

Justin?
2/0

Heart disease in Insanity.

1.

In this paper I wish to touch upon certain points with regard to the relationship between heart disease and insanity. During a short assistantship in and a much longer acquaintance with Carmarthen Asylum I could not help being struck by the large proportion of patients who were the subjects of heart disease, as evidenced by clinical examination during life and post mortem records, and was led to look for some cause for such frequency. In this paper I shall Endeavour (1) to show evidence that heart disease is of greater frequency in the insane than in the sane (2) to discuss the possible bearings of cause and effect and (3) to touch upon certain peculiar characteristics which are said to exist in insane persons with diseased hearts. In addition to the postmortem records of Carmarthen Asylum I have drawn from the annual reports of Broadmoor Asylum for the years 1881 - & 84 - 85 - 86 88 - and 1889. These years were in no way selected but were taken at random.



(1). In the post mortem records of Carmichael asylum the following points are noted - the weight - the sizes of the valves - the competency or not of the aortic valve - the consistence and appearance of the ~~aorta~~ muscular substance - the condition of the aorta at the aortic valve - and any abnormalities that may present themselves.

The cases I have taken consecutively and date from a month or two ago for 5 years back. There are 139 male cases and 129 female cases.

If we now take the weights in these cases a standard with fairly wide margins must be fixed. Reid gives 11 oz for the male and 9 oz for the female heart. Peacock gives $9\frac{1}{4}$ and 9 respectively. (Both these are given in Quain's Anatomy vol II.). Dr Reynolds in his System of Medicine (Vol II p 6) gives the mean weight of the healthy heart from 20 to 55 years of age $9\frac{1}{2}$ oz in males and $8\frac{7}{8}$ oz in females. Prof Hamilton (Textbook of Pathology p. 579) gives 12 to 13 oz for the male and 10 to 11 oz in the female. If then 9 to 13 oz is taken as the limits for the male

and 8 oz to 12 oz for the female I am allowing a fair margin for differences in size in the persons examined. All the cases with one exception were adults. In 136 male cases in which the weight was recorded 33 gave a weight of less than 9 oz. Of these 22 weighed 8 oz, 6 weighed 7 oz, & 2 were 6 oz and three were less than 6 oz - the respective weights of these being two of them 5 oz and one 5 1/2. One of these cases weighing 5 oz was only 17 years of age and is the one case alluded to who was not an adult. On the other side 27 cases were 13 oz or over 13 oz - 9 being 14 oz, 5 of 16 oz, 4 from 17 to 20 oz and 3 being or 20 oz or over. Of these three one weighed 20 oz one 22 oz and one no less than 24 oz. ^{Seventy six} ~~Eighty~~ cases therefore were within the proscribed limits and fifty cases outside them - there being about 55 1/2 per cent and 44 1/2 per cent respectively. The average weight of all 136 cases was found to be 10.8 oz which corresponds very well with the accepted average.

If we now take the female cases with the limit of 8 oz to 12 oz I find

4.

that the weight has been recorded in 121 cases. Of these 21 were below ~~about~~ eight oz in weight; and 12 weighed 7 to 8 oz; 8 weighed 6 to 7 oz and one weighed only $5\frac{1}{2}$ oz in a woman 21 years of age. Twenty cases weighed 12 oz or over: of these six weighed 12 to 13 oz, two 13 oz, one 14 oz, two 15 to 16 oz, three 16 oz, one 17 oz, one 18 oz and two no less than 22 oz. It is interesting to compare the two last cases: the one showed marked valvular disease during life and at the post-mortem; in the other there was no valvular lesion diagnosed during life or discovered after death, the muscular substance was very soft and fatty and there was great hypertrophy of the left ventricle suggesting that in this case there was an increase in quantity to make up for a deficiency in quality of the muscular wall. Eighty cases were within the limits and forty one beyond them giving respective percentages of about $33\frac{1}{2}$ and $66\frac{1}{2}$.

The 121 cases gave an average of 9.58 oz which is rather above the weight usually recorded for the

female heart.

Turning now to the sizes of the cardiac orifices as estimated by Dr Peacock (Bristow's Theory, Practice of medicine p. 485) we find that the circumference of the aortic valve is for the male 3.15 inches and for the female 3.02 inches: of the pulmonary 3.55 in. in the male and 3.49 in the female: of the mitral 4 in. in the male and 3.99 in the female: of the Tricuspid 4.74 in. in the male and 4.56 in the female. From these measurements I have calculated the diameters to be Aortic 1 inch in the male and a little less in the female - i.e. .96 in: Pulmonary 1.19 in male and 1.11 in the female - practically $1\frac{1}{8}$ in. for both: Mitral 1.27 in. in the male and 1.24 in the female or $1\frac{1}{4}$ inches for both: Tricuspid 1.51 in the male and 1.45 in the female or $1\frac{1}{2}$ inches for both. There is then very little difference in the two sexes with regard to the diameters of the cardiac orifices and 1 inch $1\frac{1}{8}$ inch $1\frac{1}{4}$ inch and $1\frac{1}{2}$ inch may be taken as fairly representative measurements for in both for the four valves.

