BEUERMANN (J. A.)

The Differential Diagnosis between Benign Lymphomyxoma and Malignant Lymphomyeloma.

BY

JOHN A. BEUERMANN, M. D.

REPRINTED FROM THE

New York Medical Journal

for August 8, 1896.

Reprinted from the New York Medical Journal
for August 8, 1896.

THE DIFFERENTIAL DIAGNOSIS BETWEEN BENIGN LYMPHOMYXOMA AND MALIGNANT LYMPHOMYELOMA.*

By JOHN A. BEUERMANN, M.D.

Any one having examined a large number of tumors of the type of lymph tissue will admit that the differential diagnosis between benign and malignant forms is extremely difficult, especially without the knowledge of the clinical history. Virchow † speaks of a benign lymphoma, which he considers merely a hyperplasia of lymph tissue, and a lymphosarcoma, which latter is characterized by the lack of persistence of its elements and the progressive and, at times, very acute growth of the tumor. He applies both these terms only to growths from the lymph ganglia, erroneously termed "lymph glands." To-day we know, however, that layers of lymph tissue, such as we meet with in mucous membranes, especially in children and young adults, are rather prone to proliferate and produce what rhinologists

* Read before the German Medical Society of the City of New York at its meeting, June 1, 1896.

† *Die krankhaften Geschwülste.* Berlin, 1864 and 1865.

like to call "adenoids." On the other hand, we know that in almost any organ of the body tumors called by Virchow small round-celled sarcoma, being of the type of lymph tissue, may arise. They are of rapid growth and considerable malignity, and have often no apparent connection with any normal lymph tissue.

I am convinced that on the ground of cellular pathology we shall never reach the solution of the puzzle why a tumor of the structure of lymph tissue should at times be benign and at other times malignant. A solution of this puzzle seems possible only if we admit that the so-called protoplasm is traversed by a reticulum the points of intersection of which, previously termed granules, may grow out into solid lumps of living matter, which in further development become vacuoled, afterward reticulated, and at last transformed into nucleated protoplasmic bodies. Another point which will aid us in distinguishing between benign and malignant growth of lymph tissue is the fact that the basis substance of connective-tissue varieties is traversed by a reticulum of living matter being transformed into protoplasm. Normal lymph tissue, both of the lymph ganglia and the diffuse layers of the mucous membranes, is myxomatous tissue—i. e., a delicate, so-called stellate reticulum, holding in its meshes a certain amount of a soft, jellylike myxomatous basis substance and a varying number of lymph corpuscles. That such a stellate reticulum does exist in the lymph tissue all histologists now admit; but that this tissue is of the myxomatous variety is not as yet generally acknowledged. I do not hesitate to term what Virchow has called small round-celled sarcoma a lymphosarcoma, or preferably lymphomyeloma. Virchow's name sarcoma means a fleshy tumor, and does

not truly designate a malignant tumor bearing all the characteristics of an embryonal or medullary tissue. The word myeloma, as suggested by Dr. Carl Heitzmann, would really indicate a tumor of the embryonal or medullary type.

Let us analyze with medium power of the microscope a so-called adenoid growth sprung from the mucosa covering the turbinated bone (see Fig. 1).

We perceive epithelial formations surrounded by a myxo-fibrous tissue, rather rich in small globular or oblong, non-nucleated elements. The main mass of the growth consists of lymph tissue—i. e., a protoplasmic reticulum, the meshes of which contain an indistinctly granulated basis substance and a number of so-called lymph corpuscles, formations of living matter, varying in size from a small homogeneous lump to a granular corpuscle, in which we recognize but exceptionally a distinct nucleus. The reticulum is mostly protoplasmic, but in many places fibrous, infiltrated with a glue yielding basis substance, and here and there even broader tracts or bundles of fibrous connective tissue are met with traversing the lymph tissue. Most of the meshes contain several lymph corpuscles, up to six in number. In some places, always of a limited extent, the lymph corpuscles are more crowded and the myxomatous reticulum less pronounced. These are obviously places where a more lively outgrowth of the living matter and the tumor is taking place, resulting in a temporary increase of the bulk of the whole tumor. I would lay stress upon the fact that the myxomatous reticulum is always traceable; certainly with less ease and distinctness in places where the lymph corpuscles form crowded masses than in the spot from which this drawing is taken.

