

UROLOGY

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Advancements in the field of urology have been made (1) the treatment of urinary calculi, (2) carcinoma of the bladder, and (3) carcinoma of the prostate. The treatment of urinary infection with penicillin and streptomycin has specific applications in urology, but they also have many general applications and therefore will not be discussed. There have been many technical improvements in the older methods of therapy and diagnosis which are unsuitable for discussion.

The cause of urinary calculi has been studied from the standpoint of calcium metabolism and endocrines. The most specific advancement in the cause of stone formation has been made by Albright (1). In a study of 23 cases of hyperparathyroidism he found 15 patients to harbor renal calculi and three other patients had renal lesions due to calcium deposits in the renal tubules. Hyper-secretion of the parathyroids results in increased calcium and decreased phosphorus in the blood. It is an excellent example of what may happen when a kidney has to deal with a blood stream which is laden with calcium. Bone diseases and immobilization of the patient may result in increased urinary calcium which is derived from decalcification of the bone. The increased excretion of uric acid, oxalates, and the presence of cystin in the urine are other examples of hyper-excretion of a specific salt which may result in stone formation.

There is a great deal of difference of opinion as to the frequency with which hyperparathyroidism occurs as an etiological factor in the formation of renal calculi. This phase of the disease has been stressed by Albright et al. from the Mass. General Hospital. From 1930 to 1937 in a study of 36 cases of hyperthyroidism, Chute (2) found calculi formation in 83% of them and the disease to be bilateral in 53%. Braasch (3) at the Mayo Clinic found but two cases of proved hyperparathyroidism in 1,206 patients suffering from calculus disease. Higgins (4) at the Cleveland Clinic found the disease in only one-tenth of one per cent of stone patients.

Regardless of the wide difference of opinion as to the frequency of hyperparathyroidism in stone formation, one fact seems to stand out and that is that where hypercalcinuria occurs stone formation may result. This is substantiated by Flocks (5) who found that 66% of stone cases showed increased urinary calcium and in a great number of them none of the causes of excess calcium excretion was discoverable.

The above facts have stressed the etiology of certain varieties of stone formation due to excess of calcium excretion by the kidney. Advantage of this knowledge has been taken in the prevention and treatment of stone formation. It has long been known that the pH of the urine is a factor in the type of stone formation which will occur. Thus with a pH of 5 a uric acid stone should form; whereas with a pH of 8 calcium carbonate and phosphatic stones occur. It would seem that with a reversal of the pH of the urine, in the examples cited above, it should be of aid in the dissolution and prevention of these stones. Within certain limits this is true.

In those calcium and phosphatic stones in which hypercalcinuria plays a part, the administration of acidifying drugs and the so-called "acid ash diet" have been shown by Albright and Flocks to defeat their purpose, in that their administration results in increased absorption of calcium from the tissues and increased excretion of calcium by the kidney. This is especially so where stone formation is taking place in the presence of urea splitting organisms, where it is impossible to render the urine acid. These procedures are definitely contraindicated, because, bringing

more calcium to the infection means more rapid stone formation. It is evident that the purpose of this type of medication is to decrease the precipitation of calcium and phosphatic salts at the kidney level and thereby prevent stone formation.

Shorr (6) . . . believed that the less calcium and phosphates the kidney had to dispose of, would also lessen the possibilities of stone formation. He lowered the calcium and increased the citric acid content of the urine by the use of estrogens. Estrogens increase the excretion of citric acid and the citrates combine with calcium to form a soluble calcium-citrate complex instead of an insoluble calcium phosphate. He diverted the excretion of phosphate from the kidney to the intestinal tract by the use of aluminum hydroxide gel. By the use of both agencies he was able to prevent the precipitation of the relatively insoluble electrolytes of calcium and phosphorus, which participate in the formation of calcium and phosphate stones. This reaction takes place regardless of diet or infection of the kidney.

The doubtful efficacy and limitations of dietary and medicinal agents to dissolve or prevent stone formation led Suby and Albright (7) to investigate the effects of citric acid sodium citrate solution in the dissolution of stone. They found this solution would destroy the mucous membrane of the bladder in a short time, but they also found that by the addition of magnesium oxide, they lost none of the dissolving properties of the citric acid solution and the irritating effects of it on the bladder mucosa were neutralized. This resulted in a buffered citric acid solution which is known as G solution and is particularly efficacious in dissolving loosely constructed calcium and phosphatic stones by means of direct application of the solution to the stone.

