

Year Book

OF

UROLOGY

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1958-1959
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THE YEAR BOOK *of* UROLOGY

(1958-1959 YEAR BOOK Series)

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GENERAL CONSIDERATIONS

UROLOGIC TRAINING

Teaching of Urology to Medical Students is considered by Abel J. Leader¹ (Baylor Univ.). Findings in an intensive survey on the status of undergraduate teaching of urology in the medical schools, conducted by a committee of the American Urological Association, indicated that the greatest dangers to the present status of urologic instruction in the curriculum were to be found within the teaching programs of the specialty of many of the institutions studied. Reorganization for more effective use of the time allotted and of the services of the voluntary teaching staff, and reappraisal of the scope and content of the courses as presently taught were recommended.

The urologic teaching program for students of Baylor University College of Medicine was developed in response to these suggestions and has been in operation for over 2 years. The course, given in the third and fourth years, consists of didactic lectures, ward work with hospital in- and out-patients, demonstrations and spot seminars.

The program's effectiveness is measurable in some degree by the interest expressed by 10% of the last senior class in residency training in urology after the internship. Precise programing resulted in a well-ordered teaching effort that has used the time allotted in the curriculum to the study of this surgical specialty to the best possible advantage and has reduced the demands on the limited time of the members of the voluntary teaching faculty. Its development and effectiveness are believed to be contingent on the projection of a clear picture of the program as a whole, bearing in mind the objectives to be attained, delineation in as much detail as possible of the component parts of the program to insure its smooth, efficient operation and commitment to writing of the entire program in detail in the "Urologic Instructor's Manual," which is distributed to each faculty member well in advance of the beginning of the academic year.

► [Urology is best served by attracting good young men to it. Often this is

(1) J.A.M.A. 167:544-548, May 31, 1958.

accomplished in the third and fourth years of medical school, but only as the result of real effort on the part of the urologic teaching staff.—Ed.]

EXAMINATION OF THE URINE

Exfoliative Cytology of Urinary Sediments: Review of 2,829 Cases. N. Chandler Foot, George N. Papanicolaou, Nelson D. Holmquist and John F. Seybolt² (Cornell Univ.) used the Papanicolaou method to study the cytology of the urine of 2,829 patients during 1945-54. A final urinary tract diagnosis was possible in 1,881. Of 212 patients with definite tumors of the bladder, ureter and renal pelvis, the organs lined with transitional epithelium, 61.7% of the smears were correctly interpreted as positive. Relatively low accuracy was attained in patients with renal tumors. Only 8.3% of the cancer-bearing patients furnished urinary specimens leading to correct positive reports. The high proportion of false negative cytologic reports is felt to be largely attributable to the fact that parenchymal tumors of the kidney do not exfoliate into the urinary passages until late in their development and because most of the urine specimens were collected from the bladder. Retrograde catheterization of the upper portions of the urinary tract would presumably have yielded better results.

Of the cases of prostatic cancer, 15% were correctly reported cytologically. This indicates that a sample of urine is not the specimen of choice in detecting cancer of the prostate. Though only a few specimens of fluid obtained by prostatic massage were submitted to the cytologic laboratory in this series, the results obtained by others indicate this would be the appropriate type of specimen for study.

False positive reports were obtained in 1.2% of the bladder, ureter and renal pelvis cases, in 1% of the renal parenchyma cases and 1% of the prostate cases. Correct negative reports were issued in 90.8% of the bladder, ureter and renal pelvis cases, 92.5% of the renal parenchyma cases and 89.3% of the prostate cases. Confusion in cytologic interpretation was caused in a few instances by such nonmalignant conditions as renal calculus and chronic cystitis.

Repeat specimens are valuable, but in 60% of all cases, correct cytologic interpretations were rendered on the first specimen obtained. Among bladder carcinomas alone, this per-

(2) *Cancer* 11:127-137, Jan.-Feb., 1958.

centage of initial positive reports rose to 77.5%. Though the usefulness of cytology in detecting early carcinoma of the genitourinary tract was not given special attention in the study, a number of carcinomas in situ were discovered, principally in the bladder and renal pelvis.

► [Whereas prostatic cancer in an advanced stage can be detected more often by smears of prostatic fluid than by urine samples, even the prostatic smear has proved disappointing in detecting early prostatic cancer—Ed.]

False Albuminuria Due to Para-Aminosalicylic Acid. Earl T. Opstad³ (Minneapolis) found that patients with tuberculosis who were receiving up to 12 Gm. PAS orally were excreting 400-900 mg. PAS/100 cc. urine. When a preservative tablet containing formaldehyde was added to the urine, the urine gave false positive results when tested for albumin. The PAS and the formaldehyde changed the turbidity of the urine, which gave the false positive results.

► [According to R. W. Lippman (*Urine and the Urinary Sediment* [Springfield, Ill.: Charles C Thomas, Publisher, 1957], p. 99), "False positive tests for protein may be found during the administration of tolbutamide, massive doses of penicillin, after administration of polyvinylpyrrolidone as a plasma expander, or after the administration of various radiopaque substances such as those used for cholecystography (Priodax®, Telepaque®, Teridax®, Hypaque® and Monophen®). These false positive tests may persist for 2 or 3 days after drug administration is ended."—Ed.]

