AN ADDRESS ON CASES OF VALVULAR HEART-DISEASE LONG FREE FROM SERIOUS SYMPTOMS.

Delivered before the Birmingham and Midland Counties Branch.

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(Continued from page 10.)

3. I PASS, next, to consider cases of valvular disease in the adult, due to strain, or to strain together with alcoholic intemperance and hard living in general, including cases of traumatic valvular disease. Of these, it may be said that they are naturally less likely to be void of serious symptoms than other forms of disease. They occur in men chiefly, and in those whose occupation is laborious, either as athletes, soldiers, or working men. It is often impossible here to separate exactly the influences due to strain alone, and to strain *plus* alcoholic intemperance and imprudent living. Hence, I take them together. Exception may be made in the cases of young boating men or amateur athletes, where the early symptoms are palpitation, with evidence of overdistension of the right heart, and of hypertrophy of the left ventricle. In the cases of young soldiers and marines, a certain number are annually discharged from the service from these causes; and the troubles are plainly induced, usually within a year or two of joining, by hard drill, heavy accoutrements, and tight clothing, together with much alcoholic excess and debauchery. And all these causes come to operate together on youths often ill-nourished, too young for the duties of fully grown and developed men, begun at the age of sixteen or seventeen years. If our recruits were taken at the age of nineteen, and suitably dressed, fewer of these cases would occur. These facts are familiar to military surgeons, but the authorities pay little heed to their reiterated remonstrances. Later on, in military life, the influence of syphilis comes in, and aneurysm results. Instead of meeting this grievous damage, Parliament yields to a sensational clamour; and withdraws the only protection from this scourge, hitherto extended to our troops, in the form of the Contagious Diseases Acts, and does so deliberately, in the face of all the opposition that can be raised by the profession at large, and by naval and military surgeons in particular. It is noteworthy that much less cardiac disease from strain occurs in the Royal Navy. The reason for this is, that seamen are suitably dressed for hard work, are trained gradually, and hardened by more wholesome and bracing surroundings.

It is important to follow up cases of early exposure to strain. With care and good treatment in the upper classes, no permanent injury results; but, if a living must be gained by labour, valvular disease progresses, and these cases are never after free from symptoms more or less grave. Well-fed country-bred youths withstand these evil influences better than town-bred lads. Hence the importance of securing recruits in the agricultural districts, and training them at country depôts. Again, the evils of cardiac strain are seen in young soldiers sent to the tropics to do the work of mature men. The officers may begin life in the tropics at the age of 20, or even earlier, with impunity, having no heavy labour; but facts in my possession show that, to get the best work out of men in the tropics, none should begin military or heavy duty there till the age of 23 or 24. Their prospects in the face of all tropical vicissitudes are then much brighter.

Cases to which I now allude have been well studied in the great centres of industry. Dr Clifford Allbutt, Surgeon-Major Myers, and Dr. Fothergill, have elucidated them. They are not such as to furnish examples for our purpose, since symptoms, usually serious, pertain to them from the date of the foundation of the mischief, and only disappear upon prompt and intelligent treatment. The changes are perhaps oftenest primarily in the muscular walls, and secondarily in the valves; but cases occur where the valves suffer in a general degenerative aortitis—a lesion significant of strain *plus* alcohol, and perhaps, sometimes, *plus* syphilis. It may be regarded as a premature senile change. With cessation of exertion, the latter may not supervene, and the hypertrophy may subside; but if no care be taken, valvular sclerosis sets in, and permanent lesion remains, demanding

hypertrophy to maintain the circulation. It is in these cases that traumatic mischief may occur; an indurated valve gives way, and the most grave symptoms set in at once. In these cases, life is seldom prolonged, and death may occur in a few days. One case, however, lived for five years. It is probable that a healthy valve hardly ever ruptures; hence, in any given case, we may safely assume the pre-existence of damaged structure.¹ Men in middle life are the common subjects of this lesion, and the aortic valves rupture more frequently than the mitral curtains.

