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A COURSE OF LECTURES ON CLINICAL MEDICINE.

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LECTURE XI.

Acute Rheumatism, with metastasis to the Heart.—Pericardial and endocardial disease; general character of the physical signs; affections of the mitral valve distinguished from those of the aortic.—Progress of the case; the treatment; sudden death.—Post-mortem examination.—Pathological conditions calculated to have brought about abrupt dissolution.—Treatment, when commenced after cardiac disease fully formed, less effective than when applied in the earliest stage.—Necessity for constant vigilance for heart-disease in acute rheumatism.

Gentlemen,—The subject to which I am anxious to direct your attention to day is one of powerful interest in a pathological view,—pericarditis and endocarditis accompanying acute rheumatism,—the ravages of inflammation attacking the heart externally and internally. You have just left the *post-mortem* examination, and have witnessed the destructive effects of endocardial and exocardial inflammation. We will first examine the more prominent symptoms during life from the ward book, that you may the better understand the auscultatory signs of these destructive ravages; now that you can compare the cardiac disorganization with the altered murmurs you heard during life, you will also the better comprehend the fatal progress of such cases, and the principles that should guide you in their treatment.

E. S——, a girl of 14, form well developed, rich auburn hair, and of wax-like complexion, was admitted on February 17th, having been suffering from acute rheumatism in all the principal joints for the last seven days. On the second day after the joints were attacked she suffered acute pain in the præcordia, with fluttering sensation, and feelings of suffocation, short dry cough, and hurried respiration. These symptoms are stated to have daily become aggravated till admission. There was synovial effusion in both knee-joints, with great tenderness on pressure, and acute pain on motion; the knuckles of both hands were red, tumid, hot, and painful; the skin was of a feverish heat; the external surface extremely pallid, even exsanguineous looking; the bowels had been freely purged; the countenance was anxious; the pulse 140, soft and full, no hardness;

the heart's impulse was much augmented, tumultuous; great tenderness at the præcordia, shrinking from the slightest pressure; the heart's sounds were muffled, and there was general præcordial dulness; there was a prolonged systolic murmur heard most distinctly at the apex of the heart, diminishing towards its base, and scarcely heard at the upper part of the sternum. These auscultatory murmurs were sufficiently intelligible to declare that the progress of inflammatory action had already affected the mitral valve, the prolonged murmur heard most distinctly at the apex of the heart accompanying the systole being distinctly referrible to a mechanical imperfection of the valve.

I have had occasion more than once during the present session to point out to you the means of distinguishing affections of the mitral, from similar conditions of the aortic, valves. An error in the organic integrity of either produces a murmur coincident with the systolic sound; but when the mitral valve is affected, this murmur is heard most distinctly towards the apex of the heart, and towards the left. When the aortic valves are the seat of disease, the murmur is heard chiefly over them, and at the base of the heart, and continues to be heard distinctly, even up into the carotids; and, with imperfection in the aortic valves, regurgitation would take place during the diastole, and the second sound would also be accompanied by a regurgitating murmur. In this case, at this period, we only had evidence of disease of the mitral valve within the heart. The increased impulse and tumultuous action indicated that the pericardium was involved, and that in all probability, from the extensive præcordial dulness, the sac of the pericardium was filled with fluid, or was probably adherent to the heart. As the cardiac affection had existed for five days before admission, the rubbing murmur, which is usually present when the pericardium is first affected, had disappeared, either from the sac becoming filled with fluid, or the two surfaces becoming united by exuded lymph.

