If the correct procedure for inserting a chest tube, especially regarding finger exploration of the pleural space, had been performed properly, the physician would have felt the patient’s beating heart immediately abutting the chest wall, and thus been warned not to place the chest tube in that location. Finger exploration of the pleural space is a very important step in the placement of a chest tube. This step helps confirm that the pleural space has indeed been entered, it allows for lysis of any adhesions in the pleural space at the tube site, and it helps locate any vital organs, usually the lung, to assure that they are not injured when inserting the tube. When placing a chest tube into the pleural space, it is important never to deviate from the standard procedure. Ipsilateral narrowing of the intercostal spaces is commonly seen after pneumonectomy; these anatomic changes may prevent full finger insertion into the pleural space. Image-guided placement of the chest tube needs to be performed in these instances.

Injury to vital organs in the thorax at the time of chest tube placement has been described previously. We are aware of two other potentially avoidable cases in the literature describing injury to vital thoracic structures after blind placement of a chest tube into patients with anatomic alterations in the thoracic cage. Meisel et al. reported the perforation of the right atrium during chest tube placement in a patient with severe kyphoscoliosis, while Van Kralingen et al. described the placement of a chest tube into the pulmonary artery of a patient who had undergone a prior pneumonectomy.

The case we report herein, and the work of Biondetti et al., sparked our interest in further delineating the locations of vital organs in the thorax after pneumonectomy. Consequently, we retrospectively reviewed the CT scans of 20 patients at our institution after pneumonectomy (see page 000 in this issue). We found that nine patients had changes in location of vital organs such that blind placement of a needle or chest tube into the postpneumonectomy space at the fifth or sixth intercostal space in the midaxillary line would risk injuring them. In seven of these cases, either the liver or spleen was elevated above the fifth intercostal space and abutting the lateral chest wall. In the remaining two cases, the heart had rotated and shifted, and was abutting the lateral chest wall. These changes could not have been predicted by routine chest radiographs because of opacification of the postpneumonectomy space.

It is often difficult to detect the precise location of vital organs in the thorax after pneumonectomy by chest radiograph. Because the chest radiograph is often unreliable, and the amount of shifting of thoracic structures after pneumonectomy is unpredictable, we recommend that any attempts to drain the postpneumonectomy space should be done by an experienced physician under direct visual guidance with ultrasonography or CT. These studies will provide the physician with a clear picture of the anatomy of the postpneumonectomy space and aid in the proper placement of a needle or chest tube without harming vital structures.

References


Unilateral Segmental Hyperhidrosis Associated With Pulmonary Adenocarcinoma*

Hans Slabbynck, MD; Lieven Bedert, MD; Peter Paul De Deyn, MD, PhD; Daniella Galdermans, MD; and Dirk Coolen, MD, FCCP

This is the report of a 38-year-old man with unilateral dermatomal hyperhidrosis documented by a starch-iodine technique; a subsequent diagnosis was made of a generalized pulmonary adenocarcinoma. The association of unilateral hyperhidrosis and a malignant tumor is reviewed.

(CHEST 1998; 114:1215–1217)

Key words: hyperhidrosis; malignancy; paraneoplastic disorders

Several dermatologic syndromes including palmar hyperkeratosis, reactive erythema, and acanthosis nigricans have been reported in association with pulmonary neoplasms. The majority of cases of localized or unilateral hyperhidrosis have been reported in association with organic nervous system disease including vascular cerebral disease, spinal cord disease, and peripheral neuropathy. In addition, there have been reports of multisegmental hyperhidrosis associated with involvement of the sympathetic trunk or postganglionic sympathetic fibers by thoracic malignant tumors, especially mesothelioma. This is

*From the Departments of Pneumology (Drs. Slabbynck, Bedert, Galdermans, and Coolen) and Neurology (Dr. De Deyn), AZ Middelheim, Antwerp, Belgium; and the Department of Neurology (Dr. De Deyn), University of Antwerp, Antwerp, Belgium.
a report a case of dermatomal hyperhidrosis in a patient with a contralateral primary pulmonary adenocarcinoma.

CASE REPORT

A 38-year-old man was admitted to the hospital for evaluation of a hemorrhagic pericardial effusion. He was referred from another hospital where he originally presented with complaints of dyspnea, edema of the legs, and abdominal pain of recent onset. Symptoms were relieved by evacuation of 1,000 mL of hemorrhagic pericardial fluid; no malignant cells were found.

He smoked one package of cigarettes a day from his 16th to 36th year of age. His father died from lung cancer at the age of 62. His past medical history disclosed no abnormalities except for increased sweating on the right side of the thorax upon exertion or during hot weather with localized saturation of his clothing. The sweating was unrelated to hunger, eating, or sleep. This problem had been present for almost 2 years. He had no problems with hair, nails, or teeth.

Physical examination revealed maceration of the skin involving the seventh thoracic right-sided dermatome. Further study with the use of a previously described starch-iodine technique confirmed the localized hyperhidrosis (Fig 1). No hypohidrosis or hyperhidrosis was observed in other areas, including the axillae, the palms, the soles, and the contralateral thorax, illustrating an otherwise normal and uniform sweat gland function.

