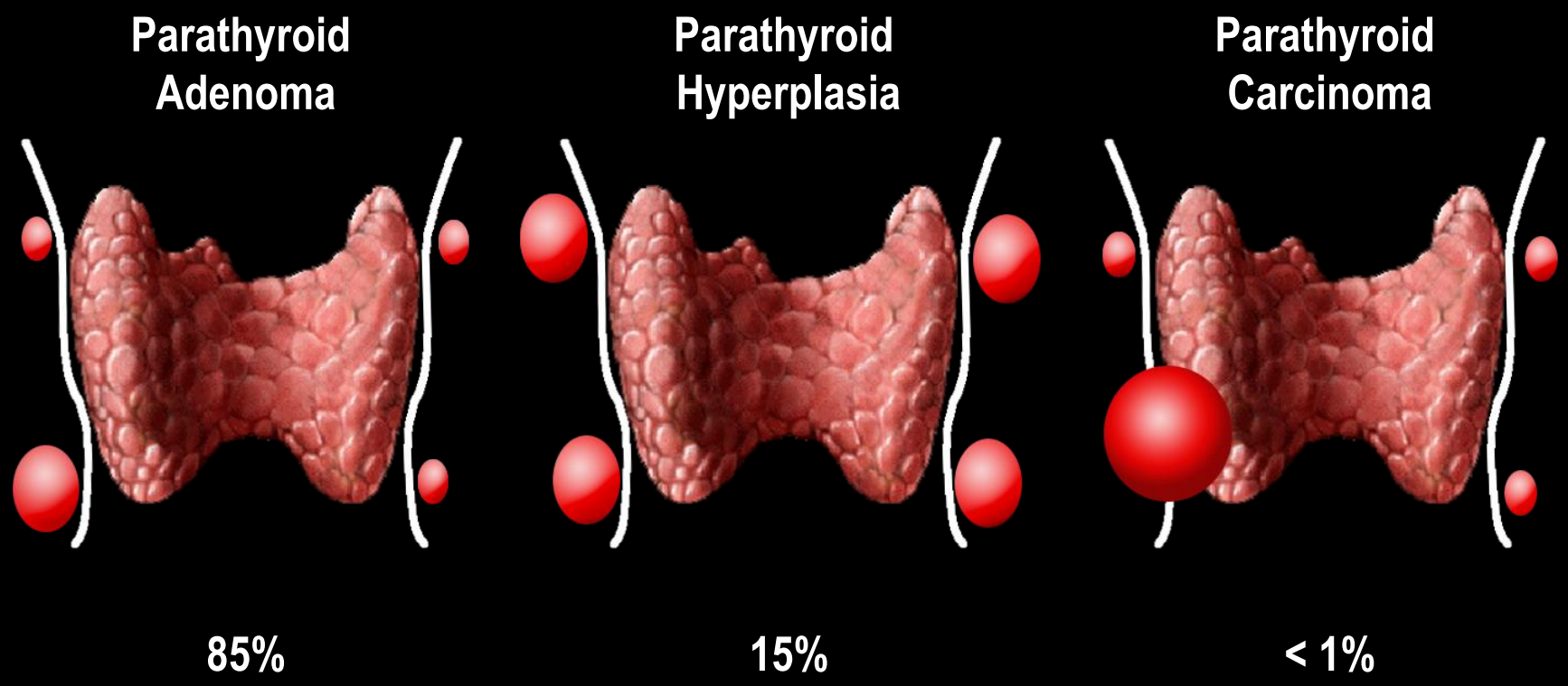
Iperparatiroidismo normocalcemico subclinico e conclamato nei nostri ambulatori

R. Cesareo

UO Malattie Metaboliche

Ospedale «S.M.Goretti» Latina

IPERPARATIROIDSIMO PRIMITIVO
EZIOLOGIA



Iperparatiroidismo primitivo

Incidenza

- più frequente nel sesso femminile (2:1)
- prevale nella 5° e 6° decade di vita
- E’ la terza causa di endocrinopatia in ordine di frequenza

