

Circulating tumor cells: historical highlights on preventing the hindrance of progress in this field

Abstract

In 1834, an eponymous giant styled as “King’s Professor of the Institutes of Medicine” at the University of Dublin, predicted that the writing of Case Reports of lung tumors would enable practitioners “to arrive at some degree of certainty even in this difficult and obscure branch of thoracic pathology.” Accordingly, this review provides - from that year to 1892- the chronology of the opinions concerning the circulating tumor cells with special reference to preventing the hindrance of progress in this field.

Keywords: tumor, cells, circulating, progress, preventing hindrance

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Introduction

Robert Graves,¹ who was an eponymous giant, became the King’s Professor of Medicine at the Dublin University. In 1834, he was moved strongly to portray in capitals the “Conversion of the Whole Right Lung into an Encephaloid or Brain-Like Structure.” Indeed, the boldness of the script equalled that of his timely testament as follows:

Rare diseases should not be looked upon as mere matters of curiosity, but should be attentively studied with the view of enabling us to recognize the true nature of similar cases when they again occur. Were the history of diseases, at present reputed to be extremely uncommon, published by all those who meet with them, facts, now apparently single and insulated, would serve as *nuclei* round which future experience and observation might cluster together similar facts in groups sufficiently numerous to illustrate and explain each other. The diagnosis of encephaloid tumors of the lungs was, a few years ago, completely impossible; but I trust that ere long we may be enabled to arrive at some degree of certainty even in this difficult and obscure branch of thoracic pathology. The wish to promote so desirable an object, has induced me to publish the details of the following case, chiefly valuable on account of the accuracy with which the symptoms were observed during life.

Historical texts

1834-Graves¹ saw that “the heart was pale, and rather atrophied; its great vessels seemed to run through the substance of the mass which surrounded the bases of the heart, so that only its lower part was visible.”

1842-Stoke² found in his Case 4 that “In the branch of the right pulmonary artery, going to the lobe, there was a small pedunculated medullary tubercle, and another on its external surface.” Incidentally, he cited another author thus: “It also was pressed upon the posterior part of the right auricle, so as to burst it inwards, and, in one part, a small tubercle, about the size of a pea, had penetrated; it had also made its way into the cavity of the left auricle, and two tubercles, suspended by narrow peduncles, hung down from the tumour into this cavity.”

1855-Wilks³ waxed eloquent thus: On opening the pericardium, the cancer was seen protruding itself into that sac. The cancer had not

affected any of the cervical or other glands, and all other parts of the body were free from the disease. On removing the heart, the cancer was seen to involve all the great vessels at its base, and, running along these, had pierced the auricles of the organ itself. The superior cava was at first not to be found, being, apparently, destroyed in the malignant growth. By tracing it up, however, from the heart, remains of the anterior wall were found. The posterior wall was quite destroyed. The cancer was closely in contact with the inner surface of the anterior wall of the vessel, and although apparently no space existed between them, still, from the soft nature of the morbid material, it is possible some small quantity of blood might have passed, though this is very improbable. The inferior cava was closely surrounded, but free. The right division of the pulmonary artery was only discovered by making a section of the cancerous mass, and then was found as a mere slit in the midst of it, incapable of transmitting any blood. A cancerous fungoid growth protruded from the posterior wall of the right auricle into its cavity. This was about the size of a large walnut. On the left side, the cancer seemed to have entered the heart by the pulmonary veins. The left branches were quite lost, and in their place a large fungoid tumor projected into the auricle. It was of the size of an egg, and more than half filled the cavity.

1857-Bell⁴ broached the microscopic plane: On a microscopical examination, these tumours were found to consist of a fibrous intercircular stroma, that is, bands of fibres arranged in a circular form, the interstices filled with *polyanucleated* irregular-shaped cells, and small granules, loose nuclei; -in every respect having the appearance of cancer tissue. The smaller and more superficial tubercles were of similar structure, except that the cells were more numerous, and mixed with fibrin and exudation corpuscles; a few fat globules also existed.

1863-Peacock⁵ could perceive similarities: There was a layer of recent lymph on the surface of the heart, with some nodules of carcinoma under the attached pericardium; and similar masses existed beneath the endocardium.

