

Pancoast Syndrome Accompanied by Rotator Cuff Tear

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Pancoast syndrome (PS) is characterized by a malignant neoplasm of the superior sulcus of the lung with destructive lesions of the thoracic inlet and involvement of the brachial plexus and cervical sympathetic nerves. The most common initial symptom of PS is shoulder pain; however, cough, dyspnea, and hemoptysis, signs often associated with lung cancer, are not as common. Investigation of PS can be difficult even with plain radiographs of the chest because it is surrounded by osseous structures such as the ribs, vertebral bodies, and manubrium. Due to these characteristics, orthopedic surgeons tend to make a misdiagnosis resulting in delay of appropriate treatment. Here we report on a patient who was supposed to undergo rotator cuff repair for his shoulder pain and weakness, and was eventually diagnosed with PS.

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Key Words: Pancoast syndrome; Rotator cuff tear; Superior vena cava syndrome

Pancoast syndrome (PS), whose most common initial symptom is shoulder pain, is characterized by a malignant neoplasm of the apex of the lung with destructive lesions of the thoracic inlet and involvement of the brachial plexus and cervical sympathetic nerves, which can cause limitation of range of shoulder motion and weakness.^{1,2)} Here we report on a patient who was supposed to undergo rotator cuff repair for his shoulder pain and weakness, who was eventually diagnosed with PS.

Case Report

A 74-year-old male was referred to our outpatient clinic with a chief complaint of progressive right shoulder pain and weakness for one month. He had previously received care in a local pain clinic with non-steroidal anti-inflammatory drugs (NSAIDs) and steroid injection at the shoulder joint for shoulder pain for 3 years. Three days before visiting our clinic, he was not able to elevate his arm. He had a medical history of undergoing percutaneous transluminal coronary angioplasty for unstable angina 5 years ago and was followed up regularly at the cardiology clinic of our hospital. He had a smoking history of 40 pack-year. On

clinical examination he was unable to elevate his arm but his passive movement of the shoulder joint was not restricted. There was considerable tenderness at the area of the greater tuberosity of the right humerus and Jobe test was positive. However there were no significant neurologic symptoms, such as tingling sensation, and no muscle atrophy on suprascapular and infrascapular fossa. The plain radiographs of the right shoulder showed a sourcil sign on subacromion and slightly upward migration of the humeral head (Fig. 1).

The magnetic resonance image (MRI) scan of the shoulder interpreted by a radiologist showed fluid collection at the subacromial and subcoracoid space and a full thickness supraspinatus tear with mild fatty muscular atrophy (Fig. 2).

His initial clinical diagnosis was rotator cuff tear (RCT) of the right shoulder. He was prescribed medication and physical therapy with a description of the possibility of future surgery. Three days later, he felt a tingling sensation at the right hand and arm and wanted to be hospitalized for unbearable pain. After admission, pain killer and physical therapy were prescribed, and pre-operative evaluation was performed for repair of the torn rotator cuff. On the first day after admission, initial chest radiography

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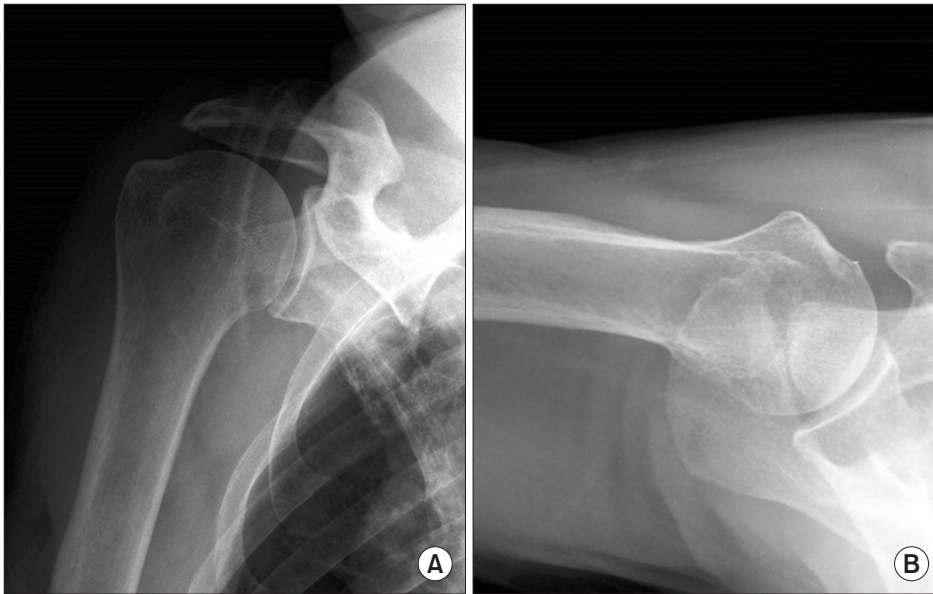


Fig. 1. Right shoulder external (A) and axial (B) view radiograph show a soucil sign at the acromion.