I may refer here to the well known and ingenious view of Dr. Balthazar Foster respecting recognition of ruptured non-coronary aortic cusp, and the prognosis which he founds thereon. I think myself that many more cases are required to furnish absolute proof of his opinions. The idea that the coronary arteries are filled mainly during aortic systole is not held by physiologists. And with respect to the conduction of aortic regurgitant murmurs, I may say that I regard it as the rule to find them well conducted down the sternum, and conveyed along with the blood-current back to the left apex. The intervening right ventricle prevents their being well heard between the xiphoid cartilage and the apex.

Instances in support of these facts may be found in the *Transactions of the Pathological Society*.

4. I take up, next, valvulitis in connection with renal disease, and as associated with general arterio-capillary fibrosis. This represents a large and increasingly recognised class of cases. The cardiac changes are dependent on, or associated with, chronic interstitial nephritis, and result from increased intra-arterial tension. The mitral valve and the aortic cusps both suffer; the former, after hypertrophy of the left ventricle has occurred, and the latter, after long subjection to increased impact of the column of blood upon them in diastole. Sclerosing changes set in and make progress; shrinking and insufficiency result in due time.

These are the cardiac manifestations of the gouty diathesis, and are often associated with granular, so-called gouty, kidneys.² For the most part, therefore, they are seen in, or after, middle life, but, in exceptional cases, are found at an earlier period, especially in cases of strong gouty inheritance. They are less often met with where there have been regular and honest attacks of gout, and where the patients have been prudent and well-advised as to their health and habits. There is evidence to prove that intemperance in food, as well as in alcoholics, may set up these changes, and exposure to cold is likewise answerable for them. Mental worries and grief seem to excite, and certainly to intensify, these states, as pointed out by Clifford Allbutt.

Such degenerative change often seems to be but a form of senile decay in certain persons, and life may go on to the tenth or twelfth climacteric period if care and easy circumstances be secured. Winter residence in mild climates adds much to the hopefulness with which such cases may be regarded in the well-to-do. Amongst the lower orders the prognosis is necessarily bad, yet the comfort and shelter of the modern union infirmary do much even for them, as a visit to such institutions abundantly proves. Amongst these patients are to be found many, chiefly men, carrying on active lives. One such, now under my care, is an active country parish priest, who conducts all his services without help. He has had aortic regurgitation for five years to my knowledge, without any cardiac symptoms. Hæmorrhage into his left eye, with detached retina, demanding removal of the eyeball, has had no warning for him, and, though aware of his precarious state, he means to die in harness. He is a very spare man, aged 70, and very abstemious in his habits.

The immunity from grave symptoms in these cases depends on the general constitutional state (the personal factors, as I term them), of which I shall speak when I presently sum up my remarks on the whole of the problem before us.

5. I refer, next, to cases of valvulitis in connection with anæmia. Not much is yet known about this. The subject is difficult, and the less *post mortem* fruits we gather, the better. Evidence is, however, accumulating to show that, amongst the results of anæmia, a measure of damage to the mitral and aortic valves occurs. The mischief probably ensues upon the dilative changes so common in the left ventricle in cases of grave anæmia. Undue tension in the valves leads up to sclerotic change. Dr. Goodhart has well-studied this subject (*Lancet*, March 27, 1880, p. 479). The pulse is often of high tension in

¹ Vide a case reported by Dr. Burney Yeo, in which rupture of an aortic valve occurred in a man, aged 45, as the result of a fall. There was history of chronic bronchitis and rheumatic pains, but the man had never been laid up. No immediate symptoms followed. (*Clin. Soc. Trans.*, vol. vii, p. 155, 1872.)

² "Gout has appeared to me to be the surest and most abiding condition of actual suffering and neurotic distress within the cardiac area, but it is rarely a demonstrative cause of static change in valves."—WALSHE.

anæmia, as I have observed, though this is hardly as yet recognised; and if the blood-state be not soon remedied, the results of prolonged intra-arterial pressure fall upon the valves most involved. Early and active treatment is thus imperative; and I would here interpolate the remark that, in my experience, it is far too common to find anæmia treated very inadequately. Medication by chalybeates is played with in a trifling manner, and much unnecessary, and sometimes dangerous, delay in the recovery results. Dr. G. W. Balfour has called attention to this point.

