APLICACIONES CLINICAS DEL PET/CT CON 18FDG EN PACIENTES CON LINFOMA

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PET/CT EN ETAPIFICACION

- Sensibilidad:

– PET: 79-100% (* 90-96%)
– CT: 73-86% (* 80%)

- Especificidad:

– PET: 81-100% (* 94-99%)
– CT: 41-100% (* 80%)

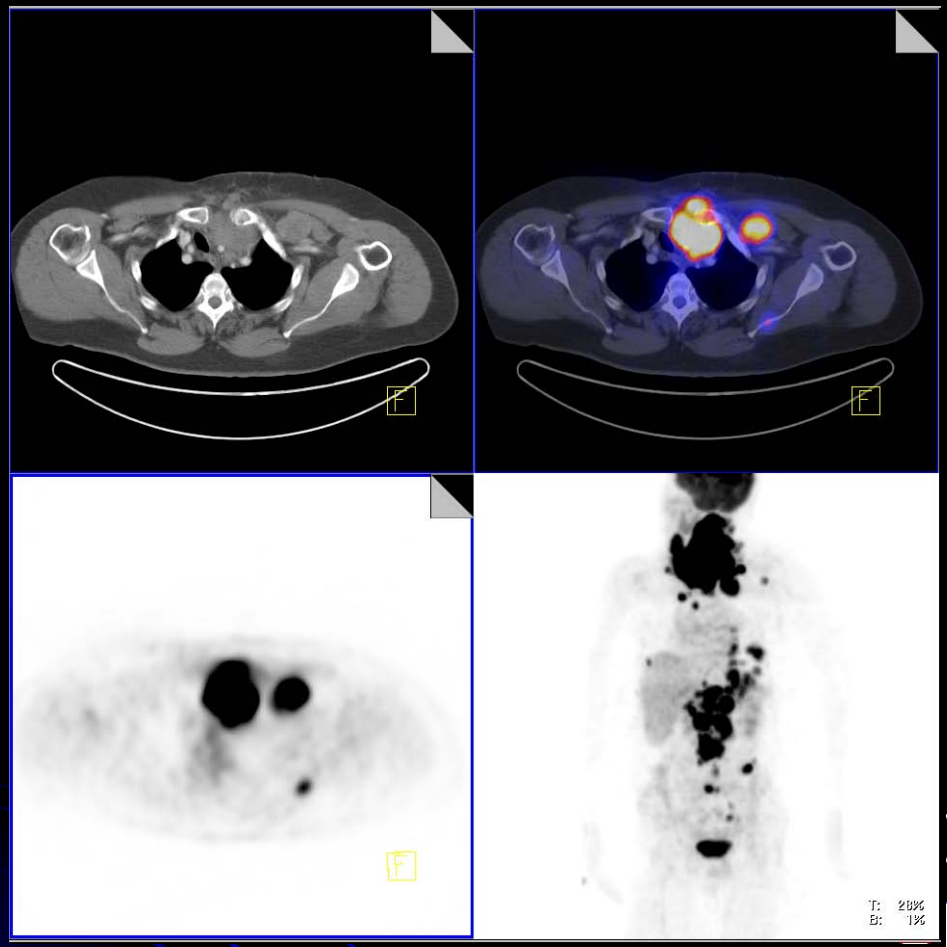
- Precisión Diagnóstica ≥ 15 % mayor que técnicas convencionales.