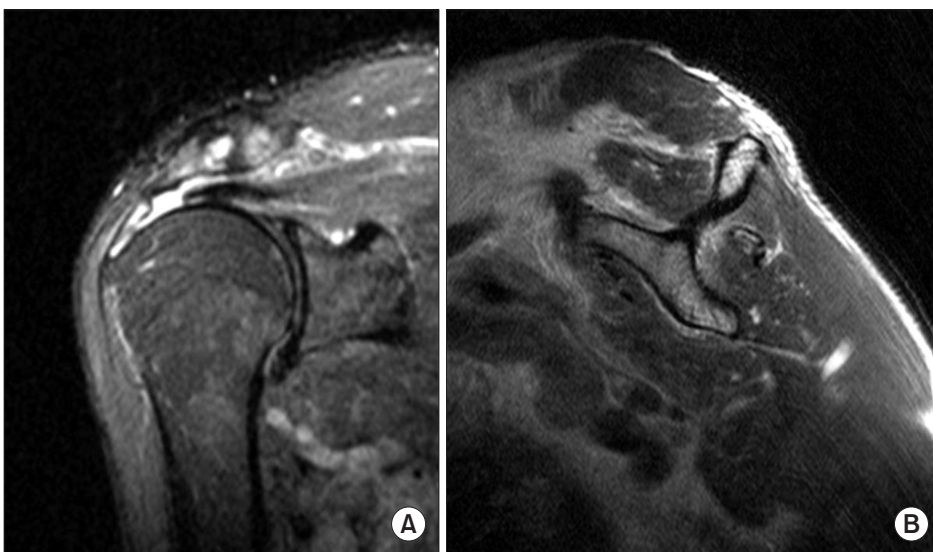


Fig. 2. (A) Coronal section of shoulder magnetic resonance imaging (MRI) shows a supraspinatus tear. (B) Sagittal section of shoulder MRI shows a mild atrophic and fatty changing supraspinatus.

showed a reticular pattern density and a homogeneous opaque shadow overlapping the anterior portion of the right first rib (Fig. 3).

Anesthesiologist as well as cardiologist who examined the patient for the preoperative evaluation did not recognize any abnormality in his chest radiograph. Although electromyography and nerve conduction velocity tests were prescribed to search for the cause of the newly developed sensory symptoms, the test could not be performed because of his pain, which was worsening.

On the fourth day after admission, facial edema and swelling of the right upper extremity was noticed and he complained of dyspnea. Computed tomography (CT) scan of the chest showed a huge mass lesion in the right upper lobe of the lung and a

bulky lymph node of mediastinum that compressed the right brachiocephalic vein, which consisted of a Pancoast tumor and superior vena cava syndrome (Fig. 4). On the seventh day, fine-needle aspiration (FNA) biopsy of the right neck-node was performed for diagnosis and staging of lung cancer. The FNA biopsy revealed a metastatic non-small-cell lung carcinoma. The patient developed a sudden myocardial infarction and then died after nine days of admission.

Discussion

Promising results of rotator cuff repair have been reported for patients who had shoulder pain caused by RCT. Thanks to the evolution of the repair techniques and methods this operation

has become one of the most popular surgeries in the shoulder. The degree of correlation of clinical symptoms and the findings of physical examination with the radiological evidence of tear is one of the most important factors in decision making with regard to operation. Nevertheless, other clinical conditions which cause shoulder pain and weakness can accompany RCT.^{3,4} PS, originally described in 1932, is a rare lung tumor comprising approximately 2% to 5% of all lung cancers.⁵ It is a malignancy developing at the apex of the lung, in the area of the sulcus formed by the passage of the subclavian artery and characterized by destructive lesions of the thoracic inlet and involvement of the brachial plexus and cervical sympathetic nerves.⁵ Symptoms often associated with lung cancer are not as common. However

the most common initial symptom of PS is shoulder pain, presenting in 44 to 96 percent of patients.² Bisbinas and Langkamer⁶ reviewed 51 patients with superior sulcus tumor of lung (PS) treated over a 17-year period, musculoskeletal complaints were presented in 46 patients. Pain is produced by invasion of the brachial plexus and/or extension of the tumor into the parietal pleura, endothoracic fascia, first and second ribs, or vertebral bodies. The pain may radiate down the ipsilateral arm following the typical distribution of the ulnar nerve. Therefore, the patient will have usually been treated for a variety of conditions of the neck, shoulder, and arm.⁷