The amount of blood-vessels is not to be considered typical for this kind of tumor; our case shows rather a goodly number of capillaries.

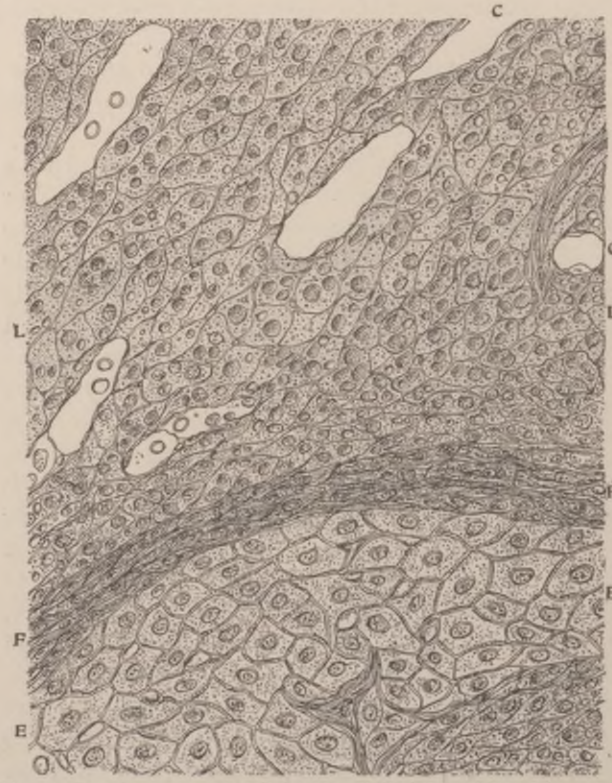

FIG. 1.—Lymphomyxoma (so-called "adenoid") of the turbinated bone, magnified 300. E E. Epithelial layer. F F. Myxo-fibrous layer surrounding the epithelial layer. L L. Lymph tissue. C C. Wide capillary blood-vessels.

If viewed with a high power, such a tumor, for which I would suggest the name of lymphomyxoma,

presents features quite characteristic, as shown in Fig. 2.

Here we see a myxomatous reticulum, well pronounced, exhibiting broadened points of intersection,

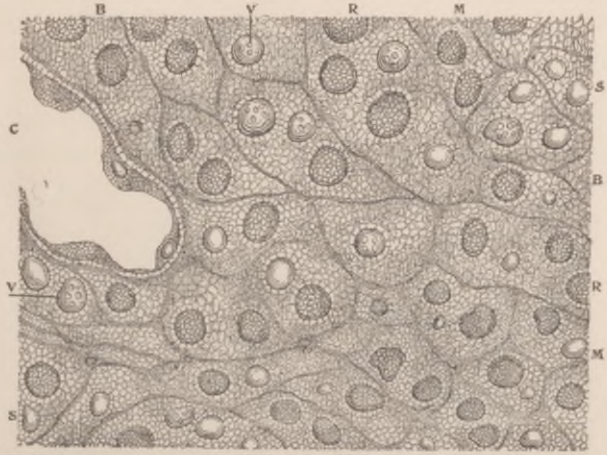

FIG. 2.—Lymphomxyoma (so-called "adenoid") of the turbinated bone, magnified 1,200. S S. Small, solid lymph corpuscles. V V. Vacuoled lymph corpuscles. R R. Reticulated lymph corpuscles. B B. Faintly reticulated basis substance. M M. Myxomatous reticulum of lymph tissue. C. Capillary blood-vessel.

with interspersed nuclei in the broadened places. The meshes hold a myxomatous or mucoid basis substance, in which we have no difficulty in recognizing the extremely delicate reticulum of living matter, without taking recourse to any reagent whatever. In the basis substance we recognize small, glossy, and homogeneous lumps in a rather moderate number; then somewhat larger lumps, with a varying number of vacuoles in their interior; at last the larger lymph corpuscles, showing a distinct reticulum of living matter in their interior.

