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Anne J. Krush
Johns Hopkins University

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HISTORY OF SCIENCE

THE CLASSIFICATION OF TUMORS BY JOHN ABERNETHY

EARLY IN THE NINETEENTH CENTURY

Anne J. Krush

The Johns Hopkins University School of Medicine
600 North Wolfe Street
Baltimore, Maryland 21205

John Abernethy was born in London on April 3, 1764, the second son of five children of John and Elizabeth (Weir) Abernethy, both from Northern Ireland and of Scottish descent. The father of our John Abernethy was a merchant in the firm of Abernethy and Donaldson in London. His father and grandfather before him, both named John Abernethy, had been "Protestant dissenting ministers in Northern Ireland." John's father decided on medicine and surgery as a career for him, although some biographers felt that with his extraordinarily retentive memory he would have succeeded equally well, or better, in a law career.

Completing his education at the top of his class at Wolverhampton Grammar School in 1778, Abernethy became apprenticed to a family neighbor, Sir Charles Blicke, who had a lucrative medical practice. He attended medical lectures and was influenced by men such as Sir William Blizard, Mr. Percival Pott, Dr. Andrew Marshall, and Dr. John Hunter before and after he was elected assistant surgeon (and later surgeon) at Saint Bartholomew's Hospital in 1787, where he spent the remaining years of his medical career.

Abernethy is best known for his lectures and writings on surgery and for the first attempt at classification of tumors, some of which he considered hereditary. His classification divided tumors into several types of sarcomas, such as: common vascular, adipose, pancreatic, cystic, mammary, tuberculated, medullary, and carcinomatous, each illustrated by one or more of his "cases."

Abernethy suffered from gout and rheumatism for some years and retired at about age sixty. He died, surrounded by wife and children, in Enfield on April 20, 1831, at the age of 67.

† † †

John Abernethy was born in London on April 3, 1764. The Abernethy family was probably of Scottish origin, although for several generations before John's birth they had resided in Northern Ireland.

John's paternal great-grandfather, also John Abernethy, in 1688 was "an eminent Protestant dissenting minister" (Macilwain, 1853) whose son, John, was also a minister. The second John, in 1733, became minister of the "Wood Street" Church in Dublin. His son chose to be a merchant, left Dublin,

and went to London, founding with a Mr. Donaldson the firm of Abernethy and Donaldson. He married Elizabeth Weir, daughter of Henry and Margaret Weir of Antrim. They had two sons and three daughters, our John being the second-born.

James, the older brother, became a merchant like his father. He died of "apoplexy" in Plymouth in 1823.

John Abernethy was educated at home for a short while and then attended grammar school at Wolverhampton, where his superior intelligence was recognized at an early age. John's father decided on medicine and surgery as a career for him, although some biographers felt that with his extraordinarily retentive memory he would have succeeded equally well, or better, in a law career.

Completing his education at the top of his Wolverhampton class in 1778, Abernethy became apprenticed to a family neighbor, Sir Charles Blicke, who had a lucrative general medical practice. He attended medical lectures and came under the influence of physicians such as Sir William Blizard, Mr. Percival Pott, Dr. Andrew Marshall, and Dr. John Hunter both before and after he was elected assistant surgeon at Saint Bartholomew's Hospital in 1787. He spent the remaining years of his medical career as a surgeon at Saint Bartholomew's.

Abernethy suffered from gout and rheumatism for some years, and retired from surgical practice at about age 60. He died, surrounded by his wife and children, at his home in Enfield on April 20, 1831, at the age of 67.

John Abernethy is best known for his lectures and writings on surgery, and for being the first person to attempt a classification of tumors. In considering his contributions to

medicine and surgery, we must remember that Abernethy and all of his contemporaries were “groping in the dark” (Macilwain, 1853:86), with difficulties in publication and a lack of apparatus and adequate facilities. Consequently, his work must be viewed from the perspective of his day. “He had a remarkable knowledge of the medical literature of the ancient writers and of his contemporaries. He frequently quoted their opinions and gave credit for innovations where he considered it was due” (Macilwain, 1853:86).

John Abernethy was founder of a school of British surgery based on physiology rather than anatomy, and he is considered first of the great 19th century English surgeons to treat his patients by “expectant means rather than by operation” (Macilwain, 1853:90).

Abernethy (1804:1) explained his reason for classifying tumors as follows: “The observations which I have had the opportunity of making in St. Bartholomew’s Hospital on the various tumours which occur in the human body have been so numerous, that I have felt myself under the necessity of forming some classification of these diseases.” Observations, then, both on the operating table and at autopsy provided the means for Abernethy to devise his classification. He wrote, “The minds of medical men have of late been laudably excited to investigate the nature of cancer, in hopes of discovering something serviceable in that dreadful disease . . . it will appear . . . that there are many local tumours and ulcers as intractable in their nature and destructive in their progress as cancer, which are liable to be confounded with that disease, but which ought to be distinguished from it, before any progress can be made in this difficult part of medical science” (Abernethy, 1804:3).

