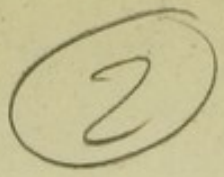
Diseases of the chest in children : their treatment by blisters / by Daniel Maclean.



DISEASES OF THE CHEST

IN

CHILDREN:

THEIR TREATMENT BY BLISTERS.

BY

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DISEASES OF THE CHEST IN CHILDREN:

THEIR TREATMENT BY BLISTERS.

THE object of this paper is to notice a method of treatment in the diseases of children, which is, so far as I am aware, novel, and which I have adopted in suitable cases with great benefit —a treatment for which parents have, very often, little partiality, but by which many lives will be saved—a treatment which, if my views be correct, is based upon a pathological groundwork, and which explains numerous circumstances in connection with these diseases otherwise obscure.

This class of diseases holds a remarkably high place in the yearly bill of mortality, causing in Scotland the deaths of as many children of five years of age and under, as the deaths at all the other ages put together. Any means, therefore, that will modify this state of things, or even give a greater control over these diseases, is well worthy of consideration, and is a justification for bringing before you what might otherwise be deemed a trivial subject.

The treatment which I would advocate, over and above the special treatment to the chest proper, is the application of counter-irritation, in the form of small blisters, over the roots of the nerves going to the chest, and those auxiliary to the act of respiration. The most appropriate spot for their application is immediately behind the ear, where there is naturally no growth of hair. The form of blister which I invariably use is the Tela vesicatoria of the Messrs. Smith of Edinburgh. This has no specific virtue over the other forms of cantharadine counter-irritation, but is very convenient, cleanly, and almost certain in its action, especially on the tender skin of children. These blisters have this special recommendation in such

cases, that they are comparatively painless, and can be allowed to remain applied to the surface an indefinite length of time, as they never produce destruction of the true cuticular tissue, only irritation, which raises the epidermis with a layer of serum below, and this serous fluid acts as a protection to the more active surface beneath. Three hours when applied to a child is in general a sufficient length of time; then by substituting a layer of fine cotton-wool, a bag of fluid will be speedily produced, whose action will protect the tissues from undue stimulation. This amount of counter-irritation is usually quite sufficient for producing the effect required; but should circumstances necessitate their further use, reapplication can be continued as long as they are thought to be of benefit. In this way we have complete control over the counter-irritation, and can modify it according to circumstances.

My reason for using this method of treatment is, because there is so much nerve-force acting in excess in children in diseases of the chest as to influence to a very great extent their continuance and their result. It is with the object of getting rid of this vis-nervosa in excess that I recommend the adoption of this blistering treatment in the diseases of children. The results of my use of this style of treatment have been such as to justify me in advocating it as one of our stock methods of cure in diseases such as those I mention. It is not of value in every case of chest disease, nor in every stage of each case of chest affection. Speaking generally, it is only applicable in disease having a permanent or prolonged irritation of the mucous and elastic minute tissue of the smaller bronchial tubes and tissue of the air-cells, such as is found in the acute stage of most diseases of the chest. I have used this treatment in many cases in different diseases of the chest in this stage of irritation, when the tubes are in the dry congestive, or inflamed condition of the disease, and I find the patient quickly improves; the respiratory murmur becomes soft, and the moist mucous râles are developed in a comparatively short time, before the child has become weakened either in body or in lungs: the convalescence is much speedier with fewer fatal mishaps, than took place pre-

viously from the full virulence of the complaint being attacked only at one point, viz., in the lungs themselves. All chest diseases influence the whole body, as well as their seat; the lungs, besides being themselves influenced and kept up by the general condition of the whole system, are so, more especially through the agency of the nervous organism.

I do not propose to give in detail the cases in which I have applied blisters to the head in chest affections, but only to mention generally those conditions in which I conceive the greatest benefit is to be gained from this procedure.

Like others, I have often been baffled by this class of maladies, and believed that there was some other factor or factors at work besides the local alteration of texture; and, from the frequency with which nervous symptoms appeared, was led to believe that the brain or nervous system was the disturbing influence at work. I had the care of a child about a year old, who baffled me for some time. There were no apparent head symptoms; the child was out of sorts, restless, uneasy, and fretful; the skin was hot, the respiration hurried, a dry irritating cough, and the child refused to take food. All over the chest, in both lungs, the respiratory murmur was harsh, rough, and tubular—no moist râles, no crepitation, no rhonchi. This condition continued for some time, and the child was losing flesh, notwithstanding the use of almost all the remedies usual in chest affections, till I persuaded the father (with the greatest difficulty) to allow me to apply two small blisters, one behind each ear, for three hours. The next day the breathing was easier, the restlessness greatly subdued, and the respiratory murmur became moist, and soon natural, all of which was the precursor of a speedy recovery.

