It has been remarked that this accident is one that occurs specially in male subjects, and M. Malgaigne says that he knows of no instance occurring in a female in which, at least, the real nature of the accident has been satisfactorily proved.

It is no easy matter to distinguish this accident from fracture near the joint, with which it has, no doubt, been often confounded. Besides the age of the patient, the most characteristic sign would be the soft, dull kind of crepitus obtained as distinguished from the more harsh and rough crepitation met with when the bone itself is broken through, though even this is by no means conclusive. The treatment, fortunately, will be the same in both cases, so that no great harm will happen to the patient, even if a mistake should occur in the diagnosis; union taking place in this injury as readily as in fracture.

Vacation Lectures

ON

FIBRINOUS DEPOSITION IN THE HEART:

ITS HISTORY AND PRACTICAL MEANING.

DELIVERED AT THE GROSVENOR PLACE SCHOOL OF MEDICINE.

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LECTURE I.

INTRODUCTORY REMARKS; *Plan of the Course*; *Different conditions of Blood in the Heart after death*. FIBRINOUS CONCRETIONS IN THE HEART: *their Forms*; *Structure*; *Weight*; *Chemistry*; *Process of Deposit*; *Post Mortem and Ante Mortem Deposits*.

[Continued from page 24.]

II.—PHYSICAL AND CHEMICAL CHARACTERS OF DEPOSITS.

FROM the consideration of the general forms of fibrinous deposits in the heart, it is instructive to turn to the deposits themselves, to remove them, and to examine their minute structure with as much care as can be bestowed upon the inquiry. In such an investigation, we may notice points relating to colour; consistency; structural outline; microscopical appearances; weight; and chemistry.

Colour. The colour of a fibrinous deposit varies from a dull red, approaching closely in tint the red of a voluntary muscle soon after death, to a perfect and pure white. This difference depends entirely upon the relation existing between the amount of hæmatine or colouring matter of the red blood-corpuscle and of separated fibrine. In cases where the separation is very rapid, some amount of coloured corpuscles, varying according to the period of separation, may be entrapped in the fibrine, when the concretion will be more or less red in colour. In other cases, where the fibrine separates very slowly, particle by particle, if I may so say, the concretion will be entirely free of coloured matter, except perhaps on its external surface, where it may have been left in contact with a little remaining red blood; and, divided in any direction, will convey the idea of a pearly looking mass throughout.

Consistence. The consistence of a fibrinous concretion is not invariably the same. In some examples—in cases, for instance, where, as we shall afterwards see, the concretion is the last fact in the course of a fatal disease, the determining fact of the death—the substance of the mass is soft and almost gelatinous in its character; while modeled to the part, and completely filling a cavity or tube, this clot may be so soft as scarcely to be removable without breakage. If it is cut across, it seems as if it were infiltrated with dirty thin fluid; and, placed on the water-bath so as to dry up, it is left as a mere film or thread on the drying plate. This condition of clot is only to be expected in cases where there has been some pre-existent asthenic long continued disease.

There is an opposite state, in which the fibrinous clot is laid down rapidly and in the course of diseases very acute and sthenic, in inflammatory diseases, such as croup and pneumonia. In these, the concretion may be, indeed generally is, so firm that it cannot be removed from any attachment it may have without some tearing either of the fibre of the concretion itself, or of the fibre of the heart. Concretion of this kind is

not unlike, in colour and firmness, the coagulated albumen of the egg after hard boiling. From this it differs, nevertheless, in that, when broken across, it is not fractured in a clean clear surface, but in a jagged fibrous form. If a fibre of such a clot be pulled, it will be found to possess a considerable degree of elasticity, and to curl up like the tendril of a vine, something in the way that the elastic or yellow tissue curls when cut across, extended, and then set free. Nothing can be more distinct, in short, than the difference in character between this form of clot and that already named as gelatinous. Both are produced by separation of the same constituent of the blood; it will be surmised, therefore, that this constituent, in the course of disease, undergoes great modification in its nature. The fact is so; and, inasmuch as death may occur at different periods in various diseases, so there may be observed, as the result of an inquiry extending over many cases, shades of consistency in all degrees, from the gelatinous and watery to the firm and fibrous.

