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## ON THE OPERATIVE SURGERY OF TUMORS.

A CLINICAL LECTURE AT THE NEW YORK HOSPITAL, BY A. H. STEVENS, M.D.

As you have recently witnessed an operation for the removal of a tumor, I design, on the present occasion, to make some remarks upon this branch of operative surgery. I am the more especially led to do so, because it is not a subject well understood by young practitioners, nor, so far as I know, correctly described by any surgical writer.

The proper mode of removing tumors with the knife, is by far the most important of all the knowledge you can acquire of these diseases—for such is their diversity, that all attempts at a regular classification have been so unsuccessful as to be comparatively useless. The diagnosis of the various species, founded upon their external appearances, is, in many cases, exceedingly uncertain; even dissection, after their removal, sometimes leaves us in doubt as to their true character. Again, but a very few can be removed, or prevented from increasing in size, by any other means than a surgical operation. It is, therefore, hardly an exaggeration to state, that in practice the sum total of all our useful knowledge is that which teaches us the best method of performing these operations. This, then, is the subject of the present lecture.

Tumors often form beneath the scalp or the integuments of the eyelids. These are usually hollow, that is, they contain matter more or less fluid, and are called *encysted*. They adhere very loosely to the adjacent parts.

The most common mode of extirpating these tumors is by dissecting them out; but this is not always easily done, especially if the tumor be very small. I have known half an hour occupied in removing a tumor, not larger than a pea, from the upper eyelid: Sir Astley Cooper advises that they should be cut into, and then torn out. If the first of these operations is attempted, the surgeon should be quite sure that he does not begin to dissect around the tumor until he has laid it quite bare. But I prefer the other method, and this is the way of proceeding that I would recommend: At the first incision, I would cut freely into the sac of the tumor; seize the sac with the forceps, and pull it away either at once, or in different portions. If the sac resists, it will be because you have seized with the forceps one or more of the layers of cellular tissue which are always found surrounding the sac, and which are occasionally dense and strong. The connection of the sac with these layers is loose, but they adhere closely to each other. A few months since, I

removed, in two or three minutes, six of these tumors from the head of a young gentleman of this city. The rule, therefore, is this—*cut into the sac and turn it out*; but do not attempt to tear away anything else with the sac.

If it should happen that any portion of the sac has formed strong adhesions to the surrounding parts, an occurrence which is extremely rare, it is proper that you should understand that a perfect cure may be obtained by destroying the internal membrane (which is seldom thicker than parchment) with a slight application of the kali purum, or of the nitrate of silver.

In the extirpation of *solid tumors* (I exclude a few cases of small malignant tumors where it is desirable to remove with the tumor a considerable mass of the circumjacent parts), there is one rule which should never be lost sight of, and by following which, many difficulties will be avoided—it deserves to be written in letters of gold. Did I say one rule? Let me rather say two rules, the first of which is this: *cut down to the tumor*. This may seem to be a simple matter, so simple that the necessity of it must occur to every one. Be this, however, as it may, I do aver that in some hundreds of tumors which I have seen operated upon, and often by very skilful surgeons, the tumor has seldom been fairly exposed and laid bare before its dissection has been commenced. Vessels have been unnecessarily divided, and the operation has been protracted by the loss of blood, and the necessary application of ligatures to the arteries. How this happens I will now attempt to explain.

Let us take for illustration the very common case of an enlarged lymphatic gland, in the neck. In its normal condition, this gland is supplied by one principal nutritive artery, and it is surrounded by an indefinite number of layers of cellular tissue. The layer next the gland embraces it like a shut sac; the exterior layers in contact with this, diverge and surround the adjacent parts. When the gland becomes enlarged from hypertrophy, or by becoming the seat of malignant deposits, the innermost layer of cellular tissue forms a sac, and its connection with the gland is usually loose, so that it may be readily stretched, or torn with the finger or the handle of the scalpel. The outer layers are also, in general, loose, and capable of being torn in the same way; but the manner in which they are applied to the gland, or rather to its sac, is worthy of particular attention, as affording a clue to the difficulties which are often encountered in these operations. The external layers of cellular tissue which cover the gland become, in the progress of its enlargement, stretched upon the exterior surface of the sac, being sometimes adherent to it, and to one another; from this point they diverge, passing to the anterior surface of some muscle, nerve or bloodvessel, or to the posterior surface of some of these or of other organs. The tumor itself, in the meanwhile, receives no new vessel, other than that which originally supplied it, even though it may have grown so as to completely surround the carotid artery, the internal jugular vein, and their branches. Even in this case, the proper sac will be found interposed between these parts and the tumor. These vessels are, in other words, pressed

into the side of the tumor, which, with its sac, becomes folded around them; thus, strictly speaking, they form no part of the tumor, being exterior to the sac.

