Gulstonian Lectures

ON

THE USES OF BLOOD-LETTING IN DISEASE.

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BY

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WITH regard to the effects of the local abstraction of blood in internal inflammations, I believe the very same facts hold good as in the case of external inflammations. I think that the experience of every physician will lead him to the conclusion that leeches and cupping are not found so invariably beneficial in internal as they are in external inflammations; and that, in fact, they not unfrequently fail to give the relief expected of them. May we not fairly seek for an explanation of this in the anatomical relation of the part inflamed to the surface of the skin whence the blood is taken? Thus, for example, leeches and cupping, applied over the thorax in pneumonia, sometimes do, and sometimes do not, give relief. When relief is given through loss of blood, may we not fairly conclude that in such cases the leeches have drawn blood directly from the inflamed pleura, which so very frequently accompanies pneumonia? Just so, again, in pericarditis, I would suggest that the removal of the pain, etc., by leeches or cupping, results from the direct abstraction of blood from the inflamed pleura; local pleurisy (as we know) being an almost invariable associate of severe pericarditis. I might add, also, what I have never seen noticed in this sense, that a branch of the internal mammary artery, which supplies the skin and intercostal arteries over the præcordial region, is distributed to the pericardium, forming a direct vascular connexion between the skin and the pericardium.

Leeches, again, give relief in peritonitis; and, I believe, for a precisely similar reason. In all these cases, there is a direct capillary communication between the skin from whence the blood is drawn and the parietal layers of the serous membranes spoken of. Leeches, again, applied over the liver, often give ease to pain felt there; and what is a more common *post mortem* sign in old liver-affections than adhesions between the anterior surface of the liver and the parietal layer of the peritoneum—clearly indicating that this parietal layer had once been inflamed?

Practitioners generally have some indistinct idea that, when they apply leeches or cupping over the seat of an inflamed lung, the abstraction of blood has some specific or peculiar influence, other than what it would have if the blood had been taken from any other part of the body. We seem generally to forget that, in such case, although our leeches may be near to the seat of the lung-inflammation, the abstraction of the blood can only operate upon it just as venesection would—viz., through the general circulation; so that, in truth, the blood might just as well have been taken from the thigh or the back of the neck, so far

as the mere abstraction of blood is concerned in its operating upon the inflamed lung. But we can readily understand that the leeches may give relief in such case, when they draw blood from an inflamed parietal pleura, accidentally accompanying the pneumonia. What is the relief given in such cases? Surely, in the main, it is the removal or diminution of local pain. And what more reasonable, than that the pain of pleurisy should reside in the inflamed parietal layer of the membrane? and that the direct abstraction of blood from the skin over the part should remove the pain, just as we observe it to do in the case of the inflammations, as already spoken of?

Let me give another example in this kind. We have generally a very firm belief that the abstraction of blood, through leeches or by cupping applied over the loins, is of great service in certain kidney-affections; but I think a careful examination of all the facts touching the matter throws great doubts on the opinion.

In the first place, it is manifest that no drop of the blood which is taken comes from the kidney; the blood is removed from the mass of the blood in the system, and its removal can only operate on the kidneys indirectly—i.e., through the general system. In fact, as far as the mere abstraction of blood is concerned, the kidneys cannot be affected otherwise than if the blood had been taken from the arm or the nape of the neck. I must, indeed, confess surprise that this practice of local blood-letting in cases of this kind has not been more severely questioned, merely out of anatomical considerations. I shall, of course, be told that experience here excludes any necessity for theoretical arguing; and that the benefits derived from the practice are too manifest to be doubted. But to this experience I must suggest a demurrer. I must beg those who insist upon the advantages of drawing blood by cupping and leeching from the loins in certain kidney-affections, to remember—1. That patients who are thus treated are also invariably subjected at the same time to the most powerful of all remedies in such cases—viz., rest, the warmth of bed, baths, equable temperature, and so forth; and 2. That it is a fact also of experience, that the lumbar pain and other bad symptoms attending these kidney affections, will disappear under the influence of the treatment referred to, and without either cupping or leeching.