Again, a fibrinous concretion may be found in two states. It may be firm and tough on its exterior, and soft, pulpy, or even creamy, in its centre. It was at one time assumed that, in clots having these appearances, the matter present in the centre of the concretion was pus. Mr. Gulliver was the first to point out the error of the said conclusion. He determined the fact that the fluid matter so situated is identical with softened fibrine; and that, when fibrine removed from the body is subjected to a temperature of 96°, it begins to soften in forty hours, and looks to the naked eye like purulent matter, but may be distinguished from that matter by the microscopical characters. He adds—I believe I am using his own words—"the softening of coagulated fibrine is an elementary pathological condition, frequent, distinct from suppuration, and constituting many of those cases called suppurative phlebitis." I am fully of opinion that Mr. Gulliver, in these remarks, has indicated with great precision an important but simple pathological fact. Concretions containing pulpy matter, like those gelatinous in structure, are found only in cases of the asthenic type—in cases where the fibrine may be said to be diseased or imperfectly developed.

Structural Outline. In a great number of concretions, there is found a peculiarly well marked *laminated* condition of the deposited mass; *i.e.*, when divided, the mass bears the character of having been composed in exact order, in layers laid down one upon the other, either from the centre towards the circumference, or from the circumference towards the centre. When a striated concretion is formed in an auricle or ventricle, and assumes a globular form, the layers are encircling; they are disposed, to use a common simile, like the coats of an onion, but of course, being extremely thin, are not so obvious to the sight. Still the striated character is so well traced in many examples, that the arrangement is to be discerned even by the eye alone. When the striated deposit occurs in the pulmonary artery or aorta, being then laid down as a cylinder, the layers are also circular, running the whole length of the cylinder. The *tubular* concretion is in this way formed of a series of layers, the innermost of which encloses the contained red coagulum.

Whenever in fibrinous deposit, layer upon layer, in the manner described, the red colouring principle of the blood pervades the mass, the appearance presented bears the closest analogy to a portion of voluntary muscular fibre. This analogy is so perfect that, in one case, I knew a gentleman who, on meeting with one of these formations in the pulmonary artery, mistook it at first sight for a portion of muscle. A mistake of this kind is necessarily soon dispelled on close examination; but I point out the analogy as a means of conveying the plainest description of a coloured striated deposit.

Microscopical Characters. The microscopical characters of a fibrinous deposit present but few peculiarities. In clots perfectly free from colour and firm in structure, the microscopical form is that of a closely woven fibrillar network, uniform, or nearly so, in appearance throughout. Interspersed amongst the fibrillæ, one occasionally sees, at considerable distances apart, colourless cells resembling the white blood-cells, and indeed not to be distinguished from them. When the clot is coloured, there are to be seen, in the meshes of the fibrine, red corpuscles also, their amount varying with the depth of the red coloration. The softened matter found in the centre of some concretions presents the appearance of white cells, mixed up with disintegrated fibrils and a considerable quantity of granular substance of a brick-dust shade. In concretions lying in a cavity, and having a *mechanical* attachment, these are the only microscopical characters with which I am conversant.

In the case of a concretion becoming organised, a more complex microscopical field is presented. I have had one opportunity of examining such a clot; and the appearances in that instance were those of an areolar web rich in white cells, and having vessels ramifying in great abundance through every part.

I say that I have seen but one illustration of an organised concretion. This is true; but I had, on a second occasion, brought before me a firm growth, adherent to the wall of the left ventricle of the heart by a broad base, and presenting, as regards position and outline, the idea of a fibrinous concretion having an organised attachment to the muscular wall. But, on examination, I failed to detect any sign of blood-vessel; I found only a very loose network enclosing lymph-like cells; and, as the history of the case gave me no clue bearing towards the view of a deposit of fibrine from the blood at any period, I am left doubtful on the point whether or not this was a form of fibrinous organisation. I should rather be inclined to think that it was not, but was a new growth developed from the endocardial surface.

Weight. The weight of a fibrinous concretion is an important matter; for the weight, ascertained both before and after drying, gives us data by which to form an estimate in discussing the question of the *ante mortem* and *post mortem* origin of concretion. I have paid considerable attention to this question of weight; and the mean result of the labour leads to the fact that there is the greatest possible difference in the actual amount of fibrine in different concretions—a difference which does not in any way depend on the relative size of concretions, but on their consistence, or, in other words, on the amount of water present in the mass.

I once removed a large soft gelatinous concretion, made up almost entirely of water, from the right ventricle and pulmonary artery of a man who died from chronic alcoholic poisoning, and found it, when washed of red blood and externally dried with blotting-paper, to weigh 215 grains. Removing fifteen grains with the scissors, I let the remaining mass of two hundred grains dry at a gentle heat until it ceased to lose weight. The result was a residue barely turning the balance against six grains. The concretion, therefore, in this example, contained, as it existed in the heart, so little as 3 per cent. of fibrine.