6.

I find that in the 137 male cases in which the aortic valve was measured that 74 give the normal measurement of 1 inch : 17 cases measured $\frac{7}{8}$ inch and 4 $1\frac{1}{8}$ inch - thus 95 cases being not far from the average size : 33 cases however only measured $\frac{3}{4}$ inch : one case $\frac{1}{2}$ in. whilst 3 cases were contracted to below $\frac{1}{2}$ inch and were not capable of measurement - one of them being described as 'a mere slit'. Two cases measured $1\frac{1}{4}$ inches : one case $1\frac{1}{2}$ inch : whilst one case gave the enormous measurement of 2 inches.

In 127 female cases 67 cases gave a measurement of $\frac{7}{8}$ in or 1 in : 37 were only $\frac{3}{4}$ in. in measurement : 5 were $\frac{5}{8}$ in. and 5 were only $\frac{1}{2}$ in. Only one measured over 1 in. and that one was $1\frac{1}{8}$.

In these 264 cases the abnormal tendency was towards narrowing of the aortic valve.

The valve was found to be incompetent in 53 male subjects or 38 per. cent. and in 43 females or $33\frac{1}{3}$ per cent. of the total number of necropsies.

In 135 measurements of the pulmonary valve in the male 116 cases were from 1 inch to $1\frac{1}{4}$ inches - being fairly normal: 11 cases were below one inch in measurement and one of these was only $\frac{1}{2}$ inch in diameter. In 126 measurements of the valve in the female 95 cases were 1 inch or $1\frac{1}{8}$ inch: 16 measured $1\frac{1}{4}$ inch: two measured $1\frac{1}{2}$ in.

On the other hand 13 were below 1 inch 3 being $\frac{7}{8}$ in. 7 being $\frac{3}{4}$ in. and one being $\frac{5}{8}$ and two only $\frac{1}{2}$ inch.

In the Pulmonary valve again the abnormal tendency was towards contraction in both sexes.

Turning now to the Mitral valve I find that in 134 cases in the male subject 53 gave the normal measurement of $1\frac{1}{4}$ inches, two were $1\frac{1}{8}$ and two $1\frac{3}{8}$ in. - making 57 cases about average in size. Thirty one measured $1\frac{1}{2}$ in. two $1\frac{5}{8}$ and one $1\frac{3}{4}$. On the other hand no less than thirty-five gave a measurement of only 1 inch. Two measured $\frac{7}{8}$ and six were contracted to $\frac{3}{4}$. Among 43 cases showed mitral stenosis to a greater or less degree or 32%.

8

The 127 females I find that forty nine cases are recorded at from $1\frac{1}{8}$ in to $1\frac{3}{8}$ in - thirty nine of these being 1 in. One case measured $1\frac{1}{2}$ inch. No less than fifty three cases measured 1 inch: 24 cases were $\frac{7}{8}$ in. nine cases were $\frac{3}{4}$ inch: one case $\frac{5}{8}$: and one case only $\frac{1}{2}$ inch. The very large number of cases measuring only 1 inch cannot all or nearly all be put down to stenosis: I find that in 19 of these 53 cases were very small hearts weighing 80g or less - thus leaving 34 cases in which the mitral orifice was decidedly small relatively to the size of the heart. Taking 34 of these 1 inch measurements then as indicating some contraction I find that 51 cases out of the whole 127 showed more or less stenosis - that is to say about 40 per cent.

Lastly we will take the tricuspid valve measurements and here I find much less to be noted. Most of the cases I find described as having a soft and 'flabby' condition

of the right heart and this would
give assist in making the measurements
with the cone abnormally large.

Again although there is a general
agreement as to the sizes of the
other orifices I find that Professor
Hamilton in his list book of
Pathology (p. 171) gives 1.8 in. in the
male and 1.5 in. in the female as the
average tricuspid measurement.

In my 129 male cases 43 are $1\frac{1}{2}$ in.
3 are $1\frac{5}{8}$: 32 are $1\frac{3}{4}$: 5 are $1\frac{7}{8}$
and no less than 16 are 2 in. in
diameter. With regard to all of
these I have no remark to make.
Two cases are $1\frac{3}{8}$: 25 cases are
 $1\frac{1}{4}$: one case $1\frac{1}{8}$ and two
are only 1 inch :- these last
28 cases may, I think, be
considered abnormally small.