Another interesting if not so practical application of medicinal agents in the dissolution of urinary incrustations is furnished from the fact that in the waters of the Amazon Basin is a little fish (Candiru) which penetrates the urethras of men and women bathers particularly if they should pass urine when in the water. The great speed of this little fish allows it to enter the urethra and bladder as the urine is being expelled. Here it attaches itself to the mucosa of the bladder and produces a very painful lesion. The natives have found that by making a brew of the Buitach Apple (*Genipa americana*) which grows in the Amazon Basin and when drunk very hot has the property of dissolving the skeleton of the fish. This has resulted in an analysis of the brew and its application for the dissolution of bladder incrustations due to calcium salts. A synthetic formula of this brew has been composed and used with success by Dr. Lin (8) in cases of encrusted bladder. The formula is administered by means of rectal injections.

In 1941 Huggins (9) advocated bilateral orchidectomy for carcinoma of the prostate and later introduced stilbestrol in the treatment of the same condition. Both procedures have proved to be immensely valuable and represent progress in the treatment of carcinoma. During the last five years urologists have tried to determine the efficacy of each procedure. After the diagnosis of carcinoma of the prostate has been established, the following questions always arise: (1) When should we do orchidectomy; as soon as the disease is diagnosed or should it be reserved for patients with marked metastases, pain and other symptoms? (2) Should stilbestrol be used first to be followed by orchidectomy late in the disease? (3) Should orchidectomy be performed first followed by the use of stilbestrol or (4) should one method be used to the exclusion of the other? During the last five years physicians have had enough experience with both procedures to render opinions and their value. To determine the trend of clinical opinion, Meads (10) recently sent out 100 questionnaires to urologists concerning the above questions. Out of 78 replies, 70 urologists favored orchidectomy. . . . Of these 23 insisted the operation should be done early and 47 were convinced that it should be performed late, that is, when signs of metastases had developed as evidenced by pain, x-ray findings and rise in serum acid phosphatase.

Huggins wrote: "We still believe that bilateral orchidectomy is considerably superior to estrogenic treatment, feeling that the remission is greater and more prolonged. Further, we do not give patients who have had orchidectomy estrogen except occasionally for a short period of relieve hot flashes. Our preference for orchidectomy over estrogenic treatment is not one of caprice, I believe, since we had the pleasure of introducing both methods of treatment for this disease. We proceed with the removal of the testes as soon as the diagnosis has been made, except that an occasional patient is encountered with a lesion small enough for radical perineal prostatectomy. Incidentally, in Chicago this happens once in a blue moon."

Forty-seven urologists believed that stilbestrol should be administered first and bilateral orchidectomy delayed until late in the treatment of carcinoma of the prostate. Young believes that if it is a carcinoma entirely confined to the prostate, radical operation may cure; if it is too extensive for radical operation, stilbestrol in doses of five milligrams daily. When stilbestrol fails, orchidectomy is certainly indicated. Braasch (3) says we reserve orchidectomy until metastases and severe pain develops. Nesbitt reserves orchidectomy for patients who show evidence of an advanced disease.

Mead's paper shows that about one-third of the urologists perform bilateral orchidectomy for carcinoma of the prostate as soon as the diagnosis is made, and that two-thirds delay this operation until metastases can be recognized. While this paper represents nothing new, it does summarize the trend in application of a very valuable procedure in prostate carcinoma.

A new way to apply x-ray therapy to bladder tumors has been advanced by Rose (11). He believes that carcinoma of the bladder of the invasive type is sufficiently similar to skin cancer and if direct x-ray exposure could be successfully applied in the bladder as in the case of skin cancer, we might hope to cure certain carcinomas of the bladder by this method. To apply x-ray in this manner he opens the bladder widely to expose the tumor and by means of a sterile lead shield the x-ray is applied directly through the wound. He anticipates favorable results in about 25% of the cases and believes the procedure is another aid to be considered in bladder malignancies and states that his ten years results are very promising.

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