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TUMOR OF THE LEFT AURICLE.

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[PLATES II., III., IV.]

The unusual interest of the following case has induced me to publish in the Proceedings of the American Society of Microscopists, not only that which relates to microscopy, but also its clinical aspect, which I know will be of interest to all medical readers.

Mrs. B., age 34, mother of fourteen children had been in good health till May, 1877, when she began to suffer from nausea and epigastric distension, at the same time from a swelling in the right hypochondrium when stooping. Attacks of cardiac palpitation, cough and dyspnœa supervened; the urine became scanty, depositing a copious sediment. She gradually declined. A physician now being called, diagnosticated cancer of the stomach. Though at this time she was emaciating rapidly, she never suffered pain, although she suffered much from nausea, and often vomited.

In September, 1877, a consultation of physicians was held. The diagnosis was made: Cancer of the stomach with extension to the liver. Prognosis: Death in twelve hours. Under the care of her husband, she rallied, to the astonishment of her physicians, so that at the end of a month she was able to direct her household affairs, although she still continued weak.

In December, 1877, she became worse, and came into the care of Dr. J. B. Schueller, with whom I saw her, January 23, 1878.

At this date, anorexia, vomiting, dyspnœa, cough, much mucous expectoration, no pain, insomnia, sensation of weight in right hypochondrium, emaciated, feeble, sallow, no icterus, no oedema, tongue and lips cyanotic, epigastrium sensitive to pressure.
Margin of liver extended two inches below margin of ribs, surface smooth, chest resonant on right side to the seventh rib, fine moist rales over both lungs, respirations from forty to fifty per minute.

Heart dullness extends beyond left mammillary line; there is systolic pulsation of the jugulars, tumultuous systolic blowing murmurs heard over the whole heart, urine scanty, bowels constipated.

Diagnosis: Tricuspid insufficiency, with consecutive congestion of thoracic and abdominal viscera. Prognosis: Fatal. Treatment, symptomatic. She was allowed to choose her own diet, which was Limburger cheese, suet, herring, sour milk and buttermilk. Morphine, brandy and mild laxatives were ordered to be used, pro re nata.

February 1st, the left hand became œdematous; a week later the right hand, followed by œdema of both lower extremities. The pulse in the left radial became almost imperceptible. Dyspnoea was succeeded by orthopnoea. The sputa became bloody; towards the close, almost clear blood. Decubitus appeared on the sacrum, and made rapid progress.

On the 16th of February she died. Autopsy eighteen hours after death. Rigor mortis, strong; œdema of extremities; small quantity of fluid in abdominal cavity; liver congested, slaty color, indurated; stomach healthy; lungs, slaty hue, with widely extended emphysema; adhesions of left pleura. Pericardium contained four ounces of fluid. Heart, dilated and flabby, large tendinous patch on upper surface; cavities distended with blood. Mitral and tricuspid valves thickened and insufficient; aortic valves normal. In left auricle, attached by small pedicle, was a tumor the shape and size of a hickory nut, of yellowish hue, semi-solid in consistence. Imbedded in the tumor were hard, yellow nodules from the size of a hemp-seed to that of a pea; causing the otherwise smooth surface to be nodular. This tumor hung in ventricular opening.

The foregoing notes were furnished by Dr. J. B. Schueller.

The tumor was of the size of a small hickory nut, yellowish in color. The short, small pedicle was covered for one-fourth of an inch with endocardium, when it suddenly expanded—became globular, jelly-like and trembling. There were several yellow nodules in the soft mass of the tumor.
The tumor was hardened in alcohol, and sections made through its whole extent. The sections were stained with carmine and mounted in glycerine.

The muscular fibers of the heart extend into the pedicle of the tumor, by digitations, recalling by their club-shaped terminations those of the muscular fibers inserted into a cicatrix. (Vide Billroth's Pathology, Am. ed., p. 99, fig. 18.) This is illustrated by fig. 1.

At the termination of the muscular fibers there is a mass of connective tissue which extends between the muscular fibers for some distance, splitting and fraying them apart. In this connective tissue are seen large, round cells.

The transition from muscular fibers and normal heart tissue to the tumor formation in the pedicle is shown in fig. 2. In the upper portion are seen striated muscular fibers; below, connective tissue and numbers of cells with highly refracting nuclei. Further towards the distal extremity of the tumor the cells become irregular in size and shape, and are separated more widely, as shown in fig. 3, where they lay at some distance from one another in the transparent, trembling matter of the tumor.

In fig. 4 is shown a mass of cells surrounded with the same colloid material. These cells are of various sizes, and probably present the mode of formation, and its initial stage, of the yellow nodules attended to in the general description of the tumor. Other smaller nests occur, of the same general formation in other portions of the tumor. At the distal extremity of the tumor the cells become fewer in number, and finally disappear, and the tumor presents rounded swollen granular masses, which seem to me to mark the termination of the degenerative changes which the tumor has undergone.

