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## LECTURE III.

E.M. HALE, M.D.

### FUNCTIONAL DISORDERS OF THE HEART.

**Definition and various Forms of Disorder — Pathological Relations and Causes — Association with other Diseases — Symptoms, Physical Signs of— Diagnosis — Prognosis — Treatment — Cases.**

GENTLEMEN: I propose to take up the Diseases of the Heart in the following order: (1) Functional. (2) Inflammatory. (3) Organic. This lecture will treat of *Functional Disorders of the Heart*.

A purely functional disorder of the heart is any disturbed action occurring independently of either inflammatory or organic affection. These affections may be attended by more or less functional disorder, but there are many cases where the latter are unattended by any lesion or inflammation.

In most cases, the disturbed action of the heart is evidently due to morbid conditions seated elsewhere, but it may be symptomatic of either blood-changes, or affections of the nervous system, or of both.

It must be borne in mind that disordered function of the heart, in cases of inflammatory or organic affections, involves the same morbid conditions which often exist independently of these affections.

The subject of functional disorder of the heart is of great practical importance, on account of the frequency of its occurrence, the anxiety which it occasions, and the liability of confounding it with organic disease.

The majority of persons who complain of symptoms referable to the heart, suffer from functional disease only. But the discrimination of functional from organic affections can only be made by one who is thoroughly acquainted with the subject. The great importance of a correct diagnosis is obvious, when we consider that structural lesions involve more or less danger, while functional disorder, although very distressing, very rarely, if ever, proves serious.

There are several varieties of functional disorder. In the mildest form the action of the heart is simply increased by transient exciting causes, such as mental emotions, unusual exertions, etc., but this excited action is only transient.



*Persisting inordinate action* is another form. The heart may act with regular rhythm, but with abnormal rapidity and force, not greatly influenced by exciting causes; and this action may continue for weeks and months. The pulse, in such cases, ranges from 120 to 130 per minute, and the patient is in a state of constant anxiety, fearing organic heart disease.

*Paroxysms of irregular and tumultuous action* is another form of this disorder. Such paroxysms often occur without any obvious exciting cause, and the patient is attacked suddenly with violent beating of the heart, with disturbed rhythm. A feeling of impending death is experienced, with great terror and anxiety, which increases the intensity of the paroxysm. The slightest motion increases the anxiety and palpitation. (*Digitalis*.)

The attacks may occur at short intervals, or only once in a few weeks; they may last but a few moments, or several hours. Such cases are frequently met with in hysterical women, and are accompanied by various attendant symptoms. Boullard calls this affection "insanity," but it has appeared to me to act more like a choreic affection, such as we observe in muscles elsewhere.

Another species of paroxysm is *irregularity and intermissions, without increased force of the heart's action*; on the contrary, the action of the heart may be quite feeble. Such paroxysms inspire great terror. The patient feels as if the slightest movement would cause death, from stoppage of the heart's motion, or from syncope. (*Gelsemium*.)

It must be remembered that some cases of mere *intermittency* are congenital, and are of no importance as a symptom.

In other cases the pulse may intermit, but not the heart's action. This is termed a false intermission. The force of the ventricular contraction is not sufficient to produce a radical pulsation. . . .

#### CAUSES AND PATHOLOGICAL RELATIONS OF FUNCTIONAL DISORDER OF THE HEART.

These may be enumerated as follows: plethora, anemia, derangement of the nervous system, dyspepsia, and the gouty diathesis.

*Plethora* is that condition in which the blood is abnormally rich in red globules, and, perhaps, in excess as regards quantity. The heart becomes overtaxed and over-stimulated, and becomes morbidly irritable. There is much violence of action without much disturbance of rhythm. Palpitation may be the first symptom that awakens the anxiety of the patient, and



concentrates his attention on the heart. He becomes fearful of organic disease, and taxes the patience of his medical attendant to a high degree. Those who suffer most from this affection are men who leave the farm or workshop, and men of previously active business pursuits, who change their mode of life and become luxurious, indolent, or lead sedentary lives. Women who tend to obesity and live much indoors are liable to this form of heart disorder.

