by the irritation of alcoholic stimulant, the patient seeks to relieve the symptom by a fresh dose of the stimulant, and thereby increases and perpetuates the disease. The constant repetition of this process of exhaustion and renewed overstimulation leads to the most disastrous results, in causing chronic disease of the stomach and of the liver, with disorder of the nervous system. It is of no avail to attempt to relieve the weakened power of the heart, and exhausted nervous energy, if the patient persist even in moderate potations of alcohol; and, as a rule, it is the better plan at once to cease from all alcoholic stimulant; the stomach and the heart will then recover in a great degree their former energy and strength.

A sudden blow upon the epigastrium has been known at once to stop the heart's action and to produce instant death, and with almost equal power a shock from cold will stop the action of the heart; these, also, are instances of reflex action affecting the heart from peripheral disturbance.

We have thus brought before your notice pathological conditions of a very diverse character affecting the branches of the pneumogastric nerve supplied to the thoracic viscera. To mistake those which arise from a central origin, as from a local cause, is to misunderstand the whole character of the disease; so, also, if we refer those which are produced by peripheral disturbance to mere irritation in the parts only affected by reflex action, we fail to relieve the symptoms, because the treatment is misdirected, and therefore unavailing.

THE CROONIAN LECTURES

ON

THE PATHOLOGY AND RELATIONS OF ALBUMINURIA.

Delivered at the Royal College of Physicians.

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LECTURE II.—*Concluded.*

BEFORE proceeding to other questions, it may be well to inquire how often the renal fibrosis is concurrent with a similar change in other organs; how often it is merely one manifestation of a general fibrotic tendency from whatever cause derived; and how often the result of influences directed solely upon the kidney.

To take as a test one organ which is prone to fibrosis and easy of observation, we may ask how often the granular kidney is associated with cirrhosis of the liver. The records of St. George's Hospital showed that of 250 cases in which the renal condition was clearly described, the liver was cirrhotic in 37; a proportion of about 1 case in 7. In Dr. Grainger Stewart's cases of the same renal disorder, cirrhosis of the liver was found in 15 per cent., almost exactly in the same proportion; a proportion so small as to show that the instances in which renal and hepatic fibrosis are connected by a common origin, to say the least, must be few. Some degree of general fibroid increase is, perhaps, one of the results of age. But, of these, it is certainly one of the least conspicuous. I have been able to examine the tissues of three reputed nonagenarians; with these, fatty and atrophic degenerations were greatly more marked than fibroid hypertrophy. But, nevertheless, the nearly constant, though slight, inequality of surface which the kidneys, and, to a less extent, the liver, displays in advanced age is enough to suggest that the process which causes it belongs rather to senility than disease. As to general fibroid exaggeration ensuant upon alcohol, I need not here recapitulate observations which show that this process is very unequally distributed among the organs; the liver suffering much, as early exposed to the influence, the kidney little, as comparatively remote from it.

We cannot but conclude that, putting the associated affection of the arterial system for the present out of the question, the kidneys become the subjects of fibrotic change, in most instances alone, as the result of a morbid instigation proper to themselves, notwithstanding that other organs become involved in consequent and various changes.

It is next of importance to inquire how far we can distinguish the causes by which this organic change is engendered.

It takes its rise, in a vast majority of instances, in no cause which can be isolated, but in innate predisposition, or in some of the circumstances which belong to the common ways and even tenour of life. Hereditary influence, not so often to be traced as with some other

disorders, is occasionally strongly declared with this. I might cite the medical history of an ancient family, in which three generations, comprising seventeen individuals, furnished eleven subjects of chronic albuminuria, undoubtedly dependent on granular degeneration, though not ascertained to be so, as far as I am aware, by any *post mortem* examination. The disease affected both males and females. Four, who have already died with it, did so after having had the disorder for many years, in one instance for twenty-three, at ages varying from twenty-six to forty-nine. It has been remarked that a peculiar pallor by which the members of this family are characterised is noticeable in their portraits long antecedent to the period of which this record treats, or to which renal diagnosis extends.

Probably more prolific in the issue of this complaint is the influence of climate, which, to be most injurious in this respect, must be, as all our records of the geography of disease concur to show, of a Lacedæmonian temper, equally avoiding the extremes of heat and cold, neither arctic nor torrid, though within temperate limits presenting much thermometric variation.

It is scarcely necessary to support this assertion by reference to the prevalence of albuminuria in England, Germany, the Northern States of America, and Australia, as contrasted with its infrequency in Southern Europe, the coasts and islands of the Mediterranean, the Cape, and India. The liability of an organ to disease is, in some sort of proportion to its activity of function, as a machine becomes more apt to strain or break the more it is urged.