IPERPAPARTIRODISMO PRIMITIVO
QUADRO CLINICO

Bones, stones, abdominal
moans, and psychic groans”

Prior to 1974:
Prior to routine use of serum Ca test, diagnosis by symptoms

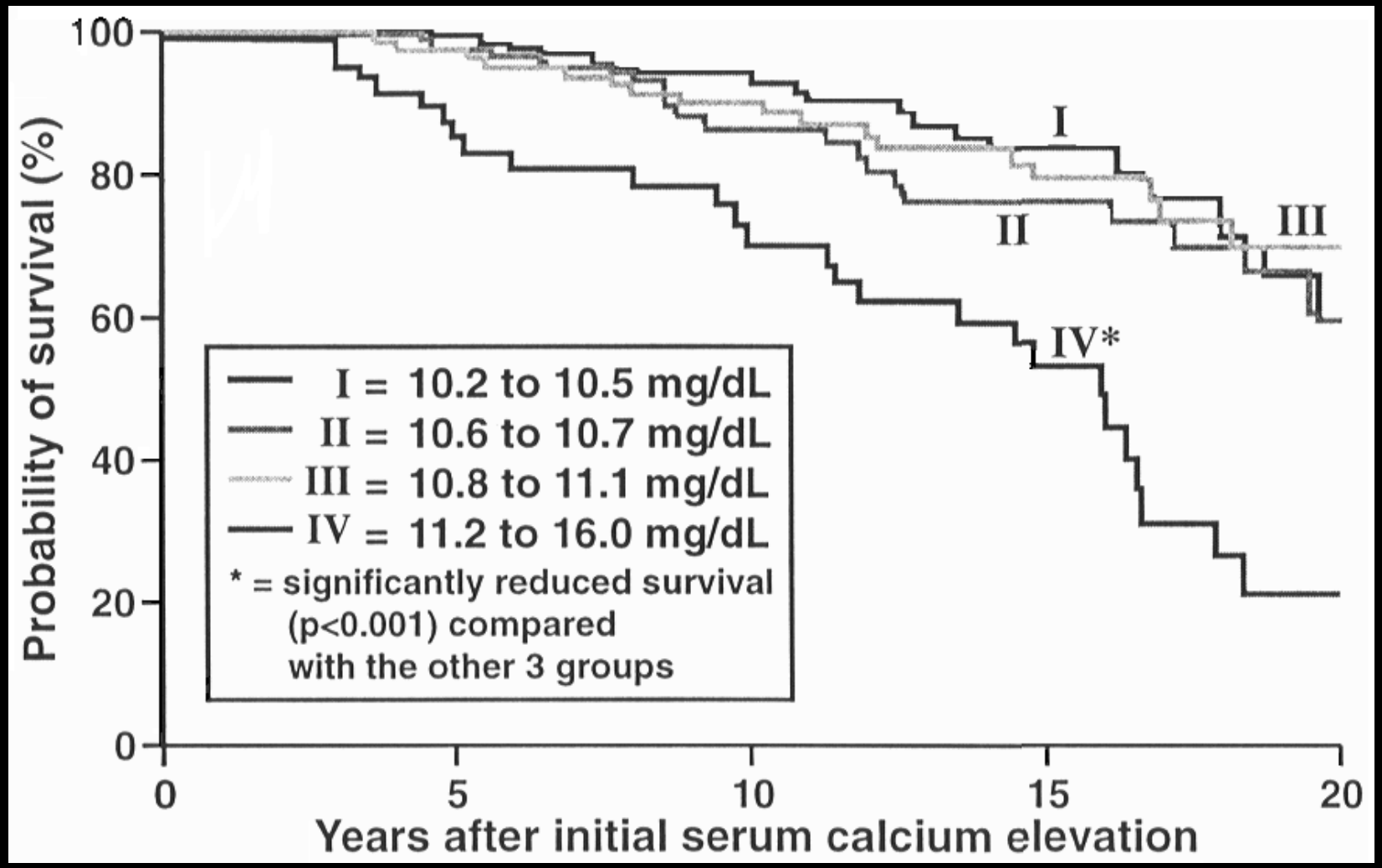
Mid 1970s to present:
Diagnosis by biochemical profile and subclinical symptoms

