

blanks or by special investigations. One year's experience in securing this information in half a dozen states should indicate whether the standard schedule now in preparation is practicable for general use among physicians. Already, in several states, information of great significance has been secured by state authorities under this law, and individual physicians as well as boards of health are preparing for the study and prevention of occupational diseases.

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## THE VALUE OF PYELOGRAPHY \*

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Accuracy in diagnosis in the urinary tract is largely due to experienced interpretation of cystoscopic and radiographic findings. Although both the cystoscope and the radiograph are of individual value, we are learning to recognize that neither method is complete without the data obtained from the other. Recently we have discovered that the union of the two methods in simultaneous examination has given us a new and valuable field for diagnostic data. This latter method is known as pyelography and consists of the injection of an opaque fluid substance into the ureter and renal pelvis followed by immediate radiography.

During the past three years, at the Mayo clinic, St. Mary's Hospital, we have employed the radiograph of the injected urinary tract in over 500 cases and have come to regard it as a valuable and frequently necessary aid in arriving at the correct diagnosis of conditions in the urinary tract. Its wide-spread adoption as a diagnostic aid seems to have been hindered largely because of a lack of technical facilities and of experience on which the success of the method depends. Objections to its use have been raised on the grounds that it was a dangerous and painful procedure. While the method may occasionally be painful unless carefully employed, it has never, in our experience, caused any permanent injury. Although pyelography should not be used indiscriminately, there is no objection to its correct employment whenever a doubtful radiograph, cystoscopic examination or abdominal tumor perplexes the clinician.

Probably the greatest value of pyelography will be found in its ability to demonstrate the following: (1) the extent and character of dilatation in (a) the renal pelvis and (b) the ureter; (2) the deformity accompanying renal tumors; and (3) congenital anomalies; and finally in the aid it affords in the interpretation of radiographs.

### RENAL DILATATION

**Mechanical Dilatation.**—First considering renopelvic dilatation we find that pelvic distention resulting from obstruction or hydronephrosis can be clearly demonstrated in the radiograph providing a sufficient amount of the undiluted injected medium reaches the pelvis. The dilatation will be readily recognized by the increased size of the pelvic lumen as well as by the broad knobbed shape of the calyces. The greater the distention, the shallower and broader will the calyces appear. The etiologic factors can often be interpreted from the contour of the distention. The mechanical or retention dilatation is distinguished from the inflammatory distention by the comparative regularity of outline as evidenced by the even lines of the free wall and rounded

ends of the broad calyces. Elongated or pear-shaped distentions will usually be found due to congenital constrictions, often anomalous renal blood-vessels. Although renal dilatation can often be ascertained by the over-distention method of Kelly, still the injected radiograph will be found more accurate. It is of particular value where the ureteral constriction will not permit the catheter to pass and in demonstrating small distentions of about 25 or 30 c.c. capacity.

**Inflammatory Dilatation.**—The outline of the inflammatory distention is characterized by marked irregularity. The degree of irregularity will vary with the extent of the inflammatory process. Pyelitis, when recent and of moderate severity, will show but slight changes. Chronic pyelitis, particularly with scar tissue change in the pelvic wall, may show considerable irregular distention. Pyelitis resulting from stones within the pelvis is characterized by the marked irregularity of individual calyces, although the general outline will depend largely on the degree of mechanical obstruction. With the extensive inflammatory changes accompanying pyonephrosis the irregular wide calyces may be seen extending into the farthest limits of the cortex. The pelvic outline may appear fringed with detached shadows of varying size which are caused by cortical abscesses connected with the pelvis. In cases in which the inflammatory process has extended into the peripelvic tissues we frequently find the upper ureter involved. The method will be found of practical value particularly in demonstrating the extent of the inflammatory destruction when surgical interference is not clearly indicated. The demonstration of inflammatory changes in the pelvis may also be of considerable value in the identification of doubtful renal shadows which I will discuss more fully later.

Where a clinical differentiation between pyelitis and renal tuberculosis is difficult, the demonstration of pyonephrosis or of cortical abscesses would identify the latter.

