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EVALUATION OF PULMONARY TUMORS WITH 18F-FDG PET/CT

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Introduction:

- Correct caracterization of pulmonary nodules remains a difficult task for clinicians.
- Helical CT has 98% sensivity, but only 60% specificity.
- PET alone has sensivity 96% (83-100%), specificity 79%(52-100%)
  - Sensivity and Specificity are worse in small lesions
  - Sensivity is poor in Bronchioloalveolar carcinoma
  - Many benign conditions may be hipermetabolic and can lead to false positive results in PET studies

Introduction:

- **Multimodality PET/CT tecnology benefits from both the metabolic information of provided by PET and the high anatomic resolution of CT, which together improve sensivity and specificity in the caracterization of pulmonary nodules**

- **In this report we describe our experience in the characterization of pulmonary tumors in Chilean population with PET/CT**

Material and Method:

- 158 patients (92 males and 66 females) with Solitary Pulmonary Tumors were prospectively included in the study, mean age 63.1 years (26-96).

- All patients had histopathological study and/or clinical and complementary imaging follow up longer than 6 months.

- 68 patients had nodules of less than 30 mm and 90 had masses between 31 and 120 mm.

Material and Method:

- **All the studies were read simultaneously by both qualified nuclear medicine physicians and radiologists.**

- **Lesions were classified as malignant, benign and indeterminate, based on both radiological appearance and metabolic activity in PET/CT, with no SUV Max cutoff to distiguish one from another, but an integrated diagnostic criteria.**

- **For this reason, some lesions that were classified as malignant could have SUV Max < 2.5 g/ml, and some hypermetabolic lesions with SUV > 2.5 g/ml colud be considered benign.**

RESULTS

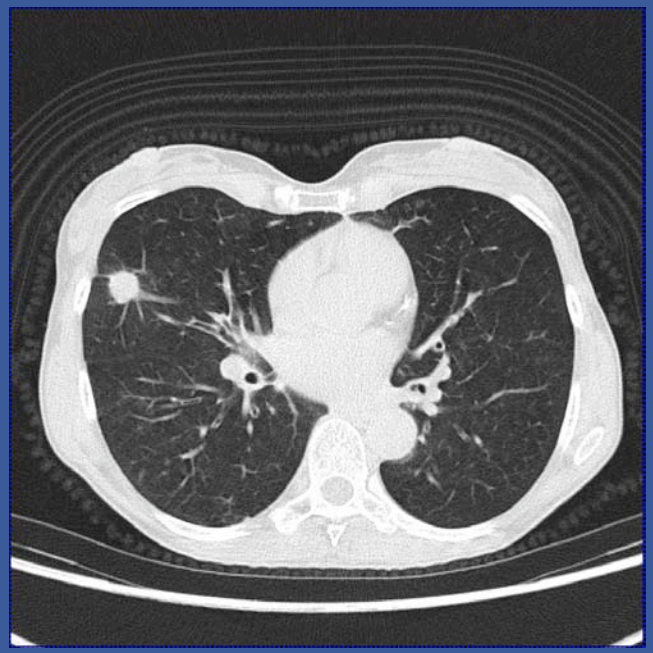
- 115 patients (72.8%) were classified as malignant:
  - Malignancy was demonstrated in 109/115 (94.8% PPV);
    - 96 non small cell lung cancer (NSCLC), 6 small cell lung cancer (SCLC), and 7 metastases.
    - 6 false positive: 4 infectious/inflammatory lesions and 2 typical carcinoid tumors.
- 31 (19.6%) as benign
  - 4 were demonstrated malignant by biopsy (12.9% false negatives), 2 metastases of colorectal cancer, 1 metastasis of thyroid cancer and 1 of angiosarcoma.
- 12 (7.6%) as indeterminate.
  - 5 lesions malignant (41.7%), 3 lung cancers, 1 metastasis of kidney cancer and 1 of colorectal cancer.