Primary Pneumaturia: With Report of Case Diagnosed Radiologically. According to R. Glyn Thomas and A. Sandler⁴ (Univ. of Witwatersrand), pneumaturia is the passage of gas from the bladder on voluntary micturition or during catheterization. Primary pneumaturia results from the formation of gas within the bladder caused by urinary infection by a gas-forming organism. It occurs in diabetics and nondiabetics.

In the nondiabetic, residual urine is usually present because of a "neurogenic bladder" of diabetic neuropathy or bladder neck obstruction. Infection is superimposed on the vesical urinary stasis and a gas not readily soluble in urine is produced. The infecting organism is usually *Bacillus coli*, but *B. lactis aerogenes*, *B. aerobacter aerogenes*, *B. aerogenes capsulatus* and yeasts may be present. Hydrogen forms the bulk of the gas formed in diabetics as does carbon dioxide in nondiabetics. The gas is produced by fermentation in the glucose-rich urine with production of butyric and lactic acids. In

(3) Minnesota Med. 41:111-120, February, 1958.

(4) South African M. J. 32:309-311, Mar. 22, 1958.

nondiabetics, the gas may result from proteolytic breakdown of a special type of albumin, or of ordinary albumin by a special strain of *B. coli*.

The diagnosis may be suggested by the finding of a midline suprapubic tympanitic mass which may reach the level of the umbilicus. The patient complains of the passage of gas during micturition. The x-ray features are: (1) round or pyriform translucency in the suprapubic midline area; (2) pelvic fluid level with gas cap above it when a horizontal x-ray beam is used with the patient in the erect position; (3) on excretory urography in the supine position, there are opaque medium pools in the dependent portion of the bladder, giving the appearance of a poorly-defined blob of opacity surrounded by a broad halo of translucent gas and in the erect position, there is a fluid level at the upper limit of urographic medium, with gas cap completing the bladder outline; and (4) any translucencies in the region of the urinary bladder in the plain abdominal film should raise suspicion of gas in the bladder, particularly if bowel shadows can be distinguished separately.

INFECTIONS, INCLUDING GONORRHEA

Determination of Volume of Residual Urine in Bladder without Catheterization was studied by Ramzi S. Cotran and Edward H. Kass⁵ (Harvard Med. School), using two methods.

INITIAL PROCEDURE.—Patients were given 1 ml. of standard phenolsulfonphthalein solution (containing 6 mg./ml.) intravenously at bedtime. They were instructed not to void until morning. After voiding, they were given a glass of water to drink. A second urine sample was collected 1 hour later. The urines were alkalized and the concentration of phenolsulfonphthalein in both specimens was determined colorimetrically at wavelength of 550 μ . The volume of residual urine was calculated from the formula

$$V_r = \frac{U_2 \times V_2}{U_1 - U_2}$$

in which V_r is the volume of residual urine in milliliters, U_1 and U_2 are the concentrations of phenolsulfonphthalein in milligrams/milliliters in the first and second specimens, respectively; and V_2 is the volume of the second urine in milliliters.

Studies of the pattern of excretion in 12 patients with no evidence of disease of the kidneys or bladder showed that uri-

(5) New England J. Med. 259:337-339, Aug. 14, 1958.

nary excretion was complete in 8 hours. Thus, residual volume as small as 10 ml. might be expected to be detected by this method. This assumption was tested in patients with indwelling catheters; phenolsulfonphthalein was injected intravenously at bedtime and urine was collected overnight. In the morning a measured volume of the overnight urine was reinserted into the bladder and the catheter clamped, thus creating an artificial residual urine. Urine was collected an hour later and the volume of residual urine was calculated in the usual manner. When 40 ml. of residual urine was inserted artificially, the value obtained by the phenolsulfonphthalein method was 36 ml. When 20 and 10 ml. were reinserted into the bladder at different times, the respective values obtained using the dye test were 18 and 8 ml.

A collection period shorter than overnight was desirable for outpatients and for patients unable to retain urine for the entire night. Advantage was taken of the finding that persons without apparent disease of the kidneys or bladder excrete 86-97% of the administered dye in the first 3 hours and 0-4.5% during the 4th hour after intravenous administration of 3 mg. Thus, when the first specimen of urine was collected 3 hours after the dye injection, and the second an hour after the first, the total amount of the dye excreted during the 4th hour was so small that an apparent residual volume of under 20 ml. was generally calculated.

FOUR-HOUR PROCEDURE.—The well-hydrated patient empties the bladder, is given 3 mg. dye (0.5 ml. standard solution) intravenously and voids again 3 hours later. This specimen is labeled urine 1. The patient is given 2 glassfuls of water to drink and voids an hour after the previous voiding. The second specimen is labeled urine 2. The volumes and phenolsulfonphthalein concentrations of both specimens are determined and the residual volume is calculated from the formula shown in the initial procedure.