Time forbids me pursuing further this most interesting subject; but I would earnestly ask my auditors to test by serious consideration the propositions here laid down, and not hastily to consign them to oblivion, as unworthy the attention of practical men.

The general propositions, summed up, are these: That in all those cases of internal inflammations in which there is a direct capillary connection between the skin and the internal part inflamed, the local abstraction of blood is of manifest service, just as we see it to be in external inflammations; but that, in all those inflammations in which there is no such capillary communication, the benefits of the local abstraction of blood are neither clear nor positively ascertained. In saying this, however, I do not deny that leeching and cupping may have some influence over internal inflammations, other than that which is supposed to result from the abstraction of blood. The discoveries of Claude Bernard, and the experiments of Brown-Séquard and others, have opened to us an entirely new field of pathological

observation in the matter of inflammation—a field which is as yet almost untouched. The main—the prominent—fact in inflammation is the enlargement of the blood-vessels of the part inflamed; that is to say in other words, an increased amount of blood supplied to the part. And the experiments referred to have shown that the vessels of a part may be influenced, as regards their contraction and dilatation, through their vaso-motor nerves. If the mere dipping of one hand in water will so alter the calibre of the vessels of the other hand as to change its temperature, why may it not be argued, that the application of leeches, etc., to the thorax sets up a reflex action, not by abstracting blood, but by the local irritation which they produce, and such a reflex action as shall influence through the vaso-motor nerves the vessels of the inflamed lung—for instance, produce a contraction of them, it may be, and so tend to reduce the supply of blood through them and to the inflamed part, to its natural amount? If there be not some such action as this exerted over the vessels of the lungs by irritation of the skin, how are we to account for the beneficial effects of plaisters, blisters, etc., applied to the thorax in bronchitis and chronic affection of the lungs? Dr. Brown-Séquard has shown that external irritation will produce, through reflex actions, contraction of distant capillaries within the body; and Claude Bernard has demonstrated, that redness and swelling and heat—*i.e.*, enlargement of capillaries—may be produced by injury of the sympathetic nerve. By division of the splanchnic nerves, he has, we are assured, produced pleurisies and other visceral inflammations.

With such facts before us, I think it may be very fairly suggested, that any good effected by leeches, etc., and local irritation of the skin, over those internal inflammations—in which there is no capillary communication between the skin and the inflamed part—may be ascribed to the excitement of a reflex action over the vaso-motor nerves of the part, producing contraction of the inflamed capillaries. An agent, said Hunter, having the power to contract the vessels, would probably be a specific in inflammation.

It is not my intention to enter into the interminable tale of inflammation; but I must observe, that no distinct and comprehensible explanation of the *modus operandi* of bleeding in inflammation, in accordance with our modern pathology, has yet found its way into general acceptance. In the minds of most of us, I believe, the idea attaching to the old phlogistic theory of inflammation is that which generally prevails—the idea, *viz.*, that the focus of inflammation is a fire; and that, by cutting off the supply of blood, we reduce the fuel, and consequently the conflagration.

But we err, I venture to think, through not having modified our views in accordance with the teachings of modern physiology. Physiology and pathology have assuredly not yet bared to us the arcana of an inflammatory process—the *fons et origo mali*; but surely the experiments alluded to have given us some additional information, and that kind of information—the best of all—from which the man of practice may glean a hint while engaged at the bedside of his patient. We have learnt, for example, that lesion of certain nerves which supply the blood-vessels destroys their contractility, and so allows their undue dilatation under the influence of the heart's pressure, and consequently an undue amount of blood to flow