Guidelines for the Management of Asymptomatic Primary Hyperparathyroidism: Summary Statement from the Third International Workshop

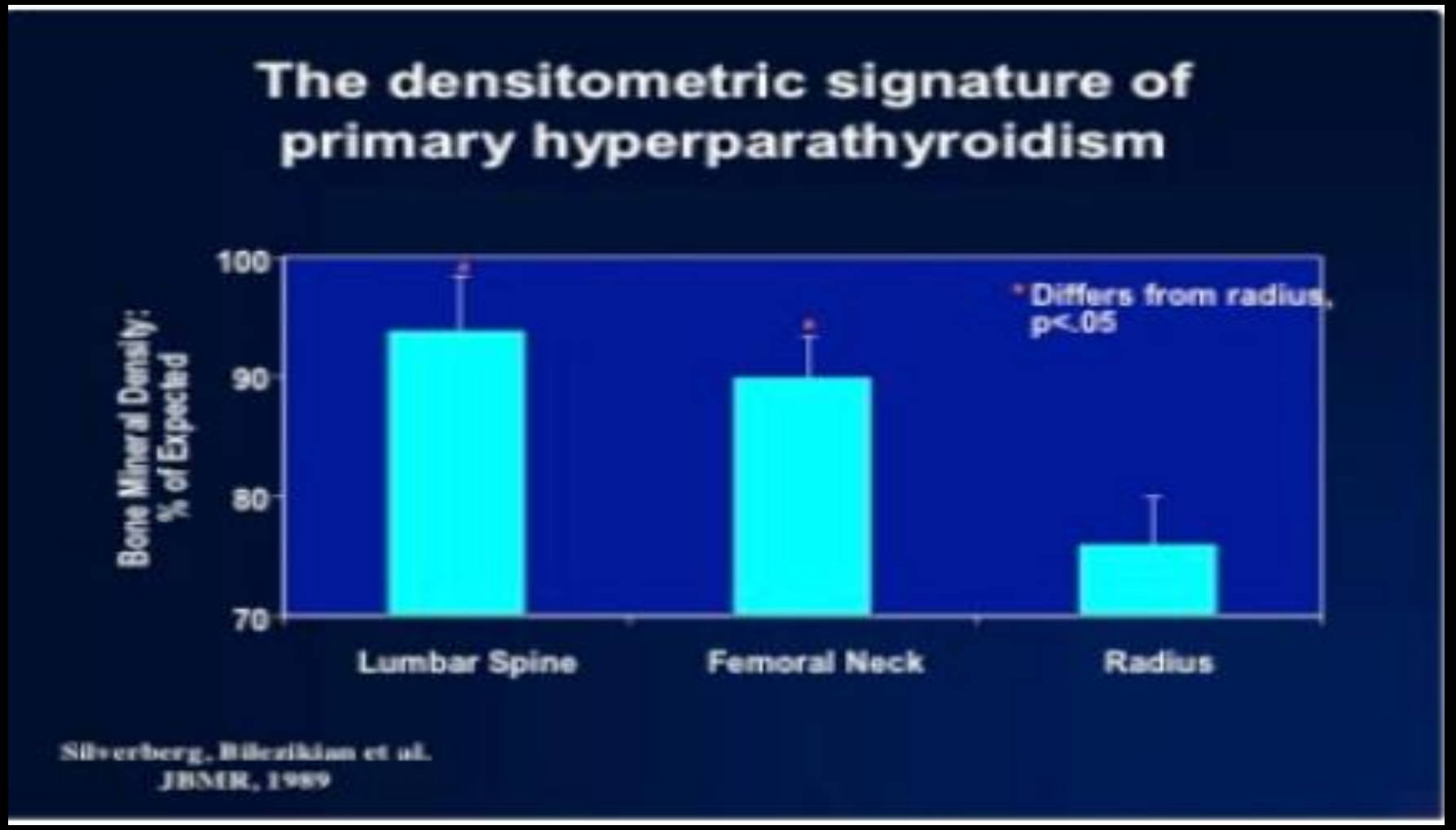
	1990	2002	2008	2013
Measurement[b]				
Serum calcium (>upper limit of normal)	1–1.6 mg/dL (0.25–0.4 mmol/L)	1.0 mg/dL (0.25 mmol/L)	1.0 mg/dL (0.25 mmol/L)	1.0 mg/dL (0.25 mmol/L)
Skeletal	BMD by DXA: Z-score <−2.0 (site unspecified)	BMD by DXA: T-score <−2.5 at any site[b]	BMD by DXA: T-score <−2.5 at any site[b] Previous fragility fracture[c]	A. BMD by DXA: T-score < −2.5 at lumbar spine, total hip, femoral neck, or distal 1/3 radius[b] B. Vertebral fracture by x-ray, CT, MRI, or VFA
Renal	A. eGFR reduced by >30% from expected B. 24-h urine for calcium >400 mg/d (>10 mmol/d)	A. eGFR reduced by >30% from expected B. 24-h urine for calcium >400 mg/d (>10 mmol/d)	A. eGFR < 60 cc/min B. 24-h urine for calcium not recommended	A. Creatinine clearance < 60 cc/min B. 24-h urine for calcium >400 mg/d (>10 mmol/d) and increased stone risk by biochemical stone risk analysis[d] C. Presence of nephrolithiasis or nephrocalcinosis by x-ray, ultrasound, or CT
Age, y	<50	<50	<50	<50

