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ARTEFACTUAL FOCAL PULMONARY 18F-FDG PET/CT UPTAKE IN ABSENCE OF CT FINDINGS: PREVALENCE AND INTERPRETATION CRITERIA

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BACKGROUND-AIM

To assess prevalence and interpretation criteria of focal 18F-FDG uptake in the lungs at PET/CT sine materia, i.e. without any findings at coregistered CT imaging.

METHODS

We evaluated clinical records from 10500 consecutive patients who performed 18F-FDG PET/CT in our centre on an almost 4-years period (Dic. 2010-Oct. 2014). 18F-FDG PET/CT scans were performed using standard procedures in our center: whole body PET/CT acquisitions commenced 60 minutes after tracer injection through a butterfly needle of 2.2 MBq/Kg/bw of 18F-FDG and followed by a flush of 10 ml of saline to avoid vessel stagnation of the tracer. Non contrast enhanced low-dose CT (140 KV, and 40-80 mA auto-modulated on the basis of body weight) was coregistered with PET images for attenuation correction and to allow a precise CT localisation of PET-positive lesions. In cases of incongruence between PET and CT findings, potentially indicating an artefact, a segmental PET/CT of the lungs was also immediately obtained, or patients were referred for control PET/CT at 24-48 hours or contrast enhanced CT .

RESULTS

16 patients (12 males, 4 females; mean age 63 years, range 44-83) presented a focal area of high 18F-FDG uptake in the lungs (mean SUV max 15.75; range: 3.5-81.0), mainly located in the periphery with mean maximum diameter of 1.3 cm (range 0.5-2.2 cm) measured on PET images. In 14 patients the FDG focality was unique, whereas in two patient two focal uptakes were visualised. Of note, in none of these patients there was evidence of corresponding abnormalities at coregistered CT images. The precocious identification of these "focalities" during the acquisition phase led to late PET scans of the thorax in eight patients which were performed using motion free algorithm or gating respiratory protocol. In late PET/CT images, obtained 2 hours after tracer injection, no significant changes of the PET-positive "focalities" about the site and the size was observed. In five cases PET/CT scan was rescheduled 48 hours later which did not confirm the "focality". In five cases patients underwent subsequent contrast enhanced CT (CECT) for comparison with low dose CT, and resulted negative thus confirming the low-dose CT data. These FDG-positive 'focalities' at PET/CT without anatomical correlation findings were considered as "artefactual accumulation" of the tracer.

CONCLUSION

Focal FDG uptake in the lungs in the absence of any morphological abnormality is very rare (1.5 cases/1000 PET scans) but potentially very "dangerous" since it can lead to false interpretations while it should be interpreted as "artefactual". In this regard identification of the artefact during acquisition can lead to late images using specific acquisition protocols for lungs which can help interpretation with more confidence avoiding erroneous descriptions or further imaging procedures.