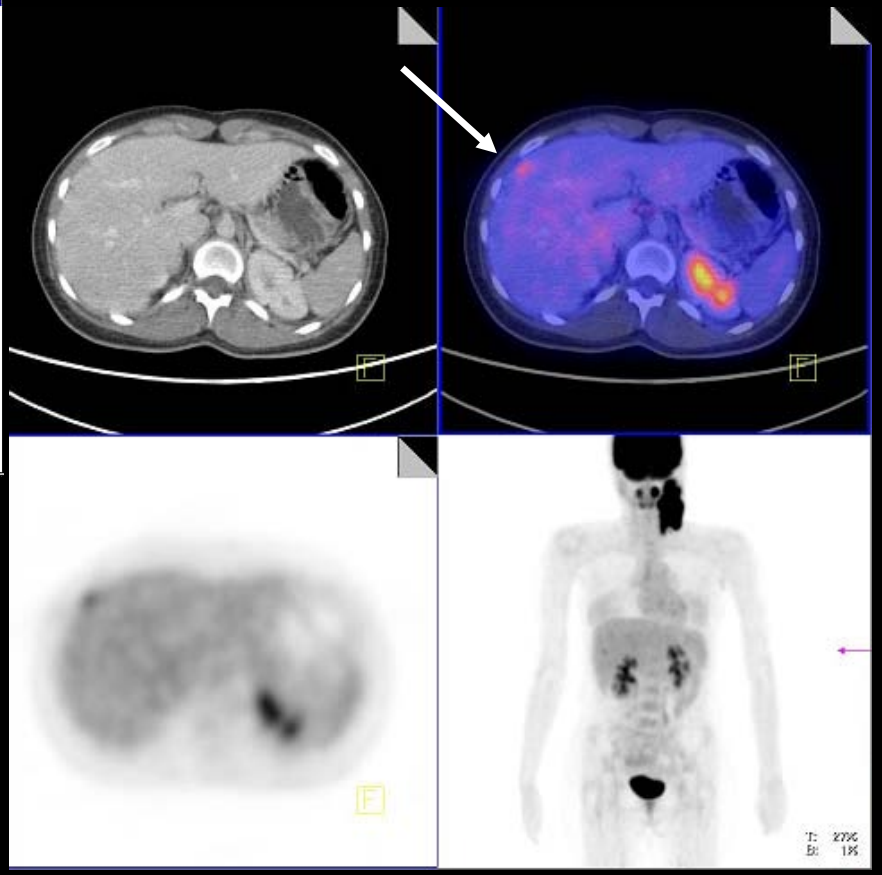
Isasi et al, Cancer. 2005;104:1066-1074
Schaefer et al. Radiology. 2004;232:823-289
Naumann et al. Br J Cancer. 2004;90:620-625
Hutchings et al. Haematologica, 2006;91:482-489

- Cambio a estadío mayor: 8-41%
  - * **20% - 30%**
  - * Especialmente útil en enfermedad extranodal
- Cambio a estadío menor: 2-7% (* 3%)
- Cambio conducta terapéutica: **8-25%**

Basal para posterior control de tratamiento

Especial utilidad en pacientes con estadíos I o II, en los que se evalúa posible RT





SENSIBILIDAD

- En General:
  - EH y LNH de grado alto e intermedio: **~ 100%**
  - LNH de bajo grado: 40-70%

- Específica según histología:
  - LH, LDCGB, LF (interm/alto) y MCL: **~ 98-100%**
  - LLCP, LCTP: 40-50%
  - LZM (MALT): ~ 67%

Elstrom R et al. Blood 2003;101 (10): 3875-6
Tsukamoto N et al. Cancer 2007;110:652-659

CONTROL PRECOZ DE TRATAMIENTO

- Múltiples estudios apoyan su uso en pre-tratamiento y respuesta temprana en DLBCL, HL y NHL folicular de grado alto o intermedio