JCEM 2014

I pazienti non trattati hanno un aumentato tasso di mortalità ?



da: Wermers RA et al. Am J Med, 1998



J Bone Mineral Res 1989

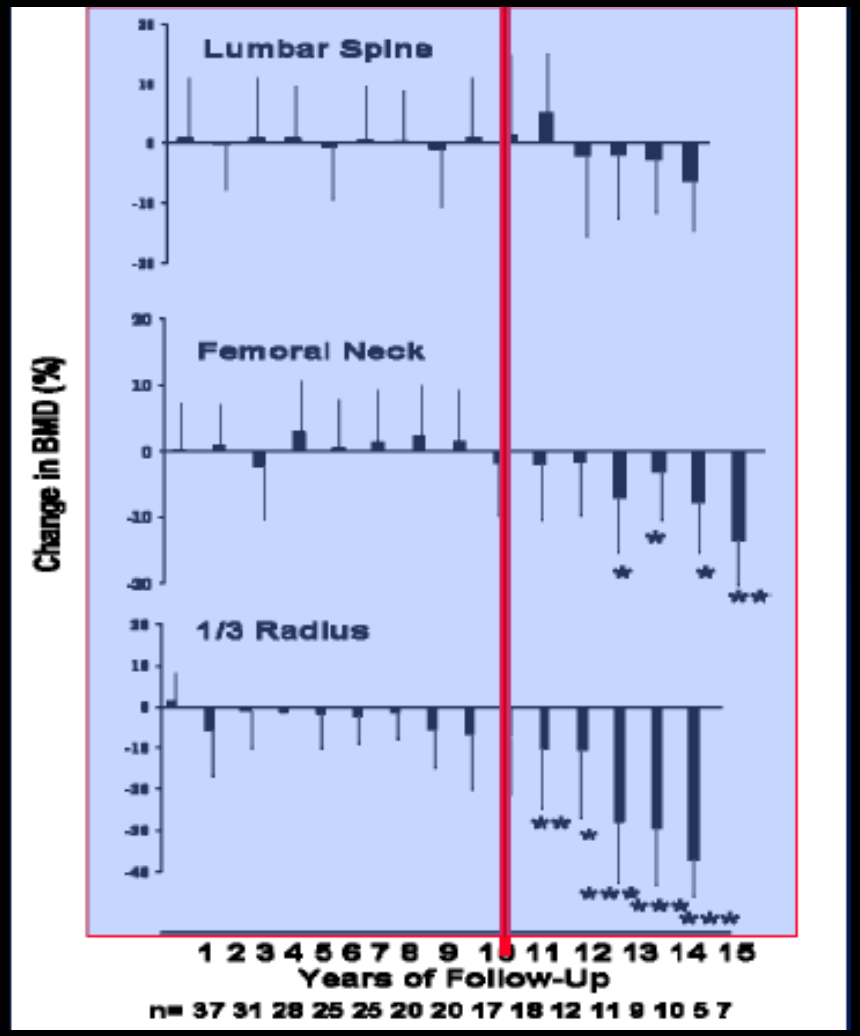
Current Issues in the Presentation of Asymptomatic Primary Hyperparathyroidism: Proceedings of the Fourth International Workshop