1865-Andrew⁶ drew attention thus: The left innominate vein is all but obliterated, the most contracted portion being occupied by a clot which is firmly adherent to the walls of the vessel, and which appears to have been itself invaded by the disease by direct continuity. The branches of the pulmonary artery supplying the affected lobe are completely obliterated. Heart - Recent acute pericarditis. Projecting

into the interior of the left auricle from the orifice of the left pulmonary vein, which it completely obstructs, is a small nodulated, button-shaped tumour.

1868-Powel⁷ was aware of interesting facts: An ovoid elevation, two inches and a half by two, projected from inner surface of left parietal portion of pericardium on a level with left auricle; but between it and the auricle, another rounded nodule projected, about the size of an unshelled walnut; this nodule formed a bulging within the auricle one inch and half by one and a quarter, between the apertures of the pulmonary veins.

1871-Arnott⁸ noted the prevailing theory: No doubt the doctrine of embolism as set forth by Dr Kirkes and amplified by many subsequent observers has gone far to remove from the diffusion of cancer the mystery which formerly enshrouded it, and the great majority of secondary growths may be explained by a transference of cells or fluid from the primary tumour by either the lymph- or blood-channels.

1878-Church⁹ chose his words carefully: Projecting into the left side of the pericardium was a red-looking fungous mass, which had displaced the heart; this mass was a portion of a large tumour which nearly filled the left side of the chest, compressing the lung against the chest walls, and rendering it airless. The tumour partly surrounded the aoesophagus, but its walls were not involved in the disease. The tumour had not affected the walls of the chest either by extension into the tissues, or by causing absorption of them. There was no defined line of demarcation between the tumour and the lung which it compressed; the cavity of the left pleura was obliterated everywhere by very firm adhesions; the tumour appeared to have sprung from the root of the lung. The right pleura and lung were healthy.

1884-Moore¹⁰ mentioned interesting appearances: At the base of the heart and for one third downwards on its anterior surface, and two thirds downwards behind, the visceral layer of the pericardium was infiltrated with a firm, whitish new growth, and this extended over a lesser area of the parietal surface.

1885-Finlay¹¹ was brief: A couple of nodules projected slightly under the superior vena cava, elevating the inner coat of the vessel.

1886-West¹² was perceptive: The pericardium was dotted with small hæmorrhage and the tumour was visible through it and had spread along the pulmonary veins so as to involve the left auricle.

1888-Handford¹³ dwelt with his Case 3 pointedly: One of the large pulmonary veins was found completely embedded in new growth.

1888-Coats¹⁴ celebrated with a Figure on the role of the lymphatics: There can be no doubt, on the other hand, that the tumour is advancing by the lymphatics. It is not uncommon to meet with appearances, such as those represented in Figure 1, in which the lymphatics around a branch of the pulmonary artery are filled with epithelium having the characters of that of the tumour proper.

1891-Rolleston¹⁵ remarked thus: The growth had projected into the pericardium to the right of the superior vena cava.

Harris¹⁶ viewed the picture briefly: The pericardium was studded with new growths in small masses, and was covered with a deposit of blood-stained lymph.

Discussion

During the third decade of the 19th century, an eponymous giant pointedly drew attention to the need to improve thoracic pathology through the publication of case reports. Throughout the rest of that

century, as many as 16 such reports were published. Accordingly, it is well to conclude that, in focusing on their scripts here, it was found that enough materials exhibited highlights on circulating tumor cells as they were perceived by the medical masters of yester years. Clearly, they prevented the hindrance of progress in this field.^{17,18}

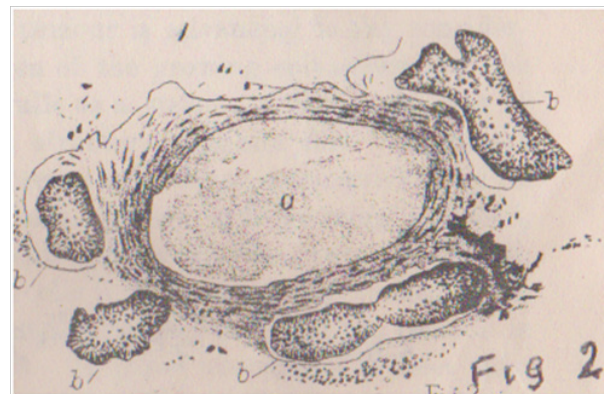


Figure 1 Advance of cancer in perivascular lymphatics surrounding a blood vessel.

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Conflicts of interest

Author declares there are no conflicts of interest.

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