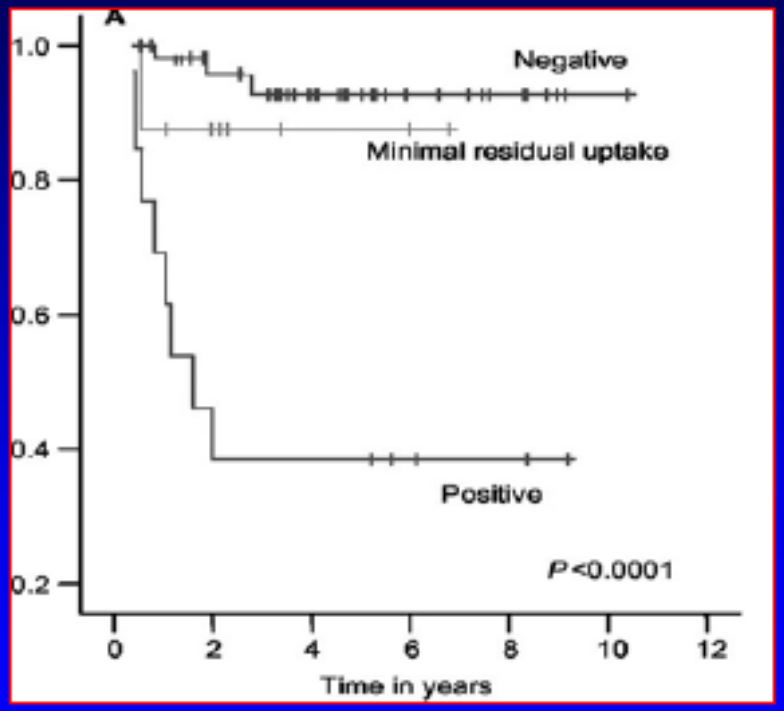
- Resultados de PET precoz intratramiento, posterior a 2-3 ciclos de QT tienen fuerte valor pronóstico:

  - PET (-): SLE **89%** a 5 años
  - PET (+): SLE **16%** a 5 años

Spaepen et al. Ann Oncol. 2002;13:1356-1363
Haioun et al. Blood. 2005;106:1376-1381
Mikhaeel et al. Ann Oncol. 2005;16:1514-1523
Mikhaeel et al. Leuk Lymphoma, 2000;39:543-553
Itti et al. J Nucl Med. 2009;50:527-

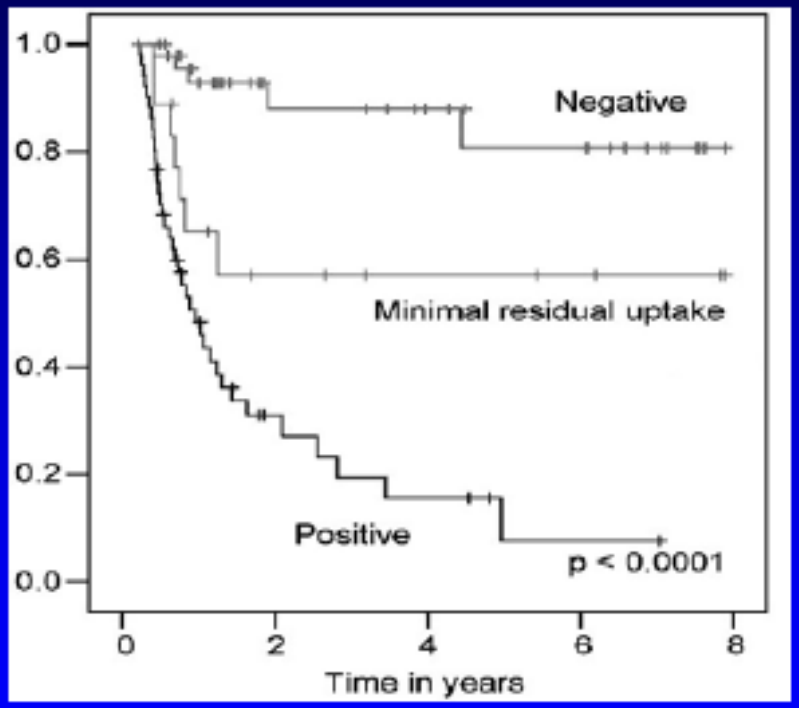
Early Therapy PET: Disease-Free Survival

HD



M Hutchings, NG Mikhaeel, PA Fields et al. Prognostic value of interim FDG-PET after two or three cycles of chemotherapy in Hodgkin lymphoma. Ann Oncol 2005; 16:1160-1168.

NHL



NG Mikhaeel, M Hutchings, PA Fields et al. FDG-PET after two or three cycles of chemotherapy predicts progression-free survival in high-grade non-Hodgkin lymphoma. Ann Oncol 2005; 16:1514-1523.