In this case, the patient had progressive right shoulder pain and weakness for one month. He had previously received care in a local pain clinic with NSAIDs and steroid injection at the shoulder joint, but it was not effective. MRI scan showed a tear of rotator cuff, but it was not relevant to the neurological symptoms such as tingling in the right upper extremity, and the facial edema and swelling of the right upper extremity which are noticed in the superior vena cava syndrome.⁶ PS is one of the lung cancers, nevertheless, it can be difficult to detect with plain radiographs of the chest because it is surrounded by osseous structures, including the ribs, vertebral bodies, and manubrium. Villas et al.³ stressed the value of standard antero-posterior (AP) cervical radiographs in the diagnosis of Pancoast tumor. By examining the AP radiographs of their cervical spines, the third rib and the top of both lungs were observed in all cases. Lordotic views and radiographs of the cervical and upper thoracic spine may also be helpful in determination of the presence of tumor. In this case, anesthesiologist as well as cardiologist who examined the patient for the preoperative evaluation did not recognize any abnormality in his chest radiograph. The mass was not found until chest CT scan was performed. CT scanning is an important diagnostic tool to find the accompanying lesion such as superior vena cava



Fig. 3. Chest postero-anterior view shows a reticular pattern density and a homogeneous opaque shadow which overlaps the anterior portion of the right first rib.

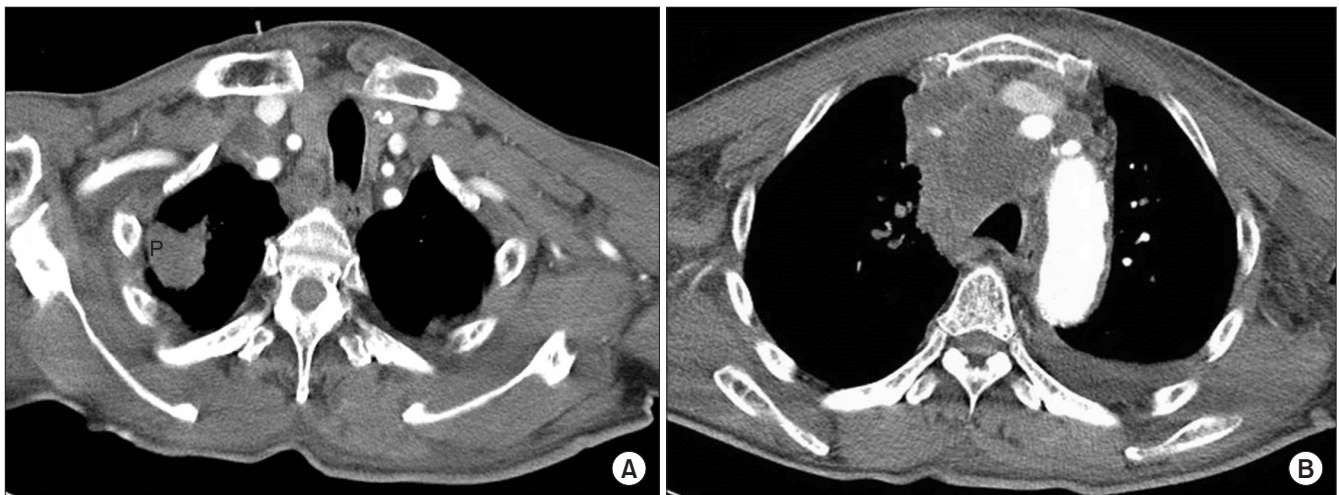


Fig. 4. (A) An axial section of chest computed tomography (CT) shows a pancoast tumor (P) in the right upper lung. (B) An axial section of chest CT shows obstruction of superior vena cava.

syndrome as well as the mass itself.⁶⁾ A thorough radiographic study of the thoracic inlet is recommended for any elderly patients having smoking history, and persistent shoulder or neck pain with or without brachialgia.⁷⁾ If a patient cannot perform arm elevation, it is important to identify the cause of symptoms between neurologic weakness and muscular weakness at the shoulder. However, without some neurologic symptoms it is difficult to distinguish neurologic weakness from muscular weakness. More delicate evaluations for cervical spine and brachial plexus should have been performed in this case. Electromyography and nerve conduction velocity tests can be helpful in cases with distal neurologic sign in the upper extremity and unexplained weakness.⁶⁾ In this case, these were not prescribed until he complained of a tingling sensation on upper extremity just before admission.

In this report, the shoulder pain which did not respond to treatment existed for 3 years, and the patient was supposed to undergo rotator cuff repair for the weakness and pain of the shoulder which was well relevant to the findings of the torn rotator cuff in MRI scan. However newly found neurological symptoms, and the facial edema and swelling of the right upper extremity caused us to proceed in searching for the cause of these symptoms.

Due to delayed diagnosis, the patient did not receive proper treatment for his lung cancer. Furthermore, the patient came close to undergoing surgery for RCT. Accurate evaluation of a patient's symptoms is essential, and if the symptoms are different from typical RCT like neurologic symptoms, other diseases should be considered. Among them, PS should be ruled out be-

cause it can lead to death.⁸⁾

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