Keeping in mind the close application of several layers of cellular tissue, over the most superficial portion of the tumor (the first and greatest enlargement of the tumor being in this direction, because it is there least opposed in its progress by the pressure of the surrounding parts), and the separation of these layers on the lateral and deep-seated portions of the tumor, it is easy to understand:

1st, That important bloodvessels, nerves and other organs may be brought into close proximity to the morbid growth without absolutely touching it.

2nd, That if the surgeon, in cutting down upon the tumor, does not divide each and every layer investing the tumor before he begins to dissect around it, he cuts outside the sac, gets into some of the folds of cellular tissue, and encounters parts which ought not to be meddled with. He finds his knowledge of normal anatomy of little service to him; he gets away from the tumor, and makes a tedious and bloody operation in a case, where a different method of proceeding would have made everything plain and easy.

Finally, when the tumor is removed and examined, folds of cellular tissue, perhaps portions of muscle, or of other parts, are found to have been removed with it, which can be torn off, and that very readily, from its external surface. Had the surgeon, in the first instance, cut down to the tumor after dividing every layer investing it, no more difficulty would have been experienced in tearing these layers from the tumor before it was removed than afterwards.

If a surgeon is not familiar with operations upon tumors, he will almost uniformly fall into the error I have pointed out. The layers of cellular tissue are so transparent, and so closely applied to one another, that the tumor is distinctly seen, even when it is covered by several of them. It is better for a young surgeon, and even for an old one, if he has any doubt in the matter, to cut a little into the tumor, in order to be sure that he has fairly cut down to it.

Having reached the tumor, if the cellular tissue can be torn by the fingers or by the handle of the knife, tear it—in cases where it cannot be torn, cut in this manner: put the tumor upon the stretch, and cut lightly upon it near its points of attachment. Thus you avoid the possibility of any large bloodvessel or nerve being brought under the edge of your knife without being seen.

If the tumor is very large, or is deeply seated, it will sometimes be advisable, after having separated the attachments of the exterior portion of it as deeply as possible, to remove this portion. The removal of the remaining portion is thus much facilitated. In this manner, I safely removed a large tumor situated beneath the mastoid muscle, and which embraced the ninth pair of nerves in one part, and the common carotid artery, the internal jugular vein, the par vagum and œsophagus, in another part; after very little cutting the sac was separated from these parts. I have never taken up the carotid artery for the removal of a

tumor in the neck or face, nor do I believe that it is ever necessary. If the principles already laid down are carefully observed, there will be no danger of hemorrhage, nor yet of sloughing, from the nerves and blood-vessels being extensively laid bare—laid bare, indeed, they are, but their sheath still covers them, and is sufficient for their nourishment. I have, on several occasions, left them plainly exposed, from the sternum to a point above the bifurcation of the carotid artery, and have never known secondary hemorrhage to follow.

In conclusion, I do not feel willing to admit the impossibility of safely removing any tumor about the head or neck, always excepting enlargements of the thyroid and parotid glands, of the successful results of which operations I have no knowledge.

In some cases of malignant tumors, not only the superficial, but other portions of the sac will be found closely adhering to the adjacent parts. If the tumor is in the vicinity of important parts, as in the axilla or neck, the plan I would recommend is this—cut down until the knife fairly enters the diseased parts, then, by the sight and touch, decide where the tissues, adjacent to the disease, are entirely healthy; make a slight incision into them on the distal side of the tumor; continue to separate them with the handle of the scalpel and the finger. If you are among healthy parts, as you proceed the cellular and other tissues will yield to a very moderate degree of force; the separation of the veins, arteries, and, lastly, the nerves, will require more force, increasing in the two last named. These parts will be felt like strings holding the tumor, and are not easily separated. Be careful not to use much force in the separation of a large artery, and still more in the separation of a large vein. It is a great mistake to suppose that arteries when torn never bleed: I have often seen them bleed, *per saltem*, after having been torn by the finger. Still, they do not bleed so freely as when cut, and, moreover, their orifices are usually easy to be found, and as easily secured. They also stop bleeding much sooner, if an attempt is made to check the hemorrhage by pressure. A nerve no larger than a silk thread is half as strong; yet I have broken them when nearly as large as a small crow quill. My practice is to bring the resisting cord, be it vein, artery or nerve, into view upon the palmar side of the fore-finger of my left hand, and then to seize it with the forceps, and divide it half an inch on the distal side of that instrument. If it is an artery, its patulous mouth will be seen, and a ligature may be applied before the forceps is removed. Thus you will conform to the *second rule*, that is, to remove the whole tumor and nothing more.

