4. Never to pass any instruments into the bladder in a recent uncomplicated case. In the army my experience was 13 per cent. of all cases of gonorrhoea had epididymitis—6.5 before admission and 6.5 after—and many of the cases in the latter portion were due to treatment. By keeping to the rules I have mentioned I very rarely see epididymitis after treatment has commenced.

The symptoms of chronic prostatitis and vesiculitis can almost always be relieved by treatment, but these conditions are practically incurable if the test of cure is complete absence of pus cells in the secretion expressed by prostatic massage. It is possible to divide them into two classes. First there is the man who without symptoms of any kind has pus in the expressed secretion. He gives a history of gonorrhoea some years previously and generally the only thing he complains of is an occasional discharge; or else he wishes to be examined to find out his fitness for marriage. Treatment is essential in these cases, as many of them will develop sexual or urinary disturbances or metastatic lesions later on. For them I prescribe prostatic massage for three months. Although most of them will still have pus at the end of this time, I think the treatment is beneficial and likely to ward off later symptoms. The other class may have a persistent urethral discharge, frequency of micturition, iritis, muscular rheumatism, fibrositis, pain during sexual intercourse, blood-stained ejaculation, and neurasthenic symptoms. Treatment should be continued till these symptoms are cured. The patient should also be instructed to live a careful and regular life, avoiding alcoholic and sexual excess, constipation, and other irregularities. For years I have relied on massage alone, but latterly I have combined it with application of heat by a water-heated applicator in the rectum. Water at a temperature of 120° F. flows from a container through the applicator for twenty minutes. The heat brings an increased flow of blood and lymph to the tissues and a much greater quantity of fluid can afterwards be expressed by quite lightly applied massage. Dilatation of the prostatic urethra by solid instruments or by mechanical dilators is, in my experience, useless, if not harmful. Certainly it is so with a Kollmann's posterior dilator. In the first place, it is only too easy to produce severe damage to the mucous membrane and it does not dilate the urethra. A few years ago I experimented with four blades the same size as those of the Kollmann fixed to the end of a urethroscope. I passed the instrument into the deep urethra and there I saw the mucosa in folds round the blades meeting in the centre of the urethra, but very slight air pressure was sufficient to expand these folds and form a tube. It seems to me that the action of Kollmann's dilator is merely to press certain portions of the mucosa against the deeper firmer structures. I know of two cases where extensive bleeding followed the use of this mechanical dilator.

As regards treatment by vaccines, I do not think that for Class 1 they have any beneficial action at all. I have used ordinary and detoxicated stock vaccines and autogenous vaccines without any effect on the quantity of pus cells obtained in the secretion. For Class 2, with metastatic lesions, I always use Thomson's detoxicated mixed vaccines. The dosage varies for each patient; 2,000 million in one may produce a marked local and general reaction, whereas a much larger dose in other cases has no appreciable effect.

Surgeon Commander PARNELL emphasized the importance of the prevention of secondary infection. He agreed with Mr. David Lees that vaccines (detoxicated) were of most value in the acute early stages. Internally ichthyol (pil. gr. 3 t.d.s.) was of value. Less than 5 per cent. of cases at Haslar had vesiculitis. In metastatic gonorrhoea a chronic glandular prostatitis was more often the infecting focus than vesiculitis. Glandular prostatitis was often asymptomatic, could not be diagnosed by palpation, and was only detected by the microscope. Massage was the great stand-by in treatment—controlled by microscopic examination of the expressed secretions. Sulfarsenol in his hands had shown no appreciable benefits in any metastatic complications of gonorrhoea.

Dr. G. L. EASTES (London) said that he had hoped to have heard the views of bacteriologists on the subject of chronic prostatitis. Vaccines and vaccine treatment had received some hard knocks from previous speakers, but a vaccine to be effectual must be complete. It must include all the secondary organisms as well as the patient's own strain of gonococcus, and in addition, for reasons adduced, the best polyvalent stock gonococcus available; and by the best he wished to emphasize that the age of the stock vaccine should not exceed six months. The secondary organisms must comprise the Gram-positive bacilli so frequently present as well as the cocci. In acute urethritis vaccines were, in his experience, of very great use in effecting a cure without complications.

