This paper describes a case of primary melanoma of the lung. The histologic features required to make a diagnosis of primary melanoma of the lung or bronchus are demonstrated in this case. It is suggested that since melanoma may occur fairly commonly in juxtacutaneous mucous membranes, it is not unreasonable to see a few cases in an adjacent site such as the bronchus of the lung.

Although the occurrence of primary melanoma of the oral mucosa, nasal fossa, and paranasal sinuses is not considered exceptionally rare, a primary melanoma of the lung arising from bronchial epithelium is most unusual. One is reluctant to accept many of the reported cases as primary in the lung for many reasons. In order for the lung or bronchus to be accepted as the primary site of a melanoma, it seems reasonable to require the following criteria as previously suggested:

1. Junctional change with a "dropping off" or "nesting" of malignant cells containing melanin (melanoma cells) just beneath the bronchial epithelium;

2. Invasion of the bronchial epithelium by the melanoma cells in an area where the bronchial epithelium is not ulcerated;

3. An obvious melanoma beneath the above described changes in the epithelium.

Significant additional features would be the presence of a nevus-like lesion in the bronchial epithelium adjacent to the tumor and the so-called "melanoma flare" in the bronchial epithelium in an area away from the tumor mass.

A case for primary melanoma of the lung would be weakened by a past history of primary melanoma elsewhere in the body, or by the presence of melanoma in a cutaneous or juxtacutaneous site in conjunction with a so-called primary melanoma of the lung.

It thus appears of value to report a case of melanoma of the lung with (1) no past history of excision or fulguration of a lesion of the skin or mucous membrane, (2) no demonstrable tumor elsewhere, (3) histologic evidence of junctional change, "nesting" of melanoma cells beneath the bronchial epithelium and invasion of the intact bronchial epithelium by the melanoma cells with an obvious melanoma below these changes. In addition, there is a nevus-like lesion adjacent to the above described changes in the bronchial epithelium and a "melanoma flare" in the bronchial epithelium in areas where there is no melanoma below.

Case Report

A 40-year-old Caucasian woman was admitted to the University of Virginia Hospital with the chief complaint of easy fatigability of 5-month duration. Three months prior to admission she had a two-week period of cough productive of green sputum. Three weeks prior to admission a roentgenogram of the chest showed a shadow in the superior segment of the lower lobe of the right lung. There had been no hemoptysis or weight loss.

Physical examination and routine laboratory work were essentially normal. There was no lymphadenopathy. No skin or subcutaneous lesions were seen. The retina, ear, nose and throat, anal mucosa, and scalp were all normal. Repeated roentgenogram of the chest at the time of admission showed no change in the mass in the right lung. There had been no previous excision or fulguration of a skin or mucosal lesion.

Thoracotomy disclosed a firm, white mass in the superior segment of the lower lobe of the right lung. Frozen section of the mass was reported as carcinoma but the hilar lymph
nodes showed no carcinoma. A right lower lobectomy was done.

Gross pathology (U. Va. surg. path. no. 317976): A gray-white circumscribed mass, $5 \times 4 \times 4$ cm, approximately 2 cm beneath the pleural surface and approximately 5 cm from the bronchial resection margin, was present in the upper portion of the lobectomy specimen. The base of the tumor arose from a small bronchus with extension of the tumor downward into pulmonary parenchyma. The dome of the tumor projected into a “cavity-like” space that was shown microscopically to be the dilated bronchus. A very thin line of brownish discoloration could be seen at the base of the tumor. There was chronic inflammation of the lung parenchyma distal to the tumor.

Microscopic pathology: At the base of the tumor, beginning laterally, there was first normal bronchial epithelium, then junctional change into a nevus-like lesion (Fig. 1, 2), and finally junctional change into a melanoma (Fig. 3, 4). In some areas there was nesting of melanoma cells immediately beneath the mucous membrane. Overlying the large mass of tumor, the melanoma cells had invaded the bronchial epithelium without ulceration of the epithelium. Scattered in the overlying epithelium adjacent to the tumor, but away from the tumor base, were large vacuolated cells containing melanin, the melanoma flare (Fig. 5).

For the most part, the malignant tumor cells were large and irregular, with large amounts of acidophilic cytoplasm, prominent nuclei and one or more large irregular acidophilic nucleoli. There was binucleation of some of the tumor cells. Mitotic figures were numerous. In some areas the tumor cells elongated into racquet-shaped or strap-like cells. Large giant cells with foamy cytoplasm were seen. Inflammatory cells formed a prominent background throughout the tumor. There was scattered phagocytosis of the inflammatory cells by tumor cells. In most areas of the tumor, the malignant cells were loosely arranged in irregular groups or nests. The large mass of the tumor contained no pigment. Only the area immediately adjacent to the bronchial epithelium contained melanin (Fig. 6 A–D).

