MULTIPLE GLOMIC TUMORS

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As is known, Masson described in 1924 a peculiar form of tumor which he called a glomic tumor. These tumors are usually localized in the nail bed, but they are also described as occurring in other parts of the skin of the extremities and of the coccygeal region. Usually they lie below the epidermis in the deeper layers of the skin.

Clinically they are characterized by more or less severe pain which occurs in sudden transient attacks and is frequently occasioned by pressure on the tumor, or exposure to changes of temperature, especially cold. In a number of instances it has been possible to demonstrate in the extremity which is the site of the tumor some disturbance of the sympathetic nervous system in the form of higher or lower temperatures, hyperhidrosis, etc.

Stout, who made a thorough examination of the literature published prior to Masson's paper, has been able to show that this form of tumor was by no means unknown previously, but that it had been described under the name of angiosarcoma, perithelioma, etc. Clinically, it had been the object of observation at a very early date, and in 1812 Wood gave an extensive description of a number of cases, under the name of "painful subcutaneous tubercle."

From Stout's detailed account it is seen that multiple tumors of this character have been observed only twice.

Having had the opportunity of observing two additional cases of the kind, one of which presents a localization of the tumors which, as far as I can find, has hitherto been unknown, I believe that a report may be of interest.

CASE I: N. N., thirty-three years old, was born in 1903. At the age of eight or nine he began to suffer from sharp, intensive aching localized in the right ankle and around the Achilles tendon. The pain began suddenly and lasted for about an hour to as much as twenty-four hours. It would then disappear almost instantaneously and the patient would be free from trouble for some days, sometimes as long as a week. At the age of twenty he was admitted for the first time to the hospital, as the condition had become so aggravated that he was unable to work. He was given massage but became no better. On readmission to the same hospital in 1927, a periarterial sympathectomy was carried out, followed, one month later, by laminectomy with resection of a number of the posterior nerve roots. This brought about an amelioration of the symptoms together with partial anesthesia in the right foot and leg. Later on, however, the condition again grew worse.

In November 1934 the patient was admitted to the neurosurgical department of the Serafimer Hospital, Stockholm (Professor Olivecrona). Here there were palpated around the lateral malleolus of the right foot some round, extremely tender tumors, the size of a large pea. Three of the tumors were extirpated. One of them lay in the immediate neighborhood of the sheath of the peroneal tendon. The largest lay subfascially and had no connection with either tendons or nerves.

The microscopic examination of one of these tumors showed it to be provided with
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A clearly visible capsule of connective tissue (Fig. 1). Inside the capsule was visible a tissue consisting of large cells, rich in protoplasm, separated from each other by extremely fine collagenous filaments (Figs. 2 and 3). A number of these cells contained iron pigment.

The tumor tissue was traversed by wide vessels (Figs. 2 and 3), the walls of which consisted of a thin, collagenous membrane in connection with the fine filaments running between the cells. These cells entirely filled the space between the lumina of the vessels. Consequently, one cannot speak of any interstitial tissue between the different vessels. Towards the center of the tumor, the collagenous filaments increased in volume and became hyalinized. In the very center there was an edematous softening with cyst formation (Fig. 1).

In consequence of the fact that a number of the cells contained hemosiderin and other fats, the tumor was considered to be a xanthoma.

![Figure 1. Case I: one of the tumors removed at the first operation](image)

The tumor is encapsulated. Towards the center, the collagenous element in the tissue increases and becomes hyalinized. In the very center there are edema and a secondary cyst.

After operation the patient grew better, but in January 1936 the symptoms returned, accompanied by attacks of extremely violent pain. On readmission to the Serafimer Hospital examination revealed great tenderness above the Achilles tendon. An exploratory operation was done in the region under the lateral malleolus. Three tumors were found. One of them lay below the skin; it was as big as a pea and was provided with a capsule. Deep within the adipose tissue in the sinus tarsi lay another tumor, as large as the tip of a finger. Last of all, there was found a tumor behind the Achilles tendon and in the immediate neighborhood of the peroneal nerve. After operation, the pains disappeared.

On this occasion, the microscopic examination revealed pictures which were easier to interpret than the earlier ones, and which led to a correct diagnosis. The tumor tissue proved to consist of a tangle of peculiarly constructed, fairly thick-walled vessels. The walls consisted solely of large epithelium-like cells, or of such cells mingled with smooth-muscle cells. The same vessel could be seen to consist in one place of smooth musculature alone, and in another of nothing but epithelial cells. Between the latter there were visible the fine, collagenous filaments (Fig. 4) described above. On reexamining the tumor which was submitted to investigation after the first operation, similar vessels were now observed in and around its capsule. A fairly large number of nerves were seen between the vessels. It is evident that all the tumors are glomic tumors of varying structure.
FIG. 2. CASE I: PHOTOMICROGRAPH OF THE TUMOR SHOWN IN FIG. 1

The tumor tissue, which consists of epithelial-like cells, is traversed by wide vessels with thin walls (Mallory stain).

