BRITISH MEDICAL JOURNAL

LONDON: SATURDAY, JANUARY 19th, 1935

SOME RECENT ADVANCES IN CARDIOVASCULAR DISEASE *

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The cardiovascular system comprises four sections—the heart, the arteries and arterioles, the capillaries, and the veins; and perhaps the most interesting of all recent advances lies in the conception of the essential unity of this system and of the various mechanisms, nervous and biochemical, which unite and co-ordinate its elaborate activities. The heart is ever varying its output, and it is not too much to say that no two consecutive beats, unless perhaps in tranquil sleep, have quite the same stroke volume. It is well recognized that were all the capillaries dilated at the same time we should bleed to death into them in the course of a minute or two. The control of the capillaries is such that each tissue and every part of it can make a call for blood where needed, and shut down the supply where not. An intermediate mechanism switches pints of blood off and on to the muscles, the brain, or the abdominal organs, necessarily shutting down elsewhere. The co-ordination is elaborate perhaps beyond conception, but we are beginning to understand it.

There is no single cell in this whole system which is not under direct nervous control. One implication of this is that nervous disturbance may throw various sections out of gear and suggest serious disease, and the mere notion of this is apt to set up a vicious circle and produce ill-health, which reassurance may be able to dispel. Emotional pallors and blushing deceive no one, but vasovagal attacks, the effort syndrome, and many other conditions that are not really cardiac at all are often referred to in such unsatisfactory terms as "tired heart," "weak heart," and the like. These are, I think, unfortunate terms, and although they are frequently used by doctors they are searched for in vain in the index of any treatise on medicine.

Blood Pressure and Arteriosclerosis

Having considered very briefly the circulation as a whole we now turn to its constituent parts, and a word on the veins must suffice. Venous pressure has recently received intensive study by some investigators which will lead to important results, while the modern treatment of haemorrhoids and of varix and dependent ulcers has brought untold comfort to countless sufferers. On the arterial side the more general recognition of angiospasm, which accounts for dead fingers, Raynaud's disease, intermittent claudication, many transient palsies, and for other as yet less familiar anomalies is of great value, if kept in mind—saving much needless decubitus, for instance, in cases where organic lesions in the brain are suspected.

Blood pressure cannot be so lightly dismissed. The prevalent idea would seem to be that high pressure and arteriosclerosis are essentially associated; but high pressure may exist with supple arteries, and arteriosclerosis may exist without high pressure. At the other end of the scale we are apt to associate low pressure with ill-health (tuberculosis, for instance, and neurasthenia), yet one of the most successful of the Everest climbers has a normal blood pressure of 100/70. Both high and low blood pressures are compatible with superabundant health. I have a patient who for at least three or four years has had a pressure of 220/120, but who with supple arteries lives a very active life, both mentally and physically—writes books, boxes, plays squash, and dines out. I should be very chary of attempting to alter his habits or to do more than give a general caution as to excess. He *may* be playing on a volcano which may spurt, but the alternative would be to seat him upon a smouldering and by no means safe volcano, of the presence of which he was always aware, and which left him but little ease of body, mind, or spirit. Had this patient, who knows no more and thinks no more of blood pressure than I do of differential calculus, been frightened, restricted, and treated three years ago he would certainly have lived a much less happy and useful life than he has done, and I wonder if he would have been alive to-day.

Stagnation has its drawbacks. To attempt to lower blood pressure may be wise in certain cases—it obviously is—but many people with high pressures lose their spring when it is artificially lowered, and although they may gain safety in one direction they may deteriorate in another. Indeed, a rising pressure may have its ameliorations, and those who have suffered from devastating migraine for four or five decades often find that with a rising pressure they are more or less immune. Turning to generalities, I believe that elastic tubing lasts better if kept in use; and as to nourishment the old adage is here as elsewhere generally applicable: "a little of what you fancy will do you good."

The last word in the latest edition of perhaps the highest authority on hypertension¹ admits that treatment is very unsatisfactory, while in Dr. Cowdry's collection of papers on arteriosclerosis² culled from the world's greatest authorities, the general conclusion is that neither diet nor drugs have been shown to have any effect whatever on the course of the disease. This is insisted on by many of the distinguished contributors—Aschoff stating that vegetarian people suffer as much as those living on a mixed diet, while Weiss and Minot remind us that animals which prance, jump, run, and climb are less liable than those of the bovine kind. "One fails to find,"

* Presidential address to the Kent Branch of the British Medical Association, Tunbridge Wells, June 27th, 1934.

concludes Wyckoff, "a basis for thinking that there is a relation between arteriosclerosis and diet; and one can only conclude that rational treatment at present is non-existent."