The dangers of operations for the removal of tumors may be thus enumerated, in the order of their magnitude, in the majority of cases:

1st, *Hemorrhage*. This may be either venous or arterial; usually the latter. Venous hemorrhage may be diminished by placing the patient in such a position for some time before and during the operation, as will favor the return of blood by gravitation. Large veins running over the surface of a tumor may be rendered distinct by pressure, and pushed to one side, or tied and divided.

Arterial hemorrhage may be diminished by tearing the vessels from

the tumor. I have seen some surgeons tear the tumor itself out; this cannot always be done except to a limited extent, because a large number of parts are thus put upon the stretch at once. The better way is to hold the tumor, and tear off its investments, one portion at a time, with the fingers or with a strong pair of forceps; this method is also less painful than the former. Sometimes a vessel will retreat behind the ramus of the lower jaw, or into the axilla, and give rise to a troublesome bleeding. As these are usually the last attachments to be divided, it may be prudent to tie them before this division is made. I would also advise you always to divide and secure the trunks of arteries, before dissecting among their branches. If you neglect this rule, you may cut and tie the same vessel half a dozen times, as I have often seen done. This is the reason some surgeons are constantly encountering tumors of extraordinary vascularity; this vascularity being, in fact, simply owing to their wandering away from the sac of the tumor, and dividing the vessels at each successive cut nearer and nearer to the heart.

An important means of diminishing hemorrhage, in the removal of large tumors, is to subject them, for some hours previous to the operation, to the influence of cold applications. This, besides lessening the quantity of blood in the parts, has the effect also of diminishing the sensibility of the nerves, and thus essentially moderating the danger from the shock of the operation.\*

Another, fortunately a more rare source of danger in operations for the removal of tumors, is the *introduction of air into the veins*. I have met with this occurrence only once in my practice, and that was in this hospital about ten years since. I was in the act of removing the last of several of the deeper chain of lymphatic glands of the neck, which had become enlarged so as to interfere with the functions of deglutition and respiration, and was cautiously using the knife about half an inch on the outer side of the internal jugular vein. After a slight escape of venous blood, I heard a noise like that produced by drawing up with a syringe the last drop of water in a vessel. I immediately placed my finger over the spot from which the blood had issued, not being able to discover any orifice; and looking the patient in the face, asked him how he felt; he answered, "very well." Marks of consternation were visible around me, and many suggestions were made which I did not heed, but calling for an eyed probe, I directed a ligature to be passed through it. I applied to the internal jugular vein two ligatures—one above, the other below the wound, directing them to be successively tightened. I then removed my finger and proceeded with the operation. No bad consequences followed the application of the ligatures. The wounded vein appeared to be a branch of the internal jugular, but I did not think it safe to pass a ligature directly round the divided vessel, not liking to run the hazard of removing the pressure of my finger.

I have enumerated, under the preceding heads, all I have to offer on

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\* It has often occurred to me, though I have never put the idea into practice, that cold might be readily applied so as to cause tumors to slough out, and that the process would not be attended with as much pain as caustics, or even the knife.

the first branch of this subject, except that I would dissuade you from performing any operation upon a female about the menstrual period; and when about to perform it, to have the instrument within your own reach, rather than to have it handed to you by an assistant.

In operations of great magnitude, I like to have the assistance of a judicious medical practitioner; he need not be a surgeon, but he should know what human nature will bear, and what it will not. If he is a personal friend of the patient, so much the better. I request this person to attend to the personal comfort of the patient (there is comfort in a well-performed operation, comparative comfort at any rate), to see that his position is easy, that he is supplied with suitable drinks, and, above all, to keep me informed, by a look or word, how the patient's pulse continues—how he sustains the operation; not but that the surgeon should judge for himself of the condition of his patient, but with this assistance he will avoid having his mind distracted too much from the manipulations of the operation; he will still find suitable occasions to give a look or word of sympathy and kindness.

