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HISTORY OF ONCOLOGY

Melanosis, melanoma, and melanosarcoma: concepts and terms in 19th century ophthalmology

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Summary

At the early 19th century, the distinguished physician and inventor of stethoscope René-Théophile-Hyacinthe Laennec (1781-1826) described melanoma as a disease entity. After his discovery much research had been devoted to the appearance and variations of melanoma in various organs of the body. However, identifying this condition in the eye was challenging for the 19th century ophthalmologists who introduced three discrete terms: melanosis (a benign condition), melanoma and melanosarcoma (malignancies).

Key words: *ocular malignancies, history of ophthalmology, melanosis, melanoma, melanosarcoma*

In 19th century, René-Théophile-Hyacinthe Laennec (1781–1826), known as the inventor of stethoscope, recognized melanoma as a separate nosological entity and coined it with the term mélanose [1,2]. Despite the controversy between his teacher Guillaume Dupuytren (1777-1835) on the primacy of the description, scientific community credits Laennec. After this leading discovery, the 19th century medical research focused on the appearance of melanoma in various organs of the body. However, the recognition and diagnosis of ocular melanoma was challenging because of its co-occurrence with other types of ocular cancers. Distinguishing malignant from benign pathologies also was difficult due to the phenomenon of hyperpigmentation. The observation of melanocytes in the surface cells of the eye could indicate various types of cancer or a benign condition, and the slow progression to malignancy further hindered accurate identification and classification of ocular melanoma [3,4].

The 19th century medical literature used three terms to describe ocular conditions related to the appearance of discoloration: melanosis, melanosarcoma, and melanoma. Laennec coined the term mélanose (melanosis) based on the Greek term *melas – melan*, which means "black" [1] (Figure 1). In ophthalmology the term melanosis was used to describe cells that had black or dark colored nuclei, due to a congenital malformation [2]. The malformation occurred mostly in the iris but also in the conjunctiva, cornea, sclera, and other anatomi-

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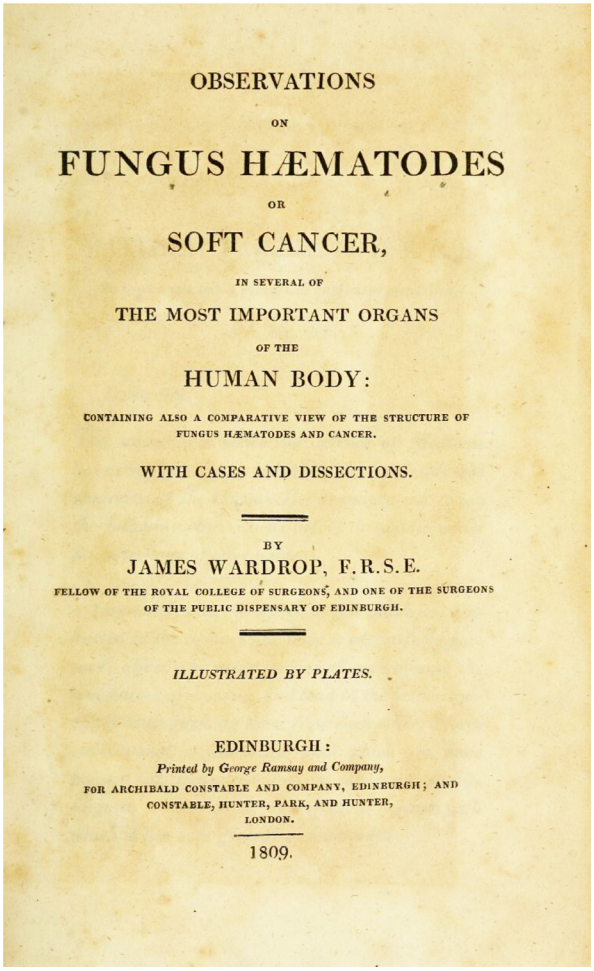
Figure 1. Ocular melanoma as represented by the 19th century French anatomist and pathologist Jean Cruveilher (1791-1874) in his textbook entitled: "Anatomie pathologique du corps humain" (Pathological anatomy of the human body).