*Anemia*, or an opposite condition to the above, is more frequently met with, and rarely occurs without more or less disturbance of the heart's action. Women are more subject to this variety than men. Anemia being produced by excessive loss of blood, or of any of the fluids of the body, the first cause may generally be located in some particular organ or tissue. It must be borne in mind that the heart disorder is not always proportionate to the anemia. It may be slight in cases of marked anemia, and severe when that condition is hardly appreciable.

With the anemia, besides the functional heart disorder, we shall find coldness of the extremities, headache, neuralgia, melancholy, irritability of temper, etc. Anemic patients, with heart symptoms, live in constant dread of organic disease, and fear of fatal results. If the physician trusts altogether to symptomatic phenomena, he may have the same fear of serious results in his patient, for in these cases palpitation is excited by the slightest exertion; dyspnoea is experienced, the countenance is morbid, and occasionally dropsy sets in, which may be mistaken for the dropsy caused by organic disease.

*Derangements of the nervous system* may be a cause of functional disorder of the heart, without the presence of anemia. Cases of hysterical palpitation come under this head, for hysteria often occurs without anemia, but with plethora.

A condition of the nervous system favorable to functional disorder is said to be caused by masturbation and venereal excesses. Uterine disorders are a prolific cause. The excessive use of tobacco, green tea, and coffee often induce a condition giving rise to functional disorder of the heart.

Whatever may be the causes of this condition, mental depression is a constant attendant (in marked contrast to chronic pulmonary affection). The patient persists in believing that he has organic disease, in spite of our most earnest assurances. He watches the action of the heart with constant anxiety, and habitually counts his pulse, and feels for the beating of the heart, and lives in such a morbid state, mentally, that the condition of the heart is actually aggravated by his constant dread and apprehension.



*Dyspepsia*, in its various forms, tends directly to cause this disorder, but as many dyspeptic ailments proceed from derangement of the nervous system—and this often induced by mental distress or anxiety—it is often difficult to separate this cause from those gastric affections proceeding from indigestion or hepatic derangement.

Dyspeptic patients with heart disorder are equally prone to magnify it into a dangerous complaint. They watch the pulse and the beating of the heart, and are in dread of sudden death, such as they have heard of in organic disease. It is notorious that this morbid watching for heart-symptoms, and the anxious expectations of finding heart disease, is actually sufficient, in some cases, to produce the functional variety. The presence of gas in the stomach, even when dyspeptic symptoms are not present, often causes severe attacks of palpitation. In such cases, the expulsion of a quantity of wind by belching often puts an end to the distressing paroxysm.

*The gouty diathesis* gives a liability to functional derangement of the heart's action. Attacks of palpitation occur in such persons before the joints are affected, and cease when tumefaction is present. The presence of an undue quantity of *lithic acid* in the blood is supposed to be a cause—acting as an irritant to the nerves which control cardiac action.

Other causes of functional disorders have been noticed by clinical observers. It occurs during convalescence from fevers. Deformities of the chest seem to favor it. Young persons whose growth is rapid are liable to it. Excess in muscular exercise induces it. Soldiers in the late civil war were affected with it, probably caused by the excitement and muscular exhaustion incident to their life.

#### FROM WHENCE COMES CARDIAC INNERVATION?

This is an interesting question, both in its pathological and therapeutic relations. Barthez<sup>1</sup> says we must make a distinction between the *radical* and the *acting* forces governing the heart. The former may be nearly exhausted, while the latter are in full play; and, *vice versa*, the latter may be but slightly manifested, while the former are powerful. The amount of *radical* forces represents a person's capacity of vital resistance to disease and fatigue. The *acting* forces have their origin in the radical. In cases of functional disorder we have hyperesthesia from debility, or a *morbid* stimulus may be reflected from the nervous centers on the cardiac nerves.

