Case Report Inguinal bladder hernia with left lung carcinoma: a case report

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Abstract: Inguinal hernia is a common disease with intestine or omentum majus herniating into hernia sac. Bladder herniation is a special type of inguinal hernia which often happens in old male with very low incidence. Here we report a rare case of an inguinal bladder hernia, which was diagnosed by ¹⁸F-FDG PET-CT during detection of lung carcinoma.

Keywords: Inguinal hernia, bladder, PET-CT, lung carcinoma

Case report

A 90-year-old male presented with cough and bloody sputum for 5 days. He had a history of frequent micturition and dysuria for 1 year. Local hospital CT detected a 5.6 cm × 3.6 cm × 4.1 cm mass in left upper lung with multiple small nodules in both lungs with maximal size 1.6 cm. He was diagnosed left upper lung carcinoma with multiple metastasis in both lungs. CT guided biopsy demonstrated a squamouscell carcinoma (grade 2-3). The patient was admitted to our hospital for whole body ¹⁸F-2fluoro-2-deoxyglucose, positron emission tomography/computed tomography (18F-FDG-PET/CT) scan. Abnormal accumulation of radioactive ¹⁸F-FDG (Shanghai Atom Kexing Pharmaceuticals Company, Ltd., Shanghai, China) was detected by PET/CT (Discovery VCT; GE Medical Systems, Milwaukee, WI). The radiochemical purity of the FDG was more than 95%. The patient was instructed to fast for 12 hours before the examination. The blood sugar was 5.4 mmol/L immediately before the exam. Image acquisition started approximately 1 hour after intravenous injection of FDG (3.7 MBq/ kg). The patient urinated immediately before scan.

CT scan from brain to femoral shaft was performed immediately before PET by using multidetector spiral CT scanner (3.75-mm-thick sections, 120 kV, 30-200 mA depending on the patient's total body mass). Then, whole-body PET was performed, covering an area identical to that covered by CT. The acquisition time was three minutes per bed position, with seven bed positions for body imaging, and five minutes for head. The thickness was 3.27 mm. The PET/CT imaging detected that left upper lung mass with abnormal FDG metabolism increase, multiple nodules in both lungs with no FDG metabolism increase, multiple lymph nodes in mediastinum and right hilum with mild FDG increase. The imaging also detected bladder herniating to right inguinal. The patient was diagnosed 1) lung carcinoma with multiple metastasis; and 2) right inguinal bladder hernia (Figures 1 and **2**).

Discussion

Inguinal hernia is a common disorder. It often contains intestine or omentum majus in the hernia sac. Inguinal bladder hernia is a rare type which often happens in old male with very low incidence [1]. Most bladder hernias are diagnosed intra-operatively, because of its difficulty in diagnosis before surgery, which increases the probability of bladder injury during the surgery [2]. The hernia content can be part of bladder or even entire bladder. The



Figure 1. PET-CT imaging of inguinal bladder hernia. A. Sagittal CT image showed bladder herniated from inguina. B. PET image showed the radioactive concentrate in the hernia sac. C. PET and CT image fusion of the inguinal bladder hernia.

pathogenesis is 1) chronic disease such as prostatitis, prostatic hyperplasia causing dysuria, retention of urine, and enlargement of bladder, chronic cough and constipation causing abdominal pressure increase; 2) flaccidity of ligaments around the bladder and weakness of abdominal wall which cannot provide enough support. These factors cause part of bladder protruding from the weak area of abdominal wall and format inguinal bladder hernia. Clinical manifestations are mass in inguinal area accompanied with frequent micturition, urgent urination, urodynia, increased mass with pain when urinating and decreased or disappeared mass after urinating [3-7]. In this case, the patient appears frequent micturition and dysuria.

The most effective diagnostic technique is ultrasound [8-10]. Other methods include cystography, excretory urography, and cystoscopy. However, cystoscopy cannot diagnose bladder hernia directly. It can only show irregular bladder and imply the clue to perform further exam. PET-CT is a non-invasive whole body imaging modality, which integrates advantage of PET and CT to sensitively detect not only high-resolution anatomic structure imaging but also functional metabolic distribution. The integrated two parts combine the advantages of PET and CT and significantly improve the diagnosis accuracy. In clinical practice, PET/CT is used mainly in malignant tumor diagnosis, but we should not ignore it can also be used to detect and diagnose benign disease. ¹⁸F-FDG-PET-CT



Figure 2. PET-CT imaging of left upper lung carcinoma. A. CT detected left upper lung mass with multiple small nodules diffused in both lungs. B, C. Axial and whole body 3-dimensional PET imaging detected abnormal increase of radioactive concentrate at left upper lung with inhomogeneous density which the maximal SUV is 5.82. D. PET and CT image fusion showed the abnormal increase of radioactive concentrate in the lung mass.

is an effective method for detecting and staging lung carcinoma. In this case, staging the tumor using ¹⁸F-FDG-PET-CT is pre-therapeutic staging. This method is not the primary modality to detect bladder hernia [11-13]. ¹⁸F-FDG mainly excretes from urinary system. Radioactive concentrates can be detected in renal collecting ducts, calices, pelvis, and bladder. Sometimes, it can also be detected in bilateral ureters. In this case, the bladder contains abundant radioactive urine, so the right inguinal bladder hernia is observed. Due to the difficulty of urine draining, the standard uptake value (SUV) in hernia sac is higher than in bladder. It demonstrates the advantage of PET in metabolic imaging.

Conclusions

PET-CT is a non-invasive whole body imaging modality. It integrates metabolic imaging of PET and high resolution imaging of CT. It utilizes the advantages of both imaging technique and improves the diagnosis accuracy. In clinical practice, PET-CT is used mainly in oncology (approximately 80%). However, we should not ignore it can accurately diagnose benign diseases.

Disclosure of conflict of interest

None.

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