So much the less is there any scientific justification for discriminating between butcher's meat on the one hand, and poultry and fish on the other. Yet the lady who told me a week or two ago that the "danger point" in her case was 146, and that although she consumed as much chicken as she could "to keep up her strength" she would not dream of eating the cutlet she craved for, is a common enough type. When asked why, she replied in astonishment at my ignorance: "Because it would bring on a 'stroke.'" Sweetbread, which this lady's oracle would allow as an occasional dainty, contains more "pressor" substances than are found in red meat. The whole history of dieting these patients is one of error, too often dogmatic and ridiculous. A salt-free diet, among other obsessions, is not necessary; a light and varied diet may be allowed.

The kidneys, of course, come into the picture, yet a wise physician, quoted by Sir Humphry Rolleston, stated that "the great danger of chronic nephritis is that someone will find it out and try to treat it." This may be an intentional exaggeration, but there is truth at the bottom of the well. Moderation here is the desideratum for both adviser and advised. One should treat the patient rather than the disease, and, finally, the sphygmometer should be regarded as a servant and not as a master. I may quote another case in which the kidneys were certainly involved—that of an old gentleman, aged about 80, once a keen mountaineer, with wrinkled arteries and a blood pressure higher than any I have quoted, who said: "What a life I am condemned to! Am I never again to taste a bit of bacon, to drink a cup of coffee or a glass of wine, or to smoke a cigar? May I not go to the mountains for a holiday instead of to the sea, which never suits me?" I told him he might die in the mountains or at home, but that I didn't believe any of these things would make a difference of sixpence to the £100 on his insurance value. That was three years ago; he has done all these things and was very much alive a month or two ago, when he met me with a smile in place of the pathetic look of despair which I remembered.

Blood Pressure and Vertigo

Intimately associated with blood pressure in the lay mind and perhaps fostered by our profession is the symptom of vertigo. If Ménière is excluded and the blood pressure is up, the danger of a "stroke" often becomes an obsession. Unquestionably many people with high pressure are apt to suffer from giddiness, but a hundred are giddy for one who has a stroke, and many have strokes who have never thus suffered. Vertigo is also associated with low pressure, as in persons about to faint, while many with normal pressures experience this symptom from such varied causes as eye-strain, migraine, drug toxæmias, sea-sickness, wax in the ear, liver disturbance, and from looking down from a height. Subtle changes in the labyrinth are probably involved in all cases. And here I may refer very briefly to the strange case of an elderly lady who had suffered for some months from almost paralysing vertigo, but who was cured by a severe emotional shock. A friend who was staying with her, and was apparently quite well, suddenly fell down dead; the shock was overwhelming, but the giddiness disappeared. My only suggestion as to the cause of this miracle is that it was due to some sudden alteration of labyrinthine circulation, occasioned by the subtle control mechanism to which I have alluded. Possibly capillary labyrinthine hyperæmia was permanently switched elsewhere. In my

view we are not justified in encouraging our patients to allow this very unpleasant symptom to dwell unduly on their minds or on ours.

Returning to the subject of the heart my memory slips back for nearly twenty years; for in 1915, when I was first called to this high office, I read a paper on the irregularities and demonstrated Mackenzie's polygraph, while in 1918 (owing to the war my presidency was automatically extended from one year to four years) I read another on murmurs, which were then, after a reign of about a hundred years, receiving their death blow and the myocardium was coming into its own. Both of these papers were published in the *British Medical Journal*,^{3 4} and perhaps these subjects should be ignored now, for I have but little to add to what was said then. Some points, however, still need emphasizing.

Recognition of the Arrhythmias

Mackenzie's work in differentiating the arrhythmias was the starting-point of real clinical knowledge about heart disease. Previously the irregularities might have been likened to a closed fist; now they are as distinguishable as the spread-out fingers of a hand. They can generally be recognized by ordinary examination; but the electrocardiograph, which differentiates them with certainty, occasionally shows that clinical conclusions have to be revised, for mixed rhythms and showers of extrasystoles, neither of which are very rare, may simulate fibrillation, while anomalies such as bundle-branch block are only thus revealed. It is very important to be sure of auricular fibrillation, which in 1915 was regarded as a peculiarly sinister indication. Now, under the influence of digitalis, it is probably the most treatable of all cardiac defects; for if, as often happens, the ventricular musculature remains intact many patients are able to carry on their avocations indefinitely.