Abernethy first researched the works of ancient medical writers and found that a great variety of dissimilar diseases had been classified under the general title of “tumors.” These included “diseases of arteries, veins, glands, tendons, joints and bones . . . enlargements of natural parts, and entirely new productions in the body” (Abernethy, 1804:4, 5).

Abernethy (1804:6) defined tumors as “such swellings as arise from some new production, which made no part of the original composition of the body; and by this means I shall exclude all simple enlargements of bones, joints, glands, etc.” He described two kinds of tumors, those which resembled the part of the body near which they grew, and those which were different from the surrounding parts. Examples of the first were a fatty tumor in adipose tissue and of the second a “pendulous portion of fat growing from the peritoneum” (Abernethy, 1804:8) on a stalk of fibrous tissue. He noted further that if the tumor which “derives its nutriment from the surrounding tissue but grows by its own inherent powers” is removed, the surrounding parts soon heal and “a complete cure ensues. But if a tumour be removed whose existence

depended on the disease of the surrounding parts which are still left, and is not altered by the operation, . . . these parts again produce a diseased substance, which has generally the appearance of fungus, and being irritated by the injury of the operation, the disease is in general increased by the means which were designed for its cure” (Abernethy, 1804:12). In our present-day scientific knowledge, it seems that Abernethy was incorrect in one respect and correct in another. He seemed to have thought that spread of a tumor was much like a layman’s misconception in our day—that surgery “makes the cancer spread” when surgery actually reveals metastasis to lymph nodes with later appearance of the cancer in other organs. He was correct in his thinking, when one considers the occurrence of desmoids and fibromas in Gardner syndrome. In patients with this condition, each surgery only produces more connective tissue, which, though considered benign, can grow and fatally strangle vital organs.

ABERNETHY’S CLASSIFICATION

1. Common Vascular or Organized Sarcoma

These were tumors “which appear to be composed of the gelatinous part of the blood, rendered more or less vascular by the growth of vessels through it. . . . This kind of tumour seems to be the most simple in its nature; many, perhaps all of the varieties of tumours were at first of this nature. These tumours generally grow till the skin is so distended that it ulcerates and exposes the new-formed substance . . . which sloughs and falls out” (Abernethy, 1804:19).

2. Adipose Sarcoma

This tumor occurs most often on “the front or back part of the trunk of the body, and sometimes in the extremities; it is formed in the midst of cellular and adipose tissue and has very small blood vessels growing through it; it is encapsulated also, and thus separated from contiguous body tissue” (Abernethy, 1804:26). Abernethy explained that it was easy to remove such tumors and that very little bleeding ensued after removal. He then described the case of a man with such a tumor on his thigh that had been allowed to grow until it weighed 15 pounds.

3. Pancreatic Sarcoma

Abernethy described this tumor as “resembling the pancreas, and made up of irregularly-shaped masses . . . connected to each other by a fibrous substance” (Abernethy, 1804:33). This kind of tumor was said to occur frequently in the female breast (now known as cystic fibrosis). In his discussion, however, Abernethy considered both benign cystic mastitis and cancer of the breast with metastasis to axillary lymph nodes in the same category as pancreatic sarcoma.

4. Cystic Sarcoma

This kind of tumor, according to Abernethy, occurs as a distinct tumor, more frequently found in the testis and ovary. The part may be enlarged to six times its natural size, and consists of "congeries of cells containing a serous fluid" (Abernethy, 1804:42). These cysts could attain the size of currants or grapes, but were oval in shape. "The sides of the cysts are so vascular as to be made red by injection" (Abernethy, 1804:43). They may occasionally result from an injury to the part.

5. Mastoid or Mammary Sarcoma

This tumor resembles strikingly the mammary gland in color and texture. It is white and firm. Abernethy observed that this kind of diseased structure "may degenerate into an intractable ulcer which will communicate its disease to the surrounding parts" (Abernethy, 1804:47) and become lethal. He placed this sarcoma "between those which seem to possess no malignity and those which are of a very destructive nature" (Abernethy, 1804:47). These follow:

6. Tuberculated Sarcoma

These sarcomas consist of "an aggregation of small firm, roundish tumours, of different sizes and colors, connected by a kind of cellular substance" (Abernethy, 1804:47). The tubercles vary in size from a pea to a horsebean, or sometimes larger. They are of a brownish-red or yellow color. Abernethy noted such tumors most often in the lymph glands of the neck and described them as "painful and intractable sores which destroyed the patient" (Abernethy, 1804:48). I am sure that they would be described today as metastatic lymph nodes from a cancer in some other part of the body or as Hodgkin's Disease.