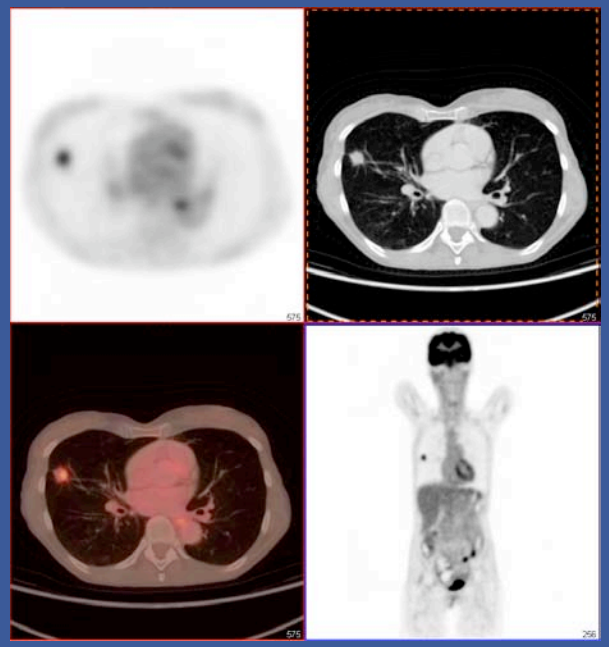
RESULTS

Median SUV Max:

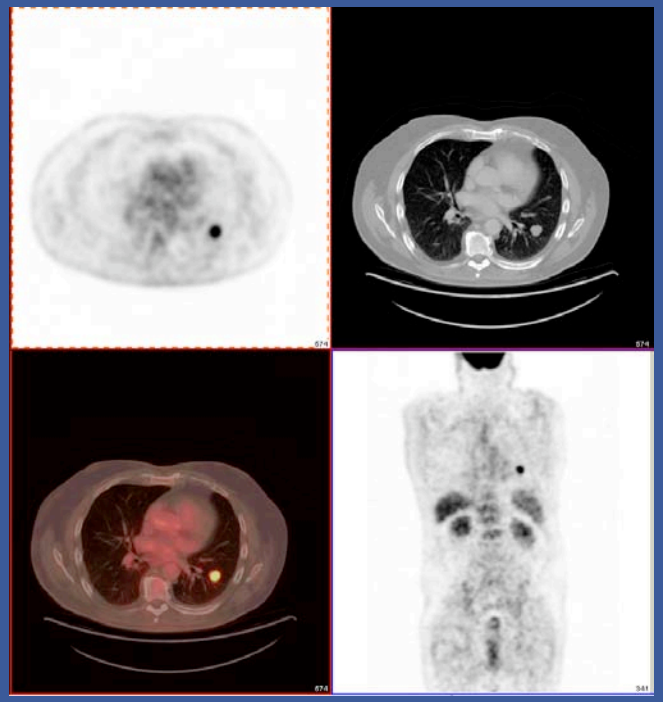
- 10.4 g/ml (1.8-35.9) in the malignant group
- 1.0 g/ml (0.3-15.3) in the benign group
- 2.2 g/ml (0.6-5.3) in the indeterminate group.

Difference on SUV of malignant and benign lesions was highly significant.





Female patient, 67 years old.
Evaluated for right SPN, PET/CT demonstrated 15 mm diameter hypermetabolic nodule in the right middle lobe, SUV Max 3.6 g/ml, with no other lesions.
Biopsy demonstrated adenocarcinoma, T1N0M0.



Male, 76 years old.
Evaluated for left SPN,

PET/CT demonstrated
18 mm diameter hypermetabolic nodule in the left lower lobe,
SUV Max 8.2 g/ml,
with no other lesions.

Biopsy: adenocarcinoma, T1N0M0.

RESULTS

- Positive Predictive Value for malignancy in the Malignant Group was 94.8%
- False Negatives in the Benign Group was 12.9%
- Negative Predictive Value 87%

- Specificity 0.82
- Sensivity 0.96
- Accuracy 0.93

RESULTS

		B		M				
B	TN	27	FN	4	Test -	31	npV	0.87
M	FP	6	TP	109	Test +	115	ppV	0.95
					Total	146		

spec	0.82	sens	0.96	Acc	0.93	

CONCLUSION

- Combined PET/CT is a reliable method for study pulmonary lesions,
  - with 94,8% positive predictive value for malignancy
  - and 87,1% negative predictive value
- In the indeterminate lesions 41.7% of malignancy was found, and then this patients need a biopsy