assay using the riboprobes for 5-HT\textsubscript{1A/1D/1E} and 5-HT\textsubscript{2A/2B} receptors to clarify which subtypes of 5-HT receptors are expressed in the coronary arteries. 5-HT\textsubscript{1D/1E} and 5-HT\textsubscript{2A} receptor mRNAs were found, but 5-HT\textsubscript{1A}, 5-HT\textsubscript{1D/1E}, and 5-HT\textsubscript{2B} receptor mRNAs were not detected in the coronary arteries of this patient (Fig 2). The presence of 5-HT\textsubscript{1F/2C} receptors was excluded by reverse transcription-polymerase chain reactions (data not shown).

**DISCUSSION**

To our knowledge, this is the first report of a patient with variant angina showing the supersensitivity of isolated coronary arteries to sumatriptan, and the expression of 5-HT\textsubscript{1D/1E} and 5-HT\textsubscript{2A} receptor mRNAs in coronary arteries. These findings suggest that 5-HT\textsubscript{1D/1E} receptor is expressed functionally and may mediate the supersensitivity to 5-HT in spastic coronary arteries, since sumatriptan is devoid of agonist properties at the 5-HT\textsubscript{2A} receptor.

**Figure 2.** Top: A: RNase protection assay for 5-HT\textsubscript{1} receptors. Cohybridization of total RNA (30 μg) extracted from the coronary arteries with the \textsuperscript{32}P-labeled riboprobes for 5-HT\textsubscript{1A/1D/1E/1F} receptors yielded the protected fragment of 214 bases consistent with the 5-HT\textsubscript{1D} receptor (lane 5). Human total brain RNA was used as positive control for 5-HT\textsubscript{1A/1D/1E/1F} riboprobes (lane 6). Bottom: B: RNase protection assay for 5-HT\textsubscript{2} receptors. Cohybridization of the total RNA with riboprobes for 5-HT\textsubscript{2A/2B} receptors yielded the protected fragment of 239 bases consistent with 5-HT\textsubscript{2A} receptor (lane 3). Human total brain and small intestine RNA were used as positive controls for 5-HT\textsubscript{2A} and 5-HT\textsubscript{2B} riboprobes (lanes 4 and 5), respectively.

Diffuse intimal thickening and fibromuscular accumulation were observed in the RCA, and the supersensitivity to 5-HT associated with these atherosclerotic changes appears to be a fundamental mechanism in coronary spasm. 5-HT has been reported to contract human coronary arteries through 5-HT\textsubscript{1A/1D/1E/1F} and 5-HT\textsubscript{2} receptors, and this agent is used to provoke coronary spasm. Ketanserin, a 5-HT\textsubscript{2} receptor antagonist, failed to block 5-HT-induced coronary artery contraction and coronary spasm in patients with variant angina. In addition, effects mediated by 5-HT\textsubscript{1A/1D/1E/1F} receptors, but not those by 5-HT\textsubscript{2} receptors, are preserved in patients with ischemic heart disease. Therefore, it is suggested that 5-HT receptor subtypes are altered in coronary arteries with atherosclerosis or coronary spasm, and that 5-HT\textsubscript{1A/1D/1E/1F} receptors rather than 5-HT\textsubscript{2} receptors may be involved in the enhanced vascular reactivity to 5-HT. Our findings contribute to the characterization of 5-HT\textsubscript{1} receptors in spastic coronary arteries. We speculate that the leftward shift of the dose-response curve for 5-HT, which may be a crucial mechanism in the pathogenesis of coronary spasm, is mediated by activation of 5-HT\textsubscript{1D/1E} receptor.

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**An Unusual Presentation of Metastatic Colon Cancer to the Lung**

Elias A. Zias, MD; Randall P. Owen, MD; Alain Borezuk, MD; Joseph Reichek, MD, FCCP; and Robert W. M. Frater, MD

A 75-year-old man with a history of resected colon carcinoma presented to his primary care physician because of a new onset of coughing. The patient had expectorated a small piece of solid tissue; pathologic examination of the tissue found it to be consistent with metastatic colon adenocarcinoma. After further
work-up, a right upper lobectomy was performed. The surgical specimen removed during the lobectomy showed a tumor that was histologically identical to the patient’s prior colonic primary tumor.

(CHEST 1998; 113:244-46)

Key words: case report; colon carcinoma; lobectomy; lung metastasis; metastatic; productive cough

A patient with a medical history of resected colon carcinoma expectorated a piece of solid tissue. Pathologic examination of the specimen revealed that it was metastatic colon adenocarcinoma. A right upper lobectomy was performed. A histologic study of the surgical specimen demonstrated a tumor identical to the patient’s prior primary tumor of the colon.

