It has been shown in many cases of sterility, without actual complete occlusion of both tubes, that normal pregnancy has followed the injection of Lipiodol. It is probable that the iodine has a stimulating effect.

Important points in the technique of such cases are—

(1) The injection should be done after the 8th to 10th day after the menstrual period.

(2) The patient should keep lying down on the table for at least 20 minutes after the operation.

(3) No coitus should take place until six weeks after.

Chronic salpingitis is shown by an irregular distortion of the tube, sometimes with occlusion. Various congenital anomalies such as double uterus or bicornuate uterus are well shown by this method. Early pregnancy is shown by the marked increase in size of the uterine cavity. The attachment of the ovum is always seen as a filling defect in the cavity, the normal triangular outline of the uterine cavity having lost its shape, becoming roughly ovoid.

Uterine tumours.

In certain cases an injection of Lipiodol is of value to show the relation of the uterine cavity or Fallopian tubes to uterine tumours. In such cases radiograms should be taken in several positions. The method is also often of value in demonstrating the relationship of extra-uterine tumours, such as ovarian cysts, to the uterus and its appendages.

Cases have been reported by Béclère and others showing that where a ruptured or frayed endometrium is present, accidental injection of the utero-ovarian blood vessels may take place leading to startling appearances in radiograms. It has been shown, however, by experiments done by Sicard and Forestier both on dogs and on human beings that no harm results in such accidental injections.

5. *Lipiodol in the diagnosis of certain pulmonary conditions.*

It is now almost a routine practice in Europe and America to obtain in all doubtful cases a visualization of the bronchial tree by means of an injection of Lipiodol. This may be done in two ways—

(1) Using a suitable introducer in the form of a direct vision laryngoscope, a thin catheter is passed into the trachea. The patient lies on the side to be examined and the Lipiodol is slowly injected, preferably under fluoroscopic control.

(2) The more usual and better method consists in the passing of a hypodermic needle at the end of a specially constructed syringe into the trachea at the position of a low tracheotomy and then introducing the Lipiodol as before. By this method the bronchial tree is well outlined. Any irregularities such as dilatations of the bronchioles or actual bronchiectatic cavities are well shown.

Other cavities in the lung, abscesses, etc., may be demonstrated. The method may be of extreme value in determining whether or no any opacity seen in an ordinary radiogram has any connection with the bronchial system. Occlusion of the bronchi or bronchioles through any cause can be demonstrated.

6. *Lipiodol in the spinal theca.*

In cases of spinal tumours or of a transverse myelitis whenever we wish to determine the level of the lesion the introduction of Lipiodol is very helpful. It may be introduced in two ways.

(1) By a cisterna magna puncture, or (2) by a low lumbar puncture. In either case the fluid is allowed to gravitate to its final position. Before introducing the Lipiodol a rather greater quantity of cerebrospinal fluid should be allowed out.

7. *Lipiodol used to determine the tracks of sinuses.*

The injection of Lipiodol into sinus tracks, to determine their position and extent, is of great value. It is superior to all other opaque materials used for the purpose, because of its greater permeability and radio-opacity.

NOTES ON THE TREATMENT OF *B. COLI* INFECTION OF THE URINARY TRACT.

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AT the present time when *B. coli* infection of the urinary tract is beginning to be recognised generally, its treatment naturally becomes relatively more important; but it is unfortunate that much confusion exists even among men at the top of the medical profession as regards the correct principles. I resolved therefore to venture to put down the following lines in the hope that it will furnish a useful guide to a few of the readers at least.

The standard treatment for this condition is to give alternate courses of—

(1) Alkaline diuretics containing among other things potassium citrate and bicarbonate. The idea of this is to render the urine alkaline and thus make it an unfavourable medium for the growth of the organisms, which prefer an acid one. This will also be indicated when there is high fever and other constitutional symptoms.

(2) Hexamine. This drug is one of the best urinary antiseptics that we possess and acts by liberating formaldehyde. A knowledge of chemistry tells us that the splitting up of hexamine occurs only in the presence of an acid, and consequently the best results are to be expected when the reaction of the urine is strongly acid. With this object in view acid sodium phosphate (NaH_2PO_4) is given to the patient, as this is the salt which is mainly responsible for the acid reaction of the normal urine. The commonest mistake is to prescribe hexamine and acid sodium phosphate in the same mixture with the