The tumor grew into the bronchial lumen as a polypoid mass and downward from its base into the lung parenchyma. Diastase resistant, PAS-positive material in the cytoplasm of some of the tumor cells represented degenerated polymorphonuclear leukocytes. There was no squamous metaplasia of bronchial epithelium.

Ten peribronchial lymph nodes contained no tumor in microscopic sections.

Differential Diagnosis

Melanoma is the great imitator. The surgical pathologist must “think” melanoma in order to diagnose melanoma. The great variations in the histologic pattern of melanoma, both within the same tumor and of different tumors, are well known. One sees a range from spindle cells to medium-sized polyhedral cells to large cells with a large amount of acidophilic cytoplasm. Melanoma may resemble poorly differentiated epidermoid carcinoma, fibrosarcoma, undifferentiated lipo-

![Fig. 1. Photomicrograph of a section of bronchial epithelium adjacent to the tumor mass. Normal bronchial epithelium to the left; nevus-like lesion to the right (x36).](image)
in the lung, were considered in the differential diagnosis of this tumor before the junctional change and malignant cells containing melanin were discovered.

The reported cases of giant cell carcinoma of the lung resemble, in many respects, this tumor. Giant cells, leukophagocytosis by the tumor cells, giant nucleoli and cyto cohesive nests as reported in giant cell carcinomas of the lung were all seen in some areas of this tumor. Had we had only the biopsy of this tumor or had we sectioned only the main bulk of the tumor, we might have been content to call this case a giant cell carcinoma of the lung since in the superficial sampling of tissue the melanin pigment, nevus-like lesion and junctional change would have all been overlooked.

**Discussion**

The controversy as to the histogenesis of melanoma in extracutaneous sites has been
Fig. 4. Higher magnification of a different area of junctional change in bronchial epithelium (x300).

Fig. 5. Pigmented vacuolated cells (no doubt melanoma cells) in the bronchial epithelium adjacent to but not overlying the tumor mass: the melanoma flare (x495).
Fig. 6. Histology of the tumor. A, large irregular melanoma cells in a prominent background of inflammatory cells (×180). B, double nucleated cell showing leukophagocytosis (see arrow), a common finding in this tumor (×180). C, cytocohesive nest of melanoma cells. Some of the malignant cells elongate into racquet-shaped cells. Note mitotic figure (×300). D, heavily pigmented (melanin) area of the tumor (×300).
discussed elsewhere.\textsuperscript{8, 11, 14} If primary melanoma occurs fairly commonly in the juxta-cutaneous mucous membranes—the conjunctiva, oral mucosa, nasal fossa, paranasal sinuses, urethra, anus and vagina—it might occur, although much less commonly, as a primary lesion in the mucous membranes somewhat distant to the juxta-cutaneous sites, in this case in the bronchus. If melanomas of the oral mucous membrane and of the esophagus can be primary, primary melanoma of the bronchus, a structure that arises embryologically from the foregut, can be accepted as reasonably, as suggested by Salm.\textsuperscript{13}

The junctional change in this case is undeniable. The grouping of cells in the sub-mucosa, the malignant cells with melanin in the mucosa, the nevus-like lesion of the bronchial mucosa at one margin of the tumor, and the "melanoma flare" all speak for a primary melanoma.

Primary melanoma of the lung is probably more common than is generally recognized. When a series of tumors with a somewhat uncertain diagnosis such as “poorly differentiated malignant tumor” or “spindle cell sarcoma” (penis, vagina, nasal fossa, paranasal sinuses, larynx) is reviewed, a certain number of the cases often are recognized on more thorough examination to be melanoma. This may be true of some of the giant cell carcinomas and sarcomas of the lung. Certainly, a critical evaluation of the unusual tumors with full consideration of the diagnosis of primary melanoma is commendable. To caution that metastatic melanoma can occur from an occult primary melanoma that is never identified seems obvious.\textsuperscript{16}

The unpredictability of the biologic nature of individual cases of melanoma is well known. Prognosis in this case, after surgical excision and without metastases to lymph nodes, although obviously guarded, is nevertheless hopeful for long survival or cure.

REFERENCES