IAEA Lymphoma Coordinated Research Proyect E1.50.20 2008-2013

"Aplicación del PET con FDG y de la Determinación del Perfil Genético para Estratificación de Riesgo en Linfoma No Hodgkin Difuso de Células Grandes Tipo B en Diferentes Poblaciones Étnicas"

1. PET/CT basal, post 2 ciclos y 8 semanas post fin tto
2. IHQ: CD3, CD5, CD10, CD20, CD30, BCL2, BCL6, MUM1, FOXP1, Ki67
3. Perfil genético con RT-PCR: BCL2, BCL6, LMO2, FN1, CCND2, SCYA3

IAEA
International Atomic Energy Agency

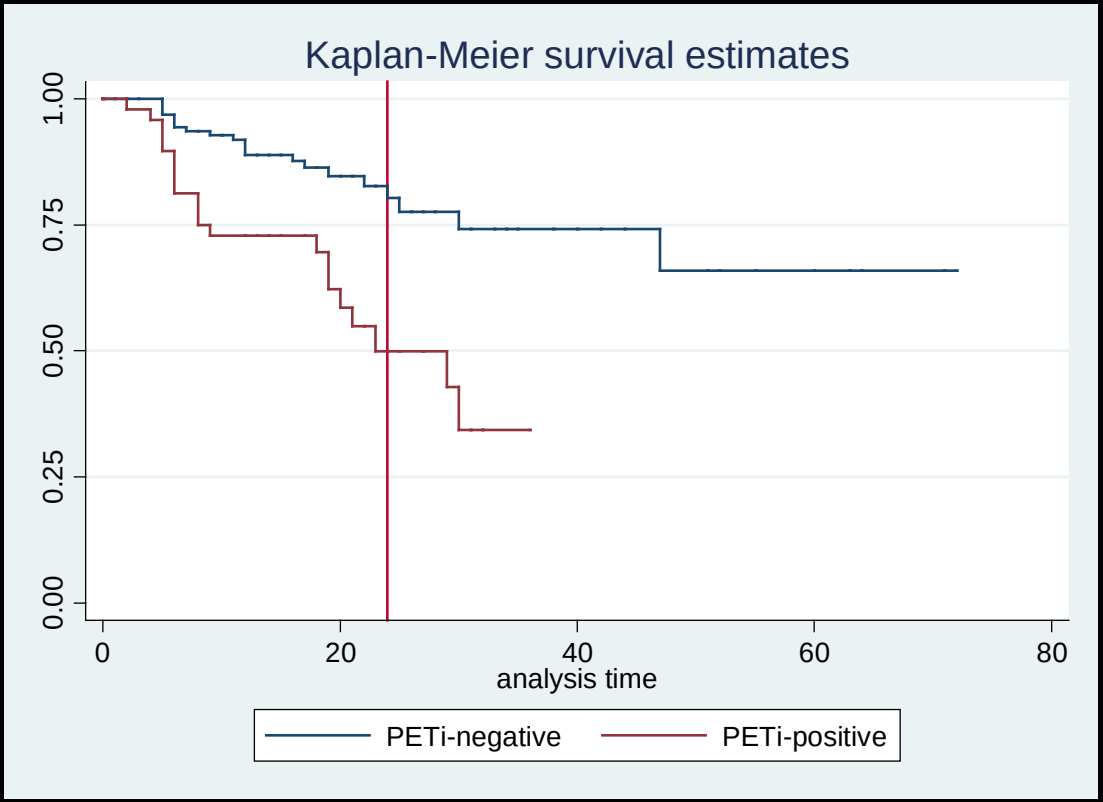
187 pacientes de 4 paises

Mediana de seguimiento de 18.6 (±13.0) meses

Se observó fracaso de tto en:

IPET (+) 43.8%

IPET (-) 15.7%



Sobrevida libre de enfermedad a 2 años:

IPET (+): 49.9%

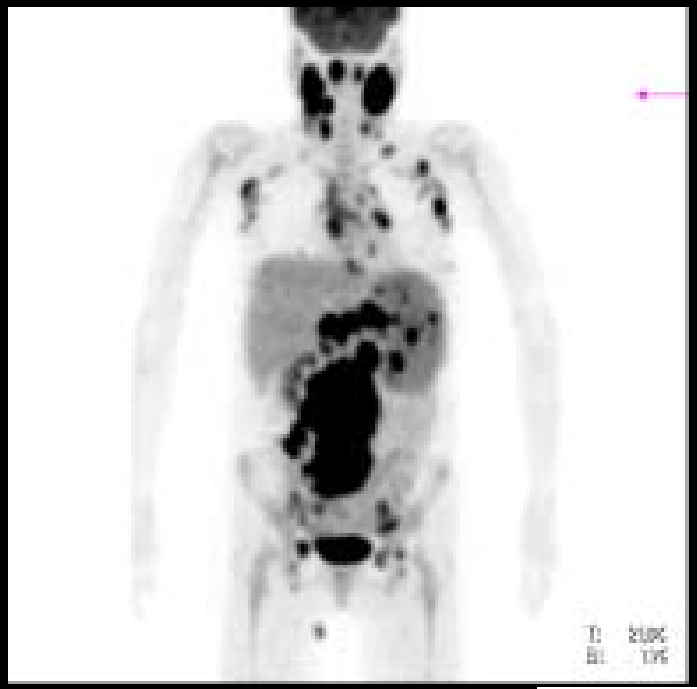
IPET (-): 80.3% (p=0.0001)

IPET unico factor pronóstico con significancia en análisis univariado.

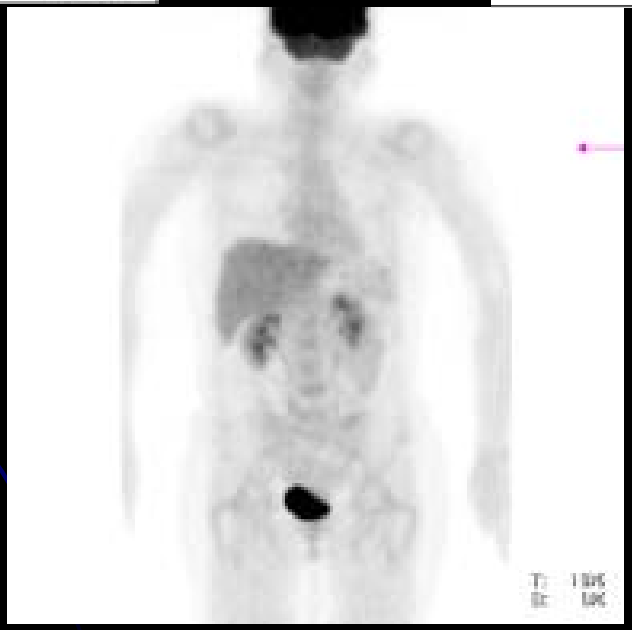
Clinical characteristics	P
Age	0.22
Sex	0.29
Initial Stage	0.44
RIPI	0.31
iPET	< 0.0001

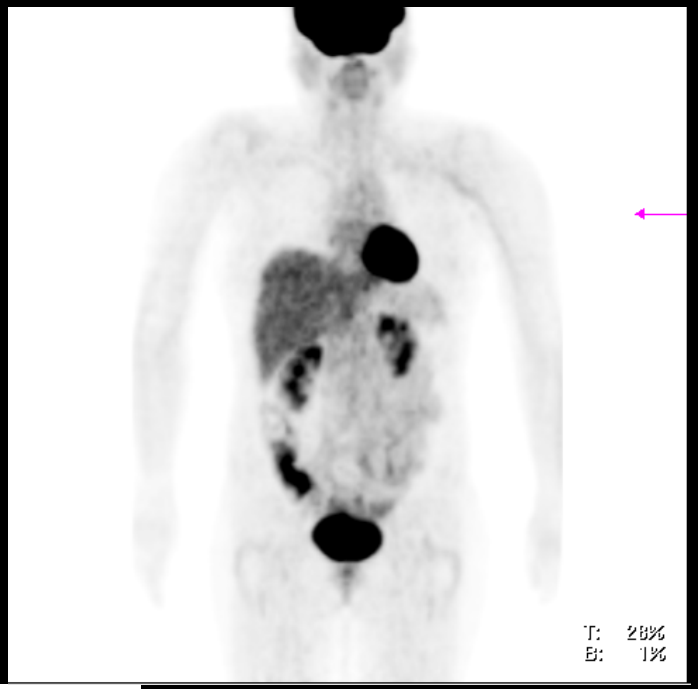
INTERIM FDG PET

- Falsos (+) por Rituximab
- PET (+) debe ser estudiado histológicamente antes de decidir cambio de terapia
- En caso de RT, reetapificación pre-RT