Nucleated protoplasmic bodies, such as are seen even in normal lymph ganglia, especially in the centres of the follicles, are not present in the spot chosen for illustration, and are, indeed, scanty throughout the tumor under consideration. Whatever the size of these corpuscles be, they invariably show radiating spokes of living matter which enter into and inosculate with the reticulum of the basis substance.

The malignant lymphomyeloma (small, round-celled sarcoma of Virchow) presents to us quite a different aspect. Fig. 3 illustrates a section from one of these

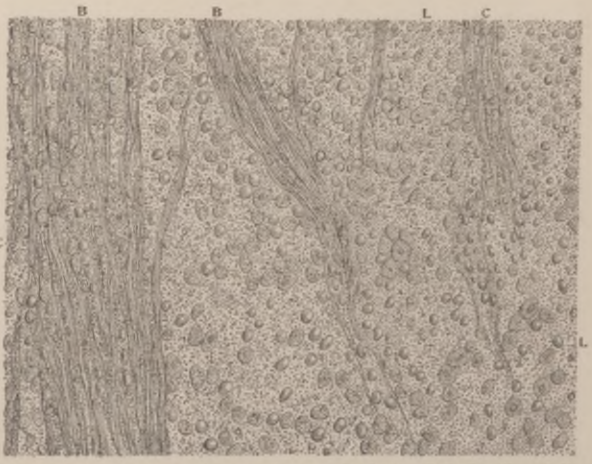

FIG. 3.—Lymphomyeloma of the testis, magnified 300. B B. Bundles of fibrous connective tissue of the albuginea, much reduced in bulk. C C. Myeloma elements, sprung from previous fibrous connective tissue. L L. Tissue of lymphomyeloma.

tumors of the testis. We not infrequently meet, in a malignant growth of this description, with an extremely delicate myxomatous reticulum, the meshes of which ap-

pear crowded with lymph corpuscles; in the spot I have selected here, however, such a myxomatous reticulum is entirely absent.

In the main mass of the tumor we fail to recognize any variety of basis substance, but it presents a mass of so-called coarsely granular protoplasm, in which we find imbedded, without any apparent regularity, a large number of elements which, owing to their size and shape, no microscopist could distinguish from lymph corpuscles. The number of somewhat larger coarsely

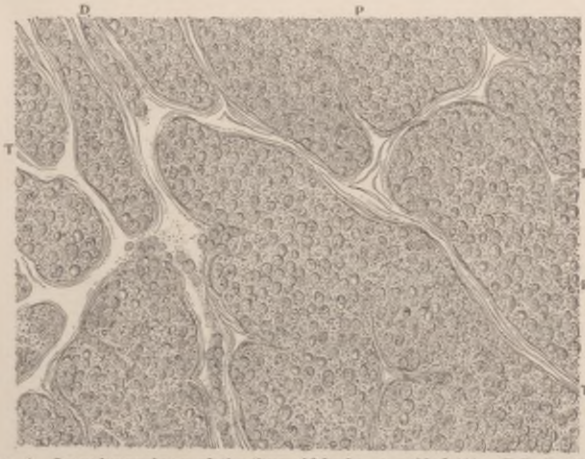

FIG. 4.—Lymphomyeloma of the thyreoid body, magnified 300. T T. Tracts of fibrous connective tissue, partly in hyaloid change. R. Vestige of a previous tract of fibrous connective tissue. D. Destruction of a tract of fibrous connective tissue by myeloma. P P. Protoplasmic masses, with interspersed lymph corpuscles.

granular protoplasmic bodies is far greater than in benign lymphomyxoma; the number of still larger nucleated protoplasmic bodies is quite conspicuous—so much so that the tissue here and there approaches the type of

globomyeloma (large round-celled sarcoma of Virchow). In analyzing this tumor, we find larger masses composed of nucleated protoplasmic bodies; therefore we have a combination of lymphomyeloma and globomyeloma, as may be, indeed, observed in a majority of myeloma tumors of a pronouncedly malignant type.