An adult, with ordinary powers of endurance, will, generally, sustain an operation of the average severity, during protracted suffering of one hour's duration—rarely much more than this. A clammy skin, with coldness of the extremities, and a soft, thready pulse, indicate alarming exhaustion of the vital powers. But an experienced surgeon will judge most accurately from the expression of the countenance, from the eye and mouth especially—the former partially loses its lustre, the latter becomes relaxed, until, finally, the eyes are turned upward, and the jaw falls, indicating an almost hopeless condition. The voice, also, is an index of the degree to which the vital powers are sunk; its tones become more and more feeble, until, at length, the patient can only speak in a low whisper, like one in the collapsed stage of cholera, and finally ceases to articulate at all. On the first approach of this state of things, I would advise you to give your patient a few minutes' respite. I give you the above indications, as being the only ones that occur to me as capable of being conveyed by language; your own observation will hereafter enable you to determine their real value. It is also important for you to know that a patient will endure a long operation much better by being allowed two or three short intervals in which to rally during the progress of an operation, it being more easy to prevent him from sinking, than to raise him from extreme prostration.

In conclusion, let me advise you never to undertake an operation which your own judgment does not approve. In a matter involving life, the wishes of the patient, either for or against the operation, should go for nothing, and so should the authority of others. If reasons cannot be given that convince you, retain your own opinion, and act upon it, if the patient will submit to it.

Finally, do not assist or countenance, except officially as hospital surgeons, an operation undertaken against your judgment. I acted otherwise on one occasion; certainly I shall never do so again. After the operation had but fairly commenced, I saw, by the patient's countenance, that he would sink under it, and taking aside a friend of the

operator, I entreated him to use his influence, which I thought would be effectual to avert the further procedure: but my request was not regarded, and the patient survived only a few hours.

It is not in the way of self-praise, but to endeavor to give value to the remarks I have made, that I say, that during the course of five and twenty years' practice, during most of which time I have been a surgeon in this hospital, I have never declined an operation as impracticable which afterwards proved to be otherwise, and that I have never lost a patient from the immediate effects of any operation I have undertaken.—*N. Y. Journal of Medicine and Surgery.*

#### TRIFOLIUM PRATINSE.

DR. MEAD, of Poolville, N. Y., in a recent letter says—"In the last volume of your Journal I saw a short notice of the use of the ext. of *Trifolium pratense* in ulcers, &c. I have used it in three cases of irritable ulcers with the most happy effects. It was conjoined, however, with alterative treatment. In two cases it cured them in a little while, after everything else, almost, had failed to have any effect. A case has occurred in the practice of a neighboring physician, of what was denominated "fever sore," where this extract was made use of. In every case where I have seen it used, so far, it has allayed all irritability, and promoted healthy granulations, and the healing of the ulcers."

#### MEDICAL REMINISCENCES.—NO. III.

[Communicated for the Boston Medical and Surgical Journal.]

CONTINUING the subject of bills of mortality, I have ascertained, since writing the last number, that in the Second Society of the town of Wethersfield, from 1826 to 1840, the average mortality has been  $9\frac{1}{2}$  annually, which is 1 of  $68\frac{1}{2}$  of the population. I am able now to present the ratio of deaths in this parish for 94 years in succession. For the first 80 years, it was 1 of 76. For the whole period it will stand as follows: Whole number of deaths, 813; which divided by 94, the number of years, will make  $8\frac{3}{4}$  annual average, or 1 of 75 of the population. During the 14 years from 1826 to 1840, the deaths of consumption in this parish were 12 only, amounting to 1 of 11 of the deaths—a very small proportion indeed, considering that the village is not exposed to miasmatic fevers. From these facts it appears that, in this parish, it will take something more than 76 years to produce a number of deaths equal to the average number of the population.

I have before me a very interesting communication from the Rev. Dr. Chapin, well known throughout New England as a most respectable and worthy clergyman, who is the pastor of the third parish of Wethersfield (Rocky Hill), where he has been settled from the year 1794 to 1840, a period of 46 years. He writes, "The correctness of my book for that space I cannot doubt." The table is so interesting, I present it as he gave it to me.