Dr. JAMES HUDSON (Newcastle) called attention to the frequency with which potassium permanganate was employed in too strong a solution, with the result that the urethral mucous membrane was burnt. In his opinion it should never be used in higher concentration than 1 in 4,000. He had found sodium salicylate of use when given in an alkaline mixture as a means of avoiding such complications as chronic prostatitis and epididymitis.

Mr. KENNETH WALKER and Dr. DAVID WATSON then briefly replied to the questions that had been put to them by the various speakers. Mr. Kenneth Walker agreed with Dr. David Lees that the success of prostatic massage could not be entirely gauged by the amount of discharge that appeared afterwards at the meatus. This amount depended on numerous factors, and sometimes when a patient emptied his bladder a large amount of discharge was found in the distending fluid even although but little had appeared at the meatus.

Sir ARCHDALL REID, in closing the proceedings, congratulated the Section on the excellent discussion that they had listened to, and said he considered that the meeting had been a very great success.

THE VENTRICULAR COMPLEX OF THE ELECTRO-CARDIOGRAM AS A PHYSICAL SIGN IN CARDIAC PROGNOSIS.*

BY

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It is well recognized that our understanding of cardiac disease requires a sound knowledge of the anatomy and physiology of the circulation, and that without such knowledge it is impossible to interpret rationally most of the ordinary symptoms and signs associated with diseases of the heart. It has been the custom, therefore, to impress upon the student the necessity of understanding thoroughly the physics of the cardio-vascular system. In recent years electro-cardiography has come to be a method of clinical application in most teaching hospitals, and the student, both in the physiological classroom and at the bedside, has to understand what an electro-cardiogram represents. As is usual, the novelty attracts the student, but, I am afraid, also somewhat deters the practitioner when it comes to be a question of the use of such a method in general practice. It has been recognized by most of the medical men who use the electro-cardiograph that its application to-day must be mainly for the purposes of investigation or where an especially full cardiac examination is called for. There is no doubt that, from a prognostic point of view, the electro-cardiogram has a right to be classified as a physical sign of considerable importance. As a physical sign, therefore, the electro-cardiogram has a definite place in the

* Summary of demonstration at a clinical meeting of the British Medical Association at the Royal Victoria Hospital, Belfast, June, 1923.

summation of signs and symptoms which go to make the basis of our prognosis.

After a considerable experience in the use of electro-cardiography as a purely clinical method, some conceptions have seemed to be helpful in conveying to students our ideas as to what exactly is the information we obtain through this galvanometric record. In the first place, it is to be recognized that we have a galvanometric record which represents the summation of all the fluctuations of electric potential that occur between the sites of application of our electrodes. If we consider this fluctuation of potential from the point of view of the electronic theory—which theory is fundamental in modern molecular physics, and is the accepted basis of all practical teaching in “wireless”—we may look upon the electro-cardiogram as representing merely an electronic pulsation in the body. We also must realize that we can pick up this electronic pulsation by electrodes placed on the body in any such position that the heart influences the circuit between them. The electro-cardiogram obtained varies in its form according to the position the electrodes occupy relatively to the heart, but in all cases it is to be remembered that the galvanometric record can only be a summation curve of variations of potential which occur during the cardiac cycle.

It may be added that where the electrodes are in a fixed position the electro-cardiogram may be altered by a change of the position of the heart relatively to the electrodes; this, for instance, occurs markedly in the third lead (left arm—left leg) in some people where the heart moves considerably with respiration.

As a result of the work of Sir Thomas Lewis and others this electro-cardiogram has been analysed with most illuminating results. To follow this analysis is difficult for those not well versed in electro-cardiography, but to-day all students who come to the bedside have a working knowledge of the “mechanism of the heart beat” due to the efforts of these investigators. Thus we know that the starting-point of the heart beat is at the sinus node or “the pace-maker,” spreads over the auricle, reaches the auriculo-ventricular junction, and inaugurates there the changes which lead to ventricular contraction. This stimulus for ventricular contraction first traverses the bundle of His, the A-v bundle, which bundle divides into right and left branches to supply the respective ventricles. In dealing with the conduction of the impulse in this A-v bundle system it may be noted that Keith Lucas mentions the work of Mines and Rocke, which suggests that the whole system may be analogous to an enormous myoneural junction.¹ At any rate, the ventricular conducting system, as known to-day, consists of four distinct portions—namely:

- A. The undivided A-v bundle.
- B. The right and left branches of the bundle.
- C. The enormous arborization formed by the division and redivision of these branches into an interlacing network of fibres lying beneath the endocardium all over the inner surface of each ventricle.
- D. Extending from the arborization, filaments of this conducting tissue pass in amongst the branched fully striated true muscular fibres of the myocardium, to end in relation with the semi-striated Purkinje fibres.

