Incidentalomes thyroïdiens en TEP/TDM

Réunion de DES Auvergne-Rhône-Alpes 25 mai 2019

Vincent HABOUZIT (interne S8 CHU Saint Etienne)

Incidentalomes thyroïdiens en 18F-FDG

Diagnostic and Clinical Significance of F-18-FDG-PET/CT Thyroid Incidentalomas

Clin Endocrinol Metab, November 2012, 97(11):3866–3875

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Review
27 études
147 505 pts

First author	Ref.	Year	n	N.TI (%)	N.TIFI (%)	N.Mal (%)
Cohen	15	2001	4,525	102 (2.3)	15 (15)	7 (47)
Kang	23	2003	1,330	29 (2.2)	15 (52)	4 (27)
Hsieh	35	2003	477	12 (2.5)	10 (83)	1 (8)
Ishimori	22	2005	1,912	29 (1.5)	11 (38)	6 (24)
Chen	16	2005	4,803	60 (1.2)	50 (83)	7 (14)
Kim	18	2005	4,136	94 (2.2)	32 (34)	16 (50)
Chu	20	2006	6,241	76 (1.2)	14 (18)	4 (29)
Even-Sapir	32	2006	2,360	59 (2.5)	41 (70)	13 (32)
Choi	17	2006	1,763	70 (4)	44 (63)	17 (39)
Nam	31	2007	689	19 (2.8)	12 (63)	5 (42)
Bogsrud	19	2007	7,347	79 (1.1)	48 (61)	15 (35)
Are	13	2007	8,800	263 (2.9)	84 (32)	44 (52)
King	30	2007	15,711	22 (0.2)	22 (100)	3 (14)
Kwak	34	2008	14,434	88 (0.6)	85 (97)	42 (49)
Chen	36	2009	2,594	99 (3.8)	11 (11)	7 (64)
Bae	28	2009	3,379	285 (8.4)	99 (35)	22 (23)
Eloy	37	2009	630	30 (4.8)	18 (60)	5 (28)
Kang	38	2009	12,840	1,151 (8.9)	190 (16)	57 (30)
Zhai	29	2010	3,600	115 (3.2)	96 (83)	48 (50)
Kim	26	2010	11,623	159 (1.4)	140 (88)	37 (26)
Ohba	33	2010	1,501	20 (1.3)	20 (100)	11 (55)
Nishimori	21	2011	4,726	160 (3.38)	50 (31)	9 (18)
Nilsson	24	2011	3,641	64 (1.8)	27 (42)	16 (59)
Ho	25	2011	5,877	220 (3.7)	55 (25)	8 (15)
Pagano	27	2011	11,040	191 (1.8)	37 (19)	15 (40)
Bonabi	39	2012	3,062	75 (2.4)	42 (56)	10 (24)
Pampaloni	40	2012	8,464	156 (1.8)	40 (71)	15 (38)

Incidence poolée : 2,46% ; I min / max : 0,2-8,9%
Asie : 1,83% ; Amérique du Nord : 2,05% ; Europe : 3%

Malignité : 34,6%
Min / max : 8-64%

Bertagna et al. Clin Endocrinol Metab 2012

Limites :

- **+++ Rétrospectives**
- **Nombre de patients variable**
- **Population hétérogène (FDR pathologie thyroïdienne…)**
- **+/- faible taux de cytoponction/chirurgie (Chen)**
- **Gold standard variable (cyto, anapath)**

				N.TI (%)	N.TIFI (%)	N.Mal (%)
				102 (2.3)	15 (15)	7 (47)
				29 (2.2)	15 (52)	4 (27)
				12 (2.5)	10 (83)	1 (8)
				29 (1.5)	11 (38)	6 (24)
				60 (1.2)	50 (83)	7 (14)
				94 (2.2)	32 (34)	16 (50)
				76 (1.2)	14 (18)	4 (29)
				59 (2.5)	41 (70)	13 (32)
				70 (4)	44 (63)	17 (39)
				19 (2.8)	12 (63)	5 (42)
				79 (1.1)	48 (61)	15 (35)
				263 (2.9)	84 (32)	44 (52)
				22 (0.2)	22 (100)	3 (14)
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Incidence poolée : 2,46% ; I min / max : 0,2-8,9%
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Bertagna et al. Clin Endocrinol Metab 2012

Malignité : 34,6%
Min / max : 8-64%

TABLE 2. THE 2017 BETHESDA SYSTEM FOR REPORTING THYROID CYTOPATHOLOGY: IMPLIED RISK OF MALIGNANCY AND RECOMMENDED CLINICAL MANAGEMENT

Diagnostic category	*Risk of malignancy if NIFTP ≠ CA (%)*	*Risk of malignancy if NIFTP = CA (%)*	*Usual management*[a]
I. Nondiagnostic or unsatisfactory	5–10	5–10	Repeat FNA with ultrasound guidance
II. Benign	0–3	0–3	Clinical and sonographic follow-up
III. Atypia of undetermined significance or follicular lesion of undetermined significance	6–18	~10–30	Repeat FNA, molecular testing, or lobectomy
IV. Follicular neoplasm or suspicious for a follicular neoplasm	10–40	25–40	Molecular testing, lobectomy
V. Suspicious for malignancy	45–60	50–75	Near-total thyroidectomy or lobectomy[b,c]
VI. Malignant	94–96	97–99	Near-total thyroidectomy or lobectomy[c]

Cibas et al. Thyroid 2017

Etiologie ?

