ON

RENAL CALCULI;

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THE nature of urinary calculi has of late years engaged much of the attention of the medical world; and many most enlightened men have applied their minds to analyse these concretions, and to investigate the causes which influence their formation. The aid of chemistry has been successfully employed in ascertaining their composition, and tracing the proximate principles of the urine; and several interesting statistical reports have been published, illustrating the comparative frequency of the different species, the periods of life at which they have occurred, and the particular districts in which they have prevailed.—It is to be hoped that, by still more extended views, and a more intimate acquaintance with the nature of the soil and the food most commonly used by the inhabitants, we may hereafter arrive at some important conclusions on this interesting subject:

hitherto, however, it must be confessed, that no certain practical inferences have been drawn; and we have yet to learn the causes which influence its frequent occurrence in particular countries, whilst in others it is scarcely known to exist.

From the application of chemical principles to the medical treatment of those afflicted with calculous complaints, some good has undoubtedly arisen; unfortunately, however, the efficacy of medicine does not extend beyond the occasionally correcting some peculiar diathesis, which may be known to predominate either from the previous analysis of calculous matter which may have passed, or from the state of the urinary secretions.

Whenever a stone has acquired any considerable magnitude, even though its nature may have been accurately ascertained, experience teaches us that all that can be expected from art, is, possibly, to check its increase. In all such cases, recourse must be had to surgery, to remove an evil which the united powers of medicine and the constitution are unequal to combat.

But though the judicious employment of acids and alkalies may in some instances prove of signal advantage, and even wholly alter the prevailing diathesis, yet other cases too frequently occur which alike resist the efforts of medicine, and the strictest attention to diet. It has often appeared

to me that, in such cases, the attention of medical men has been too exclusively directed to the state of the constitution, and remedies have been directed with a view to correct the secretions through the medium of the circulation, without any reference or attention to the peculiar state of the secreting organs. The kidneys, indeed, seem to have been regarded in the light of filters, through which certain fluids charged with extraneous matter were to pass, rather than as vascular organs, endued with all the properties of living matter, and consequently susceptible of the same morbid actions to which all glandular bodies are liable.

Such appears to be the opinion entertained by Dr. Marcet at the commencement of his valuable work. "The formation," he says, "of concretions in the urinary passages being occasioned by the separation or consolidation of certain ingredients contained in the urine, and *being independent of any specific agency of the urinary organs themselves*, calculi are liable to form in any of the cavities to which the urine has access." It is with much deference that I take the liberty of differing from the opinion above cited, and venture to suggest the probability, that in some instances, at least, the formation of calculi may depend on a local morbid action of the kidney, independent of any predisposing constitutional cause.

My attention was first called to this subject in the year 1809, by the examination of a woman

who died in St. Bartholomew's Hospital.—The ideas which then suggested themselves to my mind subsequent experience has only tended to confirm; and as the conclusions to which they lead are practical, I trust the facts will be deemed of sufficient importance to merit consideration.

M. Paris had been liable to calculous affection for eleven years, which she attributed to a violent strain in the loins; from which time she had constantly suffered from pain in the region of the right kidney. During all this time she had passed numerous small calculi, and had submitted to four operations, for the removal of larger concretions. The last operation produced peritoneal inflammation, which terminated her painful existence in the latter part of 1809. During a considerable period that she remained in the hospital, she was under the care of Dr. Powell and Sir Charles Blicke.—The calculi which were extracted, and which passed *per urethram*, were analysed; and every attempt was made by the exhibition of suitable remedies and the strictest attention to diet, to endeavour to overcome the disposition to form fresh calculi, but nothing appeared in the slightest degree to influence the disease, which continued unabated to the day of her death.

On opening her abdomen, the peritoneum was found much inflamed, and lymph was deposited extensively on the surface of the intestines, the folds of which adhered firmly together in various places.

On removing some of the viscera, two ulcerated openings presented themselves on the surface of the bladder, which had been completely closed during life by the adhesions which had formed between the peritoneal surface of that viscus and the small intestines. On examining the bladder, it had a dark sphacelated appearance, and the mucous coat was in some places quite destroyed by ulceration. The left ureter and kidney were perfectly healthy, and bore no appearance of having been at any time diseased. The right ureter was much enlarged, and the kidney was small and misshapen; in its pelvis were two calculi, of the size and shape of almonds; in all the infundibula, and even in the tubuli uriniferi were found calculi of various sizes, amounting to twelve in number*.