through them; and that thus, by nervous lesion alone, all the main characteristics of inflammation may be produced—*viz.*, heat, redness, and swelling. And, again, we know that excitation of certain nerves will produce contraction of those blood-vessels—the very opposite condition. Hence, then (as we know not what the element is which occasions the nervous lesion in inflammation), we may reasonably consider that this nervous lesion is, practically, the anatomical starting-point of inflammation. Also do we know that an increased action is going on at the part inflamed—not a natural formation of healthy structures, but an excessive production of crude and imperfectly elaborated material; and fairly may we conclude that this excess of action depends upon the excessive supply of blood. The object of the practitioner, then, is to reduce this excessive production of ill-formed materials; to direct the inflammatory process through its natural course (if I may use the term), so that the parts shall be left in their original state of entirety when the inflammatory action has ceased; and reasonably enough he concludes that, by regulating the supply of blood, he can in some degree regulate the inflammatory action. And here it is, in teaching us how to attain this object, that physiology has given us new knowledge. If we cannot remove the original exciting element of the inflammation—the cause, we suppose, of local nervous lesion—still we may direct our art to the removal of the next link in the chain of the diseased process; *viz.*, the relaxation of the blood-vessels—the result of the nervous lesion, and the main and most efficient element in the inflammatory process; using those methods of cure for the purpose which will tend to the increase of the contractility of the blood-vessels. For example, cold is a well known remedy in inflammation; and cold is an excitor of the vaso-motor nerves, and thus is it of service in external inflammations. Now, the excellent effects of the local abstraction of blood, as I have said, may be in part accounted for in a similar way. Besides relieving tension, the leeches and the cupping, by the irritation which they occasion, may also excite contraction of the partially paralysed blood-vessels of the part inflamed. But there is no proof that venesection does anything of the kind. By diminishing the contractile force of the heart, it temporarily diminishes the supply of blood to the inflamed part, as it does to all other parts of the body; but there is no proof that it, in any other way, influences the inflammatory action—tends to its cure—*i.e.*, tends to the contraction of the blood-vessels. The blood-vessels are emptied; but their loss of contractility is not repaired. A striking illustration of this is given by M. Marey from Gerdy's method of treating phlegmonous inflammations by raising the inflamed limb. "Frequently," says he, "have we seen the limb, when brought down to the horizontal, rapidly resume an exaggerated size, and its coloration intensified, and its heat increased, in consequence of the atonic relaxation of its vessels." (Marey, 321.) Position here, like venesection, had merely assisted in preventing the temporary flow of blood to the part; it had, like venesection, done nothing towards improving the tonicity of the blood-vessels. As Hunter truly said: "Neither bleeding, sickness, nor purging can possibly lessen the original inflammatory disposition; by lessening the power of action of any disposition, you only lessen or protract the effects."

We read, it is true, of the cutting short of inflammations by venesection; but I apprehend that no one can produce an authentic example of the fact. In the flourishing days of blood-letting, men were bled till the congested eye became pale, and the rheumatic joints and erysipelatous limbs lost their vivid red colour; but I believe that the most heroic (as the term was) bleeder never pretended that he had thereby at once removed the inflammation.

The action of venesection over the vessels of the inflamed part is totally different from that of the local abstraction of blood. True, a temporary emptying of the partially paralysed vessels is produced, or rather the blood disappears from these vessels; but this emptying of the vessels results solely from the lessened force of the heart's action, and from the diminished quantity of blood which is consequently projected into them. No contraction results from any excitation of the vaso-motor nerves; there is, in fact, no increase or induction of the healthy and natural contractility of the vessels, such as is effected by cold, or may be effected by leeches, etc., but merely a less distension of them. And the action is merely temporary, lasting only until the heart has regained force enough once again to distend those morbidly dilatable blood-vessels. But by the local abstraction of blood, not only is blood, and depraved blood, drawn from the part inflamed, but also, in all probability, the action of the vaso-motor nerves is excited, and a healthy contraction of the blood-vessels thereby occasioned. Was not this, indeed, the effect which Hunter's wonderful sagacity anticipated when he tells us: "Bleeding in the part inflamed, I can conceive, does more than empty the vessels mechanically; it acts by continued sympathy." To remove the blood from the distended vessels of an inflamed part, large bleedings, as a rule, are requisite—such bleedings as have an effect upon the system—make the man faint; and, to maintain the vessels in such a state, the bleeding must be again and again resorted to. Moreover, we must keep in view the fact that the inflammatory process has a local excitant; and that the distension of the blood-vessels (for the relief of which, be it remembered, the bleeding is especially employed) is due to some morbid influence exerted at the part, and is still present and operating there. And, therefore, again to use the very words of Hunter, "the lessening of the quantity of blood, considered mechanically, can never remove a cause which neither took its rise from, nor is supported by it."