In hot climates, the skin and the liver take the stress of excretion from the kidneys; while it is probable that, in arctic and subarctic regions, these excretory organs are spared by the more perfect oxidation which answers to the demand for animal heat, and ultimately adapts to respiratory exhalation matters which in ordinary circumstances would escape in earlier stages of conversion with the urine.

From causes of disease inherent to race, or inseparable as their physical conditions from diverse parts of the earth's surface, we come to others which fall with a more partial incidence upon individuals. These may be generally classed as causes of congestion or modes in which a low degree of inflammatory irritation is brought to bear upon the organ.

To speak, first, of the easiest to trace, though, perhaps, not the most frequent or the most important, mechanical venous congestion has the priority. The induration of the organs, which results from heart-disease when attended with venous obstruction, was long ago described in its palpable results by Sir W. Jenner. Looking minutely into the condition of the kidney as found in such circumstances, an instructive series of changes presents itself. To the naked eye, hardness, redness, and increase of cortical bulk, tardily followed by small, slightly indented, and irregular granulation and corresponding diminution of volume. With the microscope, distension of the blood-vessels, a large accumulation of epithelium little different, save in its abundance and irregular detachment, from that of health, and these for long the only discoverable changes. It is apparently chiefly to the excess of epithelium that the characteristic hardness of the cardiac kidney is due. After a time, though often long delayed, a more permanent injury ensues in a thickening of the fibrous tissue, attended with a sparse and scanty development of connective nuclei, which show like the thin produce of an uncultivated soil as compared with the prolific issue which causes of a less mechanical sort engender. The patience with which mechanical or venous congestion is tolerated is marked with the kidney as with other organs. How small is the result of mere turgidity as compared with that of a special stimulant; a modicum of scarlatinal poison, or of cantharides, or a chance influx of cutaneous excreta! An organ is eager to respond to or to resent an appeal to its special function, and will draw to itself blood according to its purpose; but blood merely retained in a passive gland is but fuel without fire, the means of disease without the motive.

The fact that, from long continued or oft-repeated congestion of cardiac origin, the renal fibrous tissue is sometimes increased, is evident both in external granulation and in the intimate changes as displayed in section; but the process is slowly developed and is more partial, as well as more scanty, than when it has sprung from other causes; large tracts often remaining entirely unaffected, save by epithelial accumulation. The condition of kidney described is characterised during life by urine which is at intervals scanty, lithatic, and albuminous, and between times natural. It is usually of less importance clinically than the cardiac lesion. When dropsy gives evidence of both valvular and renal mischief, it usually happens that the valvular is primary, the renal consequent.

Another condition, acting also, apparently, by way of venous obstruction, is not in itself morbid, however attended with morbid results. The pressure of the gravid uterus upon the emulgent veins and vena

cava appears in certain individuals to cause a condition of renal congestion, and, if often repeated, of granulation analogous to that which results from valvular disease. It has been supposed by some writers that the necessity of getting rid of some excrementitious product of gestation is the chief cause of the renal embarrassment, but such a surmise would seem gratuitous in view of the congestive nature of the renal lesion and the obvious cause of venous obstruction which exists. The date at which the symptoms usually begin, after the uterus has left the pelvic and entered the abdominal cavity, their increase with the increasing bulk of the organ, the greater frequency of the affection when the structures have not been made distensible by antecedent pregnancies, these, taken together with the evidence of obstruction which is often presented, independently of albuminuria, in venous and oedematous swelling of the lower limbs, all these concur to assign the result, mainly at least, to mechanical causes. But the affection thus resulting has points of difference, pathological and clinical, from that of cardiac origin. Pathologically, in the greater proneness of the organ to fatty change, and in the more general development of interstitial nuclei which belong to the puerperal form. Clinically, the puerperal form is productive of symptoms which, though more transient, are infinitely more severe. The frequency of convulsions with labour, which appear to be almost invariably connected with this organic change, needs no assertion here. And it is to be noted that renal disease, when of this origin, becomes associated with secondary retinal changes with a frequency which is unknown with renal disease of any other derivation. Possibly this may be in some measure due to the increased vascular tension which belongs naturally to the condition of pregnancy, and must lend increased force to any disorder which morbidly exalts this condition.