### URETER DILATATION

Dilatations of the ureter can be outlined in the injected radiograph and we are thus given a new and valuable aid in the diagnosis of pathologic conditions in the ureter. As in the kidney, ureter dilatation is due to mechanical obstruction, inflammatory retraction or tumor deformity. The dilatation may vary in degree from a scarcely recognizable distention to an extreme sacculation.

**Mechanical Obstruction.**—Hydro-ureter, or dilatation of the ureter as the result of mechanical obstruction, may be due to stricture, extraneous pressure, bladder retention, and ureteral stone.

1. **Stricture:** Obstructions to the ureteral catheter may be purely physiologic and will be identified as such by an absence of ureteral distention above. Actual stricture, on the other hand, always causes a dilatation which can usually be demonstrated in the injected radiograph. A common form of stricture is that resulting from tuberculous ureteritis and its demonstration may be of value in identifying the tuberculous process.

2. **Extraneous Pressure:** As the result of pressure from various pelvic conditions, such as chronic abscess, fibroids, and various tumors, considerable dilatation of the ureter may ensue. This possibility must be borne in mind particularly when the clinical picture is largely that of increased intrarenal tension.

3. **Urinary Retention:** As the result of extreme chronic bladder retention the ureter may become mark-

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edly distended. This dilatation can occasionally be demonstrated by merely filling the bladder with the opaque medium, placing the patient in the Trendelenburg position and radiographing.

4. **Ureteral Stone:** The surgeon searching for the ureteral stone looks for the dilated ureter as his guide to its location. This dilatation can be clearly demonstrated in the injected radiograph and when it is seen extending above a doubtful shadow, the distention identifies it as intra-ureteral.

#### INFLAMMATORY DILATATION

The ureter, like the renal pelvis, becomes dilated to a varying degree as the result of inflammatory changes in its walls. This inflammatory dilatation may follow either a descending or ascending infection. It is usually not so marked or so regular as the distention resulting from mechanical obstruction. It is usually present with every renal infection whether in the cortex or in the pelvis. It may be the sole physical evidence of circumscribed or dormant cortical infections. More or less inflammatory dilatation may be demonstrated in the ureter below the stone in the renal pelvis or upper ureter. The dilatation accompanying tuberculous ureteritis is often marked because of accompanying tuberculous stricture and resulting mechanical dilatation. The dilated ureter, so frequently accompanying prostatic enlargement, is probably more often the result of an ascending infection rather than mechanical obstruction.

**Tumor Identification.**—The injected radiograph is often of considerable value in identifying doubtful tumors of the upper abdomen. Renal tumors frequently occur without either urinary history or findings and are often not to be distinguished through palpation from tumors of neighboring organs. It has been our experience that a distinctly abnormal pelvic outline or other evidences of tumor involvement can be demonstrated in the pyelograph in the majority of renal tumors. The pelvic changes must be well marked in order to be recognizable. They will consist of (1) retraction of individual calices presenting strikingly bizarre outlines, (2) irregular distention of the entire pelvis, and (3) obliteration of the pelvic lumen, partial or complete. Retraction of the upper ureter by surrounding renal neoplasm may be confirmatory evidence. The absence of tumor deformity would in most instances, therefore, exclude a renal tumor. The relation of the injected renal pelvis to an unidentified tumor may also be of differential value.

#### AID IN RADIOGRAPH INTERPRETATION

Any one who has had considerable experience in interpreting abdominal radiographs will not always regard the presence of shadows as sufficient evidence for the diagnosis of urinary lithiasis. It has been our experience that various extrarenal and peri-ureteral shadows so frequently simulate the shadows of renal and ureteral stone that the majority of radiographs will require further data for their correct interpretation. We have found the cystoscopic data to be of considerable practical value in checking up the radiograph, and employ it at St. Mary's Hospital as a routine procedure. Although the ureteral catheter and the stylet are of considerable aid they may also be misleading, as I have indicated in previous papers. We have found that pyelography frequently gives us the most accurate data in identifying intrarenal and intra-ureteral shadows; particularly where there is no gross evidence of urinary infection. Practically every stone in the kidney will

show evidence of inflammatory or mechanical changes in the pelvic outline which can be demonstrated in the injected radiograph. The absence of recognizable irregularity or dilatation of the pelvis or individual calices would be strong evidence that a doubtful shadow is not due to renal stone. If a considerable distance is seen to separate the injected pelvis from a doubtful shadow it would identify the latter to be extrarenal. Not alone will the injected radiograph be of value in identifying renal stone, but it will also be of aid in ascertaining its exact position within the kidney. If the stone is within the renal pelvis it will be obscured partially or entirely, depending on the comparative density of stone and injected medium. If the stone is situated in the cortex its relation to the injected pelvis should localize it precisely.