On considering all the circumstances of this case, it appeared to me, that the examination *post mortem* satisfactorily explained the total want of success which had attended the medical treatment during life. It was most apparent that the disease was confined to the right kidney. This might have been primarily induced by the strain, or by some constitutional derangement. Diseased action having been once established, and a calculus formed, the presence of this foreign body would prove a sufficient source of irritation to maintain it; and thus the mischief would go

* On examination, these were found to consist principally of lithic acid.

on increasing from year to year, unchecked by medicine or diet ; both of which could only act through the medium of the constitution, by correcting any particular disposition, or improving the digestive functions. It may be said that the lithic diathesis prevailed in this case ; but had that been the case, would not the other kidney have been equally affected, as the same blood must have circulated through both? and consequently, had the cause of the continuance of the disease originated in any vitiated state of the digestive organs deranging the circulating fluid, it is reasonable to suppose that they must have both participated in the morbid disposition. The difficulty of accounting for the phenomena which occurred in this case may be readily solved, by referring it to a local morbid action of the kidney. The accurate researches of Dr. Prout have shewn that the proximate principles of urea and uric acid are very nearly allied ; it is possible, therefore, that a very slight derangement in the function of one kidney might convert that into a morbid concretion, which, in the other, would form perfectly healthy urine. On this subject, however, it is not my intention to enlarge at present ; I have ventured to inquire, without presuming to decide. When an investigation is, from its nature, so intricate and difficult that it is not possible to arrive at any certain conclusions, there may be some merit in pointing out such as are probable.

I shall proceed now to relate a case of diseased

kidney, most unequivocally originating from a local cause.—In the early part of the year 1816 I was requested to see a Mrs. Eyres, who was supposed to be dying of a diseased ovary, which had suppurated and burst into the bladder. On visiting her I found her hectic, much emaciated, and so reduced that she could not rise from her bed without assistance. She had emptied her bladder a short time before I saw her, and the contents had been placed in a glass tumbler; it had separated into two portions, the upper third of which appeared to be healthy urine; the lower two thirds consisted in thick inodorous pus. She stated that this proportion varied at different times, but that for many weeks she had parted with from two to three pints of this purulent matter in the twenty-four hours, and that it always subsided from the urine on standing. On examining her in a recumbent posture, I found a large tumor on the right side, occupying the lumbar and iliac regions, being continuous with the liver above, projecting forward beyond the linea semilunaris, and descending within the brim of the pelvis below. Her emaciated state enabled me to trace the outline of this tumor with great accuracy. As her bladder was nearly empty, I examined *per vaginam*, and there did not appear to be any direct communication between the tumor and that viscus. This circumstance, combined with the form and situation of the swelling, induced me to suppose that it was the kidney and not the ovary that was diseased: the

history of the origin and progress of the complaint confirmed me in this opinion. It appeared that she had enjoyed good health until the year 1810, when she fell in going down a steep flight of stairs, and struck herself forcibly in the right lumbar region against a projecting post at the bottom of the rails. She suffered severely at the moment, and had never been free from pain from that time. The tumor she described as commencing in the loins, and gradually making progress in every direction, until it attained its present bulk. The secretion of pus she had observed for about eight months. She had borne two healthy children since the commencement of the disease, and her catamenia had continued to flow until a few months prior to my seeing her. Her very reduced state and the very profuse discharge of pus afforded very little ground of hope from any treatment. A mixture, containing uva ursi and tincture of opium, was ordered for her, which she took for a few days; and her bowels were opened with castor oil. A large blister was applied over the surface of the tumor, which was directed to be kept open with saviné cerate. In a few days her pain was so much relieved, and the purulent discharge had diminished so much, that I determined to institute more permanent counter irritants, and made two extensive setons, one in the loins, and the other more anterior. Her amendment from this time was very rapid; she was soon enabled to quit her room, and resume her domestic duties. In about

three months the tumor had so far subsided as not to occupy one-third of its former size, and the discharge of pus ceased except when she used more than ordinary exertions. I urged her on no account to suffer the setons to heal, and she attended to my advice for about six months, during which time she continued free from pain, and comparatively well. Conceiving herself perfectly restored, she now withdrew the setons, and suffered the wounds to close. Soon after this she was again attacked with severe pain in the region of the kidney, and having neglected to follow my instructions, she felt unwilling to apply to me. The disease made rapid progress, accompanied with very severe pain, but no purulent discharge. I was called to see her a short time prior to her dissolution. Her mouth was then covered with aphthæ, and she was rapidly sinking; the tumor in the loins had again become prominent, and was acutely tender to the touch.