Passing from the mechanical causes of the disease to others less obvious in their mode of action, the gouty condition is too well known as the associate and the antecedent of the granular kidney to need more than mere enumeration among the causes of the disease; and the influence of lead, scarcely distinguishable from that of the gout, which the absorption of this metal so constantly causes, has been so often dwelt upon of late, more especially by our distinguished Fellow Dr. Garrod, that any elaboration of this striking fact in renal etiology would be here out of place. So often does this form of renal disease come upon saturnine impregnation, that in this metropolis, if we may take the testimony of St. George's Hospital, more than 50 per cent. of those artisans who are exposed to it display after death the morbid state in question. To bear witness to so common a sequence, is easier than to explain it; lead works its way out with the urine; that it is an irritant is evinced by the occasional outbreak of acute albuminuria under its action; it may be, that a chronic inflammatory process is maintained by its continued percolation.

The influence of alcohol—not to speak too positively upon a question as to which there may still be differences of opinion—must be credited with some similarity of result; though the effect of this volatile poison upon the renal exit is, in whatever way we test it, immeasurably smaller than that of the stable and persistent metal.

And other causes, acting, as we must suppose these to do, by way of irritation or a low degree of the inflammatory process, discover themselves to our search, not in numerous results, but in such wise as to place their existence beyond doubt.

I have already shown how the fibrotic and granulating process may succeed upon the diffuse inflammation which scarlatina engenders; and cases sometimes occur—I have seen two or three—in which, though this exanthem has been immediately followed by no dropsy or by any ostensible sign of renal inflammation, yet health has broken down with the disease, never to be recovered, the failure marked by pallor, want of strength, and retarded growth, and ultimately by albuminuria, hypertrophy of the heart, possibly retinal hæmorrhage, and symptoms which tell unmistakably of renal and granular change. It would seem as if, in these rare instances, the febrile poison had fixed first upon the interstitial tissue, or, at least, had reached it after an affection of the proper secreting structures too slight to be noticed.

With similar infrequency, I have also seen cases in which the disease has slowly succeeded upon tropical intermittent fever; and it must be conjectured, though my own knowledge, at least, is too small upon this branch of the question to speak otherwise than doubtfully, that the intense congestion of the cold fit may set up hyperæmia of the kidney as of the spleen, which in the former organ may with repetition eventuate in hyperplasia of the fibrous tissue, and thus, after lapse of years, give rise to the marked condition of renal fibrosis of which the instances to which I refer have given evidence.

And, to touch upon another origin of the same glandular change, there is reason to suspect that it may be brought about by the prolonged influence of accumulated urine. In young persons, with whom in

ordinary circumstances the disorder is exceedingly rare, I have more than once noticed it in connection with a history of stone or a dilatation of the renal pelvis or of the ureter, which must have resulted from some former obstruction.

The boy Dodd was operated on for stone at the age of three. At the age of fourteen, he died of granular degeneration affecting both kidneys; one was, in addition, dilated obviously from urethral impediment.

The girl Tillet, again, who died of the same disorder at the age of twelve, presented a somewhat similar condition; the kidneys were unequally atrophied; the pelvis of the larger and the ureter of the smaller were dilated. A former obstacle was necessarily inferred, but there was no clue as to its nature.

Retained and decomposing urine has, as we know, the power of setting up about the renal blood-vessels points of intense and suppurative inflammation; and it is probable that the continued backward pressure of urine of any kind may have an irritating effect, chiefly manifested, as chronic irritations are apt to be, upon the interstitial tissue. Some degree of fibrous thickening is, indeed, often to be noted in a kidney long exposed to urinary pressure.

I have dwelt at some length upon the causes of renal fibrosis, both in consequence of their occasional obscurity and also in view of the questions which surround the disease in reference to its glandular and local or vascular and general origin. So far, it is clear that the granular or fibrotic kidney, though often without ostensible cause, is, in a certain proportion of cases, to be definitely traced to circumstances of mechanical congestion, or to others in which a more definite form of glandular inflammation must be held to take part. It has been shown that the fibrotic process may be left behind as a legacy or residuum by diffuse inflammation of the gland, and that its origin in other instances may be directly due to influences capable of causing glandular irritation—scarlatina, the poisons of lead and alcohol, and probably the irritation of retained urine. And it must be added that, however definitely the disorder can be traced to one or other of these accidents, the cardiac hypertrophy and arterial thickening are present in as marked a shape as when the origin of the disorder is equivocal or apparently spontaneous.

With the facts which I have attempted to catalogue in reference to the association, both of comparatively acute renal inflammation and also of the state of granulation or fibrosis, I may now approach, though with caution and misgiving, a vexed and difficult question. I have sketched the mere morbid anatomy of the arteries in connection with both disorders; I have yet to deal with the significance of the changes which have been described; whether directly consequent upon the glandular embarrassment; and, if so, whether there be any clue to guide us to their mode of production; or whether connected with the renal change only as the parallel results of a common cause. These questions may fitly be discussed before proceeding to the consideration of the lardaceous disorder, since the special cardio-vascular change of chronic albuminuria, constantly as it accompanies the forms of the disease hitherto considered, appears to have only an occasional and accidental connection with that which is to follow.