Similar features are found in an extremely malignant lymphomyeloma of the thyreoid body, which shows vestiges of previous walls and alveoli (Fig. 4).

High powers of this tumor plainly exhibit the typical features of an intensely malignant and rapidly growing lymphomyeloma (see Fig. 5).

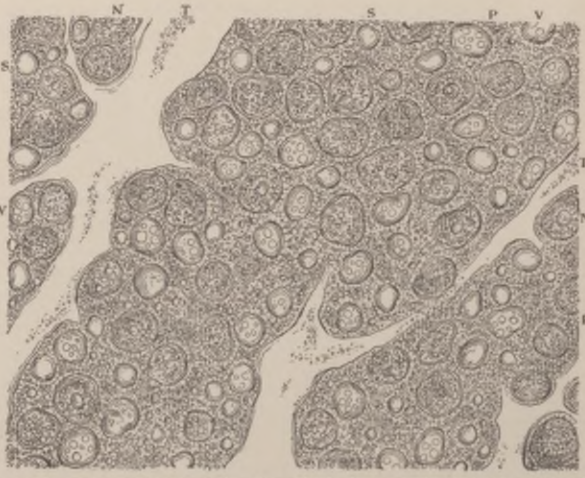

FIG. 5.—Lymphomyeloma of the thyreoid body, magnified 1,200. T T. Trabeculæ of fibrous connective tissue, in hyaloid change, much reduced in bulk. S S. Small and solid myeloma elements. V V. Vacuoled myeloma elements. N N. Reticulated, partly nucleated myeloma elements. P P. Protoplasm between the elements, with coarse points of intersection.

A few tracts traverse the myeloma tissue, being in so-called hyaloid degeneration and not exhibiting any

distinct structure. In the myeloma tissue itself we notice numerous comparatively large points of intersection of the living matter, evidently the starting-point for the formation of lymph corpuscles. We can trace all stages, from a minute granule to a distinct glossy lump, not showing any structure as yet. The large number of such lumps is certainly indicative of rapid growth, and therefore of considerable malignity of the tumor. After the lumps have gone through the process of vacuolation, they assume that of reticulation, and then these bodies are in the condition termed by the older pathologists "coarsely granular." In our present views this so-called coarse granulation signifies a considerable increase of living matter, even in the stage of reticulation of lymph corpuscles. A good many protoplasmic bodies in the reticular stage exhibit central lumps of living matter, generally termed nuclei. Even these nuclei show stages of development from a solid homogeneous to a vacuoled and at last reticulated lump of living matter.

The second point that I would consider of great value for the distinction between a benign lymphomyxoma and a malignant lymphomyeloma is the condition of the fibrous connective tissue, either surrounding the invaded organ in the shape of a capsule, or traversing the same in the shape of trabeculæ in alveolar structure, or as interstitial tissue in glandular organs. Whereas in benign lymphomyxoma the capsule surrounding the tumor remains unchanged and always well pronounced, in malignant lymphomyeloma the amount of fibrous connective tissue is invariably reduced in a considerable degree. In Fig. 3 we see the albuginea of the testis in this condition. In analyzing such fields we easily reach the conclusion that the fibrous connective tissue is trans-