There could be no mistake as to the disease we were here called on to heal: there was no difficulty in the diagnosis; the signs manifested to the ear were explicit enough; and had the case come under treatment at an earlier stage, much might doubtless have been done towards saving life. At first I had no reason to doubt, that severe as the symptoms were, they might be made to succumb to remedies. The further history of the case will illustrate the amount

of influence they exercised. The character of the pulse, soft, without any sensation of hardness or wiryness in it, together with the wax-like exsanguineous aspect of the surface of the body, under any circumstances, would have forbidden venesection; and in the young, in acute rheumatism, I am very averse to bleeding from the arm. She was directed to be cupped to ten ounces, as near the region of the heart as possible; and that we might, if practicable, bring her quickly under the influence of mercury. Hydrarg. Chloridi, gr. iii., cum Pulv. Ipecac. Co., gr. v., were ordered every four hours, the bowels to be relieved with a purging draught in the morning, and she was ordered to be placed in a warm bath.

On the next day we found the symptoms materially relieved; the pain in the præcordium had disappeared; the impulse of the heart had much diminished, and its tumultuous action had subsided; the rheumatic inflammation in the hands and knees had also abated. The sounds of the heart were more distinct, and now, in addition to the systolic murmur heard the day before, there was one accompanying the second sound, and prolonged after it, and heard most distinctly just over the aorta, and still heard as the stethoscope was placed higher and higher towards the top of the sternum. Here was the ordinary evidence of disorganization of the aorta in addition to the mischief already noticed in the mitral valve. As the bowels were much relaxed and the pulse kept up, but still soft, two grains of calomel, half a grain of opium, and a quarter of a grain of the potassio-tartrate of antimony were given, in the form of pill, every four hours.

During the next two days she improved very much, the pulse going down to 100, and the heart's action continued quiet, with the same physical signs, yet without any indication of pytalism. On the 22nd the symptoms became again aggravated, rheumatic pains recurring in all the limbs. The heart's impulse again much increased; dulness over the entire præcordial region and to a considerable extent around it; physical signs as before; respiration hurried, 40; breathing much oppressed at times; tongue red, inclined to become dry, moist at sides; urine clear; remedies continued. On the 24th, after having taken two grains of calomel every four hours for six days, faint signs of pytalism presented themselves; the tongue became moister; the paroxysms of pain in the chest intermitted; the urine became loaded with lithates; the heart's action subsided, and she felt considerably relieved. The mercury was continued in smaller doses, and a blister was directed to be applied all over the præcordial region. On the 25th, the pulse rose rapidly, and with it an increase in the heart's impulse; a sharp paroxysm of pain in the region of the heart, with a recurrence of the oppressed breathing, indicated the necessity for a further topical bleeding. She was cupped from the side to eight ounces.

On the 26th, the report states that a great improvement took place after the last cupping; the pain had entirely subsided; she breathed quietly, 26 per minute; slept a little; heart's sounds appeared clearer, less muffled; but the other physical signs remained unchanged, and there was still the regurgitating murmur

after the diastole. On the 28th, a very visible improvement is recorded,—no pains, no dyspnœa, can move freely in bed, and has had some refreshing sleep; tongue moist; pulse 96, soft; heart's impulse not increased; signs as before. The amount of pytalism produced was yet faint, and it being most desirable to obtain the full effect of mercury, a grain of calomel and half a grain of opium were continued night and morning. On the 1st of March a recurrence of a paroxysm of pain in the region of the heart and an attack of almost suffocative dyspnœa, spoke intelligibly enough of the continuance of unsubdued inflammatory action, and as the calomel, so constantly administered, had failed to produce full salivation, mercurial inunction was about to be employed, but was counter-ordered on the second, as the gums manifested increased mercurial action. All the symptoms on this day underwent a palpable improvement; the pulse was quiet and soft; the tongue moist; the gums exhibited the puffiness and tenderness of salivation. On the morning of the third, she is reported to have passed a very good night, sleeping some hours; the pulse is stated as 90; respiration quiet; all external indications of rheumatic inflammation subsided; the tongue moist; countenance placid; and some craving for food. She sat up in bed at twelve at noon, and was eating her diet of rice pudding; she laid her plate down suddenly, inspired deeply and gaspingly two or three times, and expired.