On examining her, *post mortem*, the right kidney was found embedded in a large diffused abscess, which had extensively separated the surrounding muscles. The kidney was much larger than natural; its parietes were very thin, and bore no resemblance to its original texture. It contained a considerable quantity of pus, which oozed out at two ulcerated openings. In the pelvis and infundibula were several calculi, and a conical-shaped one obstructed the ureter, and prevented the pas-

sage of pus into the bladder. The left kidney and ureter were perfectly healthy, and there were no other diseased appearances worthy of attention.

If, in the case of Paris, there was any doubt that the diseased kidney and the formation of so many calculi originated in local injury, there cannot be any reasonable hesitation in referring the mischief in the present instance to the blow sustained in her fall. The same reasoning which I have employed in the former case respecting the healthy state of the other kidney, will apply with equal force in the present. The beneficial effect which resulted from the application of setons in a disease which had existed so long, and was so far advanced, much exceeded what could *à priori* have been anticipated, and affords a reasonable ground to hope that great good may be hereafter derived, in similar cases, from their more early adoption, and a more steady perseverance in their use. I do not pretend to say, that in this case a fatal termination might not have ensued even had the setons been kept discharging. Certainly, however, this most formidable disease was arrested in its progress, and completely held in check during their employment; further than this I am not prepared to state. To persons unaccustomed to the employment of setons and issues in diseases, the cause may appear hardly commensurate to the effect, and they may be inclined to refer the relief obtained in this case to some other accidental circumstance; but any

one who has witnessed the surprizing benefit which often follows their application in necrosis, in some diseases of the vertebræ and other joints, will hardly be sceptical of their influence in arresting diseased action in the kidneys.

I feel happy in having the high authority of that distinguished pathologist, Dr. Baillie, in support of this practice. A short time since he obliged me with the following particulars of a case of diseased kidney which occurred in one of the servants of her late Majesty. He had for a considerable time been liable to violent hæmorrhages from the kidney, which was perceptibly much enlarged and painful. Various remedies had been resorted to without any decided benefit, when a seton was ordered near the seat of the disease. Soon after its application the bleeding ceased for several weeks, and the enlarged kidney diminished much in size.

Other instances of renal calculi, apparently dependent on local injury, have occurred to me, the particulars of which I shall briefly state. In April 1819, Admiral D. called to consult me respecting a very painful affection of the legs, which he described as resembling the application of hot irons to the shin bones. He was very dyspeptic, and had a very foul tongue. A pill containing aloes, rhubarb, and soap, was directed to be taken at night, and an infusion of rhubarb with soda twice

a day; and he was desired to abstain from fermented liquors. His pain and dyspeptic symptoms were soon relieved; but in about three weeks he was suddenly seized with agonizing pain in the left kidney, shooting downwards to the groin, with tenderness and retraction of the testicle, an incessant desire to make water, and every concomitant symptom of the passage of a calculus from the kidney. Suitable remedies were resorted to, and in a few hours three calculi passed *per urethram*, composed of pure lithic acid, with a very fine coating of phosphate of lime. He now informed me that he had suffered from two similar attacks in Jamaica, and one on shipboard. The first attack occurred soon after receiving a very severe contusion in the region of the left kidney, by being thrown from his curicle against a projecting point of rock. Extensive ecchymosis followed the accident, which was very slow in being absorbed; and from that time he had never been quite free from uneasiness in the kidney. I consider this case as particularly interesting in illustrating the formation of calculi from local injury, as the Admiral had for many years been either living in a hot climate or on board his ship, both which situations are stated to be most unfavourable to the production of calculi. From his dyspeptic symptoms it is highly probable that he had a great predisposition to the disease, but there can be no doubt that it was immediately induced by the local injury. My treatment of the case was influenced by this view, and I am happy

to say he has experienced only one very slight attack since. I recommended him to pay very strict attention to his general health, and to use local warm bathing and friction, with a very stimulating linament to the loins. Should he have any return of the disease, I shall strongly recommend the use of a seton, combined with constitutional treatment.

I am at the present time in the habit of seeing a gentleman who has suffered greatly from pain in his loins, and has passed large quantities of lithic acid and mucus in his urine, ever since he received a violent strain in the loins by a man falling on him in the West Indies. He has derived great benefit from cupping and local warm bathing, combined with abstinence from fermented liquors and stimulating food, and paying great attention to his general health.