Quale è la storia naturale dell'iperparatiroidismo?

Non abbiamo sufficienti elementi che chiarificano quando sia appropriato intervenire chirugicamente sia nei pazienti affetti da iperparatiroidismo subclinico che conclamato.

JCEM 2014

The Natural History of Primary Hyperparathyroidism with or without Parathyroid Surgery after 15 Years



N Engl J Med 2010

Morphometric Vertebral Fractures in Postmenopausal Women with Primary Hyperparathyroidism

	1990	2002	2008	2013
Measurement[b]				
Serum calcium (>upper limit of normal)	1–1.6 mg/dL (0.25–0.4 mmol/L)	1.0 mg/dL (0.25 mmol/L)	1.0 mg/dL (0.25 mmol/L)	1.0 mg/dL (0.25 mmol/L)
Skeletal	BMD by DXA: Z-score <−2.0 (site unspecified)	BMD by DXA: T-score <−2.5 at any site[b]	BMD by DXA: T-score <−2.5 at any site[b]	A. BMD by DXA: T-score < −2.5 at lumbar spine, total hip, femoral neck, or distal 1/3 radius[b]
			Previous fragility fracture[c]	B. Vertebral fracture by x-ray, CT, MRI, or VFA
Renal	A. eGFR reduced by >30% from expected	A. eGFR reduced by >30% from expected	A. eGFR < 60 cc/min	A. Creatinine clearance < 60 cc/min
	B. 24-h urine for calcium >400 mg/d (>10 mmol/d)	B. 24-h urine for calcium >400 mg/d (>10 mmol/d)	B. 24-h urine for calcium not recommended	B. 24-h urine for calcium >400 mg/d (>10 mmol/d) and increased stone risk by biochemical stone risk analysis[d]
				C. Presence of nephrolithiasis or nephrocalcinosis by x-ray, ultrasound, or CT
Age, y	<50	<50	<50	<50

Vignali and Marcocci al 2009 JCEM

Morphometric Vertebral Fractures in Postmenopausal Women with Primary Hyperparathyroidism

Rimane ancora da chiarire se la presenza di una frattura vertebrale «mild» possa costituire da sola una indicazione certa all'intervento di paratiroidectomia in un soggetto affetto da iperparatiroidismo subclinico/normocalcemico.

JCEM 2009

Current Issues in the Presentation of Asymptomatic Primary Hyperparathyroidism: Proceedings of the Fourth International Workshop

Ci sono nuovi dati sulle manifestazioni renali dell' PHTP?
Dovrebbero i nuovi dati, se esistono, cambiare le raccomandazioni in merito all'indicazione alla exeresi chirurgica?