CASE REPORT

A 75-year-old white man visited his private physician because of a new onset of cough that was productive of solid tissue. Two years prior, the patient was seen for an episode of rectal bleeding. Colonoscopy was performed, and he was found to have adenocarcinoma of the colon. The tumor was 26 cm in size. An uncomplicated bowel resection was then performed; neither gross liver nor nodal metastases were found. Pathologic study of the tumor specimen showed an infiltrating well-differentiated adenocarcinoma of the colon arising in an adenomatous polyp. Although the tumor was confined to the mucosa and submucosa, lymphovascular invasion was noted. The lymph nodes were all negative for carcinoma.

Six months later, follow-up colonoscopy showed no evidence of recurrence. A routine chest x-ray film performed 21 months after colon resection revealed a 1.0-cm nodule in the upper lobe of the right lung. Subsequently, a CT scan of the chest was interpreted as a linear density of the upper lobe of the right lung, this was believed to be most likely a scar. One week later, the patient visited his doctor to show him a piece of solid tissue that he had expectorated.

Upon pathologic microscopic examination of the expectorated tissue, poorly preserved but recognizable glandular elements along fibrovascular stalks were seen (Fig 1, A: expectorated tissue). A bronchoscopic biopsy of an erythematous area in the bronchus of the upper lobe of the right lung contained well-preserved, well-differentiated adenocarcinoma with the same tall columnar cells that were seen in the colonic tumor (Fig 1, B: bronchoscopic biopsy). The histologic similarity suggested a metastasis from the original colonic primary tumor.

The patient was admitted to the hospital. Physical examination and preoperative laboratory testing were within normal limits. A CT scan of the abdomen and pelvis as well as colonoscopy showed no evidence of colonic cancer recurrence.

The patient underwent a right upper lobectomy. A specimen removed at that time revealed a 0.8-cm mass, 0.6 cm from the upper lobe bronchus margin. Slides of the surgical specimen were compared with those of the patient’s colonic adenocarci-

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noma and were shown to be histologically identical (Fig 1, C: lobectomy specimen; Fig 2: colon specimen). All margins and lymph nodes were negative for the presence of tumor. The patient did well postoperatively and went home after a short hospital stay.

FIGURE 1. A: poorly preserved glands lined by columnar cells amidst a fibrous stroma from the expectorated tumor mass. B: bronchoscopic biopsy fragments revealing well-differentiated adenocarcinoma. C: section of bronchus from the lobectomy specimen showing infiltrating well-differentiated adenocarcinoma histologically identical to the colonic primary tumor (hematoxylin-eosin, original ×160 [A and B], ×63 [C]).
COMMENT

Colon metastases to the lung are characteristically peripheral but rarely, as in this case, endobronchial. The most frequent causes of metastatic endobronchial mass lesions in the 1990s were Kaposi's sarcoma and lymphoma, as reported by Argyros and Torrington.1 In patients who present with resectable lung metastases from colonic primary tumors, the mean interval between colon resection and lung resection is 34 to 44 months.2,3

Most patients with pulmonary metastases at the time of diagnosis are asymptomatic, and only a small fraction have a cough.4,5 Usually the diagnosis is suspected based on chest x-ray film findings. A solitary lesion on a chest x-ray film is most likely metastatic if the patient has a known sarcoma or melanoma.6 If the known cancer is in the GI tract, there is a 50% chance that a solitary lesion on a chest x-ray film is malignant.7

The unusual presentation of expectorated tissue found to be colonic metastasis was first reported in 1956 by the pulmonologist Rubin.8 The patient he described developed a cough and expectorated tissue that was histologically identical to a previously resected sigmoid colon cancer. That patient unfortunately died 6 months after the diagnosis.

CONCLUSION

The first clue to metastatic colon carcinoma to the lung may be sputum examination. Essential follow-up for patients with resected colon cancer must include a medical history and a physical examination, a chest x-ray film, and sputum examination when pulmonary signs or symptoms or x-ray film findings are present. As demonstrated by this case, sputum examination may be diagnostic.

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Dyspnea Resulting From Fibromyalgia*

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Two patients with chronic, severe, episodic dyspnea underwent prolonged, extensive, and invasive evaluations without a diagnosis being made. Both were subsequently diagnosed with fibromyalgia, and therapy directed at this condition resulted in resolution of their symptoms. Fibromyalgia is rarely included in the differential diagnosis of dyspnea, and timely diagnosis and treatment may be delayed. However, this condition must be considered because it can only be established by seeking the appropriate history and physical findings.

(CHEST 1998; 113:246-49)

Key words: dyspnea; fibromyalgia; pleuritic chest pain

Fibromyalgia is a syndrome of unknown origin characterized by chronic muscle pain, fatigue, and sleep disturbance. Two patients are reported with chronic, episodic dyspnea who were referred to our clinic after extensive and invasive evaluations had yielded no diagnosis. Both patients had clinical manifestations of fibromyalgia, and their symptoms of dyspnea resolved with treatment directed at this condition. Fibromyalgia generally is not included in textbook or primary reference lists of the differential diagnoses of dyspnea.1 Similarly, dyspnea is not commonly recognized as a clinical manifestation of fibromyalgia.2,3 An increased awareness of this association is needed.

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