First author	Ref.	Year	N.Mal	PTC, n (%)	FTC, n (%)	HcC, n (%)	PDC, n (%)	MTC, n (%)	Other, n (%)
Cohen	15	2001	7	4 (57)		2 (29)	1 (14)		
Kang	23	2003	4	3 (75)	1 (25)				
Ishimori	22	2005	6	6 (100)					
Chen	16	2005	7	7 (100)					
Kim	18	2005	16	14 (88)					2 (12)
Chu	20	2006	4	4 (100)					
Choi	17	2006	17	16 (94)					1 (6)
Nam	31	2007	5	4 (80)	1 (20)				
Bogsrud	19	2007	15	12 (80)					3 (20)
Are	13	2007	44 (20#)	19 (95)					1 (5)
Kwak	34	2008	42	39 (93)				3 (7)	
Chen	36	2009	7	3 (42)	2 (29)				2 (29)
Eloy	37	2009	5	5 (100)					
Kang	38	2009	57	56 (98)	1 (2)				
Kim	26	2010	37	36 (97)		1 (3)			
Ohba	33	2010	11	10 (91)					1 (9)
Nishimori	21	2011	9	9 (100)					
Nilsson	24	2011	16	9 (56)	5 (31)				2 (13)
Ho	25	2011	8	7 (88)				1 (12)	
Pagano	27	2011	15	13 (87)	2 (13)				
Bonabi	39	2012	10	5 (50)			1 (10)	1 (10)	3 (30)
Pampaloni	40	2012	15	11 (73)	1 (7)		1 (7)		2 (13)

84% C. Papillaire

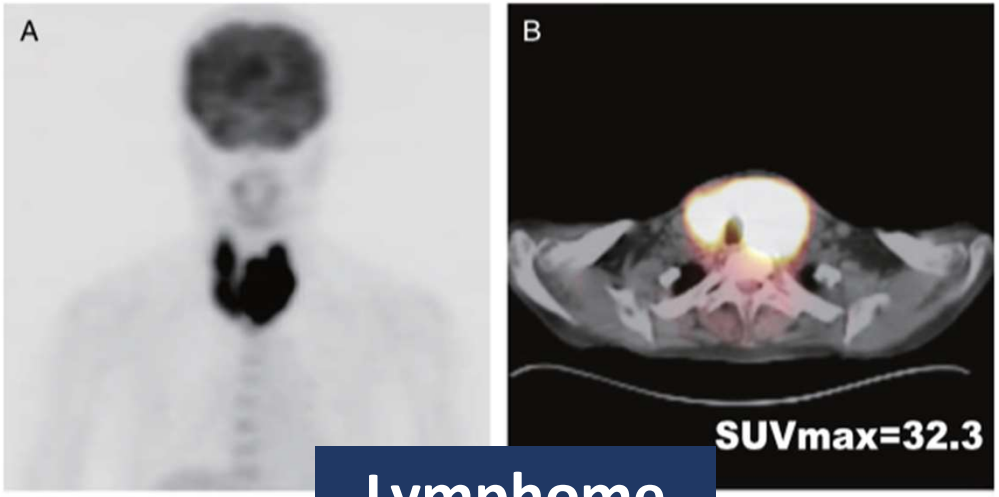
Bertagna et al. Clin Endocrinol Metab 2012

Autres néoplasies ?

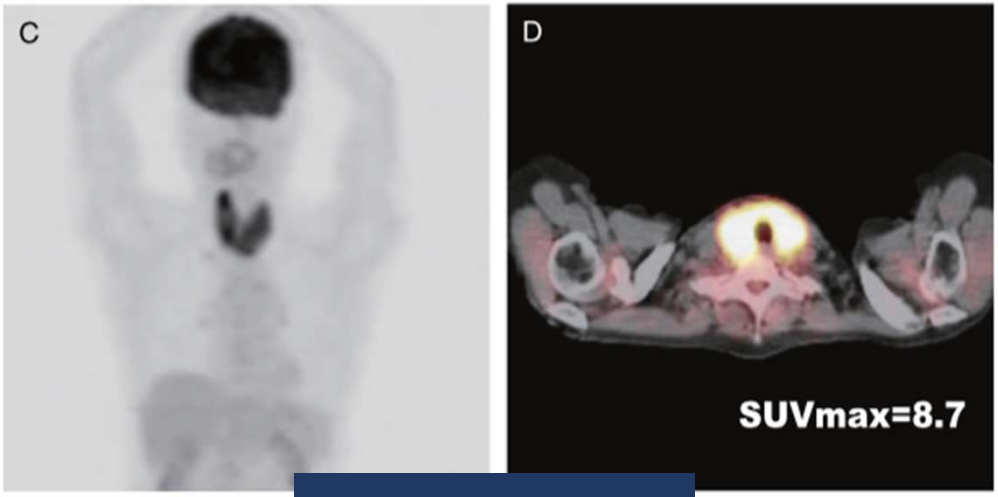
- Localisations secondaires thyroïdiennes :
  - 1,4% des néoplasies thyroïdiennes

  (Lin et al. Thyroid 1998)
  - Primitif : Rein (33%) > poumon (16%) = sein (16%) > œsophage (9%) > utérus (6%) ; colon, mélanome…