It is necessary to inquire, first: Whether the state of vessels which may be briefly designated as albuminuric is directly produced by renal disease, and traceable to causes which act by way of inflammation or otherwise separately upon the glands in question; or whether the arterial and the renal conditions are common results of a general fibrosis which has its origin not in causes local to the kidneys and obvious in their nature, but of a sort not to be more narrowly defined than as producing changes allied with those of age.

I will recapitulate the observations which bear upon the reply.

The albuminuric change of vessel is generally present not only with the granular or fibrotic kidney of advanced life, but as constantly and in as marked a shape where the same renal condition occurs as a disease of childhood at ages ranging from six to fourteen, where deteriorations akin to those of age are, to say the least, unlikely.

And among such early cases in those where there is reason to look upon the disorder as a late result of scarlatina, or possibly of urinary obstruction, the arterial condition is none the less to be found.

Further, the albuminuric thickening of heart and vessels less advanced, but in its degree unmistakable, occurs in connection with the diffuse nephritis consequent upon scarlatina or cold, which begins abruptly with acute dropsy and terminates with the large smooth kidney. And the evidence afforded by these cases is scarcely rendered less conclusive by the circumstance that more or less interstitial nucleation or incipient fibrosis is nearly invariable with those of which the fatal ending allows the vessels to be made the subjects of observation. The circumstances in which the nucleation has originated, the youth and previous health of the subjects, and the inflammatory concomitants

of the disorder, are such as to show that it is the result of local disturbance, not general deterioration.

And it has been further shown, both by Dr. Galabin and by Dr. Sibson, that simple hypertrophy of the heart, which may probably be taken without error as an index of the cardio-vascular change, may result from the incapacitation of one or both kidneys by calculous disease. I can see no escape from the conclusion that disease, at first local to the kidneys, may be attended by, or, in other words, may produce, the vascular and cardiac thickening. And, as to the *modus operandi*, none other can be suggested than functional disturbance of the gland.

To take note in passing of a prominent clinical landmark which opens to our view, it may be accepted as a general truth, that hypertrophy of the heart in connection with albuminuria is a sign that the kidneys, however affected originally, have become the subjects of fibrotic and irrevocable disease. The association is, no doubt, partly one of time. When the disorder has lasted long enough to thicken the ventricle, it will almost invariably have extended to the interstices of the gland.

To speculate on the essential nature of the cardio-vascular change, it has been shown that, though differing in degree, it is similar in kind, whether the renal affection be of inflammatory origin or have begun, however obscurely, as granular degeneration. The change is compounded of muscular thickening, arterial and ventricular, which deserves in both situations to be called hypertrophy, notwithstanding its admixture in the arteries with degenerative changes, and, as coincident with or successive upon it, an exaggeration of the outer or fibroid sheath which is as truly as the muscular coat hypertrophied. These structural alterations are concurrent during life with increased tension or tightness of the arterial system. Where there is no increase of tension, to anticipate a fact with regard to the lardaceous disorder, there is no arterial or cardiac thickening. When both ensue, and the time of their accession can be observed, as happens when they succeed upon an inflammatory attack, the tension appears early, the hypertrophy late, in the disease. Thus, it is impossible to attribute the tension to change of structure; but, on the other hand, the two may be the consecutive results of a common cause, or the change of structure may be directly due to the increased tension. Whether we seek the cause of the cardiac hypertrophy or of the arterial tension, we can find it only in obstruction. After what has been recently brought before the College, I need not recur to the evidences that the increased tension of Bright's disease depends upon retardation of the arterial outflow. Bright, with a sagacity which served him in the place of microscope and sphygmograph, was led by the cardiac hypertrophy to infer the existence of this condition, and to attribute it to a difficulty with which the impure blood penetrated the capillary vessels. And at present the only question which calls for consideration is, whether we are to place the difficulty with Bright in the capillaries, or with Johnson in the arterioles. In the view of the later pathologist, one to whose observations, however we interpret them, a large importance must be attached, the circulating system is the seat of divided councils. The arteries resent the contact of the impure blood, seek to shut it off from the tissues by an action which has been likened to that of a stopcock, and by their continued efforts become hypertrophied. The heart at the other end becomes hypertrophied by its endeavours to overcome the resistance thus occasioned.