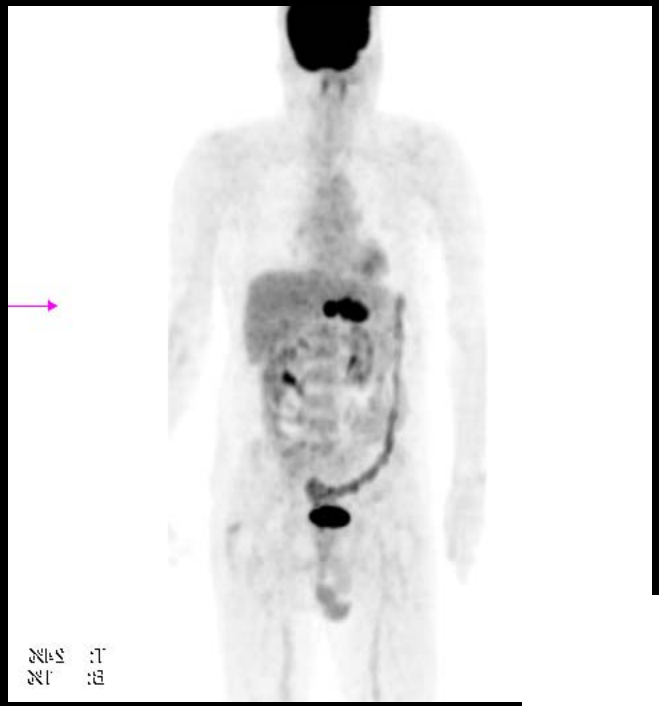
BASAL



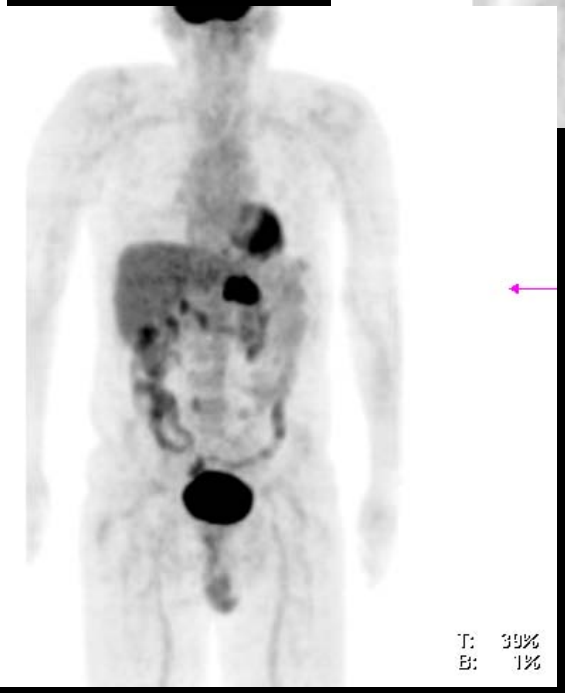


POST 2 CICLOS

8 SEMANAS POST TTO



BASAL



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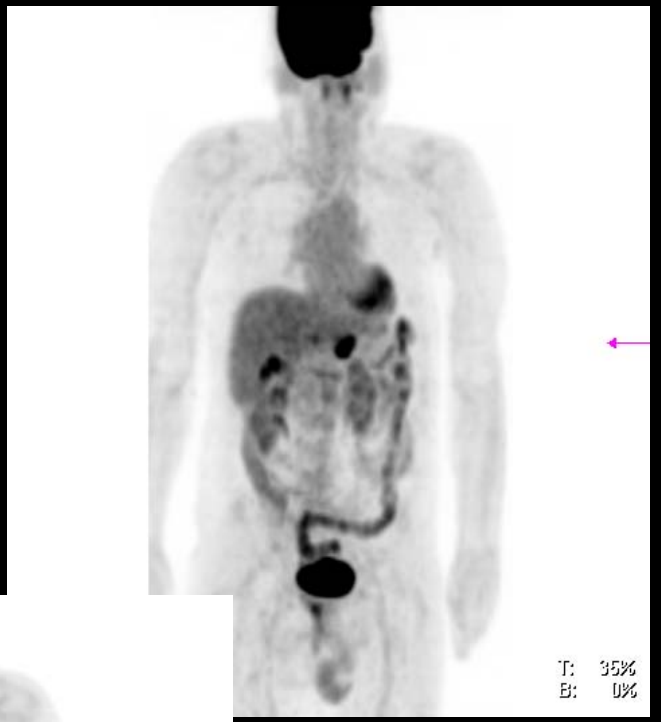


POST 2 CICLOS

CONTROL FIN DE TRATAMIENTO

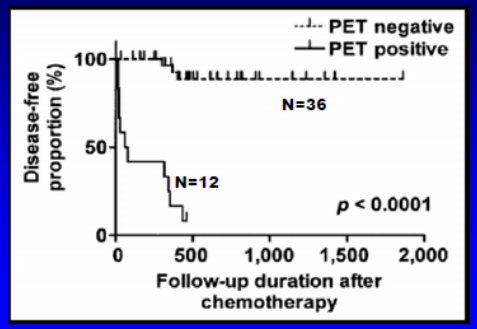
- Masa residual: 20-60% de pacientes (hasta 70% en EH)
- Mayor VPP y VPN que las demás técnicas convencionales
- Más confiable en tumores con alta captación de 18F-FDG

Prognostic Value of Post-Treatment PET in HD

AUTHOR	YEAR	# PTS	RFS	PPV	NPV
Weihrauch	2001	28	1 yr	60%	95%
Spaepen	2001	60	2 yr	100%	91%
Mikhaeel	2002	65	1 yr	100%	93%
Guay	2003	48	1 yr	92%*	92%*

** CT: PPV=45%, NPV=80%*

Prognostic Value of Post-Treatment PET in HD

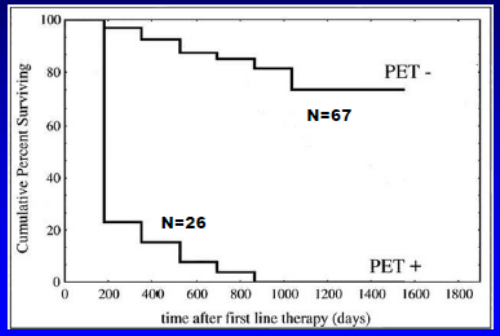


C Guay, M Lepine, J Verreault et al. Prognostic value of PET using 18F-FDG in Hodgkin's disease for posttreatment evaluation JNM 2003; 44:1225-31

Prognostic Value of Post-Treatment PET in NHL

AUTHOR	YEAR	# PTS	RFS	PPV	NPV
Mikhaeel	2000	49	1 yr	100%	83%
Spaepen	2001	93	2 yr	96%	85%
Juweid	2002	38	1 yr	92%	88%

Prognostic Value of Post-Treatment PET in NHL



K Spaepen, S Stroobants, P Dupont et al. Prognostic value of positron emission tomography (PET) with fluorine-18 fluorodeoxyglucose ([18F]FDG) after first-line chemotherapy in non-Hodgkin's lymphoma: is [18F]FDG-PET a valid alternative to conventional diagnostic methods? J Clin Oncol 2001; 19:414-9

CONTROL DE TRATAMIENTO: TIMING

- Cirugía:
  - ~ 2 meses para evaluar sitio cirugía
  - Sin restricción para evaluar enfermedad a distancia