Dr. Walshe tells me he has no experience of valvulitis induced by anæmia (spanæmia) pure and simple, but he recognises, as do all pathologists, grave changes in the nutrition of the cardiac walls in consequence. I am inclined to agree with Dr. Goodhart in believing that anæmia is a probable factor in some cases of mitral stenosis, and that it may account for the greater frequency of this lesion in the female. Prognosis here will depend upon the prompt and efficient treatment of the anæmia at an early stage, care being taken that the patient is allowed to rest, and to have her blood restored to normal corpuscular richness before she passes out of sight.

It is probable that animals are long the subject of cardiac valvular disease, without the supervention of serious symptoms. A Dandie Dinmont terrier of my own has had a loud mitral murmur for three years, and is, apparently, in no way the worse for it. An experienced veterinary surgeon informs me that he has known horses, the subject of valvular disease, to continue at work, being carefully tended, for three years; and Mr. Robertson, Principal of the Royal Veterinary College, tells me that he has known horses, so affected, able to do moderate work for twelve or eighteen months, without serious inconvenience, proofs of the lesion being afforded after death. He believes that, in many instances, they work for much longer periods. The cases are, moreover, seldom discovered before some important symptoms supervene. Horses and dogs are subject to rheumatism, and strain is an element in the production of valvulitis in both. Mr. Robertson has also known valvular disease to be well borne for lengthened periods in dogs.

6. I consider, lastly, and briefly, the subject of syphilis, in relation to hopeful cases of valvulitis. It is only of late that the whole question of visceral syphilis has been studied. Seventy-five years ago, Corvisart suspected that some valvular vegetations were of syphilitic nature. (*Op. cit.*, p. 217.) Recent observers have, however, found growths of this nature more certainly in the cardiac walls than on the valves. One case, shown as syphilitic valvulitis, affecting the aortic cusps, was brought forward by Dr. Learé (Path. Soc. Trans., 1868), but Drs. Burdon Sanderson and Cayley, after examination, decided against this view. Walshe and Gowers think the matter is not yet proved. I have notes of a case in which gummatous growths were found in the left ventricle and septum of the auricles of a woman, aged 25, a prostitute, who had died suddenly. There were scars in the groin. (Edinburgh Royal Infirmary, June, 1862.) Hanteraux describes a case in a man, where there were thickenings in the mitral and tricuspid valves, but he allows that the valves and orifices commonly remain intact in syphilitic affections. (*Treatise on Syphilis*, New Syd. Soc., vol. i, p. 319.) I regard the following case as one, possibly, of cardiac syphiloma. A medical man, aged 26, came under my care for a cardiac murmur, which he could hear when he was excited, or held his mouth open. His personal and family history was good. There was no history of rheumatism. The murmur had been detected a year previously, in 1871. He was passed for life-insurance in 1870. A systolic murmur was audible in the aortic area, and up the carotids. There was no indication of hypertrophy. Dr. Walshe diagnosed aortic stenosis. There was history of syphilis six years previously, followed by sore-throat and squamous rash. No mercury or iodide of potassium had been taken. I believed it probable that there was a gummatous growth about the aortic valves; or in the cardiac wall adjacent, and ordered iodide of potassium. He had very trifling symptoms, palpitation being worst after exertion, or a full meal. I heard no more of this case till some weeks since, when the patient wrote to say he had had no trouble with his heart since 1872 (fourteen years ago). He can still hear the murmur when in bed, or lying on the right side. He leads an active life in practice, much in the saddle. He was passed, without extra premium, at an insurance-office six years ago, in London. If this case be truly of syphilitic nature, it may afford a clue to the prognosis attaching to such lesion. The gumma may have disappeared, and some scar-tissue perhaps occupies its place.³ With the influence of syphilis on the

production of aneurysm we are not now concerned. Dr. Goodhart is of opinion that aneurysm in women is commonly due to this cause.

