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THE POLICY OR IMPOLICY OF REMOVING LEUCOCYTHÆMIC,
GLANDULAR TUMORS.

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To approximate a decision as to the propriety or impropriety of removing leucocythæmic tumors, we must seek for data in the etiology of a disease whose pathology is, as yet, uncertain; and of which, clinically, there is little, and surgically nothing, known.

Within a few weeks of each other Bennett* and Virchow† announced to the world, in 1845, the discovery of a new blood-disease, which the former called leucocythæmia, the latter leukæmia and leucocytosis. Their views as to its pathology were almost identical; but as to its causation, somewhat different.

Leucocythæmia, or white-cell blood, may be defined to be an excess of white corpuscles over the red, in the blood. Or, that a change in their relative proportion, which is normal in certain stages of digestion, becomes a constant morbid state. For whereas in health we may see half a dozen white corpuscles in the field of the microscope, in this disease we may see fifty; and the proportion of white to red becomes changed from one in many hundreds to one in one or two hundred, or even more. Coincident with these changes in the blood-corpuscles, and, as our authors think, causative of them, there are enlargement of the spleen and of the lymphatic glands; which, acting and reacting on each other, lead to so permanent an impoverishment of the blood, as to give rise to positive disease—to dropsies, hæmorrhages, and death.‡

It seems to be pretty well proved by observation, that the spleen exercises some important action on the blood. Gray, in his mono-

* Bennett's Clinical Medicine.

† Virchow's Cellular Pathology.

‡ All of the so-called ductless glands are classed by some as blood-making, or blood-restoring organs, and included in these morbid changes. They are, preëminently, the spleen, thymus, thyroid and lymphatic glands; and, perhaps, the supra-renal capsules, pineal and pituitary bodies. The liver, also, has been added by some physiologists.

graph,* speaks of it in two different capacities: first, as a reservoir which can dilate and accommodate an excess of blood; second, as changing the quality of the blood going through it. In the blood of the splenic veins and its lymphatic vessels the white corpuscles are found very abundant; thus for the same number of red globules, there were over thirty times as many white ones in the blood which left the spleen, as in that which arrived at it.

It is to this action of the spleen—exaggerated by its morbid enlargement—"numerical hypertrophy," as Virchow calls it, or a repetition and multiplication of its own elements, as we may translate the term, that the production of an excess of white corpuscles is mainly due.

This view of the white-cell-producing function of the spleen is sustained by the ascertained enlargement of this organ during digestion, when new cells are being added to the blood.

It is the opinion of Bennett that the chyle corpuscle is changed into the white corpuscle of the blood by a change in its investing membrane, which frees the nucleus; and that this change is effected in the spleen and lymphatic glands. In leucocythæmia, this change is not properly carried out; and we have a persistence of the cell membrane, even after entering the systemic circulation, or an excessive growth of imperfectly developed blood-cells.

Besides these two causes of leucocythæmia—the excessive production of white corpuscles by the morbid spleen, and the arrest of their transformation into red corpuscles—we have another source of vitiation in the blood in the lymphatic glands, which, when irritated and enlarged, throw large quantities of white cells into the circulating current by a desquamation of their own cells, just as the uriniferous tubes of the kidney desquamate their cells in albuminuria.

This enlargement of the lymphatic glands may exist apart from, and without, morbid enlargement of the spleen. Like the latter, the glandular hypertrophy is here also numerical, or a multiplication of the same elements. This is proved by a microscopic examination of the glandular tumors which have been removed, which shows them to be entirely made up of an increase of cells and connective tissue, identical with the glands.†

* On the Spleen, by Henry Gray.

† There is no essential difference in the views of Bennett and Virchow as to the origin and nature of leucocythæmia. Both believe that numerical hypertrophy of the spleen—or a multiplication of its cellular elements—is the principal cause of the increased number of white corpuscles. Both agree, also, that the same kind of hypertrophy of the lymphatic glands is also a cause of a leukæmic condition of the blood.