La presenza di «imaging» positivo e la riduzione della clearance della creatinina (<60 ml/h) dovrebbero costituire una indicazione alla chirurgia

JCEM 2014

AME Position Statement: Primary hyperparathyroidism in clinical practice

Michele Zini[1], Roberto Attanasio[2], Roberto Cesareo[3], Ignazio Emmolo[4],

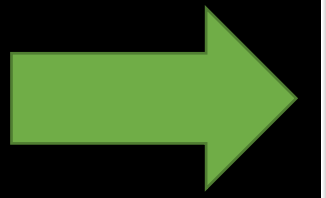
We recommend serum creatinine and estimated GFR evaluation.

We suggest routine use of kidney US in patients with PHPT.

JCI 2012

AME Position Statement: Primary hyperparathyroidism in clinical practice

Michele Zini[1], Roberto Attanasio[2], Roberto Cesareo[3], Ignazio Emmolo[4],



We recommend surgery in:

- patients with symptomatic PHPT;
- patients with asymptomatic disease addressing one or more of the criteria indicated by the 2008 Workshop on asymptomatic PHPT.

We suggest surgery also in patients with asymptomatic disease addressing none of the criteria indicated by the 2008 Workshop on asymptomatic PHPT, if pre-operative parathyroid adenoma localization is positive by first-line imaging studies and if a skilled surgeon is available.

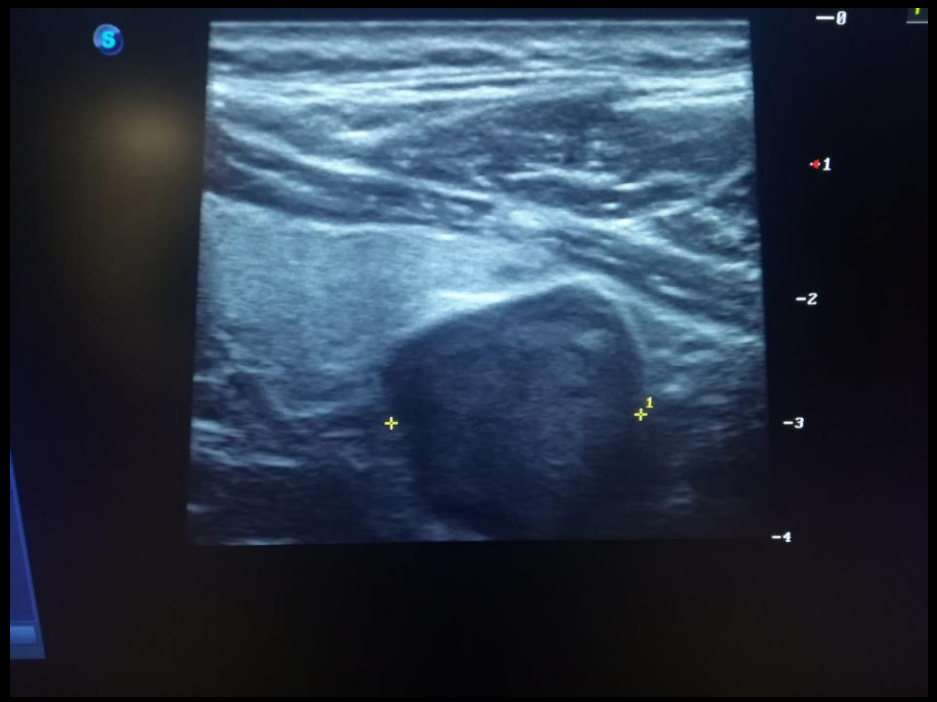
We suggest conservative treatment in patients with asymptomatic disease addressing none of the criteria indicated by the 2008 Workshop on asymptomatic PHPT, if pre-operative parathyroid adenoma localization is negative by first-line imaging studies.