Another case of the same character came under my care; the same difficulty was experienced in removing the disease; but the father, being a man of intelligence, on the reason being explained to him, at once permitted the application of the blisters; after which the alteration in the condition of the child became, in a very short time, so marked, that there was no difficulty in tracing the result to its proper cause.

I also use the blisters in the bronchitis of children, in all

cases in which I am permitted, and when I am called in the early stage of the disease, before the supervention of the moist mucous râles, notably in the first, or dry feverish stage of the complaint. Bronchitis is a complaint occurring so frequently, that people become accustomed to it, and object to what they consider the cruelty of applying blisters to young children, and refuse to permit their application at the only time when they can be of service; but would often wish them put on in the advanced stages of the disease, when, instead of doing good, they do harm. Thus, I have not had the privilege of applying them in all cases of bronchitis, but where I have had the opportunity, in the proper cases and at the proper time, I have invariably shortened the disease, and had speedy recoveries.

In measles, also, blisters applied as I recommend, are desirable. Although not strictly a disease of the chest, yet in every case the lungs are involved as much as if the origin of the ailment had its seat there. When the disease has a fatal termination, it comes generally through some lung complication, or through some alteration of the cerebral centres, such as convulsions. The latter complication is not an accompaniment invariably attending measles, like the chest affection, but nervous derangements occur so often, that it shows an intimate connection between the two, and unmistakeably points out for adoption the principles and practice I wish to establish. In measles I generally apply the blistering treatment, both as a means of cure to the chest complication, and as a preventive to the development of cerebral symptoms. In all cases I look out for nervous symptoms, as I believe they always indicate a very severe phase of the malady. The sudden disappearance of the rash in measles is often followed by an outbreak of some affection of the brain. It is, therefore, at all times wiser to be prepared for such an emergency, by the adoption of treatment which will have a tendency not only to prevent such an occurrence, but will at the same time relax the excited and congested bronchioles and air-cells.

The same treatment by blisters holds good also in cases of infantile pneumonia during the first or congestive stage, when

there is a determination of blood to the pulmonary capillaries and increased activity in all parts of the lungs. Of course, this treatment is founded upon the same principle as in the other diseases of the lungs, and is applicable to all diseases in which the same condition of things holds good.

It will be observed that all the different diseases which I have mentioned—bronchitis, pneumonia, measles, and congestion—may be divided into two classes, those that begin in the lungs, and those that have their origin in the nervous system. But, although the origin is different, the result upon the lung in the first stage is the same, and justifies the adoption of the same method of treatment.

By this method of applying blisters behind the ear, I claim to shorten the duration of the disease—reducing the length of the first stage, and hastening the recovery. The irritated condition of the minute tissue of the bronchial tubes and air-cells, with the determination of blood towards the parts being removed, the moist stage of the disease is quickly induced, thus generally preventing the exhausting of the body and lungs which takes place, if allowed to run its course, or if we must wait till it submits to our usual pulmonary remedies.

This method of treatment is not only of practical value, but also involves a pathological principle of action, which is of the first importance, and which is in force not only in the case of children, but in adults as well, although not so apparent, and not at present under discussion, viz., the important part which the nervous system plays in disease, and especially in disease of the lungs. In children this part of the organism cannot be ignored, and is on all hands admitted to be proportionally in extra activity—necessary during early life to fulfil the purposes of growth—and it thus becomes a factor, whose influence cannot be safely overlooked during disease. In the condition of parts to which the blistering treatment is applicable, the reflex action of the nerves supplying the lungs plays no secondary part in exciting, continuing, and modifying the abnormal action going on.

We must remember that the air-sacs in children, as well as the ultimate bronchial tubes, the terminal dilatations, and

the alveoli being smaller than in adults, when, from any cause, contraction takes place, these become still smaller. Their capacity being diminished, and the blood-vessels becoming smaller in diameter through the forcible application of the power of the elastic tissue, less air gets into the air-vesicles, less blood into the capillaries, and less freedom in the transfusion of the gases so necessary to health, from the increased thickness of their walls. We have thus increased frequency of respiration, and diminished aëration of the blood; so that we have a condition inherent in the parts themselves, which enables the smallest cause to act prejudicially.