Bennett makes no distinction between the different varieties of leucocythæmia, but considers them all essentially the same. Virchow divides the disease into two kinds, the splenic and the lymphatic, according to the organs affected. To quote his own words ("Cellular Pathology," p. 204):—"I have therefore distinguished two forms of leukæmia, namely, the *ordinary splenic* and the *lymphatic form*, which are certainly not unfrequently combined. The distinction rests not only upon the circumstance, that in the one case the spleen, in the other the lymphatic glands, constitute the starting point of the disease, but also upon the fact that the characteristic morphological elements which are found in the blood are not precisely similar. Whilst in the splenic form these elements are comparatively large and

Having, then, two causes of leucocythæmia—hypertrophy of the spleen and hypertrophy of the lymphatic glands, which, according to Virchow, do not always coëxist—by remedying either one of these can we affect the diathesis? If chalybeates and a general tonic course exhaust the resources of medicine in this disease, can surgery do anything? If it can, it is obvious that the glands alone can be attacked, as the spleen is inaccessible; and, as it happens that the glands of the neck are the most prone to enlarge into coherent, clustering tumors in leucocythæmia, they offer themselves especially to the surgeon for removal.

It was in answer to the above questions that the expediency of an operation offered itself to my own mind, as it probably has to other surgeons.

CASE I.—[Treated at the Central Office of the Boston Dispensary. March, 1863. Service of Dr. Cheever.]

John S., eight years of age; a slight, puny lad, with an anæmic look. One year since, an enlargement of the cervical lymphatics began on the left side of the neck. The blood now contains from ten to fifty times as many white corpuscles as are found in health. There is no pain, but the tumor has doubled in size within the last two months. It now begins to occasion headache and dyspnoea, from pressure on the veins and trachea. The tumor is about as large as two closed fists. It shows no signs of softening. It is lobulated, and extends from near the middle line of the neck in front back upon the trapezius, and from the lobe of the ear down to and beneath the clavicle.

March 31st.—The operation was begun by carrying an incision from just below the ear to the cricoid cartilage, disclosing a hard, glandular mass lying behind and beneath the sterno-mastoid muscle. It was very adherent, and had to be slowly dissected out, yielding to the edge of the knife only. It was found necessary to divide the sterno-mastoid, and dissect aside the external jugular. The lower edge of the tumor extended into and below the subclavian triangle, and its base rested on the carotid sheath.

Under the microscope, the tumor presented the exact cellular structure which is figured in "Virchow's Pathology" (page 208, American Edition) as typical of lymphatic glands. No other cellular elements were discovered in it, except connective tissue.

The child's health improved very materially after the operation. The blood showed fewer white corpuscles, although they were not reduced to the normal standard. Eight months after removal the tumor began to return, near the clavicle of the same side, but below its original site. Two years after the operation it had attained a

perfectly developed cells, with one or more nuclei, and in many cases bear a great resemblance to the cells of the spleen; we notice in the lymphatic forms that the cells are small, the nuclei large in proportion and single, sharply defined and granular, while the cell-wall is in close apposition to them, so that it looks, in many instances, as if perfectly free nuclei were contained in the blood."

size two thirds as great as at first; and a new glandular mass had begun on the other side. The glands in both axillæ were also much enlarged. The child's health was rapidly failing, and the prognosis not difficult.

CASE II.—[From the Records of the City Hospital. Service of Dr. Cheever.]

Conrad M., aged 15, has enlarged lymphatic glands of neck, of five months' duration. An irregular, lobulated, oval tumor, four inches by three, occupies the left side of the neck, chiefly in the great posterior triangle, from behind the ear nearly to the clavicle. A smaller tumor occupies the remaining space just above the clavicle. Tumor increasing rapidly. No softening, redness or pain. No enlargement of spleen to be discovered. Patient is pale, but otherwise pretty healthy. The blood showed a large excess of white corpuscles.

May 10th, 1865.—An incision four inches long over the middle of the sterno-mastoid exposed the larger tumor, which was found very adherent to the neighboring parts. It was dissected out cleanly, laying bare on its deep surface the sheath of the carotid. Some half dozen single and enlarged glands were then enucleated; and, finally, the lower tumor, in the subclavian triangle, was removed.

Under the microscope, the tumor was found to be identical in character with the one first described, being made up wholly of glandular and connective tissue.

Ten months after the operation this patient was examined, and there was no recurrence of the tumor. The blood, under the microscope, was normal, no more than two or three white corpuscles being seen in the field. He had grown much, and was more vigorous and of a healthier color. It remains to be proved whether time will assure a permanent cure.