The nature and significance of heart-block is, I think, generally appreciated, and extrasystoles are known to be anomalies of innervation common to both healthy and diseased muscle. But to sinus arrhythmia I am tempted to revert, for its significance is, I am sure, by no means commonly recognized. Mackenzie called it "the irregularity of youth," and regarded its presence as evidence of a healthy heart. Of course, throughout life the pace-maker in the sinus is continually altering the frequency of the heart beat in response to somatic and emotional requirements, and may occasionally cause recognizable irregularity, but in childhood and youth extreme irregularity is common and may be safely ignored. The relation to respiration is the key. Let the patient lie in bed or on a couch, and when emotional tachycardia has died down place the stethoscope on the heart and ask him to take half a dozen long, slow breaths and to hold the breath at the end of each inspiration and expiration: note if the pace quickens with inspiration and slows with expiration. These changes are often very obvious, and are very reassuring. In fever the respiratory phases are abolished, and in post-febrile toxæmia they remain in abeyance; but their reappearance is evidence of the return to health, and marks the period when recumbency may be replaced by gradual exercise. Sinus arrhythmia is due to youthful imbalance between vagal and sympathetic influences which should disappear with maturity. If found in later life it has not the same significance.

Innocent Systolic Murmurs

It was the systolic mitral, the victims of which used to be counted by the thousand, that I had especially in mind when I said that the war had dealt murmurs a death blow. In acute rheumatic and other febrile diseases all cardiac signs need careful watching, and, of course, this

murmur is common in cases of chronic myocardial disease accompanied by dyspnoea and oedema, but the murmur does not add to the obvious gravity of such cases. By the end of the war it was generally recognized that a systolic mitral murmur so frequently existing as a solitary sign in otherwise healthy subjects might be safely ignored. The point has been stressed in numerous papers and books⁵ since then. This knowledge has brought freedom to hundreds who would have been previously condemned, but that it has by no means yet "leavened the lump" is brought home in reading Sir Maurice Cassidy's address to the West Somerset Division,⁶ in which he states: "It still seems to be true that to the average medical man 'heart disease' is almost synonymous with valvular disease and murmurs."

To what causes these innocent systolic murmurs are due it is often impossible to say, for the patients do not die. Many of them are fleeting bruits, but I am sure that some of the loudest and most widely conducted result from slight congenital anomalies. This matter is so important to our patients that I am tempted to add another case to those I recorded in 1918. A girl of 14 was brought to me in a bath-chair in December, 1917; she had a loud and widely diffused systolic murmur. I could find nothing else wrong, and well-marked sinus arrhythmia was elicited. I let her get about gradually, and within a fortnight she was snow-balling and tobogganing. I saw her once or twice during the next two years, and told her that her heart was as sound as a bell. I lost sight of her until May, 1934; she then looked the picture of health, and I took the opportunity of verifying the murmur, which was unchanged, of screening the heart, which was not enlarged, and of taking an electrocardiogram, which was normal. In reply to my report I received a letter from which I may perhaps be excused if I quote a sentence, for without it the case loses its point: "For me personally your word given sixteen years ago has meant unshaken self-confidence in the face of solemn warnings and scaring looks from doctors all over the place—India, Africa, and England." Against such advice she married ten years ago; she has borne two healthy children, and has ridden and hunted in the Himalaya with her soldier husband as well as joining in all kinds of games and sports. Why should my assurance in 1917 have given her this confidence? Because I think she felt and knew all the time that she was well, and recognized that I had no doubt whatever about it. She was only 14, and had lived a normal life until a few months before I first saw her, when some doctor had discovered the murmur and sentenced her.

Later in life the harm done by a mistaken diagnosis and its consequent advice may not be so easily remedied. Here I may quote another sentence from Cassidy's address:

"Very rarely do I see cases in which harm has been done by a doctor encouraging his patient to over-exert himself; whereas I constantly see patients on whom undue restrictions have been enjoined, and in whom, as a result, it is sometimes very difficult to restore confidence in the heart's capacity for effort."

While systolic murmurs may, in the absence of other signs and symptoms, be ignored without fear of ulterior consequences, it is otherwise with the two common diastolic murmurs, for both indicate what are apt to be progressive lesions. Mitral stenosis, unless trifling and stationary, prevents a proper filling of the left ventricle, while the leak of aortic regurgitation interferes with the full effect of the powerful back-kick of blood in the aorta, which is so important an element in filling the coronary arteries. Though many patients with mitral stenosis feel wonderfully well they are not safe lives, and warning

should be given; but this done, they may often be left to guide themselves. I have a patient who started mitral stenosis in 1895. She has lived a very active life, has done a lot of ski-ing, and has climbed several peaks of over 12,000 feet. Since 1932 her heart has begun to show signs of failure.