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<sup>1</sup> Traits de Therapeut., vol. 1, p. 43, par Trousseau and Fidoux



According to Bezold, the nervous centre of the cardiac movements furnishing three-fourths of the entire propulsive power of the heart, occupies the *cervical region of the cord, including the medulla oblongata, and extends as low as the fourth dorsal vertebra*. Its fibers run through the cervical spinal cord, and pass out between the seventh cervical and fifth dorsal vertebra, probably passing through the lower cervical and upper dorsal sympathetic ganglia, and proceeding to the heart.

The innervation of the heart is derived, in part, from the ganglionic or sympathetic system, and partly from the pneumogastric nerves. For its *active force* the heart is dependent on the cardiac ganglions and the plexus of nerves with which they are connected. The function of the pneumogastrics is to *regulate its action*. The latter presides especially over the rhythm of the heart's movements. Morbific agencies giving rise to functional disorder may affect separately these two sources of the innervation of the heart. Most of the causes of functional disorder probably act primarily upon the nervous centers, but in some cases, as when the disorder depends on dyspepsia, or uterine irritation, the morbid influence is transmitted to the nervous centre, and *reflected* upon the heart. Very many cases of functional disorder of the heart are doubtless reflex in character. If we could decide, by accurate investigation, the particular nerves upon which medicines act pathogenetically, our knowledge of the curative powers of remedies would be much more certain.

#### PHYSICAL SIGNS OF FUNCTIONAL DISORDER.

Physical exploration by means of auscultation, percussion, and palpation, is of immense value in functional disorder of the heart, as showing the *absence* of the signs of inflammatory and organic affections. The information which it affords is not less positive than if there were certain signs peculiar to functional disorder.

In our examination of the heart in cases of supposed functional disorder, we have to decide, *first*, as to the absence of abnormal phenomena denoting structural changes; and *second*, as to the presence of the normal phenomena denoting soundness of the organ.

By *percussion* we can ascertain that the heart is not enlarged, and, if not enlarged, that the disorder is quite certain to be functional. But we cannot, on the other hand, decide that the disorder is *not* functional because the heart is enlarged, for functional disorder may supervene upon, or coincide with enlargement.

*Palpation* enables us to ascertain the *force* of the heart's action. The movements and the irregular action are readily appreciated by the hand.



We can discriminate between the *increased* and disturbed action due to morbid excitement, and the augmented *power* due to hypertrophy. The impulse in

hypertrophy denotes *strength* rather than *force*; it is not quick and violent, but sluggish and strong; it does not give the sensation of a shock or blow, but it causes a gradual and strong heaving of the praecordia.

Palpation also shows that in functional disorder not attended by structural disease, the point of apex-beat is in its normal situation; not elevated, as in pericarditis with effusion, nor lowered and carried to the left, as in cases of enlargement of the left ventricle.

*Auscultation* is important in two ways, *first*, by showing the *absence* of abnormal sounds indicating valvular lesions; *second*, showing that the natural sounds preserve their essential characters and normal relations to each other.

Endocardial murmurs are very rarely heard, if ever, in purely functional disorder. A venous murmur, or hum, in the veins of the neck may be heard in persons in health, and the anemic murmur may be diagnosed by the general condition of the patient. Aside from these two murmurs, it is not of practical importance whether a murmur be organic or inorganic, so far as relates to the treatment of functional disorder. Valvular lesions do not cause notable disturbance of the heart's action prior to enlargement. If therefore enlargement is not present, the disturbed action of the heart may be considered as functional.

It must be borne in mind that all the normal heart sounds are intensified by the increased action present in functional disorder. So distinct do they become, that they may be perceived by the patient, especially at night. But if their sounds are only intensified, and not changed, we may know that functional disorder only exists.

## DIAGNOSIS.

In order to make a correct diagnosis, we must *first* determine whether organic disease be or be not present; *second*, if organic disease be present, to determine whether superadded functional disorder be not the source of more or less of the symptoms referable to the heart.

