and the response of a typical case of hypertension and of a case with normal blood pressure.

Conclusions

1. The greater part of the fall in blood pressure is due to vasomotor paralysis.
2. A minor cause is the diminished respiratory excursion, which is due to abdominal and intercostal paralysis rather than medullary ischaemia.
3. The Trendelenburg position has an immediate definite effect in increasing the blood pressure but not the respiratory volume.
4. The induction of hyperpnoea has a small delayed effect in increasing the blood pressure.

A BRIEF REVIEW OF 426 CONSECUTIVE CASES OF URINARY CALCULUS

BY

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The investigation of a large number of cases of a disease such as lithiasis, chiefly because of the wide distribution of that condition throughout the urinary tract, reveals some interesting data. First of all is the fact that the male is invariably more prone to urinary lithiasis than the female: there are approximately two cases in the former to every one in the latter. My figures are as follows: male, 278; female, 148. Lett's (1936) figures from the London Hospital are in the same proportion; these cover the period 1905-34. The next important fact to note is the high proportion of cases which occur in the upper urinary tract (79 per cent.) in comparison with the lower. The London Hospital figures (74 per cent.) are not far removed from mine on this point. The following table shows the general distribution throughout the urinary tract in my cases:

Kidney, 220	}	337 = 79.10% upper urinary tract
Ureter, 117		
Bladder, 80	}	89 = 20.90% lower urinary tract
Urethra, 9		
426		

Staphylococcal Foci of Infection in Renal Calculus

Several Continental writers, notably Hellström (1936) of Stockholm and Hryntschak (1935) of Vienna, have called attention to the importance of chronic staphylococcal foci of infection as predisposing factors in the aetiology of renal calculus. Hellström found the staphylococcus in the structure of the stones in a large number of his cases. At the same time he has identified chronic infective foci in the genitalia of many of his patients. In 115 cases of stone in the upper urinary tract which I have examined in the same way I observed similar foci in 72 per cent. These were noted in the prostate, seminal vesicles, urethra, epididymides, the cervix uteri, and at the bladder neck. The importance of treating such foci is obvious, particularly in the hope of removing a cause for further stone formation. One other aetiological factor I found important in this series—namely, a dilatation in the urinary tract which pre-existed the calculus. This was noted in

15 per cent. of my cases, and had its maximum incidence among children, concerning whom the dilatation appeared to be the principal aetiological factor with regard to stone. Parathyroid or deficiency disease, diseases of the bone, excess of vitamin D, and hypercalcaemia from various causes are all known to encourage stone formation, but they have certainly played an insignificant part in the cases forming the subject of this article.

Age Incidence

The average age incidence in 220 cases of renal calculus was 39.5 and in 117 cases of stone in the ureter 39.7. The disease is slightly more common on the left side than on the right. The percentage figures of my cases are as follows: left, 50.55; right, 36.40; bilateral, 13.05. In the kidney, calculus is of equal incidence in both sexes.

When we come to consider the ureter, however, there is a remarkable change in the sex incidence. Indeed, ureteric calculus is about twice as common in the male as in the female: eighty-two of my cases were in males and thirty-five in females. The London Hospital figures are roughly in the same proportion. Here is offered an opportunity for an interesting speculation as to anatomical differences, which might supply the explanation. When we come to vesical calculus there is a still greater disparity in the sex incidence, the male greatly predominating, actually to over 90 per cent. There is nothing new about this relationship, it being practically the same as in ancient times.

Recurrence and Mortality of Renal Calculus

I have no figures to put forward at present as to recurrence of renal calculus following operations on the kidney for stone. The literature offers a wide range of results according, I should imagine, to the way the investigations have been conducted. Although I have not yet undertaken a systematic investigation on this matter I have come across a few of my patients who have had a recurrence. In some cases this occurred in the kidney from which stone was removed; in others the stone has subsequently appeared for the first time in the opposite organ. With regard to the latter group, I would like to emphasize the fact that, in those cases in which after full investigation I have thought it proper to do nephrectomy, I have no knowledge of any in which stone has ultimately appeared in the remaining kidney. I call attention to this matter because I am of the opinion that when a kidney which is badly damaged by stone is left behind it is likely to encourage the formation of stone on the opposite side. The percentage of recurrence is quoted by some authorities as being no more than two to three after nephrectomy. My mortality for operations for renal calculus in 135 cases is 2.9 per cent.

Stone in the Ureter

Treatment of stone in the ureter presents an interesting problem. The outstanding fact about these cases is that the great majority of stones pass spontaneously without any assistance. This was so in 67 per cent. of the cases that I was able to trace. If the stones do not pass in due course they can usually be made to do so by some minor measures carried out through the cystoscope, such as passing ureteric catheters and slitting the ureteric orifice. Sometimes several weeks elapse between the instrumentation and the passage of the stone. The longest interval in my cases was nine months. As a rule there is no appreciable damage to the renal function from the lodgment of a small stone in the pelvic portion of the

ureter for such a period. But regular observation must be kept by plain x-ray and intravenous urography. Out of a total of 117 cases of stone in the ureter only 23 per cent. required open operation. In 26 per cent. of these cases the kidney was so badly damaged that it had to be removed, and in all but one of them nephro-ureterectomy rather than a simple nephrectomy was performed. In 17 per cent. transcystoscopic instrumentation was carried out to assist the passage of the stone. There was no mortality from any form of operation on the ureter.