In 112 female measurements 45
cases were $1\frac{1}{4}$ inch or under -
one of these being only $\frac{7}{8}$ inch and
8 cases only 1 inch. Sixty one cases
were about the usual average, being
from $1\frac{3}{8}$ to $1\frac{5}{8}$ - 50 of these were
 $1\frac{1}{2}$ inch. Thirteen cases were $1\frac{3}{4}$ inch
and one case 2 inches in diameter.
I have now finished recording the

valve measurements and in them I have placed more reliance on the evidence of contraction than on the ~~and~~ abnormally large measurements.

When the ordinary cone is used if the heart is soft and at all fatty degenerated the valve tends to give before it, and accurate measurement is made impossible.

I think however that the statistics have shown a large percentage of aortic and mitral stenosis and of aortic regurgitation.

The muscular substance was soft in a large number of cases: it is described as very soft in about 30% in both males and females. There is however no method of testing the softness and different observers might describe the same heart differently.

In 35 male and 26 female cases there was marked hypertrophy of the left ventricle.

In 27 male and 19 female cases atheroma of the aorta close to the aortic valve is recorded. In 4 male and 8 female cases the pericardium was adherent to the heart.

I shall now turn to the statistical tables in the Broadmoor Asylum Yearly Reports. 11.

Out of 100 cases which I have taken - all the cases successively in the years mentioned above - I find that the weight is recorded in 98 cases - 76 being males and 22 being females.

The average weight of the 76 male cases is 13.1 oz and of the 22 female cases 13 oz. Twenty nine of the male cases weighed 13 oz or over and of these no less than eleven were 20 oz or more. The largest heart weighed was 30 oz: two more were $25\frac{1}{2}$ oz and 23 oz respectively. Six male hearts were under 8 oz - the smallest weight being 6 oz.

The twenty two female cases show some remarkable figures: the smallest weight was $5\frac{3}{4}$ oz and the largest $31\frac{1}{2}$ oz. Eight weighed more than 12 oz and these included 3 three of from 15 to 16 one of $19\frac{1}{2}$ oz and one of 29 oz and one of $31\frac{1}{2}$ oz. Five weighed less than 8 oz of which two were below 6 oz. These figures alone will show that a

12.
Large percentage of these 98 cases were suffering from cardiac hypertrophy or from fatty heart.

The In almost every case some short account of the heart is given and almost every case has some form of cardiac disease or degeneration recorded against it. In 11 out of the 100 cases the aortic valve was incompetent: in 14 cases there was disease of the mitral. There was great hypertrophy of the left ventricle in 13 cases: in 11 cases the heart is described as being fatty degenerated. In 8 cases there was positive evidence of old pericarditis.

The aorta is described as atheromatous in 38 cases. In but few of the cases is the heart described as healthy.

In these two sets of post-mortem records it has been shown I think that heart disease occurs in a large proportion, and by heart disease I wish to imply any change in its form or substance which would lead to the improper performance of its functions. What is the proportion of heart disease in

the general community outside asylums. I think that it must be of less relative frequency. It must be that in any collection of diseased persons, whether suffering from disease of the brain or from disease of the foot or any disease whatever, there is a greater proportion of cases of cardiac disease than in healthy persons. But I think that there are many reasons wherefore it should be very common amongst insane patients. These reasons may be summed up into two namely that heart disease may be a cause of insanity and that insanity may cause or at any rate aggravate heart disease.

(2). Dr Julius Mickle in the Goulstonian lectures* discusses at considerable length the influence of cardiac disease on the mental state. He tabulates six ways in which this influence is exerted and shortly they are as follows 1. the disturbance of the balance of the circulation in the body generally 2. disturbance of extra-cranial circulation 3. a change in the composition of the

* British Medical Journal Mar. 10. 68

intra cranial blood 7 4 - of the blood
 generally 5 by bringing on pulmonary
 disorder and the morbid sensations
 associated therewith 6 by peripheral
 irritation influencing the cerebrum
 reflexly. These groups seem to me to
 be rather self-inclusive. The
 first group appears to include the
~~fourth~~ fifth. I do not see how
 the altered condition of the blood
 generally can affect the brain, until
 it reaches it and then it comes
 into group 3 i.e. intracranial blood.

- I should prefer to divide into
 the following four groups 1. Actual
 change in the brain substance
 2. Malnutrition of the brain which
 has not gone on to organic change.
 3. Altered conditions of pressure in
 the brain 4. Disordered sensations.