formed into the tissue of the myeloma. While the myeloma tissue increases, the amount of fibrous connective tissue steadily decreases in bulk; in other words, the myeloma grows at the expense of the fibrous connective tissue. With higher powers of the microscope we can satisfy ourselves that it is not only the tracts of protoplasm between the bundles which give issue to the myeloma, but the bundles themselves, respectively their basis substance, likewise are transformed into myeloma through the intervening stage of a transformation of this basis substance into protoplasm, from which it had arisen. This fact is not surprising to the microscopist, who is aware of the fact that the fibrous, as indeed any other variety of connective-tissue basis substance, is traversed by a large amount of living matter in reticular arrangement. Thus nothing is required but a liquefaction of the glue-yielding substance in order to re-establish its protoplasmic condition. In Fig. 4 tracts of fibrous connective tissue are seen traversing the myeloma tissue, partly in a hyaloid degeneration, therefore not exhibiting everywhere a plainly fibrous structure. The tracts in many places gradually blend with the myeloma tissue, or are pierced by rows of protoplasmic bodies, plainly indicating the manner in which the fibrous connective tissue perishes as such, and is transformed into myeloma tissue. This process can be still easier traced with high powers of the microscope, under which many of these tracts appear partly transformed into, at first, the so-called finely granular, and later into a coarsely granular protoplasm, which directly gives issue to the so-called lymph corpuscles by the growth or development of the points of intersection of the living matter. The observation of this transforma-

tion of the capsule of the lymph ganglion, called tonsil, is of especial value (Fig. 6).

Whenever a rapid growth takes place in the tonsil, the question comes up whether this growth is due to a merely hyperplastic or inflammatory process, which would be benign, or to a malignant growth known to

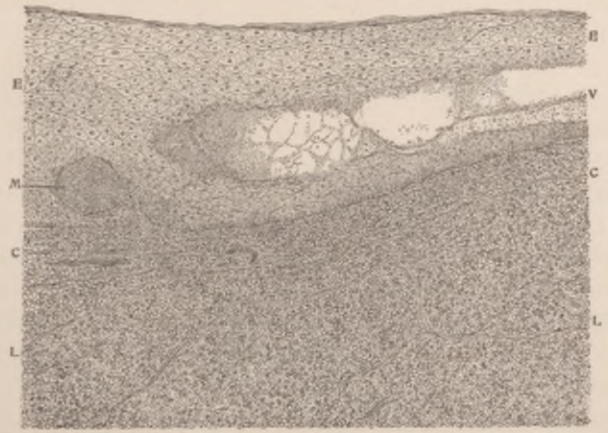

FIG. 6.—Lymphomyeloma (sarcoma) of the tonsil, magnified 100. E E. Stratified epithelial layer. V. Vesicle filled with an albuminous liquid within the epithelial layer. M. Nest of myeloma, penetrating the epithelial layer. C C. Connective-tissue capsule crowded with lymph corpuscles. L L. Lymphomyeloma, with scanty tracts of fibrous connective tissue.

endanger the life of the patient. In the former instance the follicles are invariably preserved, and the capsule environing the tonsil is always plain, representing a more or less broad layer of fibrous connective tissue, bordering the lymph structure toward the epithelial cover. As soon as the lymph tissue has assumed the malignant type of lymphomyeloma the follicles perish, since the boundary line is lost to sight and the enveloping capsule is much reduced in bulk by being crowded with

lymph corpuscles. These two features are sufficient, in my opinion, to establish the diagnosis of a malignant lymphomyeloma of the tonsil, which, fortunately, is of rare occurrence.