So sudden a death after the aspects of improvement and hope which the last twenty-four hours had presented was remarkable. Let us see if the *post-mortem* examination will throw any light on the pathological cause of this unexpected dissolution.

Sectio cadaveris twenty-five hours after death.—The external aspect of the body presented the appearance of a wax model; no sanguineous gravitation or purpling of the dependent parts, but the whole surface pale white, almost of alabaster purity. The cavity of the chest presented no diseased conditions. The lungs were of a pale flesh tint; the grey mottling but faint; no pleuritic adhesions. The mucous membrane of the larynx and trachea was pale and healthy; some fine capillary injection of the bronchial tubes in the secondary sub-divisions becoming darker in the smaller tubes, with the presence of some frothy white mucus. The heart and pericardium were firmly glued together by an uniform layer of gelatinous lymph; the two, with some degree of force, were separated and detached. At the base of the heart this jelly-like exudation was deposited in much quantity. The heart was generally enlarged; the walls of the left ventricle firm, and its cavity completely empty; not a vestige of either fluid blood, or clot, could be found in it. The mitral valve was much disorganized; the edge or rim of the valve much thickened, studded with wart-like excrescences, forming an unyielding irregular patent ring, when viewed from the auricle; the left auricle contained a very small clot of blood. Two of the aortic valves were transparent and perfect, but one was pouched, and had an excrescence of lymph deposited on it; one isolated patch of white cartilaginous deposit was noticed in the aortic arch. The right auricle and

ventricle were healthy, but much distended by large coagula. The viscera of the abdomen were healthy; the brain presented no conditions of disease.

The first question you will naturally ask after witnessing this examination is, what is the pathological condition that can explain the remarkable suddenness of the death? Could the defective valvular structures be the cause of this instantaneous death? Not of themselves alone. Could the adhesion of the pericardium to the heart, with the large amount of lymph deposited at the base of the heart, produce instantaneous death? Certainly not; for quite as large an amount of endocardial and exocardial disorganization has been recorded in other cases, where the termination of the disease has been slow, tedious, lingering,—dropsical accumulations or pulmonary congestions at length putting an end to the patient's sufferings. Could the endocardial and exocardial conditions conjointly bring about this abrupt decease? I think they could; and the emptiness of the left ventricle conveys a hint how this *death-stroke* may have been produced conjointly by these morbid causes. To comprehend the full force of these conditions, we must not overlook the effect of pericardial disease upon the heart's movements,—that in pericarditis the heart's action becomes irregular,—its impulse increased,—its motions tumultuous; in fine, that when lymph becomes deposited about the heart, its actions become embarrassed, irritable, and unsteady. With a heart adhering to the pericardium, and surrounded by recently exuded lymph, can we wonder that so sensitive an organ should become irritated and uncertain in its motions. Do not forget this consequence of exocardial disease, especially when recent.

Now, let us turn to the internal condition of the heart. The disorganization of the mitral valve proved, beyond all doubt, that regurgitation to a vast extent must have taken place during the systole. The dyspnoea and hurried respiration declare this as well as the physical signs. Bear in mind the action of the ventricle and valve in a sound heart. The left ventricle contracts on the continued blood which is propelled forward through the aorta, the perfect mitral valve preventing any blood returning backwards into the auricle. During the systole the auricle is filling with blood, coming from the lungs, and the succeeding diastole of the ventricle receives the blood from the auricle, which is again propelled forward as before. But with an imperfect mitral valve, the ventricular contraction sends some blood forward through the aortic canal, but a portion is driven backwards through the imperfect auriculo-ventricular valve into the auricle; the current of blood in the pulmonary veins coming from the lungs is thus retarded, and this obstruction causes pulmonary congestion, cough, and suffocative dyspnoea. Now, in a heart, the movements of which are embarrassed, as this heart has been shown to have been, by pericardial adhesions and deposits of lymph, and where action was known at times to have been unsteady, tumultuous, and irritable, this faulty condition of the mitral valve, co-operating with unsteady and irritable action, might, it is conceived, have produced a fatal condition in the following manner:—A