In other forms of concretion, the amount of fibrine present is very large. I removed from the right ventricle of a girl, 14 years of age, who died of acute rheumatic fever, a dense concretion, which, washed first with water and then with ether, to take up fatty matter, weighed in the moist state exactly 144 grains. This concretion, dried gently until it ceased to lose weight, yielded not less than 12.5 per cent. of fibrine. In another specimen of concretion, taken from the left ventricle and aorta of a man, a concretion which in the moist state weighed, at the time it was removed from the heart, 170 grains, I found, after perfect drying, a percentage of 11.18 of fibrine. In a third example, a concretion weighing 43 grains, obtained from the auricle of a child that had died from an acute pneumonia, yielded so much as 30.3 per cent. of fibrine. And in a fourth example, where a concretion weighing 27 grains in the moist state was found in the right auricle of an infant, a proportion of 30.2 per cent. of fibrine was yielded. In this last case, the fibrine had been enclosed in the auricle for many days before death, and was unusually firm.

These differences in the amount of water present in a concretion depend on the quality of the fibrine, and on the time elapsing from the commencement of the process of deposit and the termination. As the soft or gelatinous concretion is common to that class of cases where long continued exhaustion marks the end, so, on the contrary, that which retains so much more of solid matter is the product of a disease of the acute inflammatory type, in which the fibrine is in excess in relation to its solvent, and possesses active contractile force. The difference in weight is therefore not remarkable; for, in the last named concretion, the water is made to exude in some measure by the contraction of the mass during its deposition.

Chemistry of Concretions. In so far as I can ascertain, the concretions met with in all cases are pure specimens of ordinary fibrine. According to Mulder and Franz Simon, fibrine of inflammatory blood may be considered in a higher state of oxidation than normal fibrine; and the terms binoxide and tritoxide of protein have been used to express this higher oxidation. The hypothesis of a separate body in the form of protein is now given up; and, in so far as the action of reagents on inflammatory fibrine proves a fact, it proves that this fibrine is the same as common fibrine obtained from healthy blood.

Concretions of all kinds, as far as my experiments indicate, are composed of matter soluble in all alkaline solutions, and in acetic, citric, and butyric acids; of matter that may be precipitated from acid solutions by ferrocyanide of potassium; and of matter insoluble in pure water, ether, and alcohol. Butyric acid dissolves the concretion most energetically. The same rules obtain in regard to fibrine in its ordinary condition. I would, however, make one observation in relation to the amount of fat present in certain of these deposits. In concretions formed during acute inflammatory disorders, there is often to be seen on the external surface a distinct coating of an oily nature, which can be removed effectually by ether, and which sometimes is not confined to the surface of the clot, but extends through it. It is true there is always a small amount—about 2 per cent.—of fatty matter in fibrine; but in these examples the normal amount is very considerably exceeded. It may be doubled, or even trebled. The excess seems to me to be due to the same general producing cause as that which determines the increase of fibrine; viz., quickened respiration and circulation, and more active combustion—hypercausis. In cases where concretion occurs during exhausting diseases, there is no such increase of fatty substance.

III.—ORDER OF CONSTRUCTION OF A CONCRETION.

Those concretions which merely coat a mass of red coagulated blood, are produced exactly in the same manner as is the buffy coat on inflammatory blood newly drawn from the body. There is a simple separation taking place slowly, but *en masse*. Hence this form of concretion is not disposed in layers—it is one layer in itself. But in concretions such as were described in figures 2 to 6, the method of construction is essentially different. In these, the first step in development consists in the laying down of a portion of fibrine, in such a manner as to form a fixed point or basis for future deposition. Two special points in the cardiac cavities are favourable to such primary formation. The auricle of the auricle is one such point; the portion of the ventricle immediately below the infundibulum on either side is another; nevertheless, there may be separation commencing at any part of the cavity where, from irregularity of surface, and the presence of muscular bands or tendinous ends, the fibrine can interlace and hold fast. In forms of chronic cardiac or aortic disease, a groundwork for a concretion is offered in a surface of roughened valve or atheromatous artery. Any way, in whatever part it may be situated, or however slight its extent, there is a surface of attachment from which the further development of the deposit takes place; and, unless this fact is recollected, it is impossible to understand the peculiar courses which a concretion may assume. The first particles of fibrine thus laid down at a fixed spot, the progress of its increase is modified according to the time allowed for separation, and the condition of the blood. When the deposition commences in the earlier stages of a sthenic disease, the deposit laid down, particle by particle, during each passage of the laving blood, is arranged under the direction of the blood-currents into one or other of those forms which have been already explained. Taking the auricle of the right auricle as its basis, a concretion will go on gradually forming, and will encroach largely on the cavity without interfering with the course of the two venous currents. In this way is formed that variety of concretion which, as we have seen, sometimes fills the auricle exclusively, and even distends it. In the acute inflammatory diseases of children, this concretion is frequently formed.