7. Medullary Sarcoma

Abernethy stated that this sarcoma is found in the testis and is to be distinguished from the "soft cancer of that organ by its nature and progress" (Abernethy, 1804:51). It is of whitish color and the consistency of brain. It may also have a brownish-red appearance. These tumors increase in size, and the skin overlying them becomes thin, inflamed, and ulcerates. The exposed tumor then becomes inflamed and sloughs. He gave an example of a 40-year-old man who died of such a tumor and at autopsy it was found that the "testis was of whitish color and moderately firm in consistence. The tumour formed by the inguinal glands was as large as a man's head and the structure was similar to that of the testis, but more pulpy. The pelvis was filled with similarly diseased glands so that the vertebrae were hidden. The glands were filled with a 'fluid-

like cream'" (Abernethy, 1804:55). He stated further, "The glands of the pelvis being equally affected with those higher up, renders it probable that it induces the disease, as well as imparting irritation to them by furnishing a matter capable of stimulating them when they have imbibed it" (Abernethy, 1804:60). Abernethy described another case on the thigh of a 12-year-old boy who had a tumor thought to be arising from bone, but which at autopsy was found to have no connection with bone; it had metastasized to the lymph nodes in the abdomen, forming large tumors there. Could this have been a lymphoma or Hodgkin's Disease? Abernethy (1804:61) noted that the disease was propagated along "the absorbing vessels."

8. Carcinomatous Sarcoma

"This kind of tumour is emphatically termed scirrhus, while it remains entire and free from ulceration" (Abernethy, 1804:67). In a later stage it becomes ulcerated. Because it is not always hard and indurated Abernethy preferred to call it *carcinomatous sarcoma*.

Abernethy chose cancer of the breast to describe the various changes which occur in this disease. He wrote, "It begins in a small spot and extends from thence in all directions, like rays from a center" (Abernethy, 1804:68). He felt that there can be no cure for this disease, even surgery, though other contemporary surgeons disagreed with him. He stated that "this obdurate and destructive disease excites the contiguous parts whatever their nature may be to the same diseased action" (Abernethy, 1804:69). He stated further that pain may or may not be associated with this disease and therefore "cannot be considered an infallible criterion of the nature of the disease" (Abernethy, 1804:71). The tumor generally ulcerates and sloughs, leaving a large chasm. Abernethy thought that new flesh was then formed "constituting a fungus of peculiar hardness as it partakes of the diseased actions by which it was produced" (Abernethy, 1804:72). He thought that this process never ceases, "nor does the part ever become healthy" (Abernethy, 1804:72). He described the progression of the disease into the surrounding lymph nodes, and in cases of breast carcinoma he noted that the disease spread to the vessels surrounding the lungs which caused difficulty in respiration and eventually death. He also attributed "this disturbed state of respiration to an affection of the liver which almost constantly occurs in the last stages of carcinoma" (Abernethy, 1804:75).

Abernethy questioned whether a benign tumor could progress to cancer. What a difference the microscope made (even though it had been invented by Abernethy's time)! He did not study the cells to see how they might be infiltrated and destroyed. Therefore, he concluded that benign tumors remained so and malignant tumors began as such.

HEREDITARY FACTORS

Abernethy considered hereditary factors only in the case of wens or “encysted tumours” stating that “it is not very uncommon to see many, even 20 or 30 wens, alike in their structure and contents, in various parts of the same subject. Nay, the disposition seems sometimes to be hereditary, and transmitted from parents to their children” (Abernethy, 1804:97). As we now know, this occurs in Gardner syndrome, with each child of an affected parent having a 50% chance of developing epidermoid cysts. Multiple sebaceous cysts, known as *steatocystoma multiplex*, is also a dominantly-inherited condition in which “hundreds of round or oval cystic tumors are widely distributed on the back, trunk, arms, scrotum, and thighs” (Noojin and Reynolds, 1948:1013-1018).

With only observations by the naked eye available to him, Abernethy meticulously recorded his observations; and one of his conclusions was as follows: “If the history of these dissimilar diseases which appear in the form of tumours was accurately recorded, and their structure noted, we might perhaps from the former be led to judge of the latter; and thus attain a knowledge of the intrinsic nature of the disease which would enable us to act rightly in practice” (Abernethy, 1804:84). With his accurate observations, Abernethy provided much information concerning tumors upon which later scientists could build. However, almost 150 years later, with highly sophisticated equipment, we are still trying to solve the enigma of cancer!

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