Supposing a case of bronchitis be taken as a typical example of the action going on in the body. We have first the exciting cause or "cold" invading the lungs through the tubes, acting upon the mucous membrane as a local irritant, and interfering with its normal nutrition, and also deranging its circulation. This effect of irritation is not confined to the large and small bronchial tubes, but also affects the air cells with the pulmonary circulation, though to a less extent. This irritation stimulates the minute tissue to increased action, and we have contraction of the elastic tissue, with an increased flow of blood in the capillaries, causing active congestion, which implies a contraction of the capillary vessels. This contraction of the elastic tissue should cease as soon as the exciting cause—the "cold"—was removed; but this does not take place, as the contraction and congestion of the parts are continued long after the cause is removed. Because, besides acting as an irritant to these, it has also developed an action or irritation upon the periphery of the nerves, and irritating the filaments of the pneumogastric nerve through the afferent fibres, the impression is carried to its ganglionic centres, and thence by the reflex process sends the impression through the efferent fibres back to the already irritated and excited minute tissue, contracting still further the capillaries and elastic tissue. The original irritation is thus followed by that produced by the action of the nerves, and the process is kept up till the nervous action ceases through exhaustion.

By this time the tissues involved, and very often the body generally also becomes exhausted; too late, probably, for the little patient.

Dr. Roberts, in his article on bronchitis in "Reynold's System of Medicine," says, that "cold," besides acting as I have mentioned on the mucous membrane, operates secondly "by acting upon the system at large in some way or other not understood—the bronchitis being only a part of the general disturbance."

This little-understood part of the process going on in bronchitis is explained by taking into account the stimulation of the nervous system in connection with the local affection. It is not an explanation of all the symptoms in connection with the disease, but it accounts for most of them. You cannot have disordered function going on in any part of the body without its influence being felt more or less throughout the whole; and if deranged tissue function affects the body, how much more will the deranged nervous function affect the general system, considering how impressions are so easily and so readily carried along their filaments?

Besides the irritation going on at the periphery of the nerves, influencing the tissue to which the filaments are distributed, this influence is not without its effect upon the ganglionic centres themselves, and cannot fail by being continued for a length of time to produce a pathological action there also. No organ in the body can be for a length of time kept in a state of irritation without affecting its minute tissue and producing by its increased action an increased growth, of a low type, among its cells, making them incapable of performing their proper work. This seems to be what takes place in the cerebral centres; and they cannot be expected to escape the operation of the usual law, so that by long continued action in the filaments of the nerves, the nerve-cells are themselves ultimately affected, and at length we have what are seen very often as sequelæ of disease of the chest—nervous symptoms, convulsions, and probably effusion into the ventricles. Any one at all conversant with the diseases of children has to lament too frequently this result

following disease in the chest; and to my mind the explanation is quite clear.

Thus we have in the diseases to which I refer an action and reaction—the chest upon the brain and the brain upon the chest. To this fact is to be attributed the increased mortality among children from disease of the chest; they are less stable in the material of which they are constituted, they are more susceptible to external impressions, and their nervous system is, so to speak, too high strung, explaining rationally the little understood condition mentioned by Dr. Roberts.

The converse of this state of matters also holds good, as is to be expected if the principle advocated be true, viz., that diseases of the brain and nervous centres produce disease or disordered function at parts distant from themselves—notably in the lungs. Should an abnormal action be going on among the cells of the brain, it is impossible that an influence should not be sent along the nerves which arise from them, unless the abnormal action has advanced so far as to destroy the central cells. From the close connection established between the ganglionic cells and the nerve filaments, any irritation or stimulation among the cells will pass along the nerves to their periphery, and unless it be denied that the nerve filaments have any function to perform in the parts where they terminate, this central irritation will cause irritation and contraction of the elastic fibres of the air-cells and bronchioles, and in this way an abnormal action takes place in the lungs from a diseased or disordered condition of some of the nerve cells of the brain or nervous system.

We have thus in the chest disease arising in the lungs themselves from some cause external to the body; and we have disease in the chest arising from some cause seated in the brain. The class of cases first mentioned, where we have increased respiration, tubular breathing, &c., in which I first applied the treatment by blisters behind the ear, is an example of abnormal action in the lungs, arising from disorder in the encephalon. The affections of the lungs in measles, also, have their origin extraneous to the lungs themselves. Some authors also speak of disease in the chest from the reflex

action of the dental nerves in teething; and as examples of affections of the lungs arising in the chest itself, no better could be obtained than those of bronchitis and pneumonia.