To sum up the whole question we have been considering, and to bring this very imperfect sketch of the subject to a close, I may remark that a diligent search amongst cases of cardiac valvulitis appear to bring out the fact that a favourable prognosis, for many of them, may be given. Certain valvular lesions have their special perils, and these pertain to certain individuals more than to others. At some epochs of life, too, the prognosis is graver than at others. In each case, however, the great point is to determine the personal factors which promise longevity, or immunity from cardiac failure. As Corvisart put it: "C'est après la constitution de l'individu, son genre de vie. . . qu'il pourra prononcer sur le terme fatal." (*Op. cit.*, p. 408.) And this question, indeed, meets us, I believe, in every case of disease we are called to treat. What does this malady mean in this individual? What will it do for him, and how will he bear it? The great law of compensation is now well understood to be the protecting agency in all these cases. So long as nutrition is well maintained, and a regular, prudent, and equable life is lived, so long will cardiac valvular lesions fail to give rise to serious symptoms. Dr. Semple has the credit of having called attention, thirty-six years ago, to the fact that many persons reached advanced age, although suffering from heart-disease, many of them being quite unconscious that they were the subjects of it. (*Op. cit.*, p. 104.) What we have to try to discover, are the conditions which render tolerable the lives of persons so suffering. The lesions of each valve affected require a special study. The question how far compensating changes behind the valves can be met, must be answered in the case of each valve, and in respect of the textural habit of each patient. Discrepancies occur in the opinions given as to the relative gravity of the different forms of valvular disease.

These are to be explained by the fact that certain cases, presenting the worst of these lesions, or combinations of them, are fortified against the evil issues of them by favourable personal factors. The prognosis for each case has to be made after careful consideration of the peculiarities and tendencies of the particular individual. The tendency to embolism in proliferative valvulitis must not be lost sight of in some cases, and the frequent association of anginal symptoms with aortic mischief must be duly considered. Difficulty in prognosis, in any given case of reflux, arises from the frequent inability to estimate its extent. Audibility of the second sound in the carotids is believed, I think with justice, to indicate that aortic regurgitation is not great. (Sibson and Broadbent.) A well marked "aortic" pulse, with visible pulsations in the arteries, may be taken as indicative of serious reflux. Byrom Bramwell (*Diseases of the Heart*, p. 518. Edinburgh: 1884) thinks the average prospect of life better in aortic reflux than in mitral lesions, and the risks of complications less. With most modern writers, he agrees in thinking the prospects better in cases of endocarditis, and in youth, than in those due to degenerative changes in more advanced life.

In aortic stenosis, we have seen that the prospects are not unfavourable in many instances. In mitral disease, evidence is forthcoming to show that, with good compensation, cases may go on favourably for many years. The worst combination is that of obstructive and regurgitant disease. This commonly indicates that the lesion is not stationary; and failure of power, in the cardiac walls, too often rapidly supervenes. These cases are never free from serious symptoms. A better prognosis attaches, therefore, to instances of valvular disease in which we meet with single murmurs, and, commonly, *quæ* murmur, the louder this is, the better the prognosis. As has been long taught, the elements of prognosis in all cases are to be found in the nutritive conditions of the cardiac walls rather than in those of the valves themselves; and as these are naturally better in youth than in advanced life, the prospects are, on the whole, better for the former than for the latter. We must not look beyond our clinical studies, in their widest sense, to find the elements of our prognosis. Large and varied experience in all ranks of life will alone enable the observer to form trustworthy opinions. Careful study of family histories, of the points respecting heredity in each case, and of the quality and resisting powers of the tissues of the individual, will furnish, not only the safest, but the sole means of prognostication. Nor may we ignore the place which rational therapeutics occupies in aiding our anticipations in any given case. This, for me, means more than mere drug-giving, though this is of high importance, and includes the aversion from the patient of all the malign influences that may beset him.