From all this, it would appear, that we cannot by bleeding remove either the cause of the inflammation, or the inflammation itself; and that to attain the object desired by venesection, the removal of blood from the inflamed parts, large and repeated bleedings are necessary; such as may tell injuriously upon the constitution of the patient, and so, indirectly, upon the cure of the inflammatory process. And, moreover, that, when we have removed this blood by venesection and have emptied the vessels of the part, we have done nothing towards the cure of the inflammation, as we have done nothing towards producing a healthy contraction or tonicity of the blood-vessels. Modern physiology, to use the words of M. Marey, "indicates that, in the treatment of inflammation, we must follow a new path. Instead of combatting local inflammations by blood-lettings which exhaust the whole system, it points out to us

that we should ever, as far as possible, resort to local remedies."*

No one pretends that bleeding is of service when it weakens the constitution of the patient; on the contrary, wise physicians have always warned the profession against such abuse of the remedy. In truth, I might say that we of this generation admit bleeding to be of service in inflammations, then only, when it produces no harm upon the constitution; or, in other words, that our masters permit us to practise venesection to the extent in which it can do no harm. Now, if (as I think no one will dispute) a man in health may lose sixteen or twenty ounces of blood, and be no whit the worse for it, how can we reasonably, except on the very best of evidence, admit that a similar loss of blood is of infinite service as a cure in inflammations? And wherein can we find a more demonstrative proof of the uselessness of venesection as a cure for inflammations, than the positive fact that we of this day cure them without resorting to it? Men have, in all ages, warned us against the dangers of venesection, as well as told us of its virtues; but we of this advanced generation speak much of its injurious effects, and but little of its beneficial uses.

Surely all these considerations narrow into very small limits the value of venesection as a cure for inflammation, and throw the greatest suspicion on the praises which have been showered on the remedy as such. From whatever side we consider the subject, historically, practically, or physiologically, we still find the proof of the proposition, that venesection is, as a cure of inflammation, most defective.

But, on the other hand, when we come to regard bleeding as a remedy, not of the inflammation, but of certain secondary consequences which incidentally arise out of certain inflammation, and of certain diseases not inflammatory—then all the clouds of difficulties which obscure the subject vanish, and the clear light breaks in upon us. We then see how it is that the wise men of past days have ever lauded and resorted to the remedy; we then find, physiologically, an explanation of its mode of action; and practically can positively note its uses. And, I may add, we are then driven by the force of demonstration to the conclusion (which it is my object here to enforce), that bleeding must at all times have been an excellent remedy; that it is so now; and that its general disuse is greatly to be deplored—history, physiology, and practice, all coming in and reading us lessons corroborative of the conclusion.

[To be continued.]

* M. Marey speaks of following a new path. He forgets that John Hunter had already long ago described this path. "When bleeding is necessary," he says, "it should be as near the part as possible, in order that it may have the greatest effect on the part with the least damage to the constitution." And again: "In all cases where it can be put in practice, bleeding in or near the part will answer better than taking the blood from the general habit, for certainly less may be removed in this way, so as to have an equal effect upon the part inflamed. Bleeding in the part inflamed, I can conceive, does more than empty the vessels mechanically; it acts by continued sympathy."

PHOSPHATE IN MEDICINAL DECOCTIONS AND INFUSIONS. Some researches made by M. Terrel show that plants contain the phosphates in a soluble state; and he concludes that vegetable infusions and decoctions owe a portion of the action they exert on the economy to the phosphoric acid and phosphates they contain, the phosphate of lime of the bones proceeding from the soluble phosphates. (*Phar. Journal.*)