

## Anatomical Mapping of the Liver with Melanoma Metastases: Historical Method

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### Abstract

By 1889, it was already known that performance of autopsies can help in tracing the footsteps of Nature. Now, what can be easier than this practice in cases in which pigment is typically involved, i.e., the melanoma? Therefore, a historical review of pigment cell biology was looked up. Unfortunately, although it purposed to start the study with the earliest studies carried out before 1900, no light was thrown on this particular problem. Accordingly, appeal was sought among the pathologists whose meetings were reported in the Transactions of the London Society. They started in 1846-48, while the name, melanoma, and reportedly came into use in 1838. Therefore, the problem of anatomical mapping of the colonized liver was taken up on historical glands up to 1899.

**Keywords:** Cancer; Melanoma; Liver; Metastases; History

### Introduction

The famous German pathologist, Julius Cohnheim [1] was satisfied in 1889 that the findings from tumor autopsy "are all in a manner experiments instituted by nature, which we need only rightly interpret to get a clear idea of the causes, laws of growth, and significance of the tumour." Now, the associates of Nordlund [2] undertook a historical review of pigment cell biology for the period up to 1900. Therefore, data on metastases of the melanoma were sought therein but to no avail. Accordingly, seeing that Merriam-Webster's Collegiate Dictionary [3] mentioned the earliest use of the name as 1838, it was deemed appropriate to search from the Pathological Society of London's Transactions which started in 1846-48 period [4] in order to get a good idea of the human anatomical mappings made on the liver as sketched during the period up to 1899.

### Historical Texts

It is of interest that, by 1848 [5] the first of the Transactions in my mini-Library contained the second article which was based on "malignant degeneration of the right eye." Its spread included a black mass situated in the right lobe of the liver.

In the report of Kesteven [6] only the head was opened. Thereby, this excluded liver appearances. In the usual autopsy, Godlee [7] found no hepatic deposits. Of the two cases reported by Fagge [8] Case I contained no lesion in the liver, while in Case II "it was full of nodules of inky blackness." Little wonder that he wrote in 1877 that "The pathology of the disease, however, still remains exceedingly obscure and difficult of comprehension."

Certainly, the liver topped the list of the total organs found in an early series of the Transactions according to Calvert and Pigg [9]. On the other hand, the liver was not specifically mentioned among the attacked viscera, although bone, heart and ovaries were listed [10]. Likewise, only liver and lung came up for mention by Payne [11]. In contrast, the liver was absent among a galaxy consisting of heart, kidneys, spleen, suprarenal capsules, omentum, pancreas, stomach,

ileum, and lymph nodes [12]. Mackenzie [13] approached the liver in respect of two appearances. Thus, regarding the surface, it was reported to be smooth but modulated; the organ itself nearly filled the whole of the upper abdomen by reaching below the umbilicus. Regarding its cut, it was noteworthy thus:

It is friable, and presents a coarse, granite appearance, as if made up altogether of firm circumscribed nodules, varying from a greyish-black to a dirty-white, and from the size of a millet-seed to that of a hazelnut. Towards the periphery of the organ they are of a darker shade.

Whereas Beadles [14] found many adjoining affected organs, none was seen in the liver. In contrast, wide infiltration with growth was the burden of the liver according to Rolleston [15] This was true also of the account of Targett [16] who added that the Guy's Hospital Museum was the recipient of this patient's specimen.

The specimen contributed by Moore [17] was totally described thus:

A section through a liver which has been enormously enlarged by the infiltration of a melanotic sarcoma. The entire liver weighed sixteen pounds when removed from the body. The section shows large nodules of a black colour and circular in outline, which are separated from each other by strong white septa. In some parts the growth is diffuse and of a grey colour, but nowhere can any trace of liver-tissue be discerned.

Also outstanding was the contribution of Legg [18]. Incidentally, the extravasation of blood which he described was what I noted elsewhere [19]. Here, it suffices to give other details as follows:

The liver is enormously enlarged in all directions, but preserves its shape roughly. The surface is not granular or rough, but there are large smooth projections, two or three as large as goose eggs. On cutting the liver vertically in slices, beginning with the right border of the right lobe, the lower part shows the most natural appearance; it is pale, yellow, flabby, and looks as if the cells held fat. This more natural-looking part forms the lower part of the entire right lobe, and is most sharply marked off from the layer of tissue above, and in a singular and capricious manner, depending on no vascular arrangement. The stratum above about fills the greater part of the rest of the right lobe. It is firm, mottled green, and shows a network of broad bands of green

tissue, in the meshes of which brown spots are seen. In the midst of this stratum is a rounded mass, greener, raised above the cut surface, and formed of new growths arranged in circles with a vessel in the centre. There are about six of these together, each about the size of a florin. Towards the left lobe these new growths show a dark green ground, in which white growths, the size of barleycorns, are strewn. Where the liver is thickest there is a large new growth, the size of a child's head or bigger, quite at the back of the right lobe; this tumour is coarsely granular, less pigmented, colour of a grey green. The left lobe shows altogether different characters. It is almost uniform in colour, a very dark brown green, very tough, no natural structure visible, and through it are scattered two or three large tumours, the size of hens' eggs - some smaller. Some of these are firm, others are soft.

It suffices to give one more detailed exposition thus: On section the right lobe, especially its anterior two thirds, had a firm but resilient consistence, much like that of india rubber [20]. Its anterior one-fourth was wholly replaced by new tissue, the cut surface of which had a strikingly marbled and variegated aspect, greyish and black areas being interspersed with pale and whitish lines. The cut surface was uneven (its elasticity allowing it to swell up after section), lobulated, and permeated by vessels, so that it simulated general enlargement and alteration of the natural acinous structure. This passed almost insensibly into a similar mass, which occupied the main thickness of the lobe, reaching to the inferior surface, but marked off by a thin line from the nearly normal liver-tissue in front of it, the latter forming a layer of about three inches thick. It was roughly estimated that fully two thirds or more of the lobe had undergone this change. The hepatic tissue remaining was paler and more friable than natural, and was, moreover, largely variegated (in the anterior as well as on the surface) by greyish and black nodules and striæ. The left lobe on section proved to be less markedly invaded by the new growth, occurring here more in the form of greyish-white and black nodules, more or less closely aggregated, than as a continuous mass, similar to that replacing the greater part of the right lobe.

It remains to note what was long considered to be characteristic of "cancerous" tumor of the liver [11]. It was explicable on the ground of central (necrotic) depression or "umbilication", which tends to be nicely situated on its vast surfaces.

## Discussion

The medical masters of 19<sup>th</sup> century were aware of the grandeur of Nature in cancer metastases [21]. Here, it is remarkable how they likened the differently coloured colonies to such vegetable or similar materials as marble, granite, millet-seed, hazel-nut, goose eggs florin, barleycorns, child's head or bigger, and hen's egg or smaller! Likewise, there is a kaleidoscope of colours ranging from dirty-white to greyish-black. Concerning the anatomic relationship, it is well to spot that of metastasis appearing "in a singular and capricious manner, depending on no vascular arrangement." There is also the formation "of new growths arranged in circles with a vessel in the centre." In conclusion,

the data are in keeping with the progress made recently in understanding the pathology of melanoma [22].

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