We may learn caution in these proceedings from the shrewdness of Peter Mere Latham, who wrote that, "Neither what we know of the

³ There is a specimen of gummata in the heart in the Museum of St. Bartholomew's Hospital, taken from a man, aged 38. They are seen in the left ventricle. The small flap of the mitral valve is involved at its attachment by the new growth.

pathology of valvular diseases, nor what we know of their clinical history, will allow us to set up absolute rules of judging what will be their consequences and events in all cases, or how far they can or cannot be postponed. (*Op. cit.*, p. 239.)

We may also take heed to the wisdom of Stokes as expressed in the following passage: "The practitioner should never forget that local diseases, themselves incurable, may co-exist with an excellent state of the health for a period indefinitely long." Inasmuch as we may now fairly claim to approach the study of heart-valve disease with fuller physiological knowledge, and more exact diagnostic method, than were available either in Latham's or Stokes's time, we may not unnaturally expect to begin a new, and, I would submit, a more hopeful chapter of prognostics in relation to it. To all, then, who will aid in this inquiry, I say "*Ausculata et perpende.*"

AN ADDRESS

ON

WORTHING: ITS CLIMATIC AND SANITARY CONDITIONS.

Delivered at the Annual Meeting of the South-Eastern Branch,

By WILLIAM J. HARRIS, M.R.C.S. Eng.,

Senior Medical Officer to the Worthing Infirmary: President of the Branch.

My few remarks will be principally confined to the rise and progress of this town, more especially since it came under the Public Health Act in 1853, giving you a short statement of its geology, meteorology, and climatology, together with an account of the drainage and water-supply, remarks on certain epidemics which have occurred, and also mentioning the benefits through which the place and neighbourhood seem to be of service to those who sojourn here either for pleasure or for health.

Aspect.—The town of Worthing is situated in latitude 50.49° N., and longitude 0.22° W. The situation of the town is as due south as possible, fully exposed to the direct rays of the sun; its height above the mean sea-level being but a very few feet. The South Downs, being somewhat about two miles to the north of the town, and running from east to west in a somewhat curved form, rising, too, to a height of from four to six hundred feet above the sea, tend to shelter the place considerably from the north and north-east winds. The plateau, too, upon which the town and the surrounding neighbourhood is situated, is really never hot in summer-time as many other places are; for, owing to the receding tide, a vast amount of evaporation takes place, and consequently a "sea-breeze" is developed every day, and possibly when least expected. This is usually quite local, and sometimes does not extend a mile or so inland.

Geology.—The ground upon which Worthing and other places along the coast westward of Brighton are built, is of recent formation, being composed of gravels, sands, and loam belonging to the post-pleistocene series. This portion of the county, called the "Sussex Levels," is distinguished by low cliffs and broad estuaries. The lower strata of land and sand, known as the "Woolwich Beds," is topped by the "chalk," which rises gradually into hills, known locally as the "Downs," and especially prominent in this neighbourhood is Chanctonbury Ring, rising 814 feet above sea-level, about six miles north, and Cissbury, three miles north, 600 feet above the sea. Upon digging wells here, good water has been procured at from eighteen to twenty-five feet. There is found from four to ten feet of surface-soil, containing from two to three feet of good mould; the rest is loamy brick-earth, mixed more or less with rolled flint-stones. This may be the remains of an old beach, but no shells are found. Beneath this stratum lies the "marl," consisting of broken chalk and flints, in which water is found; but in most cases it is necessary to penetrate about seven or eight feet in order to get a proper supply.

Meteorology.—A complete series of meteorological observations have been recorded here for the last thirty-three years. The late Dr. Barker's records comprise the fifteen years 1853-1867, and my own for the following eighteen years 1868-1885. I am sorry to say that, during a portion of that period, the records have not been fully worked out, namely, 1875-1879 inclusive, but the mean atmospheric pressures and the mean temperatures which have been deduced by Mr. Buchan, of the Scottish Meteorological Society, for the eighteen years 1857-74—

calculated on twenty-four years ending 1880—are sufficient at present for comparison with all the stations in the United Kingdom which are given in his tables ending 1880.