Figure 2. The ophthalmologist Ernst Fuchs (1851-1930).

cal structures of the eye, causing them to appear darker and blacker, particularly among colored races. Melanosis was not related to malignancy and the hyperpigmentation caused no harm. Malignancies could occur on other parts of the eye and they could also present with hyperpigmentation as ocular melanosarcoma, a malignant mutation of the eye membrane in which cancer cells carry hyperpigmented nuclei [5,6]. Ocular melanoma was another cancer involving melanocytes (e.g., melanocyte nevi) mostly observed in the iris and it was first identified in epithelial cells [7]. The Austrian ophthalmologist Ernst Fuchs (1851-1930) originally classified iris melanomas as benign tumors and distinguished them into two main categories: those that arise from the proliferation of iris layer cells in the anterior chamber and those that occur at the border of the iris and originate from epithelial retinal cells; with the latter, small brownish nodules develop near the pupil (Figure 2). Fuchs considered both to be benign tumors that reach a certain size, although he observed that tumors from the first group could develop into melanosarcoma [7,8]. Again, it was difficult to distinguish a benign tumor from a malignant one during the pathological examination due to similarities. Thus, the final identification often relied on patient medical history and clinical observation, such as the presence of circular or spindle cells with hyperpigmented–pigmented nuclei, which would indicate melanosarcoma [7,9]. Similar diagnostic challenges occurred in the determination of cases of retinal or choroidal melanoma, which required surgery of the eye [10-12]. The darkening of the tunics, or layers of the eye, especially the iris and the sclera, made the study of melanoma difficult. Although characterized as a separate diagnosis, melanosis was considered a pretext for slow-growing tumors that could develop into malignancies, particularly because cells with dark nuclei were observed in malignant cases involving melanosarcoma. Thus, a histological observation of characteristic dark nuclei could not diagnose ocular cancer, especially ocular melanoma, as dark nuclei were present in both benign and malignant tumors. It is worth mentioning that this confusion concerning the medical terms of ocular carcinoma is reflected in a case of uveal melanoma which was falsely identified as fungus hematodes, known as retinoblas-



OBSERVATIONS

ON

FUNGUS HÆMATODES

OR

SOFT CANCER,

IN SEVERAL OF

THE MOST IMPORTANT ORGANS

OF THE

HUMAN BODY:

CONTAINING ALSO A COMPARATIVE VIEW OF THE STRUCTURE OF FUNGUS HÆMATODES AND CANCER.

WITH CASES AND DISSECTIONS.

BY

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Figure 3. Frontispiece of Wardrop's manuscript in which a case of uveal melanoma was described.

toma (!). The Scottish surgeons James Wardrop (1782-1869) and Allan Burns (1781-1813) have treated for the first time ocular melanoma in the type of uveal melanoma [13]. Burns called for help Wardrop in order to perform enucleation at the eye of a 41 years old woman who then it was believed that she was suffering from fungus haematodes. The woman had blindness for four months and the intraocular tumor caused retinal detachment and perforation of all ocular tunics. The patient, despite the successful enucleation died after a year. Each of the surgeons described her conditions and medical signs, while Burns performed an autopsy, after exhuming her body, revealing that she had liver metastasis. According to their descriptions which were published independently, it is currently believed that they dealt with a case of uveal metastatic melanoma [14,15] (Figure 3).

Melanosis, melanosarcoma, and melanoma became standard medical definitions at the beginning of the 20th century. The ophthalmological research eventually led to the identification of other pathologies and causes of ocular cancer. Despite the difficulty of 19th century scientists' to define and clarify the characteristics of this special pathological phenomenon, they marked the pathway for modern medical research.

Conflict of interests

The authors declare no conflict of interests.

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