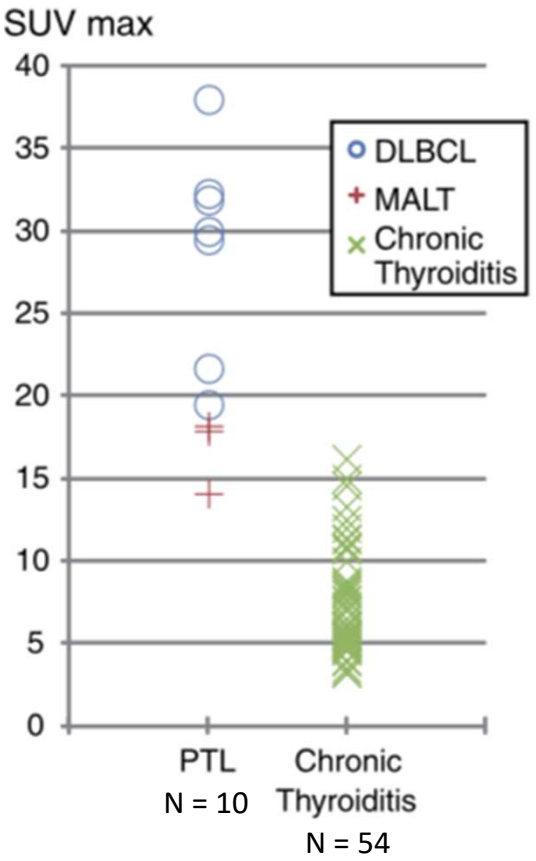
  (Nakhjavani et al. Cancer 1997)
- Localisations lymphomateuses
  - Hypermétabolisme focal ou diffus
  - Terrain de thyroïdite
  - +++ LBD, MALT

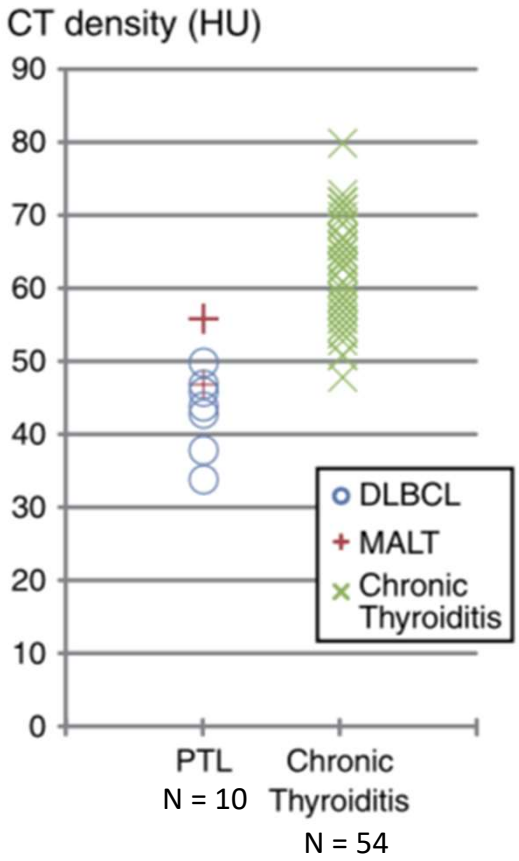


Lymphome



Thyroïdite





Nakadate et al. Clin Nucl Med 2013

CAT ? ATA 2015

american thyroid association

(A) Focal [^{18}F]fluorodeoxyglucose positron emission tomography (^{18}FDG-PET) uptake within a sonographically confirmed thyroid nodule conveys an increased risk of thyroid cancer, and FNA is recommended for those nodules ≥1 cm.

(Strong recommendation, Moderate-quality evidence)

B) Diffuse ^{18}FDG-PET uptake, in conjunction with sonographic and clinical evidence of chronic lymphocytic thyroiditis, does not require further imaging or FNA.

(Strong recommendation, Moderate-quality evidence)

CAT ? Importance du pronostic du cancer index

Follow-up parameter	Data
Follow-up (mo)	
Median	24
Range	1–103
Survival (mo)	
Median	20
Range	0–93
Survival status at last follow-up (*n*)	
Alive	182 (50)
Dead	180 (50)
Primary cancer	166 (45.9)
Incidental ^{18}F-FDG–avid TI	1 (0.3)
Nonmaligant etiology	13 (3.6)

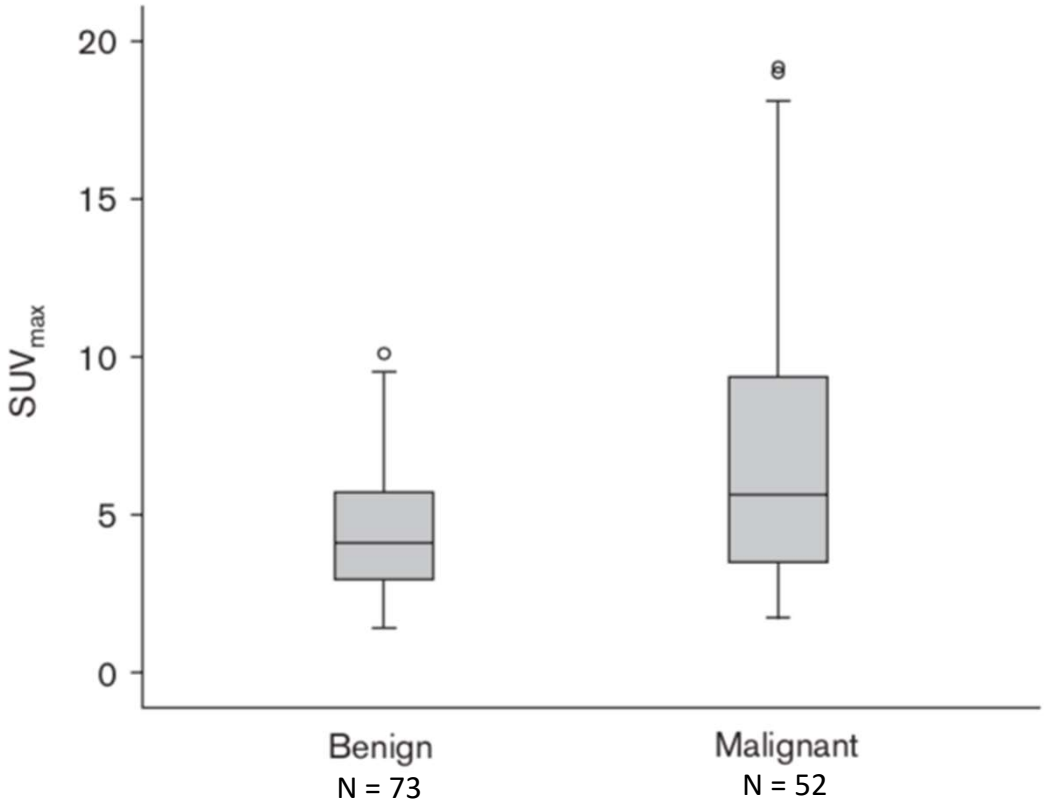
Pattison et al. JNM 2018

Préciser le risque de malignité : SUVmax ?

