Clinical Image

Emergency department diagnosis of a concealed pleurocutaneous fistula in a 78-year-old man using point-of-care ultrasound

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INTRODUCTION

Although the differential diagnosis for chest wall masses is broad, the vast majority are abscesses, lipomas, or sebaceous cysts. Post-operative chest wall masses can also include infection, hematoma, seroma, cancer recurrence, metastasis, and lung hernia. Bedside ultrasound has been well documented to be beneficial in the differentiation of superficial pathology.^[1,2] Pleurocutaneous fistula is a pathologic communication between the pleural space and subcutaneous tissues of the chest wall. Pleurocutaneous fistula is a rare complication of tube thoracostomy, video-assisted thoracic surgery (VATS) procedures, and various pulmonary infections. There are multiple case reports of pleurocutaneous fistulas occurring after tube thoracostomy as well as secondary to pulmonary infections including tuberculosis.^[3–7] VATS is becoming an increasingly common surgery for treatment of lung carcinoma, spontaneous pneumothorax, and various indications in the trauma setting. Several cases series documenting VATS complications describe pleurocutaneous fistulas after VATS procedures.^[8,9] Point of care ultrasound (POCUS) is increasing in use as a diagnostic tool in the emergency department.^[1,2,10–13] Here we present a case that highlights the intersection of a rare complication of a common procedure and the value of ultrasound in the diagnosis of undifferentiated masses and dyspnea in the emergency department.

CASE

A 78-year-old male presented to our Emergency

Department complaining of right-sided chest pain, shortness of breath, and a chest wall mass after coughing. His history was significant for stage II lung cancer. Fourteen days prior to presentation the patient had undergone right lower lobectomy with lymph node dissection through VATS. The patient stated that he had coughed in the morning and felt a popping sound in his chest. Subsequently, the patient noticed a mass on his chest wall that changed size when he breathed. The patient's initial vital signs were significant only for an oxygen saturation of 93% while on 2 liters of supplemental oxygen. His physical exam was significant for diminished breath sounds on the right side and scattered expiratory wheezes. Furthermore, the patient was noted to have a fluid filled mass in his lower right chest wall at the incision site for the VATS procedure. This mass appeared to increase in size with inhalation (Figure 1).

The treating emergency physician who was fellowship trained in POCUS performed a POC ultrasound of the chest wall mass and found evidence of a right-sided pleural effusion with pleural fistula extending from the pleural space into the chest wall subcutaneous tissue (Figure 1). The rest of the patient's emergency department workup demonstrated a white blood cell count (WBC) of 22 000 and his chest radiograph (CXR) was positive for a right sided pleural effusion. The CXR demonstrated a pleural effusion; however, it did not demonstrate any evidence of a pleurocutaneous fistula (Figure 2). The patient was started on intravenous (IV) antibiotics, and as a result of the POC ultrasound, the cardiothoracic (CT) surgery service was consulted for admission. During his hospital course, the patient underwent repeat thoracic ultrasound

Figure 1. Top left: patient chest wall without obvious defect (expiratory image). Top right: Patient chest wall with obvious defect (inspiratory image). Bottom left: ultrasound image in expiratory phase demonstrating pleural effusion but only trace pleurocutaneous fistula. Bottom right: ultrasound image in inspiratory phase demonstrating pleural effusion and large pleurocutaneous fistula.

Figure 2. Chest radiograph demonstrating haziness of the costo-phrenic angle consistent with pleural effusion versus pneumonia.

and interventional radiology performed ultrasound-guided thoracentesis removing 250 cc of fluid for symptomatic relief.

DISCUSSION

Pleurocutaneous fistula is a pathologic entity consisting of a persistent communication between the pleural space

and subcutaneous tissue that can be a consequence of a broad spectrum of diseases including pleural tuberculosis, migrating foreign bodies, metastatic cancer, radiation therapy post mastectomy, tube thoracostomy, and a VATS procedure complication.^[3–9] While rare, this case of a pleurocutaneous fistula highlights the usefulness for point of care ultrasound as an aid to prompt diagnosis and clinical decision making. Case reports have described the diagnosis of this entity by both ultrasound and CT imaging.^[4–7] In this case, the pleurocutaneous fistula and the fistula tract were identified on ultrasound imaging, aiding in the correct diagnosis.

For over half a century emergency physicians have been using point of care ultrasound at the bedside to aid in diagnostic scenarios and therapeutic procedures.^[12] Ultrasound is an integral component of undergraduate and graduate medical training and it being used for simple and complex procedures worldwide.^[14–17] In the setting of a patient presenting with a subcutaneous thoracic mass, ultrasound has been shown previously to be of use in the aid in diagnosis and differentiation of multiple other diseases such as lipomas, abscesses, and lung herniation.^[10] Furthermore, ultrasound can be

used as an adjunct to procedures and treatment such as thoracentesis or drainage of abscesses.^[1,2,18,19] In patients presenting with dyspnea of unknown etiology ultrasound has been shown to aid in the differentiation of congestive heart failure from other causes of acute dyspnea. Ultrasound can be used to assess for pleural effusions, pulmonary edema, pneumonia and pericardial effusions all of which may be useful in the undifferentiated patient with acute dyspnea.^[13] Unlike pleural effusions, which are more easily identified by the novice sonographer, pleurocutaneous fistula's are rare and smaller proving more difficult to diagnose. In this case ultrasound was used to diagnose both the pleural effusion and the pleurocutaneous fistula; subsequently, it was also used to guide drainage.

In conclusion, this case highlights an interesting and unique finding on POC ultrasound imaging. Additionally, it suggests that POC ultrasound can be used as a diagnostic adjunct for the diagnosis and characterization of a pleural-cutaneous fistula.

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