CASE III.—[From the Records of the City Hospital. Service of Dr. Coolidge.]

James L., aged 19, has had an enlargement of the cervical lymphatics on the left side for two years. A large, oblong cluster of hardened glands extends down the posterior edge of the sterno-mastoid. Glands enlarging above clavicle. One on the other side, which has long remained stationary. None in axilla. No inflammatory appearance. A microscopic view of the blood gives a large excess of white corpuscles, fifty being in the field at once.

Dec. 21st, 1864.—The tumor was removed by Dr. Coolidge, by a long incision parallel to the sterno-mastoid muscle. The chain of glands was followed down on the carotid sheath, seemingly *ad infinitum*. The dissection bared the *scalenus anticus*.

March 16th, he was discharged, with his appearance much improved. Unfortunately, the character of the tumor under the microscope is not recorded, and we have no subsequent history of the case, whether recurrent or not.

We have also an abstract of three cases operated on, within the past few years, in the Massachusetts General Hospital. Of these,

one recurred in the neck and axilla. One terminated in death, after a few weeks, by pneumonia. The third died a few days after the removal of a glandular tumor of the neck. At the autopsy, the anterior mediastinum was found filled with a similar mass, pressing on the vessels and bronchi; and which, it seems probable to conclude, was an enlargement of the thymus gland, corresponding to that of the proper lymphatics.*

This is neither a very flattering nor a very long exhibit of cases. But it must be remembered that very few of such tumors seem to have been removed elsewhere than here; or, if they have been, we can find no record of them in current medical literature.†

In endeavoring to sum up the evidence in favor of the operability of these morbid growths, we would cite first the opinion of Virchow, that leucocythæmia is of two kinds, splenic and lymphatic, which *may not coëxist*. Thus in our own cases (numbers two and three) there was a large excess of white corpuscles in the blood, a very considerable glandular tumor, a spanæmic aspect, but no enlargement of the spleen which could be detected by physical signs. It is true, however, that a moderate enlargement of it might be concealed in the left hypochondrium, and not discovered by percussion. But if the lymphatic tumor was in these cases the sole focus of morbid action, the nidus where was prepared and thrown into the circulation the excess of white cells, by removing this we might hope to cure the disease. If other glands, more or less distant, are affected by the same latent tendency, or if the morbid blood itself react upon them unfavorably, we cannot cherish a reasonable hope of eradicating the diathesis, even though the spleen be healthy.

But, admitting all this to be true, we may fairly use the argument that in all our cases manifest amelioration of symptoms and delay in the progress of the disease were evident after operation; nor was there an exacerbation of the disease in other glands or distant organs, as we see in tubercle and cancer.‡

* Vide Massachusetts General Hospital Records.

† It may not be improper to cite here the verdict of other surgeons on such operations. It relates, however, to the removal of enlarged glands of a scrofulous nature only, no mention being made of the leucocythæmic variety.

Erichsen says:—"Extirpation of enlarged lymphatic glands is seldom necessary; and, if undertaken, may lead to more extensive dissection than might, at first, appear requisite, a chain of diseased glands often extending a considerable distance—after one has been removed others coming in sight. As a general rule, these operations should not be undertaken; cases, however, occasionally occur in which such a procedure may be deemed advisable."

In *Holmes's System of Surgery*, it is written:—

"The excision of glands is now rarely practised. Occasionally a tumor is removed from the axilla or neck, which has been of long duration and inconvenient. The large tuberos clusters of absorbent glands in the necks of scrofulous subjects seemed to invite an operation; but, when once undertaken, it was found to be of a formidable character, gland after gland presenting itself for extirpation as the more superficial were removed; and the operation was, consequently, often abandoned before it was completed, and rarely had any issue but that of early death by the development of phthisis in the lungs."

‡ In Case I., every symptom improved for eight months; the white corpuscles diminished in the blood, no other glands enlarged, and the child grew stronger and healthier. In Case II., at the end of nine months there is no recurrence of the disease, and the physical appearance is extremely improved. In Case III., the patient appeared much better when he left the Hospital than when he entered it.

Next, we may justly consider these tumors operable also when they cause pain, pressure and danger to respiration, as they did in the first case reported; and when they increase very rapidly, as they do after attaining a certain size. Finally, they do not infiltrate like cancer, and although they may be numerous, yet if operated on early enough, all the really enlarged glands can be enucleated and removed.