Pas de Cut-off de SUVmax satisfaisant

First author	Ref.	Year	SUV benign	SUV malignant	*P* value
Bloom	61	1993	3.0–4.3	10.8	<0.05
Cohen	15	2001	3.4	6.9	<0.05
Kang	23	2003	6.5	14.2	<0.05
Mitchell	62	2005	1.1–3.3	6.5	<0.05
Kim	18	2005	6.1	5.1	NS
Choi	17	2006	6.7	10.7	<0.05
Are	13	2007	8.2	9.2	NS
Bogsrud	19	2007	5.6	6.4	NS
Kim	51	2007	3.6	3.4	NS
Nam	31	2007	4.2	8.4	NS
Kwak	34	2008	6.0	7.6	NS
Chen	36	2009	2.9	4.0	NS
Eloy	37	2009	2.9	3.4	NS
Kang	38	2009	3.5	5.9	<0.05
Kim	26	2010	3.08	4.53	<0.05
Ho	25	2011	5.6	8.2	<0.05
Pagano	27	2011	<5[a]	>5[a]	<0.05[a]
Bonabi	39	2012	5.05	7.8	NS
Pampaloni	40	2012	7.2	5.5	NS

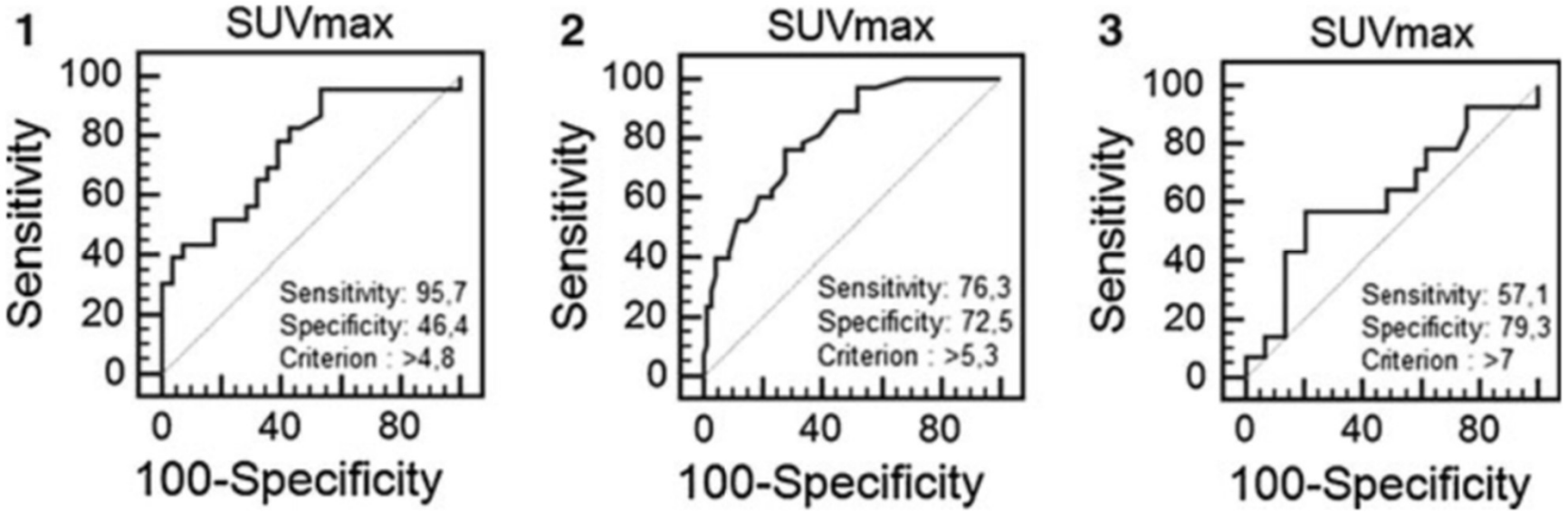
Bertagna et al. Clin Endocrinol Metab 2012