The majority of stones in the ureter will show more or less ureteral dilatation above it. This distention can usually be demonstrated in the injected radiograph provided that the injected medium can pass the obstruction. We have found this method to be practical in more than two-thirds of our ureteral stones. Inability to get the fluid by an obstruction would identify it to be intra-ureteral. If the injected ureter shows no dilatation at or above a doubtful shadow we can, as a rule, infer that the shadow is not due to stone. The moderate ureteral dilatation often seen below a stone shadow is to be explained by inflammatory changes from resulting chronic infection and it may be of confirmatory value in identifying small stones.

#### CONGENITAL ANOMALIES

Pyelography is the best and often the only method with which congenital anomalies of the kidney and ureter can be clinically demonstrated. The position of the so-called pelvic kidney is clearly outlined in its relation to the surrounding bony structure. The fused or horseshoe kidney with its pelves adjacent or situated in the same side may be graphically demonstrated. The asymmetrical or solitary kidney is frequently identified by its abnormally large or duplicated pelvis. Various ureteral anomalies, such as duplication and division, can be readily outlined. When the ureter divides after leaving the bladder the division can be demonstrated by inserting a large catheter just within the meatus and injecting. Anomalies in position and course, such as twisted, kinked and converging ureters, may be outlined. Since some complicating pathologic process usually calls our attention to these anomalies, the resulting dilatation or deformity can be demonstrated at the same time in the injected radiograph.

#### ABSTRACT OF DISCUSSION

DR. E. E. MONTGOMERY, Philadelphia: It has been my misfortune, in the observation of cases in my own hands and in those of other men, to see patients in whom operation has been done on one kidney, to find that subsequently the condition of the other kidney was such as to render the result a serious if not a fatal one. I remember very well a patient in the service of one of my assistants in whose case he felt that, owing to tuberculous disease of the kidney, it was desirable that it should be removed. The kidney was removed, the patient passed no urine during the next forty-eight hours, and at my suggestion he made an incision in the other kidney. He found its pelvis filled with material which had blocked the ureter, and although the kidney was drained the patient succumbed a few days later. I have seen numbers of cases of dilatation of the kidney, a sacculated condition, from pressure of fibroid tumors, which undoubtedly would have been recognized had we at that time known of and practiced the method

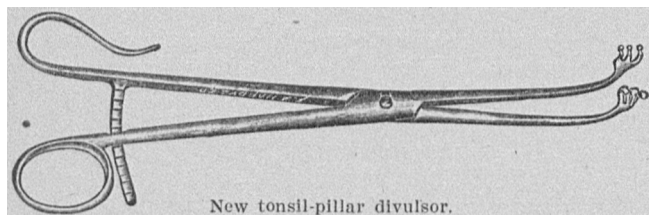
of procedure which has been so excellently presented by Dr. Braasch.

DR. H. G. WETHERILL, Denver: The excellent demonstration Dr. Braasch has given us has emphasized one of the methods of more exact diagnosis which is making modern medicine and modern surgery more nearly scientific than it ever has been before. With Dr. Montgomery, I can recall many isolated instances in which more exact diagnosis and more exact surgical procedure would have been possible had we had such assistance as Dr. Braasch has demonstrated to us.

## A NEW TONSIL-PILLAR DIVULSOR

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I have recently devised a pillar divulsor which is a great aid in removing a submerged tonsil. By its use the pillars can be spread apart so that there is no danger of



New tonsil-pillar divulsor.

injuring them; it also gives one a good view while working, and enables one to apply a sponge better. It is useful, besides, in trimming any remnants after using a snare, or in searching for a spurting artery. The points are made blunt so as not to inflict unnecessary injury on the palate muscles.