It is necessary to visualize this conducting mechanism, and this may be helped by comparing it to the ignition system in a two-cylinder motor engine, but remembering that the cylinders (that is, right and left ventricular chambers) must be ignited simultaneously. We have two wires, one leading to each cylinder. These represent the A-v bundle branches. When we consider the cylinders, we have, not one point of ignition, but we have innumerable points all over the myocardium which represent, as it were, the sparking plugs. In order that these sparking plugs may be ignited simultaneously we have the tremendous arborization formed by branching of the A-v bundle. The advantages of this enormous anastomosis are obvious. It means that it would be extremely difficult to block the impulse once it has got past the larger branches of the bundle, and also that if there is a block in the anastomosis at any point it will need to be of very considerable magnitude to have any effect upon the igniting stimulus.

To follow up the analogy, and by means of it to interpret what Lewis and others have shown us experimentally, we have to form the conception that once an impulse reaches the arborization it will spread all over the myocardium in what we recognize as a relatively short period of time. We also have to realize that if the impulse arrives or starts in one cylinder or ventricle, it will spread almost simultaneously through the arborization into the other cylinder or ventricle. This allows us, therefore, to explain why the heart will contract, apparently normally, so far as all our clinical findings go, after there has been a lesion which completely destroys one of the branches of the A-v bundle. It was by accurate and scientific tracing of the spread of the electrical excitation over the living ventricle that these investigators have shown us how the stimulus spreads, and how an electro-cardiogram can be made to alter as the result of the injury of one or other branch of the A-v bundle. It seems to-day that the electro-cardiogram has placed us in such a position that we are able to localize a lesion which occurs in the ventricular conducting system of the heart.

The recognition of a complete heart-block—that is, a lesion in the undivided A-v bundle, where the auricular impulse fails to pass to the ventricle, and the ventricle beats at its idiopathic rate—is a simple matter when an electro-cardiogram is available. The certainty of the presence of a complete, incomplete, or partial heart-block is, of course, a very great factor in forming a prognosis.

"P" IS DUE TO THE AURICULAR CONTRACTION.

Q, R, S AND T ARE DUE TO THE VENTRICULAR CONTRACTIONS.

FIG. 1.—Diagram of normal electro-cardiogram.

Without going into a very detailed consideration of the electro-cardiogram, it may be sufficient to say that in the diagram above (Fig. 1) the Q.R.S. group of deflections are taken to represent the summation of the changes which follow the flow of the impulse along the right and left branches of the A-v bundle. How much of this electric change is due to the spread in an arborization of the branch we do not think can be taken to-day as settled. There is no doubt, however, that amongst those using the electro-cardiograph it has become recognized that certain changes in the electro-cardiogram indicate a lesion, either temporary or permanent, in the right branch of the bundle, and an opposite variation indicates a lesion in the left branch. Figs. 2 and 3 show the electro-cardiograms in such a lesion.

From a practical point of view in clinical medicine the importance of these electro-cardiographic records lies in the fact that, taken statistically, they indicate a very grave prognosis, and it must be borne in mind that there is no other means at present except the electro-cardiogram of diagnosing such a lesion.

Dr. Willius, of the Mayo Clinic, recently published a most important set of statistics bearing upon the value of the electro-cardiogram from a prognostic point of view.² Taking his figures in connexion with this physical sign of a bundle-branch lesion or arborization block lesion, he gives the following summary of 112 cases:

"The cardiac mortality attending aberration of the Q.R.S. complex in all derivations of the electro-cardiogram practically trebles that of the control series.

"Aberrant Q.R.S. complexes in all derivations—cardiac mortality 62.9 per cent. in 14.2 months.