Shie et al. Nucl Med Com 2009

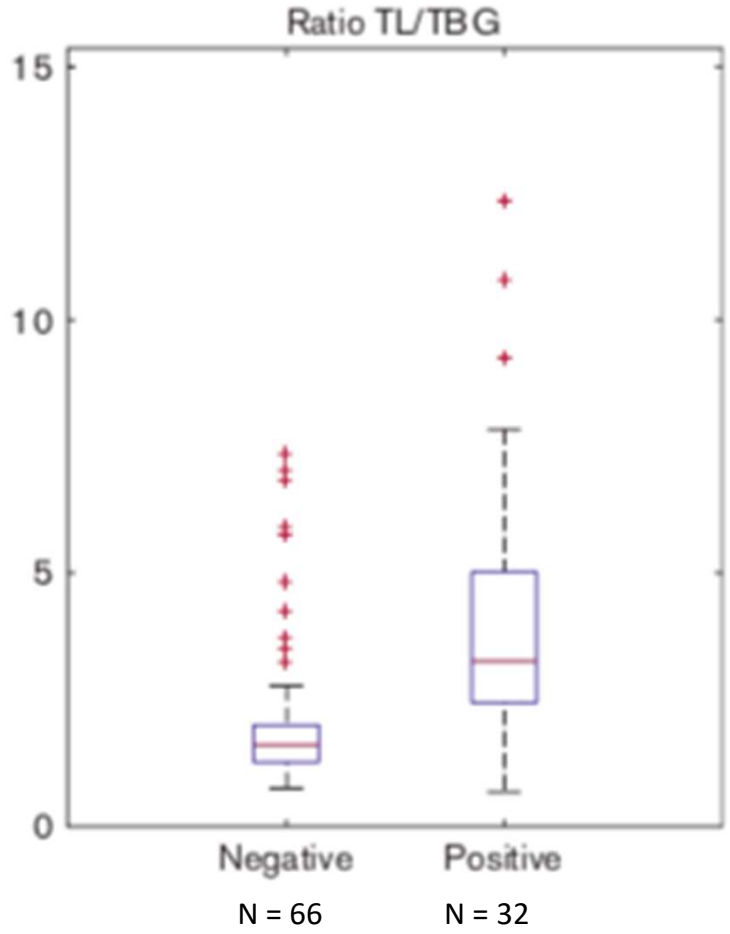
Préciser le risque de malignité : SUVmax ?

Centre	Benign (N./%)	Malignant (N./%)	Not diagnostic (N./%)	Indeterminate (N./%)	Total
Centre N.1	27 (42.2)	22 (34.4)	4 (6.2)	11 (17.2)	64
Centre N.2	69 (64.5)	38 (35.5)	–	–	107
Centre N.3	28 (70)	12 (30)	–	–	40
Total	124 (58.8)	72 (34.1)	4 (1.9)	11 (5.2)	211



Bertagna et al. Clin Endocrine 2013

Préciser le risque de malignité : SUVmax foyer / SUVmoy thyroïde ?



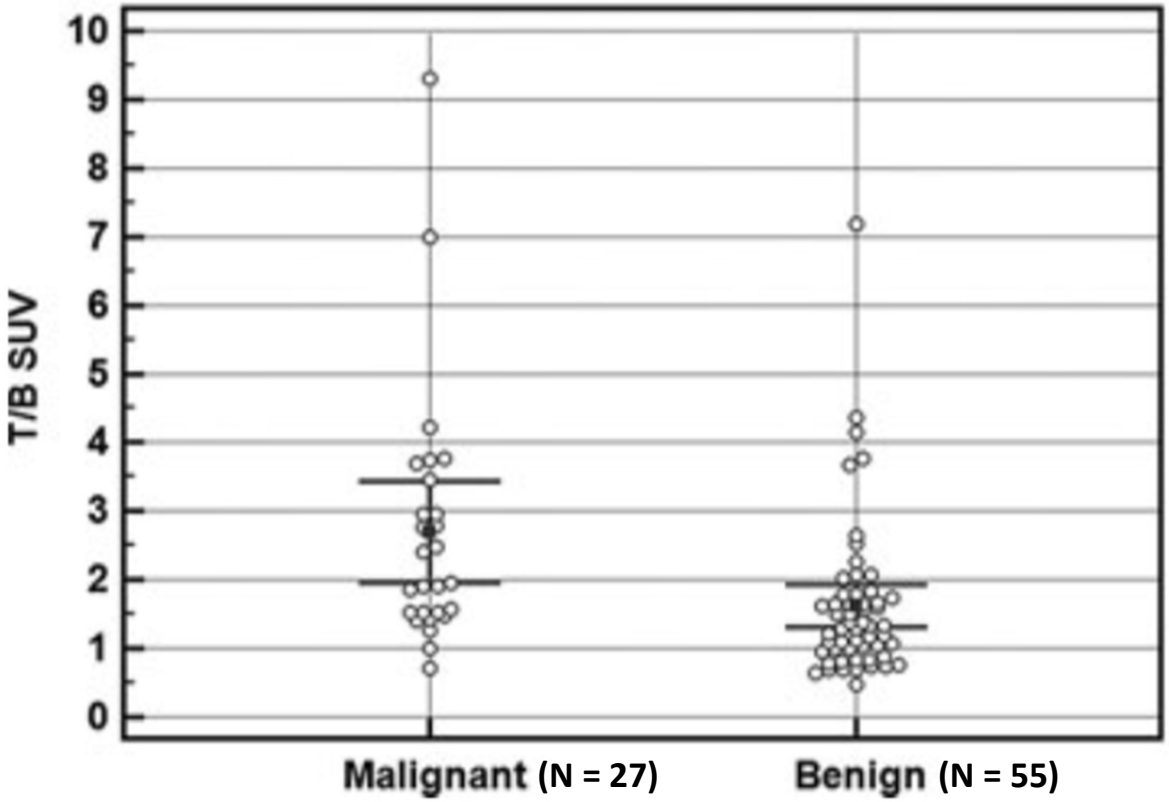
Cut-off TL/TBG > 2 :

