion immediately before operation. The mortality was much less (116 cases, 16.3 per cent.) than in hospitals where general narcosis was the method of choice. The statistics he had collected proved this statement.

In resection of the stomach local anaesthesia and mesenteric anaesthesia, splanchnic anaesthesia, or basal hypnosis, were replacing general narcosis. In resection for cancer he had used splanchnic anaesthesia in 273 cases, mesenteric anaesthesia in 148. In some of these

cases small quantities of ether were given besides. The mortality was much less under local anaesthesia ; this was true also of resections of the stomach for ulcer, and of the radical operation for gastro-jejunal ulcer. In 134 patients between 60 and 78 years of age operated on under local anaesthesia three had died (2.2 per cent.), whilst in 1,196 younger patients the mortality was 4.1 per cent.

In resection of the colon general narcosis was still regarded as the method of choice ; some surgeons operated under spinal anaesthesia. He himself operated exclusively with local anaesthesia, and applied, when mobilizing the colon, either a short ether narcosis or paravertebral anaesthesia. No post-anaesthetic atony had been observed which would cause leakage of the suture by over-dilatation. With local anaesthesia the results of the operation could be considerably improved. If the bowel were sufficiently evacuated one-stage resection of the left colon could be performed. In resection of the colon for tuberculosis, megacolon, colitis, etc., results of the one-stage resection were good (ninety-seven resections with three fatalities). Also in the operation for cancer the one-stage resection, even of the left side of the colon, might be done if the bowel were empty. His mortality in forty-one one-stage resections was 11.9 per cent., whilst Nordmann reported a mortality of 28 per cent. with general narcosis. By using local anaesthesia he could operate with success on highly advanced cases which had already been refused operation by other surgeons who preferred general anaesthesia.

Abdomino-sacral resections of a high cancer of the rectum had a high mortality from shock and infection. Up till 1922 he performed that operation under general narcosis with a mortality of 31 per cent. Since then he had operated under combined parasacral anaesthesia. Mortality was reduced to 15.7 per cent. in fifty-seven cases.

ORAL CHOLECYSTOGRAPHY: THE CUMULATIVE METHOD

BY

JOHN H. ANDERSON, C.M.G., C.B.E., M.D.

PHYSICIAN, RUTHIN CASTLE, NORTH WALES

AND

O. A. MARXER

RADIOGRAPHER, RUTHIN CASTLE, NORTH WALES

Cholecystography has now taken its place as a routine method of examination in cases where the biliary system is thought to be at fault. The test consists in the giving, either by the mouth or by intravenous injection, of a medium, generally known as "the dye," which is opaque to x rays when concentrated in the gall-bladder.

SOME FALLACIES

Inability to obtain a shadow is, as a rule, a sign of improper function, the most usual cause of which is gall-bladder disease, past or present. Most radiologists will agree, however, "that the gall-bladder may not be visualized even after the intravenous injection of the dye in certain conditions in which there is no reason to suppose that the organ is actually the seat of disease."¹ Simple enlargement of the liver, malignant growth in the right upper quadrant of the abdomen, pregnancy in its later months, perforated duodenal ulcer, acute disease (general or abdominal), and temporary kinking of the cystic duct are some of the conditions likely to produce this somewhat contradictory result. Again, the gall-bladder shadow may be late in appearing, and in conse-

quence may be missed. Graham regards this as being due to any parenchymatous condition of the liver which retards the excretion of dye.¹ Further, in 1928, W. W. Boardman² pointed out that it was possible for a gall-bladder not to fill at a first test, and to give a good shadow some weeks or months later although conditions had remained unchanged in the interval. This observation has been noted by others.

The position is, then, that a gall-bladder which is not producing symptoms may fail to fill or may give no shadow at one time and show a normal one later. "Non-filling" is generally recognized as the most important indication of gall-bladder disease, but it is also a sign which presents a definite margin of error, and, unless this point is borne in mind, mistakes in interpretation may arise. It is for this reason that one of us (J. H. A.) has advocated persistently the consideration of the case as a whole before surgery is advised, together with the repetition of the test in all doubtful cases,^{3,4} a contention strongly supported by B. R. Kirklin in a recent paper.⁵ How and when should the test be repeated? Rolleston and McNee⁶ hold that "failure to fill" after oral administration of the dye "indicates merely the . . . necessity of an intravenous test." With this we cannot agree.

ADVANTAGES OF CUMULATIVE TEST

Early in 1929, when testing keraphen (the form of dye used at Ruthin Castle), it was found, in a supposedly normal case, that the gall-bladder did not fill at the first attempt. When the test was repeated forty-eight hours later a good shadow resulted. Last year Sandström⁷ described a new method for giving the dye in oral cholecystography. He argued that as the contrast medium,

owing to its slow elimination, is held in circulation for some time, a cumulative effect can be obtained if the dye be given in divided doses. In a relatively large number of cases in which by the old method no filling at all, or only a thin shadow difficult to interpret was obtained, renewed examination resulted in a much better contrast filling—thus establishing the diagnosis. This paper, coupled with our own experience, led to a modification of our routine procedure, which is now as follows:

The usual dose of dye, graduated to the size of the patient, is given by the mouth at 8 p.m., and the first radiograph is taken at 8 o'clock the next morning. The film is examined as soon as possible, and, if the gall-bladder has failed to fill or has filled so poorly as to call for a repeated test, a special breakfast is given, omitting yolk of eggs in any form and reducing the fats. The same precautions are observed at lunch and tea, and at 8 p.m. the test is repeated, three-quarters of the previous amount of dye being used. In addition, 5 grains of Dover's powder are given an hour after the dye on each night.