Heart Enlargement

About twenty years ago enlargement of the heart, denoting dilatation or hypertrophy or a mixture of the two, replaced murmurs as the cardinal evidence of disease, and its recognition was based on palpation and percussion. I confess that I have always been a sceptic as to the deep percussion of the heart, while I have for many years mistrusted the seemingly obvious inferences of palpation. The absolute dullness of pericardial effusion is easy to map, but in percussing the total area experts examining a heart separately will often draw different outlines. The late Dr. Gordon of Exeter, who prided himself on his percussion, made a special study of this subject, and found that in a majority of cases his percussed outline agreed with the x -ray picture if the patient was standing, but was quite unreliable in recumbency. In 1923 I travelled with three cardiologists who were going to attend a meeting of that very exclusive body, the Cardiac Club, in Edinburgh. I ventured to say that I mistrusted percussion as a means of estimating the size of the heart, and found, to my satisfaction, that two of them agreed, while the third said that he only trusted his own.

At the Annual Meeting of the British Medical Association in Dublin in 1933, at a joint meeting of the Sections of Medicine and Radiology, papers were read by cardiologists and x -ray specialists, all agreeing that radiological examination was the only certain means of estimating the size of the heart.⁷ Skiagrams in three planes furnished a complete map of all the separate compartments of the heart and aorta, and the orthodiagraph provided a good second method. Dr. Kerley of the Westminster Hospital stated that "the most important method of x -ray examination of the heart is simple screening, by which means the experienced observer can tell at a glance whether the heart is enlarged or not." This simple means is the one I use habitually, reserving film photographs for special cases. The results drawn on the screen and reproduced on tracing paper are conclusive both to the observer and to those who see the tracings, in a manner quite foreign to the results of percussion as traced on the surface of the chest, which, as I have said, often vary with different observers.

Palpation in the case of gross disease in thin patients may produce outlines which are very evident, and are confirmed by x -ray examination; but conducted diffusion often produces a palpable impulse far beyond the area of the heart, and is responsible for many cases wrongly described as dilatation. Not infrequently I see cases in which a diffuse and forceful impulse can be felt over a wide area, extending as far as the axilla immediately before screening a heart which proves to be normal in size, an anomaly well recognized by present-day authorities. Lewis⁸ points out that with augmented action (which may be elicited by the mere ordeal of examination) a diffused or very diffused impulse, often visible as well as palpable, is common, "giving rise to the false idea that the heart is dilated." It is little wonder that cardiologists accept with sceptical reserve a diagnosis of "dilatation" unless substantiated by x -ray investigation.

As to the general value of x -ray examination, I append brief notes of two cases, neither of which could have been cleared up without the help of x rays.

Case 1.—A lady, aged 35, with a diffuse impulse which could be felt as far out as the mid-axillary line, had been kept in bed for three months and the heart condition diagnosed as dilatation. A carefully measured skiagram showed a heart of normal size, though somewhat displaced to the left by spinal curvature. Within a fortnight she was playing tennis.

Case 2.—An elderly, stout, stocky, emphysematous man, aged 68, complained of breathlessness on exertion, which his family attributed to increasing laziness, and urged exercise "to work off his fat." No impulse could be felt, no outline percussed, nor was there other evidence of disease. I did not think that the heart was enlarged, but a skiagram showed marked general enlargement, while the electrocardiogram had inverted T waves in Lead 1, accompanied by left ventricular preponderance. This case is easy to understand, but I know of no satisfactory explanation of the conducted impulse which is the common source of error.

Cardiac pain must, for want of space, be dismissed perfunctorily, though of all recent advances the recognition of coronary thrombosis is undoubtedly the most important. The idea of myocardial ischaemia as the essential cause of anginal pain, both in thrombosis and in the angina of effort, has been quickly grasped by the profession at large, while the conception of angiospasm as affecting the coronary circulation throws light on the anomalous anginas so common among "highly strung" women, though by no means confined to one sex.