- **Se 88% Sp 76%**
- **VPP 64% VPN 93%**
- **AUC 0,82**

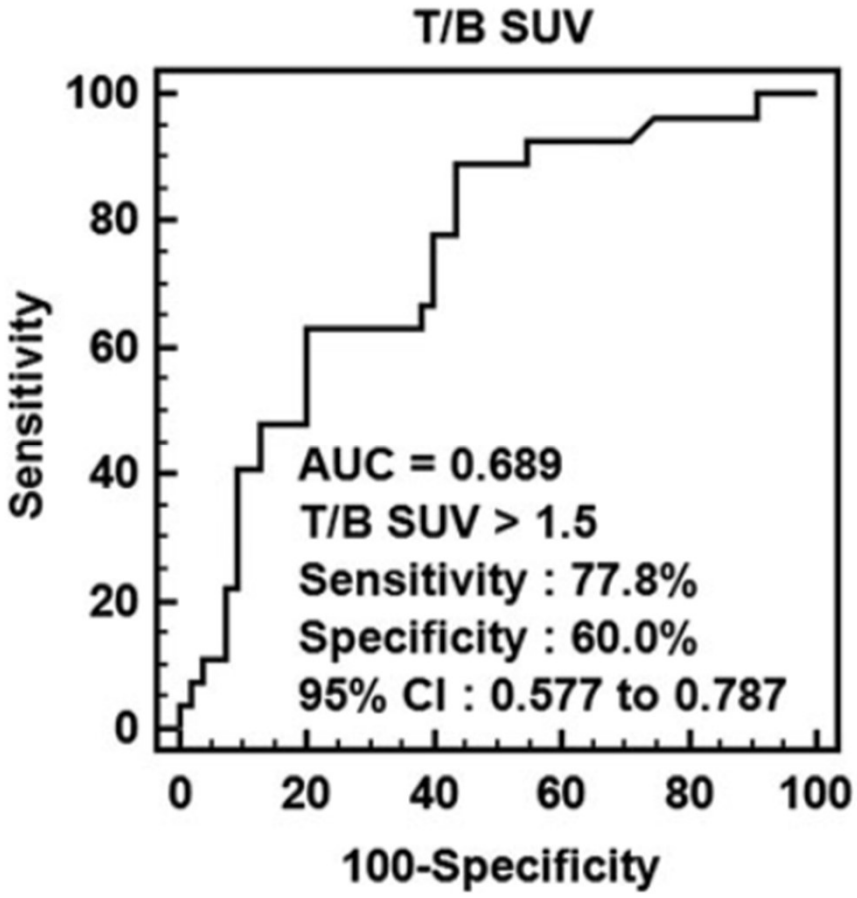
Limites du Gold Standard +++ :
Relecture cytologie
Pts + = explorations complémentaires nécessaires (nouvelle cyto, thyroïdectomie)
Pts - = pas d'autre exploration

Barrio et al. Nucl Med Com 2016

Préciser le risque de malignité : SUVmax foyer / SUVmoy foie ?