"Control series—cardiac mortality, 21.3 per cent. in 13.7 months.

"In cases where T negativity was added to the aberrant Q.R.S. complex the death rate is increased up to 86.7 per cent. in 12.7 months."

At the Royal Victoria Hospital, Belfast, we followed up the history of fifteen patients treated in hospital who showed a bundle-branch lesion, and found all were dead within twelve months. Of course, it must be understood that this is only a statistical return, and that there are some cases of bundle-branch lesion in which the patient seems to go along wonderfully well. Take, for example, a patient of one of us, aged 70, who has had this lesion for at least five years, and who during that period has successfully weathered an acute attack of pneumonia.

INVERSION OF "T" WAVE.

To consider next the alterations which occur in the T wave of the electro-cardiogram is to enter upon the discussion of a physical sign the complete meaning of which we cannot as yet determine. On the other hand, it is a physical sign which we are able to recognize without difficulty; and again, from a statistical point of view, Dr. Willius has given us figures which, we think, are of most exceptional value. In the ordinary electro-cardiogram the T wave, which synchronizes with the systole of the ventricle, is upright in the first and second leads. It may be well to explain that in the first lead the heart lies in the circuit between the right and left hands; while in the second lead the heart lies in the circuit between the right hand and the left leg. As stated above, it is taken that the T wave is always upright in the normal individual in these leads, whereas in the third lead, between the left hand and the left leg, its direction may be below the horizontal line—that is, T negativity is present, or, we may say, the T wave is inverted (Fig. 4). Dr. Willius has divided his cases into four groups, and we have used this classification for a number of the patients we have been able to follow up at the Royal Victoria Hospital, Belfast. We give in detail, similar to that in Dr. Willius's papers, our results, which appear to be very comparable to his, if we remember that all our patients were in hospital in bed, seriously ill, whereas, no doubt, many of those of Dr. Willius were of the ambulatory type. We make this reference on account of our high death rate. We give also Dr. Willius's figures, including those he took from a control series of cases which did not show T negativity, carefully selected to be as clinically similar as

possible to those which showed this electro-cardiographic change.

These figures show how remarkable in prognostic value is this T negativity or inversion of the T wave. Dr. Willius excludes the possible fallacy of the inversion being due to digitalis, so that his investigations confirm what has

been always a very definite impression—namely, that the physical sign of a permanent inversion of the T wave in leads I and II is of grave prognostic significance.

SYNOPSIS OF ROYAL VICTORIA HOSPITAL CASES.

Inversion of "T" Wave in Lead I.

Twenty cases—males 16, females 4.

Clinical Diagnosis: Endocarditis with mitral regurgitation 5; mitral stenosis 4; aortic regurgitation 2; aortic and mitral regurgitation 1; myocarditis 1; arterio-

sclerosis 2; syphilitic aortitis 3; angina pectoris 1; auricular fibrillation 1.

Of these cases 19 were traced: 2 (1 of syphilitic aortitis and 1 of mitral regurgitation) were still alive; the remaining 17 were dead, after periods varying from three years to one month. The average duration of life after the initial examination was 12.7 months. The mortality is 89.47 per cent.

Inversion of "T" Wave in Leads I and II.

Twenty-two cases—males 13, females 9.

Clinical Diagnosis: Endocarditis with mitral regurgitation 6; mitral stenosis 2; aortic regurgitation 2; aortic and mitral regurgitation 2; myocarditis 4; arterio-sclerosis 1; aortitis 1; hypertension 2; angina pectoris 1; auricular fibrillation 1.

Of these cases 19 were traced: 3 were still living—namely, 1 of aortitis, 1 of mitral regurgitation, and 1 of angina pectoris; the remaining 16 were dead, after periods varying from twenty-seven months to one month. The average duration of life after the

initial examination was 9.7 months. The mortality is 84.2 per cent.

Inversion of "T" Wave in Leads I, II, and III.

Eleven cases—males 6, females 5.

Clinical Diagnosis: Endocarditis with mitral stenosis 1; aortic regurgitation 2; mitral and aortic regurgitation 1; myocarditis 3; auricular fibrillation 4.