Mr. Langstaff has favoured me with the following particulars of a case of renal calculi: "The patient was 63 years of age, had been the mother of five children, and had enjoyed good health until Christmas 1813, when she had a fall during the severe frost, and injured her back, from which time she experienced severe pain in the loins, accompanied with difficulty and pain in voiding her urine, which was observed to be frequently of a milky colour. She had been under the care of several medical men, without experiencing any benefit. About six months previous to her com-

ing under my care, her legs became œdematous, and ascites formed, for which she was tapped in the London Hospital. From the violent pain she complained of in the region of the right kidney, distressing sickness, and there being scarcely any secretion of urine, it became necessary to afford her temporary relief by tapping, which was performed on the 17th of January 1815, when upwards of thirteen quarts of colourless fluid were drawn off. The sickness and dyspnœa abated shortly after the operation, but the pain in the loins, more especially in the region of the right kidney, continued, and an enlarged state of that viscus could be felt. The urine began to be secreted, but was mixed with pus, which was detected by its precipitating to the bottom of the *pot de chambre*, after standing. The bowels were kept gently open with castor oil, and a grain of opium given night and morning. A seton was established in the region of the kidney. Pain in the right kidney, and extreme torture in making water, were the principal causes of her misery, and the quantity of pus discharged with the urine was surprising, yet she had neither rigors nor hectic fever. About the 18th of February, the fluid in the abdomen had accumulated in such quantity as to increase her sufferings greatly, and at her request I drew it off on the 23d. Fifteen pints of fluid similar to the former escaped from an opening made with a lancet at the projecting umbilicus. She was again partially relieved, the urine mixed with pus

more copiously secreted, and her bowels more regular. Her powers gradually gave way, and she expired on the 28th of February.

“ *Examination.*—Coagulable lymph had been deposited thickly in a granulated manner over the whole inner surface of the peritoneum, as frequently happens in patients who have died of ascites or of chronic inflammation of that membrane. The liver was extremely small and solid, and its edges, instead of being thin and defined were obtuse and rounded. Its peritoneal covering was extremely thick, which prevented the color of the liver being seen; but a section shewed the whole substance to have a nutmeg-like appearance. Attention was next paid to the examination of the kidneys. The right was of an enormous size, and had the figure and shape of a very large egg of an ostrich. It was almost the largest viscus in the abdomen, having ascended to the concave surface of the liver and descended to the right ilium, and spread towards the vertebræ, so as to encroach on the vena cava. In consequence of the magnitude of the kidney, the cæcum was pushed from its situation in the iliac region; the right ovarium had formed a firm adhesion with the peritoneum, covering the kidney at its anterior part. There were likewise adhesions at its superior part, with the reflected portion on the under surface of the liver. The kidneys were removed from the body to be injected with size and vermilion, that the disease

might be more minutely investigated. The right kidney weighed two pounds six ounces. On removing the peritoneal covering, instead of the regular oviform appearance it before presented, it looked beautifully vascular and lobulated; the cause of the latter appearance was discovered on a section being made, when above a pint of thick healthy inodorous pus issued. The parietes of the kidney were not more than a quarter of an inch thick in any part. They were formed into sacculi of different sizes, from the matter having been prevented flowing with freedom through the ureter into the bladder, by a large calculus which occupied the pelvis and part of the beginning of the ureter. There was not the least appearance of the natural structure of the kidney; the internal part was very vascular, was thinly coated with coagulable lymph, and bore every resemblance to the cyst of a chronic abscess. The pelvis of the kidney and its continuation were highly inflamed, the bladder contained upwards of half a pint of pus, but the mucous coat was perfectly healthy, which proved the matter to have flowed from the kidney. A calculus weighing twelve grains was found in the pelvis of the left kidney, but that organ was capable, from its healthy structure, of performing sufficient secretion to supply the defect in the other, yet there is every reason to suppose that it would have become diseased in the same manner as the right if the patient had lived much longer, and the calculus not passed into the bladder."

The above instances will, I trust, be considered as sufficient to establish the fact of the formation of renal calculi being sometimes caused by local morbid action, induced by injuries sustained by the secreting organs. In further corroboration of this, I may mention a circumstance which I have often known to occur to different individuals, namely, the effect of horse exercise (particularly if not habitual) in producing a copious secretion of lithic acid, accompanied with considerable pain in the loins. I have frequently noticed the same fact in children affected with diseased lumbar vertebræ, arising probably from the neighbouring disease inducing an increased action in the kidneys.