In hooping cough we have another example of an irritation of the nerves causing disease of the lungs—in this we have the action of the nerves of a different character acting upon the minute tissue of the lungs only at intervals, and by the powerful spasmodic contraction and relaxation its tendency is to exhaust the tissue, as I have pointed out in my paper on the "Open-Air treatment of Hooping Cough" in the *Glasgow Medical Journal* for last year. In this disease there is an interval of relaxation, which gives the tissue time to recover itself from the effects of the nervous action; but in the cases under consideration the baneful influence at work upon the tissue is prolonged without intermission, and what is wanted is to remove for good what only takes place in hooping cough now and again.

If the opinion thus given as to the important part the pneumogastric nerve and ganglionic centres play in these diseases be correct, in what way can we turn this knowledge to account, and reduce the disease itself to a minimum? There may be other modes of effecting this object, but the placing a blister at or near the course of the nerve, at a point between the irritated terminations of the nerve filaments and the irritated ganglionic nerve cells, has given me convincing evidence that the action going on between these two spots has been stopped—at all events symptoms indicating that such an action has ceased after an application of the blisters, so that the fact seems to me as well established as if it could be demonstrated.

The explanation of the use of counter irritation at this point is, that it comes between the two spots where nervous action commences, and this new centre of irritation acts as a tap to the nervous force. The vis-nervosa coming from the lungs, and the vis-nervosa coming from the ganglionic centres, are both stopped at this point; and their energy being expended in this inflamed tissue does not proceed further, either to keep up the pathological action in the lungs

or in the brain. In fact, from whatever part the irritation comes, by this means it ceases to be reflex action. Commencing in the minute tissue of the air passages, it passes along the afferent filaments of the nerve till it reaches this new centre of irritation, and there expends itself—not passing to the ganglionic cells of the brain; and, in the opposite direction, the influence coming from the brain ceases at this point also, so that the reflex action is removed, and the irritated terminal points have time to recover their wonted condition. I consider that this action of the blister has much the same power—though less permanently—as could be attained by the division of the nerves at the same part of their course. Section of these produces in the lungs diminished respiration, relaxation of the elastic fibres, with retarded flow of blood through the capillaries, and effusion of serum from these vessels. Blistering over the course of the nerves produces a state of things much the same, only of a temporary character, and not so extreme. During the action of the blister, which can be continued or removed, the hurried respiration is moderated, the dry tubular breathing is removed, and exudation of the natural secretion from the mucous membrane takes place—so that we have remaining only what Dr. Laycock calls the vis-nervosa of the tissues themselves. Having thus removed the great factor, whose action so powerfully affected the original malady, the parts soon recover their usual tone, not having been subjected to the long-continued exhaustion which follows the unimpeded action of the reflex power playing through the pneumogastric nerves. Moreover, the system generally does not suffer to the same extent, and consequently recovery is much more rapid and satisfactory.

When disease in the chest arises from some abnormal action going on in the encephalon, the blisters remove the chest disease, and we are at liberty to direct our efforts to the cerebral disturbance, thus limiting our remedies to a smaller morbid locality; and the body submitting to only one focus of injury, the disease in the chest being removed ceases to act as a stimulus to that of the brain.

Objections may be raised to this explanation as involving a new theory of the action of blisters, as well as the new theory mentioned previously in reference to the pathological action of the nervous system in diseases of the chest. I am one of those who believe that blisters act as stimulants, but not that their stimulating action does good only through the nervous system, and in that way alone, as is believed by those who call themselves "Young Medicine." Dr. Anstie is perhaps the clearest exponent of their views; and in the *Practitioner* for March, 1870, he says of blisters, that "they are the refuge of the destitute." He will probably object to the explanation given; but even he, in his anxiety to confound those who differ from him and to establish his own views, contradicts himself in the *seven* propositions which he gives in explaining the action of counter-irritants. In some of his views I am at one with him, but in others he is as unsatisfactory as he accuses his opponents of being. He appears to doubt the action of blisters in more ways than one, and considers them as stimulants, and that they do good through the nervous system, and that through the reflex power. In his *first* proposition he says, that if they "are to do any good in the early pyrexial stage of inflammation, they must do so by an influence which contracts the arterioles, thus heightening the arterial blood pressure and relieving the stress on the capillaries." Considering that in the case of all inflammation the first stage is that of contraction of the arterioles, how can further contraction of these by increasing the contraction relieve the capillaries. If contraction means anything, it means contraction of the elastic tissue surrounding the vessels; this would diminish the diameter of these vessels, and, instead of relieving the stress on the capillaries, the increased blood pressure would increase that stress; so that, though I hold with him that blisters applied direct to the part inflamed would increase the contraction, it could only relieve the stress on the capillaries by sooner exhausting the contractility of the elastic tissue; not till then would the stress upon the capillaries be removed by the exudation through their walls of the serum of their contents. He appears to admit

