Positive predictive value of PET- CT for evaluation of malignancy in pulmonary tumors

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Francisca C. Redondo(1), Claudio M. Suarez (2), Rossana M. Pruzzo (1), Horacio J. Amaral (1), Alejandra Pizarro (1), Adolfo Barros (3), Raul Berrios (4), Felipe A. Bannura (4), Francisco J. Suarez (5), Francisco J. Orlandi (6).
(1) Fundacion Arturo Lopez Perez, Nuclear Medicine, Santiago, Chile, (2) Clinica Santa Maria, Thoracic Surgery, Santiago, Chile, (3) Fundacion Arturo Lopez Perez, Radiology, Santiago, Chile, (4) Fundacion Arturo Lopez Perez, Thoracic Surgery, Santiago, Chile, (5) Universidad de Chile, Student, Santiago, Chile, (6) Clinica Santa Maria, Medical Oncology, Santiago, Chile.

INTRODUCTION: PET-CT provides morphologic and metabolic information for diagnosis of malignant disease; however, increased glucose uptake is not exclusive of cancer. Specificity depends on the prevalence of infectious and inflammatory diseases in the population. The purpose of this study was to analyze PET-CT capacity to predict malignancy in pulmonary tumors in chilean population.

MATERIALS AND METHODS: 58 patients and 78 pulmonary tumors with increased uptake of F18-FDG were prospectively included in the study, 40 males and 18 females, mean age 62 years (21 - 96). Exams were performed using a PET-CT Scanner Siemens Biograph 6. Ten patients had extrapulmonary malignant disease; the others were referred for evaluation of primary pulmonary tumor. Three patients had history of pneumoconiosis. Forty seven patients had only one nodule or mass. Histological study was obtained for all lesions.

RESULTS: In 71 of 78 lesions histological study demonstrated malignancy, 3 small cell lung cancer, 43 non small cell lung cancer (NSCLC), 1 primary sarcoma and 24 metastases. Mean SUV for malignant lesions was 10.0 g/ml (range 0.9 - 35.9) and mean size 39.0 mm (11 - 107). Seven lesions considered malignant were proven to be benign (3 silicosis, 2 pneumonias, 1 pulmonary abscess and 1 surgical scar). Mean SUV of benign lesions was 5.1 g/ml (range 2.7 - 9.4) and mean size 25 mm (8 - 43). Difference on SUV of malignant and benign lesions was significant (p 0.0075, Mann Whitney). Positive predictive value (PPV) for malignancy was 91%. Five tumors with SUV < 2.5 g/ml considered malignant because of its morphology on CT were confirmed by histological findings (2 NSCLC, 2 colorectal cancer metastases, 1 soft tissue sarcoma metastases). Mean

SUV for these malignant lesions was 1.5 g/ml (range 0.9 - 1.8), mean size 15.4 mm (12 - 22).

CONCLUSION: PET-CT in our population is a good predictor for malignancy of pulmonary tumors with similar PPV than that described in literature (91%). False positives are due to inflammatory lesions. Clinical history is necessary for the correct interpretation of studies. Combined analysis of simultaneously acquired anatomic and metabolic images provides more accurate identification of malignant lesions than both techniques on their own.