With the year 1880, however, the Royal Meteorological Society started their series of "Climatological Stations," the number of which, at the commencement of this year, was fifty-six. There is no doubt that, in the course of time, this series of stations will prove a valuable means for obtaining information as regards the climatic condition of towns and their surrounding neighbourhoods. In this branch I should like to see a few more stations, especially along the coast. Taking the map of the three counties, I find that Margate, Ramsgate, Tunbridge, Tunbridge Wells, Norwood, Addiscombe, Beddington, St Leonards, and Worthing, are on the list. Eastbourne and Brighton report through the Registrar-General, and Dungeness—which has taken the place of Dover—is in direct telegraphic communication with the Meteorological Office.

The following are the mean readings of various instruments for a series of years; and for comparison sake I will take Bournemouth—4 or, as I believe, now Southbourne-on-Sea—where the observations have been more recently recorded by Dr. Compton. The mean yearly reading of the barometer reduced to 32 degrees at sea-level for eighteen years, 1857-74, and calculated on the mean of the twenty-four years ending 1880, is 29.972 inches. The mean yearly reading of the thermometer in the shade for the same period, and calculated at the same ratio, is 50.5; that at Southbourne is 50.1, at Bournemouth 50.3; and at Hastings 49.9. The mean annual rainfall for twenty-four years 1860-83 was 29.05 inches; that at Hastings for the same period 29.01 inches. For twenty years 1866-1885, as recorded by myself, the mean annual fall was 28.20 inches.

For determining the climate of any locality, the highest, lowest, and mean temperature must be ascertained, and the observations carried on for a considerable number of years. The relative humidity, the total rainfall, and number of wet days, together with the range of temperature, all have to be taken into consideration. The influence of ozone, as well, acts as a great factor, as, in its oxydising effects, it is a strong disinfectant of the atmosphere. On this coast, it is always fully and freely developed, especially with the winds off the sea, and principally from the south-west.

Drainage and Water-supply.—A new and complete system of drainage was commenced and carried out in the years 1854-55, after the town came under the Public Health Act. It was found, after some years, that this system had its defects, inasmuch as all the sewage gravitated to the north-east part of the town into a "sumpt" and a so-called sewage-well. From this well its contents were duly pumped into an out-fall sewer, which emptied itself into the sea about one and a half miles eastward of the town, just below the beach, and was left to be washed away by a stream of water emptying itself there as well.

About the year 1875 or 1876, it was determined by the Local Board that a new plan should be adopted, and this was finally brought into operation in the year 1877. It consists as follows. The whole of the drainage of the district finds its way to the north-east part of the town by gravitation. Thence it is conveyed by a new sewer across the park and through the brooklands direct to the sea for about a mile and two-thirds, passing through the beach in cast iron pipes down to low water mark of ordinary spring-tides. This main outlet sewer will retain the whole of the sewage between the tides, with the exception of storm waters; but such overflow is allowed for by three-eighths inch pipes being placed to discharge the same into the brooks. This main outlet sewer is three feet six inches in diameter, and on it there are fourteen surface ventilators, varying from twelve to eighteen inches in diameter. Throughout the town in the various tributary sewers there are seventy-six ventilators on the surface of the streets—one eighteen-inch stack, one twelve-inch, and one six-inch, in connection with, and emptying into the chimney stack at the Works, and in various portions of the town there are twenty-six six-inch ventilating pipes up the sides and gables of houses, and other suitable positions. All new houses, and most of the old ones, now have their soil-pipes properly ventilated, and, as there is no trap at the bottom of any of them, a more free exit is given for the escape of gas from the sewer. In all houses, too, both the scullery, bath, and waste-pipes are totally disconnected from the drains.

The main sewer is regularly flushed at spring-tides by the sewage being penned up until low water by the "penstock" at the outlet being closed, and then quickly opened; the tributary sewers are regularly flushed by the flushing valves being worked in a similar way as the "penstock," and always at low water.

All closets now (and also most of the old ones) are provided with a distinct flushing apparatus, consisting of a "vacuum" water-waste