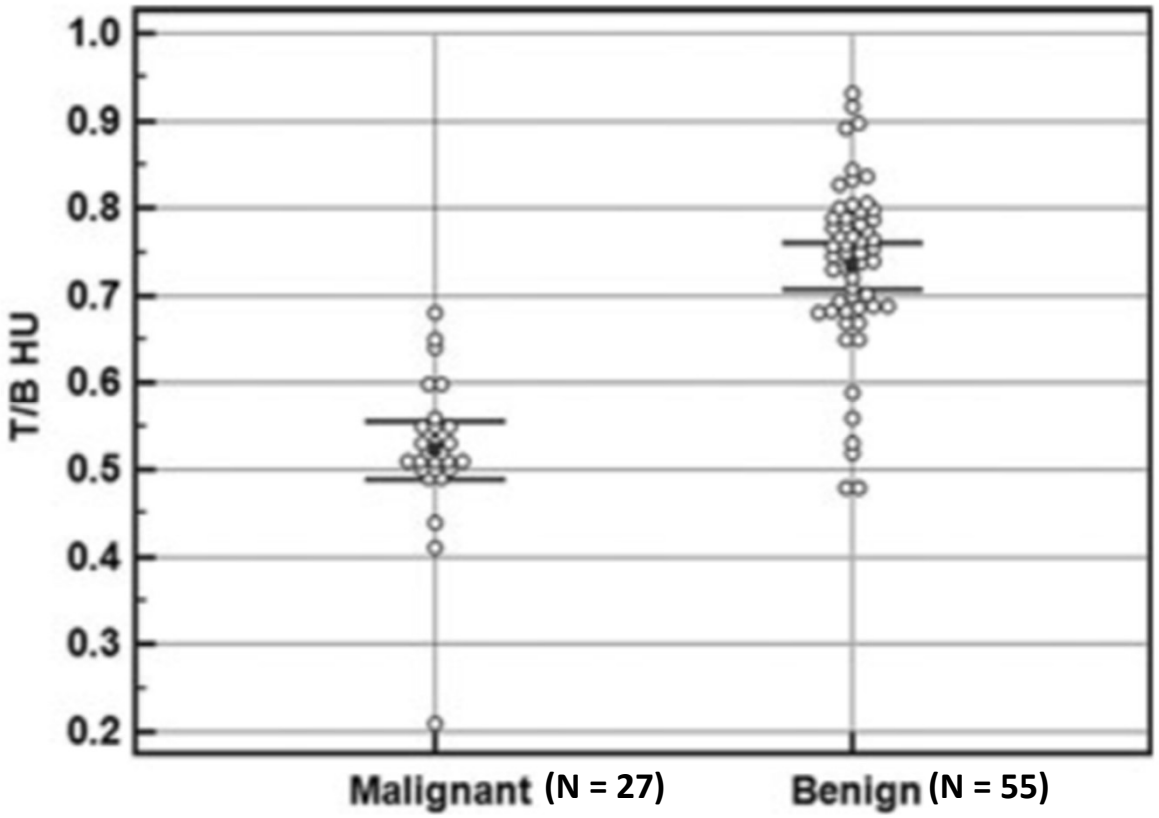


malignant: 2.69 +/– 1.86 ; benign: 1.62 +/– 1.15; p = 0.0019

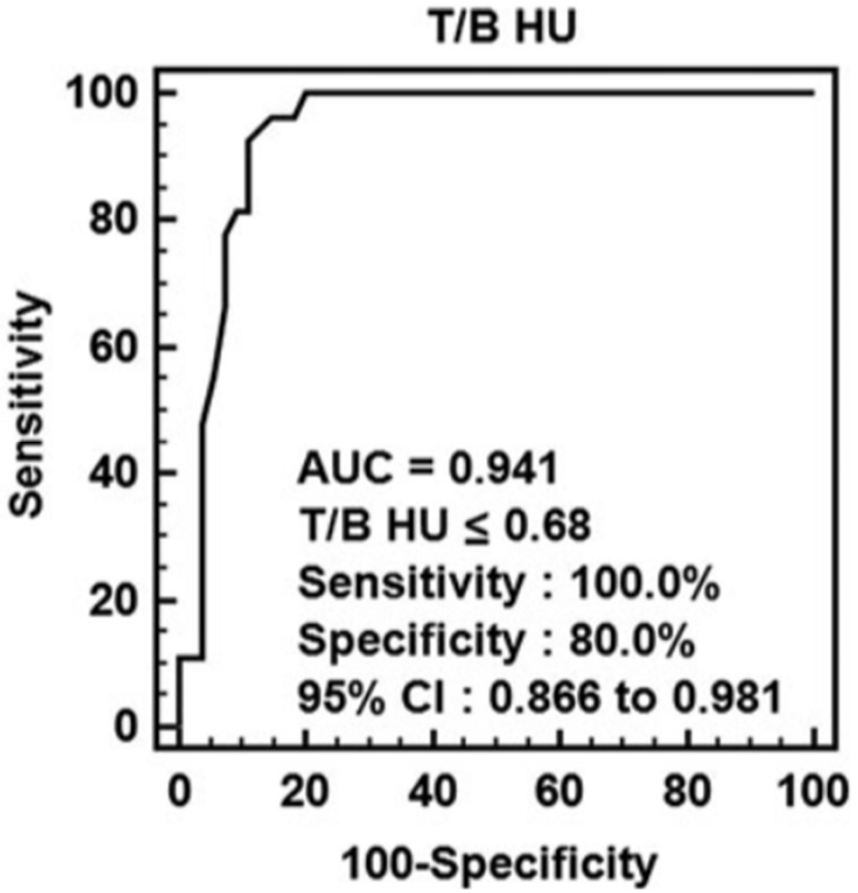


Kim et al. Thyroid 2015

Préciser le risque de malignité : UH nodule / UH thyroïde saine ?

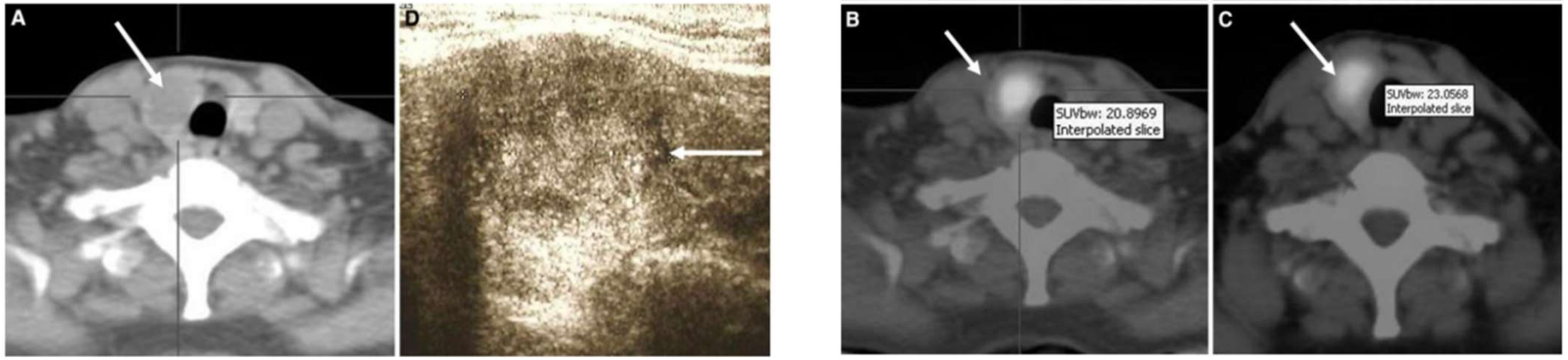


malignant: 0.52 +/– 0.08 ; benign: 0.73 +/– 0.09; p < 0.0001



Kim et al. Thyroid 2015

Préciser le risque de malignité : TEP à 60 et 120 min ?



60 min : SUV max 20,9 **120 min : SUV max 23,1**

Différence significative de Delta SUV max :
Malin : 14.9 ± 11.4 % vs Bénin -1.6 ± 13.7 % ; p = 0.0001

Imaging technique	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)	Accuracy (%)
USG	80.8	81.6	39.6	96.6	81.5
PET/CT (at 60 min)	80.8	84.5	43.8	96.7	84
PET/CT (dual time point imaging)	84.6	85.6	46.8	97.4	85.5

D'Souza et al. Ann Nucl Med 2010

Différence NS

CL incidentalome thyroïdien 18F-FDG

- 1/3 malignité
- +++ C. papillaire
- Pas de cut-off de SUVmax
- CAT :
  - Echographie recommandée (+ cytoponction pour nodules > = 1 cm)
  - Pronostic du cancer index