It is in this case as in tubercular phthisis, that we can sometimes decide from the *mental* condition of the patient. It is well known that persons affected with tuberculosis are cheerful, and do not appreciate the gravity of the disease, while in those pulmonary disorders not dangerous they are despondent and foreboding.



In functional cardiac disorder, the patient is very anxious and apprehensive, while in purely organic disease no such degree of anxiety is manifested; on the contrary, they are often apathetic on the subject.

Again, the same or a greater amount of disturbance, when present in organic disease of the heart, causes much less anxiety than when arising from functional disorder.

The paroxysmal character of functional disorder is quite in contrast with the continued persistency of the symptoms of organic lesions.

In functional disorder active exercise does not generally aggravate the symptoms, it sometimes alleviates them, while in organic disease the contrary obtains.

There are certain symptomatic conditions belonging especially to organic disease, that are absent in pure functional disorder. Among these are general dropsy, lividity, haemoptysis, and paralysis from embolism. They may coexist with functional disorder, but are not caused by it.

Cardiac disturbance is probably functional if it be connected with plethora, anemia, derangement of the nervous system from excessive venery, mental anxiety, the abuse of tobacco, tea, coffee, or with gout.

Organic disease, on the other hand, in the majority of cases originates in acute rheumatism. If the patient has never had the latter affection, the probability is that the disorder is functional.

Functional disorder occurs especially in the young, between puberty and middle life.

Organic disease is oftener present in persons past the meridian.

Functional disorder is oftener present in females than males, while the reverse occurs in organic disease.

Functional disorder is worse at night; organic disease during the day.

We should not, however, venture an opinion as to the presence or absence of functional disorder, until we have made a physical examination. This, and this only, should decide us in forming a diagnosis.

### **PROGNOSIS.**



The prognosis in cases of uncomplicated functional disorder is always favorable. The opinion that it may lead to organic lesions has been disproved. We may safely assure our patients that if a recovery does not occur, no organic disease need be apprehended.

### **TREATMENT OF FUNCTIONAL DISORDER OF THE HEART.**

The therapeutics of functional disorder of the heart include:

1. Relief of disturbed action when present, or *palliative* measures.
2. Removal of the morbid irritability of the heart or the causes of such irritability. These are the true *curative* measures

*Palliative measures* are those which will allay any temporary excitement or disturbed action.

The mildest form of the disorder, when it arises from a fright, or undue exercise, usually need only rest of mind and body to allay it. A single dose of *aconite* may be of service.

For the attacks of palpitation, irregular and intermitting action, weakness or syncope, the following remedies will be found appropriate:

For paroxysms of palpitation from physical excitement, mental emotion, etc., a single dose of *aconite* will suffice if it has been caused by fright; *coffea* if from excessive joy; *ignatia* if from sudden grief; and *Scutellaria* if from inordinate excitement of other kinds.

For paroxysms of tumultuous and irregular beating of the heart, with *violent* impulse, the chief remedy is *veratrum viride*, in doses of one drop of the tincture every hour, or oftener; a few doses will quiet the excitement. Such paroxysms usually occur in plethoric subjects. In similar cases *cactus* is often indicated, also *aconite*, *arsenicum*, *belladonna*, *cocculus*, *lachesis*, *naja*, and *spigelia*.

For paroxysms characterized by irregularity and intermissions, with *feeble* action or impulse, another class of remedies is indicated, namely: *digitalis*, *cannabis ind.*, *laurocerasus*, *acidum hydrocyanicum*, *arsenicum*, *veratrum album*, and *aconite*.

Paroxysms of tremulous agitation of the heart call for nearly the same remedies, but the attacks are generally of such brief duration, that there is no time for the administration of medicines.



Hysterical palpitations or disturbed action, require the use of *ambra*, *assafoetida*, *camphor*, *castoreum*, *crocus*, *ignatia*, *lilium*, *sumbul*, *Scutellaria*, and *Valeriana*.'