The accuracy of the method was tested in 13 patients with urologic disease who were to be catheterized to determine the residual volume in the bladder. The values obtained by the 4-hour procedure were compared with values obtained by catheterization, which was carried out within 15 minutes of completion of the phenolsulfonphthalein test. The results showed generally close agreement between the two methods.

► [Any method which permits a reasonably accurate determination of

residual urine without the chance of introducing infection seems worth while, provided it is not too complex.

If renal function is adequate—simply determined by the level of serum urea nitrogen—residual urine can also be estimated from the size of the bladder shadow on a postvoiding film made in conjunction with an intravenous pyelogram. At the same time, anatomic deformities of the collecting system can be detected.—Ed.]

Sterile-Voided Urine Culture: Evaluation in 100 Consecutive Hospitalized Women. A. Donald Merritt and Jay P. Sanford⁶ (Duke Univ.) developed a technic based on the use of sterile-voided urine collections for obtaining urine cultures from women. They also developed a quantitative culture technic.

METHOD.—The patient is placed in lithotomy position, with help if necessary, and the labia and urethral orifice are cleansed with Zephiran® sponges. The patient is requested to void, and a midstream specimen of urine is collected. The specimens are placed in an icebox (4 C.) within 5 minutes and quantitatively cultured within 24 hours. Quantitative bacterial counts are carried out by making 3 successive 10-fold dilutions of the urine in sterile 0.9% saline solution. One milliliter aliquots of the 10^{-1} (1:10) and the 10^{-3} (1:1000) dilutions are pipetted into sterile Petri dishes. About 9 ml. melted, cooled, tryptic digest agar is added and mixed by swirling. The contents of the pour plates are allowed to cool and solidify, then inverted and incubated at 37 C. for 24-36 hours. The bacterial colonies are counted under magnification in a Quebec colony counter.

Sterile-voided urine cultures containing over 50,000 bacteria/ml. urine correlated well with significant bacteriuria in catheterized specimens. A sterile-voided urine culture containing under 10,000 bacteria/ml. is believed to be as significant as a catheterized specimen containing similar numbers of bacteria. Significant bacteriuria was detected in 14 of the 100 consecutively evaluated hospital patients. In only 5 of these was urinary tract infection suspected on the basis of clinical findings and urinalyses.

The authors conclude that in the hospital or clinic as a routine screening procedure, particularly in women, this method is adequate to evaluate the urinary tract, and particularly bacteriuria. In the absence of symptoms or pyuria, a screening procedure seems indicated by the findings of significant bacteriuria. The presence of symptoms and/or pyuria needs similar evaluation because these findings were present in the absence of significant bacteriuria.

(6) J. Lab. & Clin. Med. 52:463-470, September, 1958.

Comparison of Bacterial Counts of Urine Obtained by Needle Aspiration of Bladder, Catheterization and Midstream-Voided Methods was made by Ofelia T. Monzon, Edwin M. Ory, Harold L. Dobson, Edward Carter and Ellard M. Yow⁷ (Houston) on 34 patients.

METHOD.—Patients were instructed not to void, and when the urinary bladder was sufficiently distended, the suprapubic area was cleaned with an antiseptic solution with the patient in the supine position. With a 20-ml syringe and 20- or 22-gauge spinal needle, the urinary bladder was entered through the anterior abdominal wall in the midline, 1 cm. above the symphysis pubis, after preliminary subcutaneous infiltration with 1% procaine solution. An adequate amount of urine was withdrawn for studies, and immediately afterward midstream-voided and catheterized specimens were collected. All the specimens were immediately cultured in broth and by the agar pour-plate technic, incubated and read 48 hours later.

Of the 34 patients, 27 had sterile cultures of the aspirated specimen, although 4 of these showed positive cultures of the catheterized specimens. Seven had positive cultures of all specimens. Of these, 5 had colony counts of over 100,000 organisms/ml. urine. Patients belonging to the group showing positive cultures of the catheterized specimens and those with sterile aspirated specimens had colony counts much below 100,000/ml. urine.

Thus, it appears that most of the positive cultures from catheterized specimens having low colony counts represent urethral contamination.

► [In the female, midstream-voided urine will provide a sample as representative of bladder urine as that obtained by the usual catheter, provided the vestibule is carefully cleansed and the labia are carefully held apart during micturition. A comparison of midstream-voided urine with urine obtained by the double catheter technic described by G. F. Clabaugh and P. S. Rhoads might prove informative (1957-58 YEAR BOOK, p. 14). Commenting on the last paragraph of this abstract, it should be emphasized that low colony counts do not *always* represent urethral contamination.—Ed.]

Hospital Urine Bottle and Bedpan as Reservoirs of Infection by *Pseudomonas Pyocyanea*. J. W. McLeod⁸ (Univ. of Edinburgh) examined the dust, water, catheter lubricants, blankets, urine, urine bottles and bedpans of patients in three hospitals for sources of *Ps. pyocyanea* infection. Infections with *Ps. pyocyanea* are usually hospital infections. The bacteria are not a commensal of the normal external genitals of males and therefore are not unavoidably introduced by cathe-

(7) New England J. Med. 259:764-767, Oct. 16, 1958.

(8) Lancet 1:394-397, Feb. 22, 1958.