Manipulation is about the only procedure of any value, but it cannot be used indiscriminately. Application of force injudiciously has frequently led to refracture or a new fracture of the patella or avulsion of the tibial tuberosity. Mild degrees of adhesions, whose rupture brings credit to the manipulating surgeon, are rarely seen in this connection, for the extremes of movement which cause reflex spasm and arrest of movement cannot be obtained in the cases which we are considering. More powerful, broad adhesions require successive stretchings rather than breaking down, for their forcible rupture might well result in a massive effusion and hæmorrhage which would vitiate the object in view. In cases of doubt it is certainly well worth trying the effect of manipulation, using considerable force, but bearing in mind the generalized bony atrophy that is inevitably present. Audible snapping of adhesions is satisfactory, and if improvement results after having employed massage for some time, it is perfectly reasonable to try the further effect of another manipulation after some weeks.

I am aware that manipulation is frequently practised, but I would suggest strongly that it is reserved for those cases in which some improvement, however slight, can be expected, and the joint should be made as hyperæmic as possible with moist heat, before the procedure. Its indiscriminate use may result in untold damage; several repeated manipulations are superior to one over-energetic attempt.

Treatment of the established condition is as unsatisfactory as anything a surgeon wishes to see, but if the endeavours and energy expended at the end of the treatment were employed at the early stages of the fracture the medical profession would feel that they have less to reproach themselves with than at the present time.

Practical Points of Diagnosis and Treatment in Surgery and the Specialities.

EXCRETION UROGRAPHY.

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EXCRETION urography is the radiological investigation of the excretory function of the kidneys and of the structure of the collecting portions of the urinary apparatus after the intravenous injection of a suitable radio-opaque substance. The substance generally employed and upon the use of which the following conclusions are based is Uroselectan B, a pyridine derivative with 51.5 per cent. of iodine in close organic combination. Fifteen grammes of the substance dissolved in 20 c.c. of a 10 per cent. solution of invert sugar are injected intravenously. The solution is warmed to body temperature and at least two minutes should be occupied in giving the injection. With these precautions I have observed no untoward local or general reaction following its use.

Excretion urography may be employed in all cases of a suspected urinary lesion where clinical and routine radiographic examination fail to yield sufficient information for an accurate diagnosis. In a large proportion of the cases in which it is employed it will indicate the exact site and nature of the lesion

Indications.

and may obviate the necessity of instrumental investigation. In other cases it will point to the site of, but will not definitely indicate the nature of the lesion. It may indicate what further investigation is necessary to arrive at a final diagnosis. Only in a small proportion of cases will it fail to yield some information of value.

Contra-indications. The only definite contra-indication to its use is where clinical evidence points to a marked renal insufficiency.

No special preparation of the patient is necessary before examination. As far as possible the patient should be examined under his normal conditions.

Preparation of Patient. The administration of purgatives should be avoided as these invariably tend to increase the amount of gas in the intestinal tract which, more than faecal contents, obscures the urinary tract and increases the difficulties of interpretation. There should be no restriction of the amount of fluid taken before examination.

In all cases a radiogram of the entire urinary tract should be taken before infection. The size of film used should be such as will permit one to visualize the entire urinary tract. No compression to the abdomen is necessary during the examination. The exposure of the film with the patient in the Trendelenburg position is usually sufficient to obtain a satisfactory delineation of the renal pelves, calices, and ureters.

Points in Radiographic Technique. A radiogram taken immediately after the completion of the injection will show that both renal shadows are intensified. With a correct radiographic technique the entire renal outline should be visible on both sides in a normal case. The opaque medium appears in the pelvis and calices of

Normal Excretion Urography. one or both kidneys two to five minutes after injection. As a rule it appears in both pelves simultaneously or within a few minutes of each other. Although the pelvis and calices may be incompletely filled. Maximum excretion is obtained in fifteen to thirty minutes, and during this period a satisfactory shadow of the renal pelves and calices, ureters, and bladder will usually be obtained. Visible excretion should be completed in one to one and a half hours. Not infrequently the intramural portion of the ureter is obscured by the opaque medium in the bladder, and in order to demonstrate this portion of the ureter the patient is instructed to empty his bladder immediately a satisfactory picture is obtained, and a further radiogram is made without delay. No definite times can be laid down for taking the radiograms which will yield the maximum information in every case. As a routine, radiograms should be made five, fifteen, thirty minutes and one hour after injection. In some cases additional radiograms should be made according to indications obtained during the examination.

Excretion urography is a valuable method for the localization of renal stone and for the study of the changes secondary to it. It may be employed for the differentiation of extra-renal and intra-renal shadows. In the latter case it will enable one to locate them exactly, whether in pelvis, calyx, or in cortex. By its means it is possible to determine the degree of dilatation of the pelvis and calices due to obstruction by, or as the result of infection secondary to stone. In the case of infection it may show the presence of changes in the ureter, dilatation and constriction of its lumen from periureteric adhesions. The method is extremely valuable for the estimation of renal function in urinary stone. The demonstration of the degree and nature of the pathological changes in the renal pelvis and calices, and the degree of diminution of the excretory function of the kidney as evidenced by the delayed

appearance of the opaque medium in the affected pelvis and calices, and its retention in these structures beyond the normal time limits enables one to estimate the degree of obstruction present and the amount of secreting tissue remaining in the affected kidney. It is thus of particular value in bilateral renal calculus in indicating the advisability of operative interference and to which kidney attention should first be directed.