- **Radioterapia**
  - **El mayor tiempo posible, mínimo 3 meses**
  - Indispensable comparación con estudio basal
  - Indispensable antecedentes de RT

- **Quimioterapia:**
  - Durante el tratamiento: inmediatamente antes del siguiente ciclo para reducir el cell stuning
  - Fin de tratamiento: **Mínimo 4 semanas, idealmente 8**

REETAPIFICACION

PET/CT in Lymphoma Re-Staging

(N = 27; 18 NHL, 9 HD)

Modality	Sens	Spec	PPV	NPV	Accur per Pt	Accur per Site
CT	61%	89%	54%	92%	**84%**	**61%**
PET	78%	98%	90%	96%	**95%**	**78%**
CT & PET	91%	99%	96%	98%	**98%**	**91%**
PET/CT	96%	99%	96%	99%	**99%**	**96%**

LS Freudenberg, G Antoch, P Schutt et al. FDG-PET/CT in re-staging of patients with lymphoma. Eur J Nucl Med Mol Imag 2004; 31:325-329.

PET/CT IN NCCN GUIDELINES 03 & 04 2011 RECOMMENDATIONS IN NHL

- Estudio basal para linfomas agresivos:
  - HD
  - DLBCL
  - Linfoma asociado a VIH
  - Micosis fungoide
  - Linfoma células T NK

- Estudio basal para definir presencia de enfermedad sistémica en linfomas supuestamente localizados:

  HD, DLBCL, FL, Células del manto, asociado a VIH, zona marginal, células T periféricas, MALT, etc

- Monitorización terapia linfomas agresivos (HD, DLBCL)

- Evaluación masa residual * Linfoma primario mediastínico células grandes B.

National Comprehensive Cancer Network®

NCCN Guidelines™ Version 4.2011
Non-Hodgkin's Lymphomas

NCCN Guidelines Index
NHL Table of Contents
Discussion

REVISED RESPONSE CRITERIA FOR LYMPHOMA (including PET)[a]

Response	Definition	Nodal Masses	Spleen, Liver	Bone Marrow
CR	Disappearance of all evidence of disease	(a) FDG-avid or PET positive prior to therapy; mass of any size permitted if PET negative (b) Variably FDG-avid or PET negative; regression to normal size on CT	Not palpable, nodules disappeared	Infiltrate cleared on repeat biopsy; if indeterminate by morphology, immunohistochemistry should be negative
PR	Regression of measurable disease and no new sites	≥ 50% decrease in SPD of up to 6 largest dominant masses; no increase in size of other nodes (a) FDG-avid or PET positive prior to therapy; one or more PET positive at previously involved site (b) Variably FDG-avid or PET negative; regression on CT	≥ 50% decrease in SPD of nodules(for single nodule in greatest transverse diameter); no increase in size of liver or spleen	Irrelevant if positive prior to therapy; cell type should be specified
SD	Failure to attain CR/PR or PD	(a) FDG-avid or PET positive prior to therapy; PET positive at prior sites of disease and no new sites on CT or PET (b) Variably FDG-avid or PET negative; no change in size of previous lesions on CT		
Relapsed disease or PD	Any new lesion or increase by ≥ 50% of previously involved sites from nadir	Appearance of a new lesion(s) > 1.5 cm in any axis, ≥ 50% increase in SPD of more than one node, or ≥ 50% increase in longest diameter of a previously identified node > 1 cm in short axis Lesions PET positive if FDG-avid lymphoma or PET positive prior to therapy	> 50% increase from nadir in the SPD of any previous lesions	New or recurrent involvement

Source: Table 2 from Cheson BD, Pfistner B, Juweid ME, et al. Revised response criteria for malignant lymphoma. J Clin Oncol 2007;25(5):579-586. Reprinted with permission from the American Society of Clinical Oncology.

[a] Recommended for use with Diffuse Large B-Cell Lymphoma and Hodgkin Disease/Lymphoma.

Note: All recommendations are category 2A unless otherwise indicated.
Clinical Trials: NCCN believes that the best management of any cancer patient is in a clinical trial. Participation in clinical trials is especially encouraged.