Under group 1. the chief alteration
 is white softening of the brain.
 I find in 'Dr Stokes*' book on the
 heart that Dr Law observed white
 softening of the brain in permanent
 patency of the aortic opening allowing
 free regurgitation - in contraction of
 the mitral orifice - and in permanent
 patency of the mitral orifice allowing

* The diseases of heart and aorta by Dr Stokes p. 360

free regurgitation. Dr Stokes after agreeing with this goes on to say that most probably fatty heart without valvular disease would cause the same effect. This is disputed by other writers and it may be considered an open question. Central hemorrhage may be brought about by disease of the heart: on this point I find Dr Forbes Winslow writing* that heart disease is one of the commonest causes of apoplexy. As a result of hemorrhage, softening of the brain substance round the clot may readily lead to impairment of the mind. Another cardiac cause of brain alteration is the passage of an embolus from a diseased valve into one of the central vessels + the area that is supplied by this vessel undergoing fatty degeneration i.e. softening. Dr Forbes Winslow suggests as another cause of brain change the violent shock to the delicate tissues from the beating of the arteries in diseased conditions of the heart - as for instance in aortic incompetence.

2. In the second place of the brain
 * Obvious diseases of the Brain and Mind p. 600.

may be unable to carry on its highest functions from insufficient or improper nutritive material. In aortic disease especially a too little blood is carried to the head: the complexion of the face is pale, and so also the brain substance. Or the blood may be insufficiently oxygenated owing to mitral disease and the brain is starved of oxygen. In long standing cardiac disease also the blood begins to be poor in quality owing perhaps to disease of the liver or kidney which have been set up.

3. I now come to altered conditions of ^{blood} pressure in the brain. Congestion or arterial congestion of the brain may be induced. Dr Winslow quotes M.M. Bertin and Bouillard as saying that 'the majority of patients in whom hypertrophy of the left ventricle of the heart is present will be found to exhibit symptoms of cerebral congestion and that many of them will fall victims to disease of the brain'. We have the backward pressure due to effusion - caused by obstructed mitral disease.

17.

Anæmia of the brain might have been mentioned here: and a question arises in my mind whether the alteration of mental symptoms in brain anæmia may not partly be due to arterial pressure, as well as to the malnutrition.

4. Lastly we come to the disordered sensations. In intermittence of the heart's action, in palpitation, in the loudly throbbing pulse we have disagreeable and alarming sensations always or very frequently present, which may readily terrify a patient already perhaps of a nervous and excitable temperament. The sleeplessness and horrible dreams which are often associated with aortic disease must be powerful factors in disturbing the mental balance of a man whose brain is already starved from a feeble blood supply. It may be added that the patient with heart disease is precluded from doing as other men do, by fear of a sudden death with no warning. Many men, I think, would if this fear was constantly before them become melancholy and depressed.

As Dr Savage* says in his book on insanity 'one knows that the general aspect of anxiety which is depicted on the faces of many patients suffering from heart disease is recognisable enough; and that this anxiety should be further developed into melancholia is readily to be believed'. The same writer ascribes the derangement of the brain not only to insufficiency and poor quality of blood, but also to the irregularity of the supply.

'Anything' he says 'interfering with quantity quality or regularity of the supply may upset the nervous balance and cause on the one hand anxiety with sleeplessness and vague dread - on the other exaltation of ideas and emotional instability.'

Dr Bristow is writing on 'recurrent palpitation' (Bristow's medicine p. 541) says that the patient during the attack is 'irritable and fidgety and sometimes complains of a constant feeling of being in a hurry'. No organ in the body responds with such readiness to any emotion whether of fear or joy, grief or surprise: indeed the
 Insanity p. 407. Dr George Savage.

19.

heart has ever been considered by unscientific writers to be the 'seat of the emotions'. Looking at it then from this point of view it is no surprising thing that disease of the one should be coincident with derangement of the other. I do not however wish to carry this point to extremes and to claim as evidence those asylum patients whose insanity is ascribed to 'love affairs' and 'disappointed affections'.

Another reason for the frequency of heart disease in insanity may be found in the fact that insanity aids the production of heart disease. The nervous mechanism of the heart ~~is~~ must be largely affected by the excitement of acute mania or by the sluggishness of chronic dementia. And prolonged excited action may be expected to lead to hypertrophy and prolonged sluggishness of nerve stimulus to fatty degeneration. With regard to this point I find Dr^s Bucknill and Tuke stating that dilatation of the heart with great irritability of the organ and palpitation are frequent in mania: that in dementia they

the same origin. On the same ground we may place the riotous and intemperate life, so often the antecedent of insanity, which would also tend to produce degeneration or disease of the heart.