FIG. 3. CASE I: SAME TUMOR AS SHOWN IN FIG. 2, HIGHER MAGNIFICATION

Between the tumor cells fine collagenous filaments are seen connected with the thin wall of the vessel (Mallory stain).
Case II: The second patient was a man, twenty-one years of age, whose symptoms appeared first in February 1935, when he was twenty years old, after a fall. Since the accident he had experienced pain in the left foot, especially after fatiguing work or exercise. This grew worse when the weather was cold. In May 1936, the patient slipped on the stairs, and the foot became swollen and tender.

An x-ray examination, May 19, 1936, was reported as follows: "In the medial part of the talus, in the upper part of the calcaneus, in the cuboideum and the proximal part of os metatarsale 5, there are circumscribed areas of diminished density, resembling multilocular cysts. Probably osteitis fibrosa generalisata." (Fig. 5.)

The blood calcium was somewhat increased, and on the left side of the neck there was palpated a soft area of resistance. In consequence, on Nov. 3, 1936, the parathyroids on that side were exposed, but showed no evidence of disease.

There are found vessels, the walls of which consist of epithelium-like cells, or of similar cells intermingled with smooth muscle cells.

At the same time an operation was carried out on the foot. A tumor, somewhat larger than a pea, was found between the vessels and the nerves behind the malleolus. A similar tumor was observed in the form of a swelling on the talus head. While dissecting this out, a hollow in the bone was discovered, as large as the tip of a finger, also filled with a tumor mass. This was scraped out and the defect in the bone was found to have smooth walls. The tumor tissue was blue-red and contained small particles of bone.

Microscopic examination of the extirpated tumor and of the masses which had been scraped out showed a tissue consisting of a great number of vessels, lying close to each other and containing narrow lumina surrounded by walls of large cells, rich in protoplasm (Fig. 6). Between these cells were fine collagenous filaments.

The tumor was surrounded by a capsule and, just as in the preceding case, the vessels outside the capsule were well separated from each other, while the tissue within the capsule formed a tangled mass. By employing suitable methods of staining, the individual vessels could be distinguished from one another, which was not the case in the first instance. Between the individual vessels some few epithelial-like cells were visible. An increase in the number of these cells would certainly have given pictures resembling those in Fig. 2.
The epithelium-like cells forming the walls of the vessels often assumed a longitudinal form and arranged themselves concentrically around the lumina. In a number of places, it was possible to observe a direct transition between an artery with highly developed elastica interna and smooth muscle cells, and a vessel whose wall consisted of epithelium-like cells.

In the tumor lying outside the talus, no bone tissue was found. The tumor masses scraped out from the talus head, on the other hand, showed formation of bone in the interstitial tissue (Fig. 7).

It is evident that a number of the multiple tumors are localized outside the bones. Others, again, seem to have issued from the central parts of the bone. The tumor in the metatarsus, especially, seems in all projections to be surrounded by bone. One can hardly be quite certain of this, however, until an anatomical examination has been made, for it may be imagined that an extra-osseous tumor has buried itself within the bone in the same way that a meningioma may make a bed within the brain, thus giving the impression of an intra-cerebral tumor. This supposition does not seem probable, however.

The bone formation in the tumors takes place within the interstitial tissue between the vessels. It may be assumed that the formation of bone is due to the intra-osseous growth.

The two cases described above are interesting in several respects. The tumors are localized in the same region, this being all the more remarkable that one of the two cases of multiple glomic tumors mentioned in the literature was of a similar nature. It would almost seem as if one might speak of a clinical entity characterized by multiple glomic tumors localized in the posterior lateral part of the foot and the malleolar region.

The second of the cases is unique in that an intra-osseous localization of glomic tumors has not hitherto been observed.

**Summary**

The author describes two cases of multiple glomic tumors localized in the posterior lateral part of the foot, in the malleolar region. In one case 6 tumors were observed. One of these lay deeply within the adipose tissue in the
FIG. 6. CASE II: MICROSCOPIC PICTURE OF ONE OF THE TUMORS

FIG. 7. CASE II: FORMATION OF BONE IN THE INTERSTITIAL TISSUE IN ONE OF THE INTRA-OSSEOUS TUMORS
sinus tarsi. In the second case there was a subcutaneous tumor and tumors in the calcaneus, talus, os cuboideum and os metatarsale 5, a localization hitherto unknown. In one of the two cases of multiple glomic tumors previously described in the literature, the tumors were also localized in the heel.

LITERATURE

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