Some portions of this tumor have a capsule, which is shown in fig. 5. The appearance of portions of this capsule are indicated in the drawings marked 6, 7 and 8, which refer to portions of fig. 5, marked A and B.

By arranging the first four figures in their order, a complete microscopic picture of the changes which the tumor has undergone is presented, with the exception of the distal extremity, which presented no organization, but was in the state above described.
MODE OF ORIGIN OF THIS TUMOR.

In order to get some idea of the mode of origin of this tumor, we must become acquainted with the minute anatomy of the part from whence it originated. "In the heart are many kinds of muscular elements: in the endocardium, smooth, muscular fibers; beneath the endocardium of certain animals, certain special fibers which bear the name of Purkinje; finally, the fibers of the myocardium, properly so called. These fibers are striated transversely, like the muscles of the limbs, but, like the smooth, muscular bundles, are composed of many cells cemented together." Ranvier Histologie, p. 533.

"Upon isolated fragments of the fibers of Purkinje, the marginal cells present a free face, and faces united to the neighboring cells, viewed in profile. These last show a longitudinal and transverse striation, like that of all striated muscles. As the adhesion between the cells is very complete, it is impossible to determine the limit of two neighboring cells exactly. It happens that the cells appear to be contained in a circle of muscular fibers, but this is an inexact interpretation of the appearances, because it thus exists upon the free surface of the cells a longitudinal and transverse anatomy manifest in the substance of the cell itself." These appearances are shown in drawings 9 and 10. "It often happens, when one or more of these cells are associated, they show striations all over their faces and in their interior nuclei."—Op. cit., p. 535.

"The fibers of Purkinje are formed by a series of muscular cells arrested in their development. They should be represented as embryonic cardiac fibers."—Op. cit., p. 538.

From some cause there has, in my opinion, a nutritive activity been impressed upon these embryonic fibers beneath the endocardium. They have enlarged in length; their nuclei have swollen up; they have become surrounded by an increased connective tissue. This, I think, is shown by a study of fig. 2. The process of multiplication of cellular elements has continued until the endocardium has given away.

Subsequently, from some cause which seems to be peculiar to this class of tumors, the protoplasm of the cells has increased, and undergone what seems to me to be colloid degeneration.
The part I have described as a capsule is a prolongation along the outside of the tumor, of the connective tissue which underlies the endocardium.

In fig. 6 we see the cells with increased protoplasm in the state of colloid degeneration applied to the capsule.

The proper nomenclature of this tumor has been a subject of great difficulty.

The large cells of various shapes would incline me to consider it a sarcoma, but I have not been able to recognize in it a single blood-vessel, which seems to be the essential characteristic of this class of growths. The occurrence of the peculiar yellow nodules in any tumor was formerly considered sufficient for establishing the cancerous character of a tumor.

I believe this to be a colloid cancer, relying upon the characteristics presented in figs. 3 and 4; and yet, I am free to confess, there is much to recall the characteristics of the myxoma.

In conclusion, I must express my obligations to Mr. W. H. Birchmore, a medical student in my office, who has furnished the drawings which illustrate this paper.
PLATE II.

Fig. 1

Muscular Infiltration.
Bausch & Lomb 1-6 inm.

Fig. 2.

$\times 112^\circ$

Fig. 3.
PLATE III.

FIG. 4.

1/2 M.M. in 1/20 in.

1/4 in 10° B. Eye piece
W.H.B.

FIG. 5. 1-100 in.

1/25 in. x 1/10 R & J. Beck
W.H.B.

CAPSULE OF TUMOR.
A. Outer side
B. Inner side.
C. Central portion.

FIG. 6.

Mag. 11/2 Diams
1/8 R & J. Beck
W.H.B.
Capsule of tumor part marked C
in previous figure.
PLATE IV.

**Fig. 7.**

Inerside of Capsule of tumor part marked B in Figure 5.

*R. & J. Beck 1/2 x 112.*

**Fig. 8.**

Outerside of Capsule of tumor part marked A in Figure 5.

*1/4 in. Beck × 150° W.H.B.*

**Fig. 9.**

From Auricle of Sheep.

Purkinje's fibers—showing appearance of cells surrounded by muscular fibers.

*Mag 197.5° B&L in 1/6th A Eye piece Beck*

**Fig. 10.**

From Auricle of Sheep.

Showing striations of Purkinje's fibers on surface of cells.

*1-1000 th inch*

*1-200 inch × 262.5° in % with A Eye piece B&L 0by Eye piece Beck*