On the other hand, the difficulties and dangers of the operation are very considerable. Probably no tumors in the region of the neck are harder to remove than these, excepting those involving the parotid gland. The whole mass of glands is very adherent to the surrounding parts, having incorporated into itself the superficial and the deep cervical fasciæ. It will nowhere yield except to the edge of the knife, and on its under side the dissection is both difficult and dangerous. The extent of the diseased parts is always deceptive. Feeling through the skin like a movable mass above the sterno-mastoid, when cut down on it is found to extend deeply beneath it. This arises from the superficial and deep chains of cervical lymphatics being so closely connected. The superficial glands are placed between the platysma and sterno-mastoid muscles, and are most numerous in the subclavian triangle. The deep glands are also numerous, and so closely united that the older anatomists called them *glandulæ concatenatæ*; they are situated along the sheath of the carotid artery. Both these chains are almost invariably affected.*

If a case of glandular tumor of the neck present itself desiring an operation, four points should, it seems to us, be considered:—

First, the diagnosis. This is to be differentiated by examining the patient generally—the spleen, the blood and the tumor.

The leucocythæmic patient is generally a child or a youth; and his aspect is usually more pallid than that of ordinary anæmia. His chest should be examined for the presence of tubercle; and when we have satisfied ourselves that the spleen is not notably enlarged, we should continue our investigations to the mesenteric glands and the liver.

Next, the blood must be examined on several occasions, at intervals remote from the ingestion of food, for an excess of white corpuscles. If found, we should endeavor to distinguish them into the kinds thrown off by the spleen and by the lymphatic glands, following the directions which Virchow has laid down.

Finally, we must decide whether the tumor itself be a mass of scrofulous or of leucocythæmic glands; and the following differences may aid us here.

Scrofulous or tubercular glands are separate, fewer, unattached to

* The efferent lymphatic trunks of all these glands open directly into the thoracic duct on the left, and the right lymphatic duct on the right side. Regarding the lymphatic glands as a sort of filterers of the lymph which is brought to them and emptied into the stroma of their loose tissue, we see how promptly any excess of white cells, which they may evolve, will be poured into the circulation.

each other, prone to inflame and suppurate, varying in size from week to week, apt to disappear and recur elsewhere.

Leucocythæmic glands are clustered, numerous, strongly attached to each other, forming a lobulated tumor, not prone to inflame and suppurate, and they steadily enlarge.

The *second* point is as to the best time to operate. And it will be obvious enough that the earlier the better; both because the adhesions will be increasing and becoming firmer, and because the tumor grows rapidly at last.

The *third* point involves the question as to how apt the tumor will be to recur. And here we must admit that we have not as yet data enough to decide accurately. Comparing it with other recurrent growths, it might be fair to say, in the present state of our knowledge, that it stands somewhere between epithelial and true cancer: occupying a position, perhaps, beside fibro-plastic, or simple recurrent tumors, which *may* not return, but which *often do*.

But, in the *fourth* place, we have a right to consider that we do not remove a leucocythæmic tumor for itself alone, but for the influence its removal may exert on the patient's whole system. In this it differs essentially from operations for cancer. If it be justifiable to remove cancer as a mere palliative operation, to delay a fatal issue, although we look for nothing else than a recurrence of the disease, sooner or later; *a fortiori* is it justifiable to remove a leucocythæmic, glandular tumor, since we have reason to believe that it may not only postpone death, but favorably influence the leukæmic diathesis, by removing a *nidus* of the disease.*

* No ultimate conclusion can be reached yet. Neither time enough has elapsed, nor have cases enough been observed and recorded to warrant a positive opinion, either as to the pathology of leucocythæmia, or the prognosis after such operations. Every year and every case observed, will, however, help us to a definite decision.

In concluding, we cannot refrain from observing how much certain ill understood morbid states of the blood seemingly run together.

Anæmia, or *spanæmia*, being a diminution of red corpuscles.

Leukæmia, an excessive production of white ones. The two conditions combined, existing in certain cachexies, as in constitutional syphilis.

Pyæmia, a somewhat analogous morbid change of the blood, as yet far from explained, and one which, although generally an acute disease, may be a chronic, wasting malady, as recently shown by Mr. Paget.—(Bartholomew's Hospital Reports, vol. i., 1865.)