In the last hundred cholecystographies the cumulative test has been done eleven times, and the results may be summarized as follows. Of nine cases which did not fill at the first test, two did not fill at the repeated test, three filled poorly, and four filled well; in addition, suspicious shadows were seen in three cases and a bilocular gall-bladder in one after the cumulative filling. Of the two cases which filled poorly at the first test one filled poorly the second time and the other gave a good shadow. The series included six men and five women, their ages varying from 29 to 73 years. Fuller details are set out below.

Table of Results

Case No.	Screening	First test	Second test	Emptying	Remarks
1	Neg.	D.N.F.	F.W.	Slow	
2	Faint Shadow	D.N.F.	F.P.	Normal	Tender over gall-bladder
3	Neg.	D.N.F.	F.W. Ringlets	Normal	Attacks of pain right hypochondrium with fever and vomiting
4	Neg.	D.N.F.	D.N.F.	—	Intermittent light jaundice, bile in urine
5	Neg.	F.P.	F.W.	Normal	Attacks of pain in right hypochondrium with sweating
6	Neg.	F.P.	F.P.	Slow	
7	Neg.	D.N.F.	F.W.	Slow	
8	Neg.	D.N.F.	F.P. Ringlets	Slow	
9	Neg.	D.N.F.	D.N.F.	—	Intermittent nausea and flatulence
10	Neg.	D.N.F.	F.P.	Normal	History of jaundice. Pain and tenderness in gall-bladder region
11	Neg.	D.N.F.	F.W. Bilocular gall-bladder	Slow	Stools light-coloured

D.N.F. = Did not fill. F.W. = Filled well. F.P. = Filled poorly.

SUMMARY

1. There are certain dangers in regarding as pathological a gall-bladder which fails to give a shadow after a single cholecystography, oral or intravenous.
2. Eleven cases are quoted in which cumulative filling by the oral route was carried out.
3. The method employed gave added diagnostic information, and did not increase the reaction on the part of the patient.

REFERENCES

- ¹ Graham, E. A., Cole, W. H., Copher, G. H., and Moore, S.: *Diseases of the Gall-bladder and Bile Ducts*, 1929, London, Ballière, Tindall and Cox.
- ² Boardman, W. W.: *Amer. Journ. Med. Sci.*, September, 1928, p. 383.
- ³ Anderson, J. H.: *Clinical Interpretation of Aids to Diagnosis*, vol. i, 1930, London, The Lancet, Ltd.
- ⁴ Idem: *Medical Annual*, 1930, Bristol, John Wright and Sons, Ltd.
- ⁵ Kirklin, B. R.: *Amer. Journ. Roentgen.*, May, 1931, p. 595.
- ⁶ Rolleston, Sir Humphry, and McNee, J. W.: *Diseases of the Liver, Gall-bladder and Bile Ducts*, 1929, London, Macmillan and Co., Ltd.
- ⁷ Sandström, Carl; *Acta Radiologica*, 1931, xii, 8.

Memoranda

MEDICAL, SURGICAL, OBSTETRICAL

MODIFICATIONS OF LINE RATION DIABETIC DIET

As the above diet is fairly widely used in this country it seems advisable to mention certain changes now introduced in the direction of increasing the carbohydrate. When the scheme was first introduced in 1924, the carbohydrate was high in comparison with other diets of that time. Since then the general tendency has been to increase carbohydrate, especially in insulin cases, and I have done so in my practice by prescribing more carbohydrate portions than protein and fat portions. The present modification introduces this change without affecting the essentials of the scheme.¹

The carbohydrate content of each portion has been doubled, so that each Line now contains 10 instead of 5 grams of carbohydrate. The protein and fat of the Red portions have been kept the same. The factors by which the desired number of calories is obtained are slightly changed. Also several vegetables which used to be weighed have been included among the list of "negligible carbohydrate" content, as they do not contain enough starch to upset the balance between the rest of the carbohydrate, now raised in amount, and the insulin. This "negligible carbohydrate" is likely to amount to some 10 to 15 grams carbohydrate per day spread over the various meals. Although the carbohydrate prescribed has been increased, this has not been raised to the high amounts (200 or 300 grams) sometimes used nowadays. If really high carbohydrate diets seem desirable, the present scheme can be used by prescribing more carbohydrate (Black) than protein and fat (Red) portions. Where it seems advisable to add carbohydrate without increasing calories, the latter can be kept the same by cutting out 1/2 oz. of fat for each three Black portions added. In cases where it is more suitable to continue diets containing the lower carbohydrate of the previous scheme, this can be done by prescribing half or fewer Black than Red portions.

The examples and recipes in *The Diabetic A B C*² have been revised to conform with the above changes.

R. D. LAWRENCE, M.D., F.R.C.P.
Physician in Charge Diabetic Department,
King's College Hospital.

HERPES ZOSTER AND VARICELLA IN THE TROPICS

The relation between herpes zoster and varicella is a very interesting one and recently much attention has been focused on this subject. The available evidence has been well summarized by Brain.³

In the British Solomon Islands I have recently come across two examples of cases of herpes giving rise to cases of varicella. There are two factors which lend interest to the study of the epidemiology of any infectious disease in an isolated place like this. In the first place we have a small population scattered over many different small islands, and the route of infection in any given epidemic is usually easy to trace. In the second place we are dealing with a population which has not acquired any immunity to our common diseases during childhood. During five years' residence here I have seen epidemics of measles, acute poliomyelitis, whooping-cough, and varicella. In all epidemics except whooping-cough the adults

¹ *The Line Ration Scheme*. Messrs. Lewis and Co., 1932.

² *The Diabetic A B C*. Messrs. Lewis and Co., 1932.

³ Brain, W. Russell: "Zoster, Varicella and Encephalitis," *British Medical Journal*, 1931, i, 81.