Change in Incidence of Urinary Lithiasis

When one considers the published statistics of hospital records of urinary lithiasis up to fifty years ago it at once becomes obvious that a remarkable change has since occurred in the incidence of this disease. For before that time urinary lithiasis was largely a matter of vesical calculus—it was one of the commonest of hospital diseases; to-day in this form it is one of the most uncommon. Moreover, vesical calculus in those earlier times had by far its highest incidence among the children of the working classes. It did not occur at all in children of the well-to-do. So that it becomes an interesting question to ask why this form of the complaint has so completely disappeared. The explanation is of course simple—namely, that in bygone days this form of urinary lithiasis was one of the many manifestations of faulty feeding, which, as conclusively shown by modern experimental work, is largely a matter of deficiency of vitamin A of animal origin, and to a less extent of wholemeal bread (McCarrison, 1931), the latter being harmful only when it is not modified by adding other dietetic ingredients. On looking back one can see how the improved standard of living among the working classes, as time has progressed, has made milk and butter more accessible to them, and how the improvement in the milling of wheat has eliminated the bread factor.

It is abundantly clear that urinary lithiasis which manifests itself as a deficiency disease is vesical rather than renal, and bladder stone is still very common in those countries where the predisposing conditions exist. Vesical calculus in our own midst to-day is almost invariably associated with bladder-neck obstruction of one kind or another, and is commonest in men past middle life: the average age of my patients was 52.6 years. Thus an important question of treatment is involved. To crush a stone and leave the obstruction is to invite recurrence of the calculus. Prostatectomy is indicated in some cases and transurethral resection of the bladder neck in others.

Now we come to another remarkable contrast—namely, that renal calculus was nothing like so common as it is to-day. Even the absence of means of diagnosis by x rays fails to explain the obvious increase in this form of lithiasis. Thus while we are aware of the disappearance of vesical calculus in the young, for which we have a ready explanation, we are equally aware of an increase in upper urinary tract lithiasis, the maximum incidence of which has moved to the fourth decade and the reason for which is obscure. Lett's London Hospital figures leave no doubt about the change that has occurred in relation to the kidneys; by comparing the 1915–24 decade with the succeeding ten years, it is seen that an increase of nearly 50 per cent. took place in the stone cases admitted to hospital in the latter period; the incidence was predominantly in the upper urinary tract. Reports from Germany (Grossmann, 1938) show that the increase of renal calculus is also general in that part of the world—at least in Central

Europe and in some adjacent localities. A queer fact which has come to light with respect to this wave of urinary lithiasis is that it seems to have begun somewhere about 1924. In some localities the increase has been as much as 1,000 per cent. No adequate explanation of this phenomenon has so far been forthcoming. It is difficult to believe that dietetic hardships suffered during the war are responsible for an increase at such a distant date.

Vesical and Urethral Calculus

With regard to the treatment of vesical calculus, whereas litholapaxy is commonly looked upon as being the proper method, I considered it inexpedient to carry this out in quite a large number of cases—actually 45 per cent. of seventy-eight—the reason being that often there was an obstructive condition at the bladder neck requiring surgical intervention. For example, in several cases I performed transurethral resection of a fibrous bladder-neck obstruction either at the time of or subsequent to litholapaxy. There was a mortality from suprapubic lithotomy of 5.5 per cent. Of the vesical calculus cases 51 per cent. were treated by litholapaxy, with a mortality of 4.8 per cent.

Urethral calculus, which as one would expect is predominant in the male, is the least common of the types of lithiasis with regard to locality. It has the special feature that a large proportion of the cases are associated with lithiasis elsewhere in the urinary tract—in my cases 62 per cent. In other words, such stones generally migrate from higher levels. Of my cases, 55 per cent. were in the prostatic urethra, the others being almost equally distributed in the different parts of the anterior urethra. The methods of removal varied according to the cases: several were treated by external urethrotomy, one prostatic case by suprapubic lithotomy, and another by pushing the stone into the bladder with a sound and then crushing it. In one female case a large stone was visible at the external urinary meatus, through which it was removed with forceps. There was no mortality from the urethral cases.

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The Swedish Hospital for Radium Treatment has lately moved into modern premises, erected close to the new Carolina Hospital in Stockholm. The "Radiumhemmet," as the hospital is called, was established with the aid of the funds subscribed by the Swedish people as a gift to King Gustaf on his seventieth birthday, ten years ago. Every technical resource has been utilized to make this clinic up to date. It has five rooms for radium treatment and a number of wards for three or six patients. The radium is stored in special safes, which are inspected every morning. To protect the staff from dangerous radium rays, rigorous safety measures have been introduced. When taking out the radium tubes from the safes the nurses are protected by lead screens 4 in. thick, and the tubes are conveyed between departments in heavy wagons on rubber wheels. In the basement is the department for telerradium treatment; the walls are built of iron-ore concrete 4 ft. 6 in. thick, to prevent the rays from penetrating them. There is also a special x-ray department. The clinic has 100 public and 13 private beds, and there are 130 physicians, nurses, and other officials. Everyone employed in the handling of radium or x-ray apparatus is given long holidays.