result that the formaldehyde is liberated in the bottle and the patient takes a weak aqueous solution of this. Formalin taken in this way does not exert any antiseptic action on the urinary focus of infection, moreover it is liable to upset digestion. Our aim is to manipulate the two in such a way that the formaldehyde shall be liberated only at the morbid focus, and not while it is in the stomach or circulating in the blood. Hexamine should therefore be given well diluted with water on an empty stomach, so that the hydrochloric acid of the gastric juice has, if any, a minimum action upon it. It is quickly absorbed in the blood and begins to be excreted in the urine in a short time. If a dose of acid sodium phosphate be given about an hour after it, the urine will be rendered acid and as hexamine comes in contact with the acid urine formaldehyde is liberated, and the maximum benefit of the drug is obtained. It is needless to say that a prolonged exposure of the bacteria to the antiseptic effects a more rapid sterilisation, and so hexamine should preferably be given before retiring at night so that it acts in the bladder for a long time.

Coming to the question of dosage, it will probably be safe to start with 30 grains a day in an adult not especially susceptible to it, and then go up to 60 or more grains in 24 hours; but as this drug sometimes gives unpleasant toxic symptoms and irritates the bladder, mainly due to a high concentration of formaldehyde in the urine, it is advisable to test the urine from time to time for the presence of the latter, and as long as this is not present in any concentration the dose can be safely pushed on.

To test for formaldehyde in the urine, dissolve 0.1 gram phloroglucin (Merck) in 10 c.c. of 10 per cent. caustic soda solution: one half c.c. of this added to 1 to 2 c.c. of urine gives a bright crimson red colour at once if the amount of formaldehyde is large; if only a little is present the colour takes 1 to 2 minutes to develop.

PELVIC HYDRONEPHROSIS.

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PELVIC hydronephrosis may be defined as a clinical condition in which there exists a dilatation of the pelvis of the ureter containing a clear fluid.

Ætiology.—Opinion still varies as to the primary factor in the causation of pelvic hydronephrosis, but most authorities agree that it is the direct result of some mechanical obstruction to the outflow of urine from the renal pelvis (9, 24).

A renal calculus held up in the ureter may thus cause pelvic hydronephrosis, but this condition is a rare one and renal calculi are more often found in the kidney tissue itself and associated with renal hydronephrosis (21, 23). A constriction is often present at the ureteropelvic junction or occasionally lower down the ureter which then becomes dilated above it. The constriction usually shows inflammatory changes and this is probably of great ætiological importance (3, 15, 16, 24). Experimental tying of the ureter in animals leads either to pelvic hydronephrosis or primary atrophy of the kidney. The varying result is held to be due to differences in the capsular anastomotic blood supply and the degree of infection (10).

"Congenital hydronephrosis"—a condition in which the constriction shows no inflammatory changes—is probably very rare. In some of the cases reported the diagnosis has, I am convinced, been wrongly made. Because no acquired factor can be discovered, it does not follow that the hydronephrosis is congenital in origin; nor is a hydronephrosis thought to be caused by a so-called aberrant vessel, strictly speaking a congenital one. Irregularities in the fœtal ureter seem to be physiological in post-mortem specimens (2, 5, 14, 24).

Vascular complication of pelvic hydronephrosis is commonly cited as the cause of the condition. Recent work seems to show that the vessel is usually a normal inferior branch of the renal artery which appears anomalous only because the dilating pelvis draws the upper end of the ureter with it so that the vessel comes to lie immediately posterior to the uretero-pelvic constriction (15, 24).

Virchow's view that ureteral inflammation occurred sometimes during intra-uterine life is no longer held. Abnormal renal mobility, kinks and twists of the ureter have not been proved to be the actual cause of pelvic hydronephrosis. Cases of a fold of mucous membrane forming a valve in the ureter have been reported (5, 6, 9, 10, 12, 17, 19, 24). The obliquity of insertion of the ureter in the hydronephrosis is considered by many authorities to be an effect rather than a cause of the condition, although obstruction may occur in the same way as that of an artery by a saccular aneurysm (10, 22, 24). Motor paresis and achalasia may be important ætiological factors but are obviously difficult to demonstrate as such. Pyeloscopy itself probably causes abnormal contraction of the ureteric musculature (13).

Case incidence.—Although there are certainly many undiagnosed cases, the condition of pelvic hydronephrosis is rare; thus there were only 20 proven cases out of 44,000 admittances to Saint Bartholomew's Hospital during the five-year period 1923–27.

Type of patient.—The female sex appears to be affected twice as commonly as the male, each side to be equally liable to develop a hydronephrotic condition and the average age incidence to be 20–30 years (5, 24). Most patients with pelvic hydronephrosis are pale and thin—almost the exact opposite of the renal calculus type. Stone in the urinary