In actual cardiac syncope, the use of active stimulation is necessary. Brandy, or any alcoholic liquor may be used, or *camphor*, *xanthoxylum* and *ammonia*, aided by the mustard foot bath. The recumbent posture is absolutely necessary until the attack is over.

[For special or characteristic indications for the selection of remedies consult the symptomatology given in this work.]

### RADICAL OR CURATIVE TREATMENT.

*Plethora* should be treated by means of appropriate diet, namely: the abstinence from rich and stimulating food, coffee, pastry, and the avoidance of a sedentary life. Small meals and a large amount of active exercise are the principal curative agents.

The administration of *veratrum viride* in doses of five drops of the first decimal dilution three times a day, will aid in effecting a removal of the plethoric condition. Equally efficacious is the *bromide of ammonium* in five or ten grain doses of the first decimal trituration, taken after each meal.

*Anemia* should be met by such remedies as will increase the proportion of red globules in the blood, and the use of such articles of diet as will bring about the same result. Active exercise in the open air, and a residence in non-malarious localities, should be advised.

*Ferrum*, in some form, is here the principal remedy; but it must be borne in mind that *iron* is *not* the remedy in all cases of anemia. It will not remove anemia caused by distressing emotions, nor the anemia growing out of some morbid dyscrasia. It is only useful in cases arising from some fault in assimilation or abnormal condition of the vegetative system. Various preparations of *iron* have been found useful. *Ferrum met.* in the lowest triturations is generally useful; but if this does not have the desired result, and *iron* seems to be strongly indicated, select the *lactate of iron*, *muriated tincture of iron*, *phosphate of iron*, *iodide of iron*, or the *citrate of iron and strychnia*.

The *hypophosphites of lime*, *soda*, or *potassa*, *phosphoric*, or *hypophosphoric acid*, act promptly if the anemia arise from nervous prostration or prolonged nervous excitement.



*China* is indispensable if the anemia is the result of hemorrhages, or loss of any of the vital secretions of the body. *Helonias*, *hydrastis*, *phosphoric acid*, and *arsenicum* are indicated in similar conditions.

*Cuprum* is, according to Grauvogl, superior to iron in many cases of anemia.

*Nux vomica*, *ignatia*, and *strychnia* are indispensable in certain anemic conditions, when the blood is impoverished from deficient vitality of the nervous centers.

When derangement of the nervous system causes functional heart-disorder, *nux*, *ignatia*, *secale*, *phosphorus*, *cuprum*, *digitalis*, *phosphoric acid*, and similarly acting medicines are to be used. The *bromide of potassa* and *zinc* will be found useful in many cases.

When the cardiac irritation is *reflex*, we must select:

For *gastric disturbance* — *nux vomica*, *pulsatilla*, *ignatia*, *collinsonia*, *lycopodium*, *iris ver.*, *hydrastis*, etc.

*Collinsonia* is very highly recommended by many prominent physicians of the eclectic school of medicine, as an excellent remedy in purely functional disorder of the heart, when its action is *persistently rapid, but weak*, or when there is excessive *action* with deficient *force*. It has been given successfully in doses of 5 to 15 drops of the tincture several times a day. The pathological conditions to which it is homoeopathic cannot be clearly defined because the provings do not yet indicate its specific action on the heart. But from its known curative action in cough, hoemoptysis, hemorrhoids, and constipation, we may consider its action on the heart as *reflex*. My experience confirms the recommendation of its use in some cases of functional disorder.

For *uterine disturbance*—*cimicifuga*, *pulsatilla*, *platina*, *lilium*, *sepia*, *gelseminum*, *nux moschata*, *sanguinaria*, etc.