Autres traceurs TEP

18F- / 11C- Choline

Endocrine
https://doi.org/10.1007/s12020-019-01841-z

REVIEW

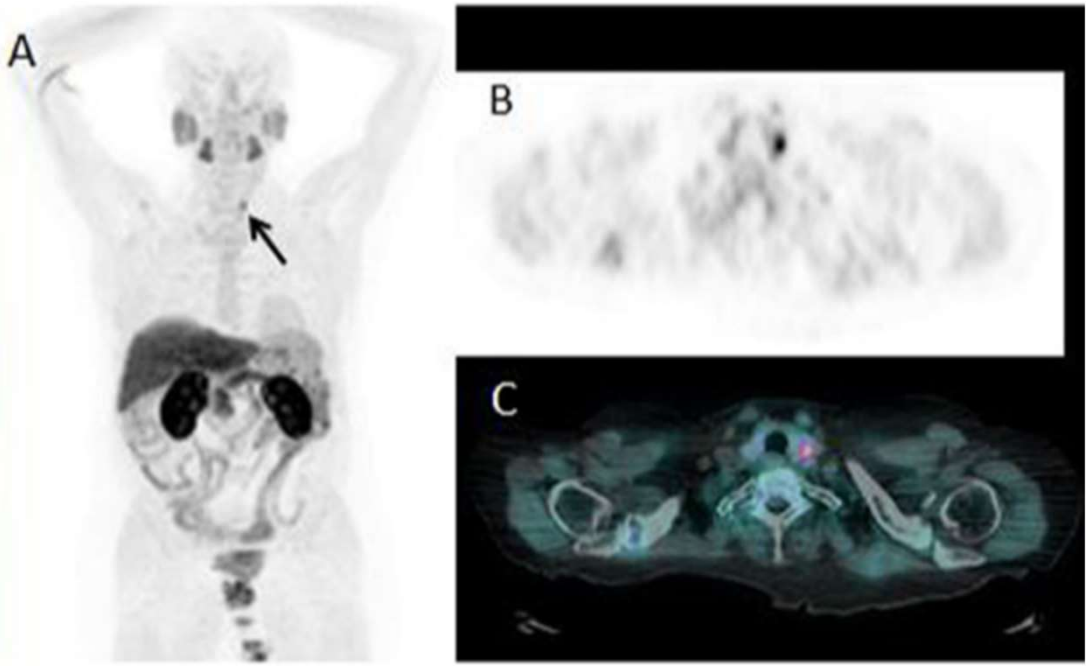
F18-choline/C11-choline PET/CT thyroid incidentalomas

Francesco Bertagna[1] · Domenico Albano[1] · Luca Giovanella[2] · Raffaele Giubbini[1] · Giorgio Treglia[2,3,4]

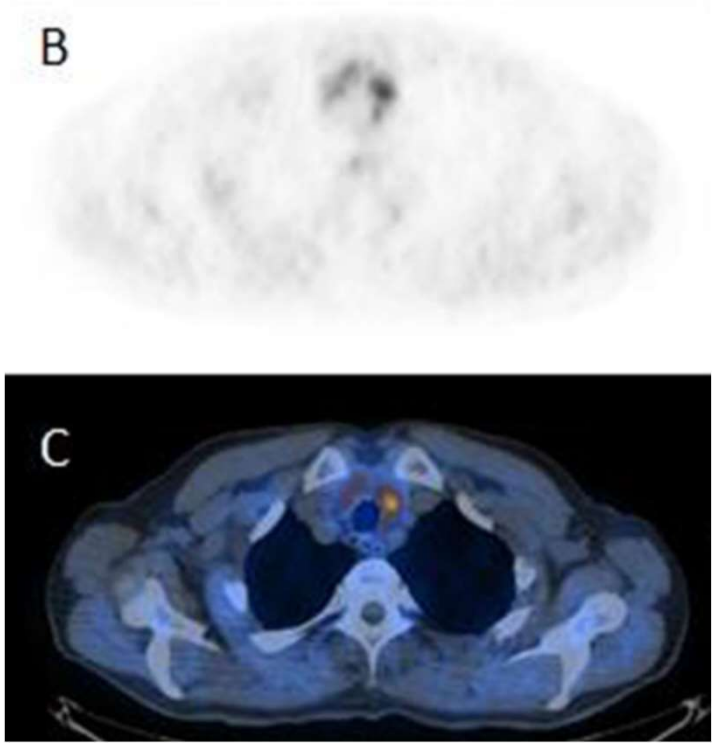
Received: 8 November 2018 / Accepted: 3 January 2019

- 15 articles (14 case reports)
- Ruiz-Esponda et al. Endo. Rev. 2014 : incidentalome 11C-Choline 20/1197 pts (**0,17%**) → **14/15 explorés = bénins**
- Parvinian et al. Am J Roentgenol : incidentalome 11C-Choline 3/2933 (**0,1%**) ; étiologie non précisée
- Au total **7/8 incidentalomes thyroïdiens malins = C. papillaire**

18F-Choline



CP tall cell



Hyperplasie nodulaire

- 368 pts KC prostate ; 9 incidentalomes (**2,4%**)
- 8 explorés : 2 Carcinomes thyroïdiens ; 5 bénins ; 1 indéterminé

Albano et al. Endocrine 2018

68Ga-PSMA

Hormones
https://doi.org/10.1007/s42000-019-00106-8

REVIEW ARTICLE

Francesco Bertagna[1] · Domenico Albano[1] · Luca Giovanella[2] · Mattia Bonacina[1] · Rexhep Durmo[1] · Raffaele Giubbini[1] · Giorgio Treglia[2,3,4]

Received: 19 November 2018 / Accepted: 25 March 2019

- 12 articles
- 23 incidentalomes thyroïdiens
  - 6 malins (26%) : 5 KC thyroïdiens primitifs ; 1 métastase rénale
  - 16 bénins
  - 1 indéterminé

Merci de votre attention