If we regard, however, the ventricle and the arteries, as the facts of comparative anatomy enable us to do, as but the subdivisions of one contractile vessel for the propulsion of the blood, which act not antagonistically, but in unison, an arterial effort succeeding upon and carrying on that of the heart, it becomes difficult to conceive a perversion of function such as this theory supposes. We may fall back upon the elder hypothesis, locate the hindrance in the capillaries, and assign it to a loss of fluency in the unpurified blood, a want of consent between it and the tissues, or in some other mode to a lessened facility of capillary transmission.

In this hindrance, whether in arteriole or capillary, in the smaller vessels or the smallest—and, perhaps, it matters practically little in which we place it—it is easy to see the explanation of the complicated change. We may, as of old, attribute the ventricular hypertrophy to the difficulty with which the heart empties itself; and with as obvious reason extend the same explanation to the hypertrophy of the arteries. The fibroid thickening, no less real than the muscular, may feasibly be assigned to the increased pressure of the blood against the arterial wall and the consequently increased soakage into it. The arterial coats are normally nourished by this process, and it is consistent with all we know of the effects of congestion elsewhere to attribute fibroid hyperplasia to its exaggeration. It is possible that the change in the muscular coat may be somewhat helped by this process, more especially in imparting

a want of distinctness or appearance of fusion to its elements. As touching the degeneration early found in the nuclei, later about the inner aspect of the muscular coat, and possibly at last universally, this may, perhaps, be fairly attributed to the irritative effect of the unpurified blood. An irritant in the blood, whether excremental or alcoholic, will cause atheroma, and may be credited with the allied result in fatty change of nuclei and fibre.

But, thus to trace the cardio-vascular change directly to renal incompetence, does not exclude the possibility that it may have other modes of origin. Cases present themselves, and by no means unfrequently, in which the lesion of vessel is marked by cardiac hypertrophy, retinal hæmorrhage, and hardness of pulse, and with which, nevertheless, the urine is either free from albumen or contains but a scarcely appreciable or intermittent amount. I think it is not to be doubted that in such the disease is less often absent than hidden, not declared by external symptoms, though effective in its internal results. Albuminuria is no such constant sign of the granular kidney as of tubal disease. Even when the gland is hopelessly crippled by interstitial growth and death by uræmia is impending, the urine, whatever be its faults of deficiency, may, if not critically examined, pass as free from albumen. The vascular mischief, therefore, is often associated with latent renal disease. Whether it ever occurs independently of renal disease, is as yet *sub judice*.

THE GOULSTONIAN LECTURES ON THE NATURAL HISTORY OF PULMONARY CONSUMPTION.

Delivered at the Royal College of Physicians, London.

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LECTURE II.

MR. PRESIDENT, FELLOWS, AND GENTLEMEN,—In my first lecture, I attempted to show that certain cases of disease included under pulmonary consumption by writers living in different countries and at different periods of time—all of them workers of the most trustworthy authority—ought not to be classed under that affection. My reasons for taking up that position were, that in none of them, or at any rate in the most typical cases, could death be said to occur from disease of the lungs; that the series of clinical symptoms was essentially alike in all, and absolutely characteristic of a disease to which the term “tuberculosis”, if it be preserved at all, may be given, but given only as a name for a certain and well defined group of symptoms, and not in relation to any particular growth or product. I stated reasons why I am prepared to hold, with Buhl and others, that this disease is one of infection, never causing independently any peculiar destruction of lung-tissue; and I think I demonstrated that, excepting in cases where the disease supervenes, as sometimes it does, on some former destructive affection of the lungs, the most marked characteristics of pulmonary consumption, as defined by Aretæus, by Sydenham, by Morton, were absent. Almost every writer without exception tell us that there was no emaciation; that the lungs, beyond being more red than normal, and surcharged with innumerable minute granulations, were sound. Bayle (*op. cit.*, p. 130; Barrow's translation, Liverpool, 1815, p. 143), in contradiction of his own definition of phthisis, exclaims in reference to his second case, that of a postilion aged 24, who died from apnoea twenty-two days after being attacked with a dry cough, his lungs being found crammed with miliary granulations, “In the beginning of November, the cough not having yet commenced, where is the physician who, on examining this young man, who seemed to enjoy the finest health, and whose chest was perfectly well formed, would have suspected a consumption?” And it was from cases of this kind, as compared with others of which I shall speak to-day, that I hope to show that this is never the commencement of the ordinary phthisis of this country. Therefore it was that I insisted that the terms “tubercle” and “tubercular”, vague in their primary use, have become vaguer in their secondary one; and in any degree I have been able to assist in encouraging some strict definition of terms so commonly used, I shall not have wasted time in a fruitless strife of words.

I pass on to consider the ordinary form or forms of consumption, keeping before me the definition of Morton, to which may be added