If, again, the concretion take the posterior surface of the auricle as its basis, it will by its steady advancement anteriorly come at last into contact with the venous currents, and will be grooved by them—will be grooved above in a long curved line, i. e. in a line directed from the superior cava into the ventricle, and below in a line indicating a sharp curve from the inferior cava into the ventricle.

Or, if the concretion take its origin from two points of attachment in the auricle—from the anterior inner surface as well as the posterior—we then after death discover the double concretion, with the two columns of blood issuing between the two deposits, and grooving both.

Once more, the concretion, taking the auricle for its base, may extend into the ventricle, and, following the course of the circulatory channel, may make a rapid sweep into the infundibulum and pulmonary artery on the right side, or the aorta on the left side. Thus continuing, its ramifications may extend into the smaller branches of the pulmonary artery, or far along the aortic curvature.

Concretions arising in either ventricle take their insertion

from the ventricular wall, and, almost invariably following the course of the blood-currents, pass into the great arterial trunks leading from the ventricle. The concretion thus running along the main trunk is either tubular in character, or is entirely surrounded by blood, or grooved spirally.

There is yet another condition, in which the deposition, being more slowly carried on and more extended in its character, occurs in the form of a layer, having no one point, but a wide spread surface. In this form of deposition are produced the hollow concretions—those which line a cavity or a vessel, and enclose in their centres red blood.

Lastly, there is that concretion which undergoes *organic* development. In all instances of this nature, there is, in my opinion, a preceding change in the endocardial lining. There are injection of the subserous layer, œdema, exudation of plastic matter, with rupture of surface, and production of a point on which the fibrine of the free blood finds not only a basis, but a basis directly connected with the endocardial membrane. In process of time, vessels from the broken membrane are thrown out, and, extending through the fibrinous matter deposited by the blood, furnish it, if the patient live long enough, with the materials for a new and special organic growth, possessing a permanent and independent existence.

[To be continued.]

Original Communications.

PALLIATIVE TREATMENT OF CANCER.

By THOMAS HUNT, Esq., F.R.C.S.

My remarks apply only to those cases of true scirrhus in the breast in which there is a hard and moveable tumour, not yet advanced to the stage of ulceration.

One indication in this condition of things is as far as possible to *prevent* the occurrence of ulceration. I regard this process as chiefly the result of the *pressure* sustained by the skin and cellular membrane, from *one* hard substance within (the stony tumour), and *another* hard substance without (the patient's corset). This pressure is generally sufficiently severe not only to give rise to pain, but to effect, first, a congestion of the healthy vessels, and secondly, an absorption of the healthy structure, without being sufficient to absorb (as has been proposed by higher pressure) the cancerous tumour itself. A second indication is, to support the tumour, without undue pressure; and a third, to relieve pain.

All these purposes are easily accomplished, in most cases, by the following expedients:—The whole breast should be allowed to rest on a thick broad compress of cotton wadding. When the breast is very pendulous, an old silk handkerchief may be passed, as a sling, between the mamma and the wadding, and tied over the opposite shoulder, one tail of the handkerchief being passed over the clavicle, the other tail over the scapula and spine; and all should be included in a capacious corset, which will then become a comfortable support, instead of acting as a tormenting *vice*. Where the pain has been very severe, I have applied to the skin a belladonna plaster, spread thinly on soft thin leather. This, by encompassing not only the whole breast, but an inch or two of skin beyond it in all directions, will materially assist in giving comfortable support, and also in allaying the irritability of the nerves. By this *local* treatment I have often succeeded in relieving the patient of all pain for months together, and also in preserving the isolation of the tumour, and in many cases diminishing its size.