The third typical point for the distinction between a benign lymphomyxoma and a malignant lymphomyeloma is the behavior of the epithelial structures, either covering the surface of the tumor or being present in the shape of acinous or tubular glands in the lymph tissue of the mucous membranes. Fig. 1 illustrates an epithelial layer sharply bordered by myxofibrous tissue toward the myxomatous lymph tissue of the tumor. This means that the growth of lymph tissue will never affect or destroy the epithelia. This is quite different with malignant lymphomyeloma, which invariably will transform either the cuboidal epithelia of acinous glands or the columnar epithelia of the tubular ones into myeloma. Rapidly growing lymphomyeloma will by degrees completely destroy and transform into its own type all epithelial formations of glands. In Fig. 3 a portion of a malignant myeloma of the testis of the size of a man's fist is illustrated, nowhere exhibiting even the slightest trace of previous seminiferous tubules. The same is the case with the lymphomyeloma of the thyreoid body, drawn in Figs. 4 and 5, in which all epithelial structures have been destroyed. In Fig. 6 the stratified epithelium covering the tonsil is pierced by a globular field of lymphomyeloma, obviously originating from transformation of originally epithelial into myelomatous tissue. The spot where the invasion of the latter tissue was effected is plainly seen in the drawing. To the right of the myeloma nest may be seen a follicle, filled with albuminous liquid, such as are frequently seen

in the aural epithelium. To the left of this follicle the stratified epithelium was found almost completely destroyed and transformed into the tissue of myeloma to a considerable extent.

I have abstained from illustrating the transformation of epithelial into myelomatous tissue, since there exists quite a literature on this topic, with numerous illustrations. I refer to the essays of Dr. Rudolf Tauszki,* Dr. Louis Heitzmann,† and Dr. Charles Dixon Jones.‡

What I have stated in this paper has reference solely to the microscopic features of the tumors under consideration. Fortunately, the clinician is often enabled to establish a diagnosis from the clinical features and the history of the case. Neither microscopists nor clinicians, however, should consider themselves infallible; in doubtful cases, unquestionably, the microscope should be called upon to determine the intimate nature of a tumor of the type described.

1891 Lexington Avenue.

* Ueber die durch Sarkomwucherung bedingten Veränderungen des Epithels. *Sitzungsber. d. kais. Akad. d. Wissensch. in Wien*, vol. lxxiii.

† The Differential Diagnosis between Fungous Endometritis and Tumors of the Mucosa of the Uterus. *American Journal of Obstetrics*, etc., 1887.

‡ Study of the Minute Anatomy of Fungous Endometritis and Myeloma of the Uterus. *New York Medical Journal*, 1894.

The New York Medical Journal.

A WEEKLY REVIEW OF MEDICINE.

EDITED BY

FRANK P. FOSTER, M.D.

THE PHYSICIAN who would keep abreast with the advances in medical science must read a *live* weekly medical journal, in which scientific facts are presented in a clear manner; one for which the articles are written by men of learning, and by those who are good and accurate observers; a journal that is stripped of every feature irrelevant to medical science, and gives evidence of being carefully and conscientiously edited; one that bears upon every page the stamp of desire to elevate the standard of the profession of medicine. Such a journal fulfills its mission—that of educator—to the highest degree, for not only does it inform its readers of all that is new in theory and practice, but, by means of its correct editing, instructs them in the very important yet much-neglected art of expressing their thoughts and ideas in a clear and correct manner. Too much stress can not be laid upon this feature, so utterly ignored by the "average" medical periodical.

Without making invidious comparisons, it can be truthfully stated that no medical journal in this country occupies the place, in these particulars, that is held by THE NEW YORK MEDICAL JOURNAL. No other journal is edited with the care that is bestowed on this; none contains articles of such high scientific value, coming as they do from the pens of the brightest and most learned medical men of America. A glance at the list of contributors to any volume, or an examination of any issue of the JOURNAL, will attest the truth of these statements. It is a journal for the masses of the profession, for the country as well as for the city practitioner; it covers the entire range of medicine and surgery. A very important feature of the JOURNAL is the number and character of its illustrations, which are unequaled by those of any other journal in the world. They appear in frequent issues, whenever called for by the article which they accompany, and no expense is spared to make them of superior excellence.

Subscription price, $5.00 per annum. Volumes begin in January and July.

PUBLISHED BY

D. APPLETON & CO., 72 Fifth Avenue, New York.