Of these cases 9 were traced: 4 were still alive—namely, 1 case of mitral regurgitation, 1 of myocarditis, and 2 of auricular fibrillation; 5 were dead, after periods varying from five years to one year. The average duration of life after the first examination was 28.5 months. The mortality is 55.5 per cent. This group is, of course, very small in numbers for statistical purposes.

Inversion of "T" Wave in Leads II and III.

Twenty-two cases—males 7, females 15.

Clinical Diagnosis: Endocarditis—mitral regurgitation 1; mitral stenosis 9; aortic regurgitation 1; aortic and mitral regurgitation 1; myocarditis 2; syphilitic aortitis 1;

angina pectoris 1; auricular fibrillation 5; pericarditis 1.

Of these cases 17 were traced: 7 were still alive—namely, 2 suffering from mitral stenosis; 1 from myocarditis, 1 from aortic regurgitation, 2 from auricular fibrillation, and 1 from pericarditis; 10 were dead, after periods varying from three years to one month. The average duration of life from the first examination was 10.1 months. The mortality is 58.5 per cent.

FIG. 2.—Lesion of the right branch of the A-V bundle.

FIG. 3.—Lesion of the left branch of the A-V bundle.

FIG. 4.—Inversion of the "T" wave in leads II and III.

*Final Summary of Dr. Willius's and Royal Victoria Hospital
Figures.***Inversion of T Wave in Lead I alone:**

Dr. Willius	...	...	mortality 63.4% in 8.5 months	...	115 cases.
R.V.H.	...	...	89% in 12.7	...	19 "
Control (Dr. Willius)	...	...	26% in 10.8	...	93 "

Inversion of T Wave in Leads I and II:

Dr. Willius	...	...	mortality 65.3% in 12.7 months	...	49 cases.
R.V.H.	...	...	84% in 9.7	...	19 "
Control (Dr. Willius)	...	...	17.5% in 28	...	40 "

Inversion of T Wave in Leads I, II, and III:

Dr. Willius	...	...	mortality 62.5% in 12.7 months	...	40 cases.
R.V.H.	...	...	55.5% in 28	...	9 "
Control (Dr. Willius)	...	...	20.5% in 18	...	39 "

Inversion of T Wave in Leads II and III:

Dr. Willius	...	...	mortality 50% in 11.2 months	...	149 cases.
R.V.H.	...	...	58% in 10	...	17 "
Control (Dr. Willius)	...	...	22.3% in 19.2	...	110 "

We wish to thank Dr. S. Picken for having accomplished the difficult task of following up the Royal Victoria Hospital patients. We cannot submit figures of a control series, but would mention that Dr. R. Marshall with one of us followed up about an equal number of Royal Victoria Hospital patients suffering from auricular fibrillation and found the mortality 68 per cent. in twelve months.

REFERENCES.

¹ Keith Lucas: *The Conduction of the Nervous Impulse*. ² Electrocardiography and Prognosis, *Arch. Int. Med.*, October, 1922, pp. 434-450.

CONSERVATIVE GYNAECOLOGY.*

BY

ARTHUR E. GILES, M.D., B.Sc., F.R.C.S.

In discussing some of the lines along which operative gynaecology is proceeding it may be well at the outset to emphasize the fact that preservation of organs is of little use unless it goes hand in hand with preservation of function. Two examples will make my meaning clear. Thus, conservative treatment of pus tubes might be praiseworthy in a woman of 20, but it would be futile in a woman of 50. A myomectomy for uterine fibroids is a desirable operation in a young married woman, but it would be uncalled-for in the case of a woman, whether old or young, who had had a double ovariectomy performed on her.

The function that stands out most conspicuously as one to be preserved whenever it is possible is that of child-bearing. The next in importance is the ovarian function. We do not know fully the part that is played in the economy of the body by the ovary as an organ of internal secretion, but there is every reason to believe that it is a considerable part. Two other functions are to be regarded as of secondary, though still definite, value; they are the menstrual and the marital functions, and we may dispose of these first.