this in his second proposition, where he says that *strong* irritation produces "paralytic dilatation of the arterioles and passive overfilling of the capillary web."

In his third proposition he says, that "if the more powerful stimulants ever do good in the acute stage of inflammation, it can only be when they are applied at such a distance that their influence falls very gently and much diluted on the part aimed at;" but if to an already over excited part additional irritation be further applied, however "gentle and much diluted," will it not increase still more the "influence which contracts the arterioles, thus heightening the blood pressure." So that, instead of being of benefit, they would act upon the part still further injuriously. If it be meant to act upon the part—whether the tissues themselves or through the nerves—and by excessive action cause paralysis through exhaustion, then that result may be attained equally by allowing the disease to take its course. I agree with him in believing that all blisters do good by stimulation, but not by stimulation alone; and I differ from him in believing that the gentle and diluted influence of stimulation ever does good in the "early pyrexial" stages of inflammation, for the reasons which have already been given.

When he treats of the chronic stages of inflammation in his fifth proposition, he agrees with Dr. Ross as to the good of blisters applied directly to the part affected, but differs from him as to the channel through which the good is derived. In this class of cases the conditions are totally different. In a hepatised lung, or portion of lung, the nerves, tissues, and glands are in functional abeyance from the effused material pressing upon and impeding them, and when from surrounding circumstances they are unable to continue their functions, or when their action is of a low type and they require stimulation to bring their action up to the standard of health, then the action of blisters stimulates not only the nerves but the tissues themselves and also the absorbents to take on a higher type of action and remove the surrounding material, thus moving them to resume their usual functions, not alone through the nervous system by reflex action, but by direct

irritation upon the diseased tissues. Even the removal of a small quantity of serum from the neighbourhood of the consolidated part must relieve the pressure upon it, and give a certain amount of freedom to the resumption of new action.

In his sixth proposition he comes nearer to my views when he treats of distant blistering in cases of neuralgia. He says, "It seems probable that by reflex stimulation, applied to a physiologically distant tract of skin, which is nevertheless in direct communication with the centre on which depend the vaso-motor, and also the trophic nerves of the affected organ, we at once secure the necessary dilution of the influence and an intelligible path for its transmission to the diseased part, and to that alone." I agree with him as to the channel, but differ from him as to the effect produced. Taking the case of neuralgia which he uses as an example, where we have not only pain at the periphery of the nerve, but very often inflammation also, is not the presence of pain and inflammation an evidence of the nerve being in a sensitive and excited condition? and by further applying a stimulant to the nerve, though from a different position, would it not be further excited and stimulated at the painful part? Then how could the influence be diluted? Is it not more probable that the blister in such a case, instead of stimulating the nerve, acts as a tap to the *vis nervosa* at the blistered spot, and thus relieves the painful termination of the nerve from nerve influence going towards it? This is at least a more rational way of securing "dilution of the influence to the diseased part," unless *we* assume that the increased stimulation dilutes the nervous influence by producing tissue exhaustion, which *he* does not. Believing in his acquiescence in the application of blisters to the affected spot in chronic inflammations, there is no necessity for diluting the nervous influence, as it is already in abeyance, and rather requires stimulation. How can that stimulation be accomplished but by the influence of blisters, traversing the body in straight lines, like "bayonet thrusts," to use what he calls Dr. Dickenson's "somewhat derisive phrase." How could the stimulation reach the sensory fila-

ments of the nerves to act reflexly without passing through the supercumbent tissue?

It seems to me that blisters act in different ways under different conditions. They act by diverting nervous force; they act by exhausting tissue contractility; they act by the stimulation of glands and tissues; and they act by stimulating reflex action; but that blisters are ever "the refuge of the destitute" I deny, unless we use "the destitute" and "the discerning" as synonymous terms.

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