The practical inferences which I should be induced to draw from the above cases are, that in all instances where the affection can be at all traced to local injury, we should combine local with general treatment, and endeavour to arrest the morbid action by the abstraction of blood, warm bathing, and counter irritants. Such a practice might perhaps be advantageously adopted in other cases not arising from injury, particularly where only one kidney appears to be affected, as although the disease may have originated from constitutional derangement, it is highly probable that the local diseased action may be kept up after that has subsided, particularly should there be any calculus in the kidney too large to pass by the ureter.

It has been very generally supposed that all urinary calculi are formed by a gradual precipitation from the urine. There are, however, some circumstances attending the formation of calculi in the kidney, which lead me to believe it probable that in some instances the calculous matter may be deposited immediately by the secerning orifices of the emulgent arteries, especially in such cases as have been related above, where there was such strong presumption of local morbid action. I was first led to this conjecture by the number of calculi which are occasionally met with in the kidney, which bears more the appearance of secretion from numerous points, than precipitation from a solution; as the latter would rather have a tendency to aggregate on a given nucleus than form so many fresh ones. On considering the subject, several circumstances seemed to favour such an opinion. In the case of Paris, and in one other instance, which I had an opportunity of examining, calculi were found in the tubuli uriniferi, where the urine can hardly be supposed to be detained a sufficient time to allow of any separation of its component parts. On breaking several renal calculi, their fracture presented a very different appearance from those which had been removed from the bladder. This is particularly well marked in the section of a vesical calculus with a renal nucleus. Cases are on record where the whole kidney was converted into a mere cyst, containing one or more enormous

calculi, and some pus unmixed with urine. Is it possible that in such cases the kidney possessed a power of secreting calculous matter after it had ceased to perform its customary function? A curious fact is mentioned in the Philosophical Transactions, which would seem to warrant such an idea. The case is thus related by Mr. Simmons:—
“ Eleanor Pelcher, 52 years old, about 25 years back, began to complain of pain in the loins, and soon after passed gravel and small calculi with much pain. In about ten years a swelling formed on the loins, which suppurated and became fistulous. Fifteen years from the appearance of the tumor the wound became painful, and after eight days a smooth calculus of twelve grains weight was extracted from it. The urine during all this time passed *per urethram*, but none by the wound, and from the time of the formation of the abscess no gravel passed with the urine. Six other paroxysms of pain have since occurred at different intervals, which have terminated in the passage of seven calculi, the least of them weighing six grains. During the intervals the patient enjoys ease and health. The right kidney does not appear to be affected.”
The phenomena in this case admit of being explained in two ways. It is probable, from the absence of calculous matter and pus in the urine, that at the time when the abscess formed in the kidney, the ureter became obstructed and ultimately obliterated. It would appear also that at the same time the kidney ceased to secrete urine,

as only matter passed by the fistulous opening in the loins, we must therefore either suppose that the calculi which came away at such remote intervals, had existed in the kidney for more than fifteen years, or that the vessels of the kidney which supplied the cyst of the abscess still possessed a power of secreting calculi.

There is yet one more circumstance which would appear to corroborate the opinion that the kidneys possess a power of immediately depositing calculi. The nuclei of a large majority of calculi, formed originally in the kidney, consist of lithic acid, though in many instances, as soon as they pass into the bladder, and sometimes even before they quit the kidney, the triple phosphates, or the oxalate of lime are deposited upon them. It is difficult to explain this on the supposition of the prevalence of any peculiar diathesis, yet it admits of a ready solution on the principle of local morbid action causing a secretion of lithic acid, which becomes a center of attraction for the salts of the urine, in the same manner as a clot of blood or a portion of bougie left in the bladder.

Lastly I would observe, that it is hardly consistent to deny the power of secreting calculous matter to the vessels of the kidney, which we know to exist in the vessels of other parts, as in the formation of gouty concretions, the deposition of calculous matter in the lungs, in the sublingual ducts

and various other situations, and the secretion of phosphate of lime in the surfaces of membranes and the coats of arteries.

It may, perhaps, appear, that it is a matter of no importance whether renal calculi are secreted by the vessels of the kidney, or deposited from the urine after it is formed. The subject, however, is so intimately connected with the previous question which I have agitated at the commencement of this paper, that I have been induced to dwell rather upon it, as I cannot but entertain a hope that in some of these most distressing diseases much good may be hereafter derived from a combination of local with general constitutional treatment, should it be proved that the kidneys may be primarily affected.

*George Street, Hanover Square,
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