## CULTURES FROM THE THYROID GLAND IN GOITER

### A BACTERIOLOGIC STUDY OF FOURTEEN CASES \*

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The frequent occurrence of hyperthyroidism in certain districts of both Europe and this country, the acute exacerbations that occur in the course of this disease and the occurrence of the disease in several members of the same family are facts of especial interest. Therefore, the study of these cases was undertaken to determine, if possible, whether infection played a rôle in the etiology of hyperthyroidism.

The cultures from these patients, with the exception of that from the first, who was a private patient under my care, were obtained from some of Dr. John B. Deaver's patients at the time of operation at the German Hospital. The primary cultures were made in bouillon and on blood-serum and further carried out on agar, glucose agar, potato, gelatin, litmus-milk, etc. For anaerobic organisms, cultures were made on agar.

The cultures were made according to the method of obtaining cultures from tissues at autopsy—by scorching the outer surface with a hot scalpel, reheating the knife, making an incision and then using a sterilized platinum loop, etc.

In all the following cases, except Case 1, in which I operated, the operations were performed by Dr. John B. Deaver.

\* Read before the Philadelphia County Medical Society, Oct. 11, 1911.

\* From the Laboratory of Clinical Pathology, Philadelphia Polyclinic and College for Graduates in Medicine.

CASE 1.—Cystic goiter. Operation at Methodist Hospital, Nov. 15, 1909. Cultures from the thyroid gland and from the contents of the cyst negative.

CASE 2.—Exophthalmic goiter. Operation, Feb. 16, 1910. Culture from the gland resulted in a growth of *Micrococcus tetragenus*. Dr. John M. Swan aided me in the study of this organism.

CASE 3.—Cystic goiter. Operation, March 9, 1910. Culture negative.

CASE 4.—Cystic goiter. Operation, March 14, 1910. Culture negative.

CASE 5.—Cystic goiter. Operation, April 15, 1910. Culture resulted in a growth of the *Streptococcus vermiciformis* of Sternberg. Dr. Norman B. Gwyn aided me in the study of this growth.

CASE 6.—Exophthalmic goiter. Operation, April 30, 1910. Culture negative.

CASE 7.—Exophthalmic goiter. Operation, May 28, 1910. Culture negative.

CASE 8.—Cystic goiter. Operation, July 19, 1910. Culture negative.

CASE 9.—Cystic goiter. Operation, Oct. 22, 1910. Culture negative.

CASE 10.—Exophthalmic goiter. Operation, Nov. 5, 1910. Culture negative.

CASE 11.—Exophthalmic goiter. Operation, Feb. 23, 1911. Culture negative.

CASE 12.—Exophthalmic goiter. Operation, May 6, 1911. Culture negative.

CASE 13.—Cystic goiter. Operation, May 6, 1911. Culture negative.

CASE 14.—Cystic goiter. Operation, May 6, 1911. Culture negative.

These cases represent six cases of exophthalmic goiter and eight cases of cystic goiter. A growth of *Micrococcus tetragenus* was obtained in one case of exophthalmic goiter, Case 2; and a growth of *Streptococcus vermiciformis* of Sternberg was obtained in one case of cystic goiter, Case 5. In none of the others was a growth obtained.

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## RAPID PREPARATION OF HEMATOXYLIN STAIN

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Every laboratory worker who takes an occasional vacation has experienced the vexation of having no hematoxylin in perfect working order on his return home. By the usual methods of preparing this stain one is compelled to wait several days for the stain to ripen. To eliminate this the following formula may be successfully used.

Hematoxylin crystals	.....	1 gm.	{ A
Alcohol	.....	10 c. c.	{ A
Alum	.....	10 gm.	{ B
Distilled water	.....	200 c. c.	{ B
Hydrogen peroxid, q. s.			

The hematoxylin crystals are thoroughly pulverized in a mortar and the alcohol added; the alum is dissolved in the distilled water. A is then added slowly with constant stirring to B. When well mixed, hydrogen peroxid is added drop by drop till the color changes to a deep purple. After filtering, the stain is ready for immediate use. The only advantage of this method is the rapidity of preparation. The entire time consumed in preparing a stain ready for instant use is about seven minutes, as compared with several days of ripening by the older methods.