Finally, the analogy between enlargement of the spleen in intermittent fever, of the lymphatics in leucocythæmia, and of the thyroid gland in bronchocele, seem to point to some connection of morbid states of all these glands, whose office is concerned with the repair or change of the blood.

We cannot help alluding, also, to the new impulse to these investigations which has been recently given here by the patient labors and the monograph of a member of this Society—"Boylston Prize Essay on Leucocythæmia, by H. F. Damon, M.D., M.M.S.S., Boston, 1863."

Since writing the above, four cases of enlargement of the cervical glands have come under my observation, in all of whom the blood has been examined, with the following results:—

CASE I.—A female of 30 years. Glands removed by operation, some time since, on left side of neck. Now, three or four large masses on right side. No suppuration now, nor at any time previous. Blood normal under microscope. No operation advised.

CASE II.—A female, about 25 years. Three large solitary glands on right side of neck. Many smaller ones in vicinity, indurated. No suppuration. Glands have been growing a long while. Aspect anæmic; health feeble. No change in amount of white corpuscles. No operation advised.

CASE III.—A boy of 15 years. Large mass of conglomerated glands on left side of neck;

Bibliographical Notices.

A Handy-book of Ophthalmic Surgery for the use of Practitioners. By JOHN Z. LAURENCE, F.R.C.S., M.B. (Univ. Lond.), Surgeon to the Ophthalmic Hospital, Southwark, Editor of the Ophthalmic Review, &c.; and ROBERT C. MOON, House-Surgeon to the Ophthalmic Hospital, Southwark. With numerous Illustrations. London: Robert Hardwicke, 192 Piccadilly. 1866.

THIS is an octavo of 160 pages. The authors have attempted, according to their preface, "to bring the principles and practice of modern ophthalmic surgery within a small compass, to supply the wants of the busy practitioner," &c. The book gives, in a brief and unpretending style, what the authors probably conceive to be the main features of modern ophthalmic practice. The reader familiar with the subject will perhaps miss some matters which he deems important, and as regards others may find opinions different from his own. Some of the topics may seem too meagrely treated. Yet there is very much valuable matter compressed into the book, and its careful perusal will abundantly repay not only one who wishes to get a quick survey of the present state of ophthalmology, but also the practitioner to whom it is important to compare others' opinions with his own. Books like the one before us, bringing to our notice the principal features of a subject, unencumbered with the less important details, have a certain value, but do not supply the place of complete, thorough and systematic treatises, to which latter recourse must also be had for a part of proper professional education.

While acknowledging the value of the book under notice and confessing to have read it with pleasure and profit, amid its rather remarkable general correctness, there is one inaccuracy, the importance of which must be our excuse for mentioning it. On page 146, in explaining the diagram from Giraud-Teulon, it is stated that the crossed diplopia, consequent upon looking through convex glasses at a point A nearer than the near point of the unaided eyes, is "overcome by the eyeballs converging to A," whereas, according to the distinguished author, p. 397 of the *Binocular Vision*,* this diplopia exists "pendant que la convergence réelle demeure fixée en A," so that when he says, page 399, "pour les (the double images) fusionner, les yeux ont donc exécuté un mouvement de convergence mutuelle," he must mean convergence to point nearer than the point A. That he does mean so is

have been enlarging many months. No appearance of suppuration. Excess of white corpuscles. The operation disclosed deep-seated *pus*.

CASE IV.—A man of 22 years. Very large suppurating sac on both sides of neck, surrounded by enlarged glands. Treated by puncture with trocar, injection of iodine, and eventually with seton. Iron internally. Glands gradually enlarging into tuberos clusters. Large excess of white corpuscles in blood. No operation advised at present.

The peculiarity of these cases seems to be the absence of leucoæthæmic blood in the non-suppurating, and its abundant presence in the suppurating ones—or those commonly called scrofulous. These results of microscopic examination differ from those previously recorded.

To whatever theory thorough experiment may ultimately lend its sanction, enough has, perhaps, been said to indicate the importance of much fuller investigation. And if this paper shall lead any to continue research in this hitherto untrodden field, the aim of the writer will have been attained.

* *Physiologie et Pathologie Fonctionnelle de la Vision Binoculaire.* Paris, 1861.