The following is one of the many notable cases of functional disorder of the heart resulting from uterine disease, which have come under my observation:

**CASE.**—A lady, mother of two children, had suffered for several years from retroversion, abrasion of the os uteri, and a great variety of anomalous pelvic pains peculiar to such cases. About a year ago the uterus was replaced, and a ring pessary inserted, which kept the uterus in normal position, and soon after the leucorrhoea and uterine pains disappeared. But she soon began to complain of rapid and persisting



beating of the heart—worse at the menstrual period—which increased to such a degree that I was consulted. Neither auscultation nor percussion revealed anything abnormal, except an increased clearness of the sounds of the heart. The force of the heart's action was decidedly increased. The pulse was generally regular—120 to 130— but sometimes irregular and intermitting. The menses, heretofore normal in amount, became scanty, and a condition of prostration set in, accompanied by emaciation. All the cardiac remedies in our materia medica were consulted and tried, but without other than palliative benefit. (*Nux moschata* helped her most.) The bromide of potassa and hydrate of chloral gave no permanent relief. A few weeks ago she was attacked by the prevailing influenza, and came near having pneumonia, but it was arrested by the free use of *veratrum vir.* A severe cough, which called for *sanguinaria*, led me to give that remedy. On the day after, she said, "Doctor, something has stopped my heart for the first time in a year." To my surprise, I found it beating regularly, quietly, at 72 per minute. Did the *sanguinaria* cause this curative action? I do not know. Her menses came on the day I gave the *sanguinaria*, and more profuse than usual, and she now began to complain of her old uterine symptoms. On examination the uterus was found retroverted—the ring pessary appearing too small to support it in proper position—and the presence of cervical inflammation was detected. A larger ring was introduced, *lilium* and *sepia* given, but the heart still beats normally. I think the irritation was transferred or reflected from the uterus to the heart and has now returned to the former organ. What part the *sanguinaria* played in this case I do not know, but imagine it may have assisted in the transference.

Among the palliative remedies in this cardiac disorder, the *chloral hydrate* bids fair to become useful. Physicians of other schools speak highly of it in "such cases. Its well known power over nervous aberrations, whether local or reflex, appears to recommend it as a valuable agent. One of my patients, whose heart kept her awake, night after night, for months, got no sleep from any remedy until she took the chloral—15 grains at bedtime. Under this remedy she improved decidedly in strength and appetite, and specific remedies appeared to have a better and more lasting effect in bringing about a cure.

*Nux moschata* has had a reputation for centuries in heart disorders of a nervous character. The symptoms given in Dr. Hering's very complete pathogenesis, prove it to have a decided influence on that organ. Among the most prominent symptoms are—*quivering, trembling, fluttering, and violent palpitation, labored beating of the heart,*—"a fearful embarrassment." It is asserted to be curative in cases arising from fear, fright, grief, stoppage of urine, uterine troubles, and menstrual difficulties. I do not hesitate to advise it in cardiac *debility*, with the symptoms above enumerated, especially in delicate, nervous women



given to fainting, or sensitive to the slightest emotion, and when the cardiac irritation alternates with uterine or vesical disorder, or even gastric troubles. Give the 3rd or 6th trituration.

*Prunus virginiana* (wild cherry) has long held a high reputation in abnormal conditions of the heart characterized by *irregular, intermitting, and feeble action*. It will be found most useful when the disorder is purely functional, but it has been used with excellent results as a palliative in structural disease. The usual method of administration is in the form of cold infusion. One ounce of the inner bark (*fresh*, if procurable) in a quart of cold water. After standing six hours, it may be prescribed in wine-glassful doses every three or four hours, until there is a decided improvement. It is a safe and simple remedy, giving tone to the general system, and improving the condition of the circulation. It is a feeble analogue of *digitalis*.

*Lycopus virginicus*<sup>2</sup> has some reputation for conditions similar to those for which *prunus* is recommended, but from the testimony adduced for-it I think it resembles *aconite* rather than *digitalis*, and is better indicated where the pulse and heart's action is rapid, but rather hard, with or without irregularity. From some of the symptoms of the proving, as well as the results of clinical experience, it promises to be useful in that disorder known as "exophthalmus," — "Basedow's Disease" — "Grave's disease," etc. According to Flint, functional disorder may end in this condition. The *lycopus* may have the power of warding off such result. Prescribe it in lowest dilutions or mother tincture.

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<sup>2</sup> New Remedies, p. 706.