few beats, of increased impulse and power, accompanied by suffocative or pulmonary oppression, are followed by a beat of unsteady force; then the ventricle contracts again with spasmodic energy, drives the blood partially forward, partially backward, regurgitatingly, into, even beyond, the auricle, the backward impulse being felt even in the mouths of the pulmonary veins; so that at the ventricular diastole, the auricle empty, or nearly so, the ventricle receives nothing to stimulate its contractile action, and the whole heart fluttering, and embarrassed, and perturbed by surrounding and external hindrances, as well as by this new internal deficiency of its vital stimulus, and the right side, overloaded by blood accumulating there, unable to move forward from the obstructed state of the pulmonary circulation, the ventricle collapses upon a void, the life-current is arrested, and the patient instantly expires. Such is the brief category of conditions that are believed immediately to have led to dissolution.

This poor girl's case illustrates most forcibly the irresistible progress of inflammation of the heart, when it has proceeded untreated or unchecked for a certain time. I believe that had this case come under treatment twenty-four or even forty-eight hours after the first symptoms of acute rheumatism had developed themselves, in all probability her life might have been spared. Had she been in the hospital thus early, we should have been on the constant watch for cardiac mischief, and ready to combat it the moment it declared itself in the faintest degree, for it is one of the characteristics and advantages of modern practice, that by the aid of the stethoscope, the earliest possible symptom of metastasis to the heart, may, by a watchful ear, be detected. In such cases you must not wait for pain in the chest, or palpitation, or uneasiness in the præcordia, or other complaint from the patient. In every case of acute rheumatism you should never omit to apply the stethoscope at every visit to the region of the heart; be always on the watch for cardiac mischief, the accustomed and educated ear will instantly detect the faintest rubbing murmur or other indication of metastatic inflammation, and will be as quickly ready to combat this fearful enemy to the ultimate safety of the patient. I have every reason to think that all the heart-mischief was perpetrated before the patient was admitted. The physical signs underwent no change, except a partial mitigation, during the time she lived and was under observation. Once or twice there was a decided amelioration of the heart-symptoms; the cupping relieved her, and the aggravated action of the heart was for a time brought down; the opium allayed the constitutional irritability, and assuaged the rheumatic fever; but our chief ally was comparatively inoperative. Faint indications of salivation could with difficulty be obtained, and this, notwithstanding the large quantity of calomel employed. It is nevertheless, instructive to remark, how palpably relieved all the cardiac symptoms instantly became, so soon as the faintest trace of the constitutional operation of mercury was developed; but the full effect of this mineral could not be produced, and the beneficial change could not be sustained. The pathological condition was more powerful than the mercury could

overcome. Such cases will occur to baffle the best-suggested and most active treatment of our art; but such cases ought not to dishearten us, for they teach us valuable lessons both in pathology and therapeutics; they demonstrate the morbid changes of structure that disease establishes, and they illustrate and develop the principles upon which such cases are to be successfully treated.

The peculiar delicacy and wax-like character of the complexion of this poor girl have already been noticed. It may seem a trifling matter to remark upon, but her general aspect was so illustrative of the old doctrine of the temperament, that I cannot forbear alluding to it. She possessed all the external characteristics of the so-called sanguine temperament, and to which especial susceptibility to acute inflammatory disease was attached. Light flowing auburn hair, fair and alabaster-like complexion, florid cheeks, a symmetrical form, full and early developed, with a mind vivacious and intelligent, and her disease the very concentration of inflammatory intensity. Without meaning to revive or discuss the obsolete question of the temperament, you may, nevertheless, remark, and be prepared to find, that among the youthful who present such characteristics as have been here described, there is a remarkable tendency, and almost special proneness, to acute inflammatory disease; and that when such subjects are attacked by inflammation, it is intense in its degree, often unmanageable, and speedily tends to a fatal termination.