In cases of suspected hydronephrosis excretion urography has its widest application and should be employed as a routine. It will frequently obviate the necessity for instrumental investigation. In the early stages of hydronephrosis characterised by slight dilatation of the pelvis and effacement of the terminal irregularities of the minor calices, the incomplete distension of the dilated pelvis and calices by this method may result in the visualization of an apparent normal pelvis and calices. Any appreciable discrepancy in the size of the pelvis and calices on the two sides is of greater significance than in retrograde pyelography, and the dilated side should be investigated by the latter method.

In the moderate degrees of hydronephrosis, the changes in the renal pelvis and calices are usually well marked. There is a marked increase in the size of the pelvis and calices, and the pelviureteric angle becomes more acute. In this stage there is no appreciable, or only slight, delay in the appearance of the opaque medium in the pelvis and calices, but there is a considerable retention of the medium in these structures up to six hours. Invariably the opacity in the pelvis and calices on the affected side is unusually dense, due to the retention and concentration of the medium. Occasionally the temporary cessation of secretion may result in no shadow being obtained on the affected side.

In advanced hydronephrosis there is marked delay in the appearance of the opaque medium in the renal pelvis and calices, and these structures may not be outlined until six hours after injection or even later. There is extreme dilatation of the pelvis and calices which are represented on the radiogram by rounded masses of varying density in the renal area. As in the previous stage, no shadow may be obtained on the affected side.

Not infrequently this method will demonstrate the existence of congenital anomalies of the urinary tract which have been unsuspected, and may reveal pathological conditions complicating these congenital anomalies. The conditions which may be demonstrated are those of: (1) partial or complete duplication of the renal pelvis; (2) partial or complete duplication of the ureter; (3) horseshoe kidney; (4) ectopic kidney.

Excretion urography may often be found to be of considerable value in the diagnosis of renal tuberculosis. It is particularly applicable in those cases where, on account of the extreme irritability and small capacity of the bladder, cystoscopic examination is impracticable. In the early stages of the disease, in which the only pyelographic evidence of renal tubercle is the erosion of one or more of the calices resulting in the typical moth-eaten appearance of the affected calyx, the findings must be interpreted with caution, as a similar appearance may result from incomplete distension. In the more advanced cases it will reveal the characteristic irregular dilatation of the pelvis and the dilatation of the major and minor calices, together with the irregular moth-eaten appearance indicative of cortical necrosis. The outline of the ureter may be characterized by marked irregularity, with areas of constriction and

dilatation. These cases invariably show delayed excretion of the opaque medium or complete absence of a pyelographic shadow on the affected side.

In a large proportion of cases of renal tumour no shadow of the opaque medium is visible on the side affected. It will indicate the site of, but may yield no information diagnostic of the lesion. Only in a few cases have I visualized the deformities of the pelvis and calices characteristic of new growth. I have been enabled on three occasions to make a pre-operative diagnosis of solitary renal cyst, the cyst on each occasion being located at the lower pole. The deformity produced is that of compression, elongation and displacement of the renal pelvis and calices, and displacement of the adjacent portion of the ureter towards the middle line.

When routine radiographic examination reveals a suspicious shadow in the course of the ureter, excretion urography affords a convenient means of investigating its nature and its effect upon the kidney. If the shadow in question is a ureteric calculus, it will be completely included in the shadow of the ureterogram. Nodular dilatation at the site of the stone is frequently present, and the degree of obstruction caused by the calculus or a superadded inflammatory process may be determined by demonstrating the degree of dilatation of the ureter, pelvis and calices and the diminution of the excretory function of the kidney. It is also of value in showing to what extent a dilated ureter and pelvis will recover after the passage or removal of a ureteric calculus.

In lesions of the lower urinary tract, i.e., lesions distal to the uretero-vesical junction, excretion urography is of limited value, and should only be employed when the other methods of investigation are impracticable. By its means it is possible to determine the opening of a normal ureteric orifice into a vesical diverticulum; to demonstrate the presence of vesical diverticula and growth. Its chief application is, however, to demonstrate the presence of back pressure resulting from obstructive lesions of the lower urinary tract.

SEX DETERMINATION.

W. McK. H. McCULLAGH, D.S.O., M.C., F.R.C.S.

THE sex of the coming child is of intense interest to the expectant mother, but as yet we can give her no very definite information. The normal sex ratio in England and Wales is 103·9 males for 100 females. It varies but little in different countries. It rose slightly to 104·6 in the war decade.

It is now generally believed that the sex is decided at conception and that the male semen consists of two groups of spermatozoa—male producing and female producing—the difference being that they have a different number of chromosomes—the male-producing sperm 11, and the female-producing sperm 12.

At fertilization which takes place in the tube twenty-four hours after coitus, the sex is decided by whether the ovum is fertilized by a male or female-producing sperm.

This journey of twenty-four hours, travelled at the rate of 1 cm. an hour, is the means of separating the two groups of sperms and the deciding factor of sex is the presence or absence of the female orgasm.