The marital function is, of course, primarily bound up with the purpose of child-bearing. But it may happen in the case of a married couple, still young, that the wife has to lose her uterus on account of fibroid tumours. Pregnancy is no longer to be looked for; but it may be very conducive to domestic happiness, or even essential to it, that married life should still be possible. If the vagina can be left unaltered, by doing a supravaginal hysterectomy, the object aimed at is more likely to be attained than it would be if a total hysterectomy were done, involving a shortening and narrowing of the vaginal vault. Conservative gynaecology would therefore choose the former operation, other things being equal. So also, in a case of total procidentia, requiring plastic operations on the vagina: in the case of a widow or a woman advanced in years, it does not matter how much the vagina is narrowed, and, for the purpose of the operative result, the narrower the better. But in the case of a woman who is called on to lead a married life, the operation must be sufficiently conservative to allow of this purpose being fulfilled.

In regard to menstruation, a man might suppose that any woman would be only too glad to be relieved of such an

* An address delivered at the North-East London Post-Graduate College, Tottenham.

inconvenient phenomenon. But if he did, it would mean that he did not fully apprehend the feminine psychology. For while no doubt many women would gladly escape the inconvenience and pain of menstruation they would be conscious that they were not as other women. So it may be desirable by proceeding on conservative lines to preserve this function even when there is little or no hope or prospect of its leading to its natural corollary, pregnancy. For example, a woman of menstruating age may have a bilateral pyosalpinx, of a type necessitating the removal of both tubes. If an ovary can be preserved, or even a portion of one, menstruation will go on and the patient will be saved from the sense of mutilation; moreover, the internal secretion of the ovary will also, in some measure, be preserved.

For the rest of our subject it will be convenient to approach it from the operative standpoint, and to review in turn the conservative surgery of the ovaries, of the tubes, and of the uterus.

Conservative Surgery of the Ovaries.

The ovaries are the only organs that have a share in all the four functions under consideration. Their control of menstruation has just been referred to, and is quite definite: no ovaries, no menstruation. Their influence on sex instincts and sex feelings in married life is not so constant. Investigation of the after-results of double ovariectomy led me to the conclusion that if the ovaries are removed in girlhood, before the waking of sex, the sex feelings may remain undeveloped. But after a woman has arrived at her full maturity, the removal of the ovaries has not a constant effect. In some women desire and feeling disappear; in some they are diminished; in some they remain unaltered. But the last group is certainly in the minority; and so, if we wish to ensure as far as possible that a woman's sex feelings shall remain active, we must leave her at least some portion of ovarian tissue. That the ovaries are indispensable for the functions of child-bearing and internal secretion is obvious.

How then is surgery to adapt itself to these demands?

1. When the uterus has to be removed on account of benign conditions, such as fibroid tumours, fibrosis, or chronic metritis, healthy ovaries should always be left behind; a special effort should be made to retain at least one. In this case two functions have to go—pregnancy and menstruation; but two will remain—internal secretion and the marital function.

2. When the Fallopian tubes have to be removed, the ovaries may be so infected that they also have to go. But in many cases one ovary can be saved; this will mean the retention of the three functions of internal secretion, menstruation, and nubility. Pregnancy will not be possible, but at least its possibility will not have been destroyed by the operation, the disease itself having already settled the question.

3. There may be an ovarian tumour on one side, or a tubal pregnancy necessitating the removal of the ovary with the affected tube. The tube of the other side may be healthy, but the second ovary may be affected by cystic disease. Here it may be possible to resect the cystic part of the ovary leaving a small portion of healthy ovarian tissue. This will allow all the ovarian functions to be carried on, including pregnancy. I have records of several cases in which pregnancy occurred under these conditions.

4. Transplantation of the ovarian tissue can be included in our conservative procedure, though it is strictly reparative rather than conservative. The operation is still in the experimental stage, but cases have been recorded that have been successful not only from the operative point of view, but also in the matter of restoring the functions of menstruation and pregnancy.

Conservative Surgery of the Tubes.

The tubes are not essential for the performance of the menstrual and marital functions; and as far as we know they have no value in the matter of secretions. Their one function is to convey the spermatozoa up to the ovum, and the zygote or oöperm down to the uterus. By reason of occlusion at one or other end this function may be in abeyance, and the aim of conservative surgery is to restore communications. Obviously this is worth doing only under certain conditions: the patient must be of the child-bearing age and the uterus and one or both ovaries must be healthy. Three procedures are in vogue.