Summary and Conclusions

Much work has been done in recent years on vascular questions to which no allusion has been made. A colleague suggested that I should concentrate on therapeutics, but to have epitomized recent work, some of it representing "advances," would have left no time for anything else; while, apart from generally known or easily accessible information, it is the therapeutics of individual cases which puzzles us and which is not capable of generalization. Yet in my disjointed remarks, picking and choosing among subjects about which whole treatises have been and will be written, there is a connecting link, and one which lies at the root of cardiac therapeutics. It might perhaps be called a plea for liberty. What is life worth without liberty? What diseases are there, compared with heart disease, real or suspected, in which liberty is so constantly curtailed by professional advice? The first stage of treatment in nearly all forms of definite heart disease, as in the case of fractures, is rest. But when is one to allow the fractured limb to be moved and when to be used? When, in heart troubles, is it safe to allow liberty, and to what extent?

Glancing over these notes we find peripheral troubles ascribed to heart disease, and rest prescribed; transient paresis in a limb due to angiospasm ascribed to cerebral lesions, and undue rest enjoined; people with high blood pressure, though perhaps in danger whatever may be done, cut off from every amelioration and interest in life and with no assured hope of commensurate benefit; the innocent irregularity of childhood with perhaps a tendency to faint regarded as a ban on games; patients with innocent murmurs told they must not marry or play games or climb mountains; people with "dilated hearts" (which are not dilated) kept in bed for weeks; patients with actual heart disease so kept for months where weeks would suffice; and those with a tendency to giddiness unduly alarmed. Of course, all this has been done in the past with the best intent. The question of when to make a move has always been difficult; but we are better equipped in the present state of knowledge than heretofore. Infected hearts get well, as do inflamed tonsils; at the worst the heart has a great reserve, and many damaged hearts can support the ordinary calls of life.

Lastly, the heart may generally be trusted to impose its own restrictions. If given a chance, twinges of pain or shortness of breath will, as a rule, pull the patient up before much harm is done. I have seldom had to regret allowing gradual liberty to the extent of what the patient could support with comfort, and it is encouraging to find that recent authorities take similar views.

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- ² Cowdry: *Arteriosclerosis*, 1933.
- ³ Wilson: *British Medical Journal*, 1915, i, 957.
- ⁴ Idem: *Ibid.*, 1918, i, 687.
- ⁵ Lewis: *Diseases of the Heart*, 1933.
- ⁶ Cassidy: *British Medical Journal*, 1934, i, 45.
- ⁷ Parkinson: *Ibid.*, 1933, ii, 591.
- ⁸ Lewis: *Loc. cit.*

TREATMENT OF LYMPHOEDEMA BY PLASTIC OPERATION

(A PRELIMINARY REPORT)

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In view of the general lack of success that has hitherto attended the treatment of lymphoedema, whether medical, physiotherapeutic, or surgical methods have been employed, the result in the case described below is of interest. The pathology of lymphoedema is still obscure in the great majority of instances, especially in those cases in female patients in which the onset is a gradual one about the time of adolescence. In the case here reported there was no evidence of acute lymphangitis, and although there were possible sources of infection the evidence for an inflammatory origin is not convincing. Probably it must be regarded as of the non-inflammatory type, without evidence of congenital or familial factors, and should be included in the group recently described by Allen¹ as "praecox."

Previous Case History

The patient is a female aged 28 years. She is of healthy parentage, being one of six children, of which one has asthma, one epilepsy, and one pulmonary tuberculosis. Following a healthy infancy and childhood she had an operation for acute appendicitis at the age of 17. This was followed by jaundice, and during the next four years by a succession of sore throats and of boils on the legs. When 21 she had acute tonsillitis and a severe hysterical attack, and many teeth were removed for pyorrhoea. At 22 the menstrual flow, which had commenced at 13 and had proceeded normally, apart from pain and the passage of clots, suddenly ceased. At 24 swelling of the right foot and ankle was noticed, and this gradually increased and spread as far as the knee: it disappeared with rest in bed and massage, but returned as soon as upright posture was resumed. A few months later the left leg commenced to swell. She was admitted to St. Bartholomew's Hospital nine months after the onset.

Examination.—On admission (January, 1931) she had an unhealthy appearance, with muddy complexion, coarse and dry hair, and acne on the face. Both legs were swollen to the lower third of the thighs, but the swelling was mainly about the ankles and on the posterior aspect of the limbs, where the skin was firm and stiff and felt thickened. About the ankles there was bluish-red discoloration, and pitting could be obtained, but with difficulty. There was slight tenderness on deep pressure about the ankles. No distension of veins; pulsation was felt in the arteries. Urine normal; no evidence of faulty renal functions. Slight reduction of haemoglobin (71 per cent.). Examination of pelvic organs under an anaesthetic disclosed no disease or cause of oedema. All other organs