An MRI of the dorsal column did not reveal anomalies of the spinal cord, vertebral column, or paravertebral structures. A radiograph of the chest showed a nodule of approximately 1 cm in diameter in the posterior segment of the upper lobe of the left lung. A CT scan of the thorax confirmed this finding and the absence of pleural involvement and mediastinal adenopathy (Fig 2). Subsequent pericardial aspiration due to accumulation of pericardial fluid finally yielded malignant cells. He subsequently underwent a pericardial fenestration for persisting pericardial fluid; the biopsy specimen taken at that time confirmed the diagnosis of a poorly differentiated adenocarcinoma. An extensive search for an extrapulmonary primary site of the tumor, including a CT scan of the abdomen and ultrasound of the prostate and of the thyroid gland, did not reveal the site. CT scan of the brain and whole-body scintigraphic examination of the skeleton did not reveal metastatic disease. Despite administration of combination chemotherapy, the patient died from widespread tumor 4 months after diagnosis. Autopsy revealed extensive involvement of both lungs, the pericardium, the retroperitoneum, and the pleura, including the sympathetic trunk region.

DISCUSSION

Sympathetic fibers originate in the preoptic nucleus of the hypothalamus, travel down the spinal cord to the intermediate lateral areas, and synapse at segments T1 through L2. One preganglionic sympathetic fiber synapses with multiple postganglionic cells up and down the paravertebral sympathetic trunk. Hence, one single sympathetic ganglion supplies innervation of the sweat glands of at least six ipsilateral dermatomal levels. The face and eyelid are supplied by spinal segments T1-4; the upper limbs, by spinal segments T2-8; the trunk, by spinal segments T4-12; and the lower limbs, by spinal segments T10-12.²

Unilateral localized hyperhidrosis secondary to ipsilateral intrathoracic tumors is a rare occurrence. Stanford³ reported three cases of mesothelioma that caused ipsilat-

---

Figure 1. Unilateral dermatomal hyperhidrosis with the starch-iodine technique.
eral paroxysmal hyperhidrosis involving the forehead, the face, the upper hemithorax, the shoulder, and the arm related to widespread involvement of the intercostal nerve and the sympathetic chain. Lambert and coworkers described a case of unilateral hyperhidrosis in the same areas associated with a left paraspinous IgD lambda myelomatous tumor. Hyperhidrosis was reported to disappear in this case after irradiation. Some reports of bronchial carcinoma causing ipsilateral paroxysmal hyperhidrosis related to encroachment of the tumor on the sympathetic trunk or intercostal nerves also have been reported.

Unilateral segmental hyperhidrosis over a solitary dermatome is even more unusual, and difficult to explain neuroanatomically and physiologically, as stimulation of a single anterior root usually results in sympathetic effects over the distribution of numerous sympathetic ganglia. Further, there is a dermatomal overlap of sympathetic innervation. Pool reported a case of an osteoma of the tenth dorsal vertebra that produced unilateral hyperhidrosis on the left side, initially along the T10 dermatome but rapidly evolving over a period of 5 months to involve the complete left side of the trunk from the axilla to T12. Dworin and Sober described a 23-year-old woman with idiopathic unilateral hyperhidrosis involving the eighth thoracic right-sided dermatome.

McCoy reported the case of an apical pulmonary adenocarcinoma with contralateral localized hyperhidrosis; the mechanism of this phenomenon is unknown. The patient reported herein suffered from unilateral right-sided dermatomal hyperhidrosis contralateral to an upper lobe pulmonary adenocarcinoma. It was not possible in this case to prove that the tumor antedated the hyperhidrosis; however, it is well-known that occult cancers may exist without clinically evident symptoms many years before their detection. Previous reports of unexplained localized hyperhidrosis contralateral to malignant tumors, together with the findings in this patient and in view of the rarity of this dermatologic manifestation, suggest a possible causal relationship between unilateral localized or segmental hyperhidrosis and malignant tumors rather than a coincidental association between the two disorders. Furthermore, there is no acceptable neuroanatomic or physiologic explanation for isolated dermatomal hyperhidrosis in eventual organic involvement of either the sympathetic trunk or a single intercostal nerve. Failure to recognize a cutaneous syndrome as possibly paraneoplastic may have significant consequences as it may be the first indication of a new or recurrent tumor, underscoring the importance of reporting potential paraneoplastic syndromes, such as localized hyperhidrosis.

REFERENCES

Diffuse Airway Narrowing From Carcinoma Metastatic to the Bronchial Submucosa*

Identification by Chest CT

Darren B. Taichman, MD, PhD; Gregory Tino, MD, FCCP; Judith Aronchick, MD; Carol Reynolds, MD, W. Roy Smythle, MD; John R. Roberts, MD, FCCP; and Daniel Haller, MD

The differential diagnosis of dyspnea in patients with prior malignancy and nondiagnostic chest radiographs is broad. We report a case of breast carcinoma diffusely metastatic to the bronchial submucosa presenting as obstructive airway disease. Chest radiographs failed to suggest metastatic disease as the cause of dyspnea. CT, however, revealed the

*CHEST / 114 / 4 / OCTOBER, 1998 1217