Together with this local treatment, great attention should also be paid to the bodily health and mental tranquillity of the patient. She should be encouraged to hope that her pains may be much relieved, if not entirely removed; that the disease may probably be checked, or even so far subdued as to become for a very considerable period comparatively harmless and benign. The health should be sustained by a generous but regulated diet; by engaging the patient as much as possible in cheerful society; and last, not least, by moderate but frequent exercise in the open air, in a locality where the atmosphere is pure and mild. This will be far, very far, better than confinement in the house, and infinitely better than confinement in the wards of a hospital containing patients with open wounds. If the health is feeble, much good will be derived from the following formula:—

R Tinct. ferri sesquichloridi 3iij; liquor arsenici chloridi 3v; aquæ destillatæ 3viij. M. Capiat minima xl ter in die ex aqua post cibum.

The dose of both the iron and the arsenic must be regulated by their respective effects. The iron is *generally* useful and necessary, the arsenic *always*; for, although I have rarely found a cancerous tumour entirely dissipated by arsenic, I have as rarely known the mineral fail to check its onward course. It most assuredly exerts, when discreetly administered, a certain amount of specific influence over the disease. I wish I could say more than this in favour of arsenical treatment; but truth requires that I should stop here. That there is no medicine which is so uniform and potent in its controlling power over this disease, is, however, most evident; and in this opinion I am supported by many high authorities in surgery.

As illustrative of the good effects of the proposed treatment, I have selected, out of many, the two following cases.

CASE I. A female servant, aged 40, single, consulted me in the autumn of 1858, on account of a tumour in the left mamma, which had been observed to exist upwards of a year, and which was becoming painful, and was beginning seriously to affect her health.

Sept. 16th, 1858. The tumour was about the size of a nutmeg, irregular, moveable, and of petrous hardness, having little sensibility, and little apparent connexion with the surrounding parts. It occupied a space a little below the nipple, which was not contracted, nor was the skin puckered or discoloured. The absorbent glands were unaffected; but the complexion was sallow and dusky; the appetite nearly gone; the nights were disturbed; and she complained of feeling "very weak and sinking". The alvine and uterine secretions were normal. A soft cushion of cotton wadding was placed under the whole breast, resting on a corset of ample size. She was directed to live well; to take every opportunity of exercise out of doors; and the chloride of arsenic and iron was exhibited thrice a day, in doses of twelve minims and a half of the solution of chloride of arsenic, and seven minims and a half of the tincture of sesquichloride of iron.

Nov. 1st. The pain was much relieved, and she had better nights; the appetite was improving, and the patient felt and looked better. The tumour was diminished in size. The treatment was continued.

Jan. 25th, 1859. She had no pain whatever. The tumour was still wasting. The health was improving. The bowels being inactive, a compound rhubarb pill was directed to be taken every night, and the arsenic and iron persisted in.

July 22nd. She had persevered most regularly in the treatment up to this time, and had had no pain whatever for several months. She looked well and plump, and had a good appetite. She considered herself quite well; but I advised her to persevere for at least another month, and to take especial care to use the cotton wadding as before.

This patient had been advised to have the tumour removed; but she strongly objected to the operation, and had resigned herself to despair. When I last saw her, her spirits were so good that I suppose no one could have convinced her that the tumour was malignant.

CASE II. Miss —, aged 24, residing on a healthy eminence in the country, had observed for several months a tumour on the right mamma, below and to the right of the nipple. She was a fine handsome girl; and nothing but the extreme hardness of the tumour, coupled with failing health, could have convinced me that she was the subject of cancer.

The tumour was of the size of a bantam's egg, of oval figure, but irregular surface, very hard. The mamma was swollen and tender; the axillary glands were not sensibly enlarged, but very tender, and somewhat painful. The pain in the tumour was often intense and lancing. The nipple was normal; the skin was slightly puckered over the tumour, which, although buried in a highly developed mamma, was in some degree adherent to the integuments. The health was considerably impaired. The bowels were very much constipated, and the catamenia very irregular, sometimes profuse, and sometimes scanty. There was also severe leucorrhœa, with pelvic pains and general uterine distress; as well as a failing appetite and a coated tongue. The pulse was rapid and feeble. The patient had wasted considerably during the last three months, and her spirits were "wretched".

March 12th, 1858. The breast was enveloped in a belladonna plaster, supported by cotton wadding and a sling. She was directed to regulate the bowels by pills of colocynth, aloes, and rhubarb; and to take the chlorides of iron and arsenic, as