THE LAW OF THE MORPHOLOGY OR METAMORPHOSIS OF THE TEXTURES OF THE HUMAN BODY.

(Fourth Series of Experimental Researches.)

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(Continued from page 315.)

XIV. INFLAMMATION CONSIDERED MORPHOLOGICALLY.

Before proceeding to substantiate the truth of these conclusions by a microscopical demonstration of the visible changes produced by inflammation, I shall remark upon certain questions which are considered doubtful with respect to the process of nutrition. According to physiologists generally, the lymph, or as I have termed it, the protoplasm of blood, is of the nature of a cyto-blastema, exuding through the interstices of the walls of the nutrient or capillary vessels, somewhat like water through a sieve, and giving origin to cells after its exudation; and upon this hypothesis they explain the origin of pus-cells.

VOGEL even attributes a developmental capacity,—i.e., a metamorphic power, not only to coagulable, but to coagulated lymph. The fibrinous fluid of a dropsy, he says, is capable of organization, and “it is indifferent whether the fibrin is in a fluid or coagulated state, as in either case it acts equally well as a cyto-blastema, and its capacity is unlimited.” “There may

be evolved from the fibrin,” he goes on to say, and he is speaking of fibrinous dropsy, “the most different forms of tissue, either normal, as cellular tissue, simple muscular fibre, cartilage, bone, vessel, nervous fibre; or pathological, as pus, granular cells, cancer, tubercle, concretions, &c.”*

Speaking of the formation of pus, he says,† “the formation of pus is dependent on two very distinct circumstances. In the first place a fluid *must* be secreted or separated, to act as a cyto-blastema; and, secondly, the pus-corpuscles *must* be formed in and from this cyto-blastema, which is always the fibrinous fluid, which has already been described in our observations on fibrinous dropsy, consequently the formation of pus *must* invariably be preceded by the exudation of a modified blood-plasma.”‡

Again, in another place, “The fibrin may coagulate, and thus give rise to false hydatids, apparent serous dropsy, induration of the affected organ, &c. Then follow the great number of changes which arise from the further development of the fibrin,—suppuration in the widest sense of the word, with all its modifications and forms, the formation of granular cells, and ulceration, epigenesis ‘neubildungen’ of the most varying kind, tumours, hypertrophies, concretions, changes of colour, softening, induration, &c.”§

Dr. J. H. Bennett adopts, if he may not be considered the author of, the views and sentiments expressed by Vogel. “The term exudation,” he says, “has been introduced into pathology not only to express the act of the liquor sanguinis (or lymph) passing through the vascular walls, but the fibrinous portion of the liquor sanguinis itself when it has coagulated.”

“In every case the exudation constitutes a blastema for the growth of nucleated corpuscles, which differ in form, size, constitution, and power of further development. The various kinds of development of the exudation may be grouped under the following heads”; and here follow sixteen different forms, normal and abnormal, amongst which are enumerated “pus-cells,” “carcinoma,” “muscular tissue” “epidermis and epithelium.”||

I have carefully perused Dr. BENNETT’s original treatise, and VOGEL’s *Pathological Anatomy*; and I can find in them no proof whatever that coagulated fibrin acts as a cyto-blastema,—no demonstration of its evolving muscular fibres, nervous fibres, granular cells, or pus. Vogel indeed, states that these things are shewn in numerous parts of his work, and advances this as a special reason for

* “Pathological Anatomy,” p. 55.—Ed. 1847.

† *Loc. cit.* p. 144.

‡ The italics in the above quoted passage are mine, and inserted to fix the reader’s attention upon the kind of demonstration on which the “unlimited” formation of cells in coagulated fibrin is based.

§ *Loc. cit.*, p. 415.

|| *Monthly Journal of Medical Science*, Jan. and Feb., 1847.