3. I now come to the third part of my paper - namely to touch upon the characteristics of heart disease in insanity. It has been said that hypertrophy is associated with exalted conditions and dilatation with depression; or again that aortic valve conditions generally cause excitation whereas mitral valve disease causes melancholia. We know that in some persons heart disease has its mental phenomena. Sometimes there are great exaltation and high spirits. Sometimes suspicion, irritability, and depression. Dr Keernan^x of Chicago says 'to form an idea of the influence of cardiac disease on the mental state, we are forced to study the insane, since mental phenomena arising in them from any given somatic cause, are simply exaggerations of the minor

^x Alienist & Neurologist Apr. 1890 p. 155.

mental phenomena of the same type found in the same afflicted with the same disease?

In the same paper Dr Kiernan quotes a number of different authorities on this subject, some of which I shall give here. Luyb is quoted as saying that the symptoms of the psychoses produced by cardiac disease are excitement and loquacity followed by somnolence: he also says that when there is periodical cardiac dyspnoea that the excitement and other psychical symptoms show an equal periodicity with it. Hertz and Burman have observed suspicion and irritability and rattation in cardiac disease. Dr Greenlee has found insane patients with cardiac disease to exhibit irritability and displays of passion. Many other authorities are quoted and most of them agree that irritability is the most general symptom. Ferral has noted periodical returns of excitability with periodical exacerbations of the cardiac disease.

D. Keenan * mentions Matthew Arnold and John Hunter as instances of mental phenomena varying with the cardiac condition. He suggests that the alternating buoyancy and cynicism of the former and the irascibility of the latter were mental symptoms of cardiac disease. He then goes on to say that 'this great buoyancy which occurs in the course of these troubles is as much a part of the disease as the murmurs' and suggests in the way of treatment that an effort should be made to restrain them.

D. Savage* states it as his opinion that melancholia generally occurs in patients, who, having had rheumatism with heart affection, become insane. Mitral disease he finds to be associated with melancholia: with aortic or with aortic and mitral disease he finds that the symptoms may be melancholic or maniacal: with simple aortic disease and hypertrophy

of the left ventricle he has met with
 * Alienist, Neurologist - April 1890 p. 172. * Insanity by D. Savage p. 40.

aortic mania and exaltation of ideas

24.

indeed he goes on to say that cases of heart disease with hypertrophy of the left ventricle may be difficult to diagnose from general paralysis of the insane.

Dr Julius Mickle mentions several cases of sane patients whose disposition was changed by heart disease: the characteristics he noted in them were feelings of suspicion restlessness and irritability. In one of these sane cases there were hallucinations which subsided with the quieting of the cardiac symptoms and always returned with them.

He gives his results after analysing a large number of cases. With marked mitral regurgitation he found that there was a state of 'melancholic dread' or 'sombre' 'Emotional dejection', or they were morose sullen and taciturn. With mitral stenosis he found a greater tendency to 'querulousness and delusions of persecution annoyance and injury'.

Cases of aortic stenosis showed 'mental depression' - 'ideas of persecution etc'. With aortic incompetency

he found in some cases
 exaltation and grandeur in others
 depression and suspicion. He does
 not agree with the theory that
 exaltation is associated with aortic
 disease. He explains the existence of
 such a theory in the following way:—

— A few persons with a tendency
 to exaltation of mind plunge into
 all kinds of excesses: they strain
 their hearts and induce aortic
 disease and should they become
 insane their insanity tends to be
 of the same exalted type.

I endeavoured ^{in vain} from the case books
 of Carmarthen Asylum to draw
 some parallel between the various
 forms of heart disease and the
 various types of insanity: such
 an analysis would require a very
 large number of cases to give any
 definite result. If I take the
 experience of a number of experts of
 lunacy — as in Dr Keenan's paper —
 I find that they differ very
 widely. Certainly suspicion and
 irritability are very frequently
 noted but, what common symptoms
 are there in any form of insanity!

There is however a considerable weight of opinion in favour of separate and distinct mental symptoms with aortic and mitral lesions.

I must now bring this paper to a close, having gone through in some manner the three points I set before myself. Very much more might have been written, but with so large a field it is impossible to traverse the whole of it. Much more is being done every day in tracing the relationship between mental symptoms and their somatic causes. The day is perhaps not far off when, by the mere application of the stethoscope the whole mind and disposition - nay even the fears and aspirations - of the patient will be at once revealed to the ear of the practised physician.

C. P. Parry, Carmarthen.

April, 1891.