

# $^{18}\text{F}$ FDG PET-CT in Predicting Acute Respiratory Distress Syndrome: A Case Report

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## BACKGROUND

Acute respiratory distress syndrome (ARDS) is a sudden life threatening lung failure that requires mechanical ventilation. It is characterized by diffuse alveolar damage with increased alveolar and capillary permeability leading to accumulation of interstitial and alveolar lung oedema. ARDS lies at the severe end of continuum of acute lung injury (ALI) syndrome (1). Several factors may trigger ARDS, from infection to major trauma. There is no gold standard radiological, laboratory or pathological tests to diagnose ARDS. In clinical practice, ARDS is under-diagnosed, accounts 20 to 48% of actual cases (2).  $^{18}\text{F}$  FDG PET-CT has become a mainstay in oncology for diagnosis, treatment and monitoring. It has also been used to study inflammation in non-oncological conditions of lung. Study suggested that FDG PET-CT may be a valuable non-invasive method for evaluating ARDS before clinical manifestation of disease (3,4). The purpose of this case report was to emphasize the usefulness of  $^{18}\text{F}$  FDG PET-CT in predicting ARDS before clinical manifestation.

## CASE REPORT

This reported case was a 60 year old male, diagnosed as hepatocellular carcinoma (HCC) with mediastinal lymphnodes metastasis treated by oral chemotherapy and radiotherapy (HBRT). He was also diabetic and receiving oral hypoglycaemic drug. The patient underwent whole body  $^{18}\text{F}$  FDG PET-CT scan at NINMAS for restaging of HCC. Baseline X-ray, CT and PET-CT of around three months back showed hypermetabolic mediastinal lymphadenopathy with clear lung fields. Current PET-CT scan showed diffuse FDG avidity (SUVmax-8.0) in upper and lower lobe of

both lungs, mainly in the dependent segments. Areas of inhomogeneous increased density, fibrosis with surrounding ground glass opacity and air bronchograms with atelectasis in both lungs were noted with dependent predominance. The scan findings were interpreted as interstitial lung disease with suspected ARDS. On the consecutive day the patient had developed respiratory distress and was admitted in intensive care unit with support of mechanical ventilation and the diagnosis of ARDS was established.

## DISCUSSION

$^{18}\text{F}$  FDG PET-CT has become a useful technique in the evaluation of pulmonary lesions (5). We present a case of diffuse pulmonary  $^{18}\text{F}$  FDG activity on PET scan in a patient who developed ARDS on consecutive days. Diagnosis of ARDS of this patient was made according to “The American-European Consensus Conference on ARDS” (6) definition and the patient presented with PaO<sub>2</sub>– 80 mm Hg, PaCO<sub>2</sub>– 44 mm Hg, FiO<sub>2</sub>– 0.6 and PaO<sub>2</sub>/FiO<sub>2</sub>– 133.3 mm Hg on admission. High rates of glucose utilization by the inflammatory cells involved in the pathogenesis of ARDS might explain the increased pulmonary  $^{18}\text{F}$  FDG uptake we observed. In a study Rodrigues R S et al. showed, patients with blunt thoracic trauma and pulmonary contusion subsequently developed ARDS 1–3 days after the PET scan who had diffuse FDG uptake pattern throughout the entire lungs. However, patients with significant FDG uptake only confined to areas of weak or absent aeration (focal lung opacity) did not develop ARDS (7). This finding suggests that aerated regions of lung can be considerably infiltrated with inflammatory cells and emphasizes the great potential of  $^{18}\text{F}$  FDG PET for noninvasive early quantitative assessment of regional pulmonary function and ARDS.



**Figures:**  $^{18}\text{F}$  PET-CT scan showed diffuse pulmonary  $^{18}\text{F}$  FDG activity (a) maximum intensity projection (MIP) image (b) coronal CT (lung window) image (c) coronal PET-CT fusion image (d) sagittal PET-CT fusion image (e) axial images (PET, CT & fusion images).

## CONCLUSION

Diffuse FDG uptake of lung was evident in PET-CT imaging prior to clinically manifestations of ARDS.  $^{18}\text{F}$  FDG PET-CT scan may give diagnostic information in the progression of ARDS. ARDS should be considered in the differential diagnosis of patients with diffusely increased  $^{18}\text{F}$  FDG uptake in lung.

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