JCI 2012

Come localizzare paratiroidi patologiche: strumenti

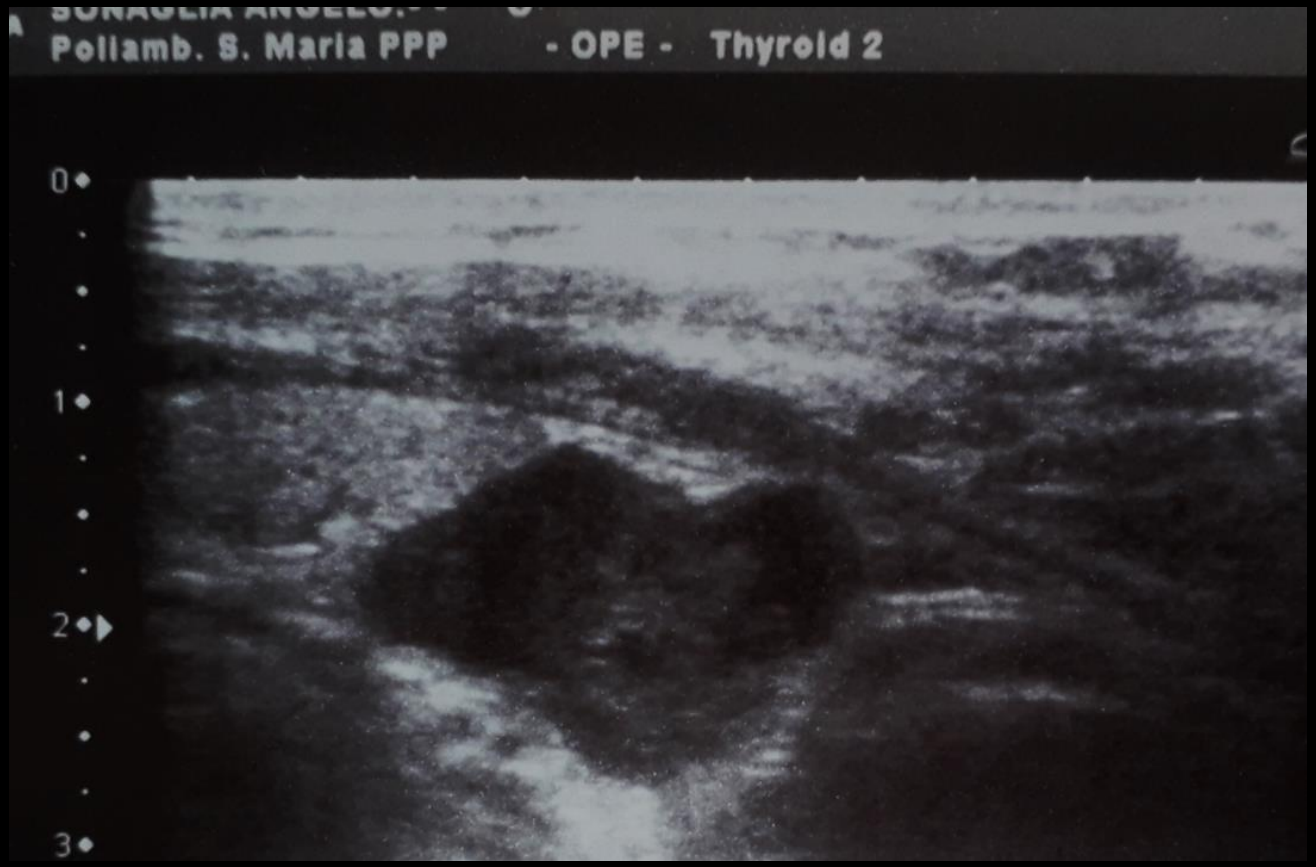
- ***Imaging*** di ***I livello***
- Ecografia
- Scintigrafia con sesta-MIBI

- ***Imaging*** di ***II livello***
- TC 4D/RM
- PET-TC




CENTRO MALATTIE DELLA TIROIDE L742/Thyroid MI 0.7 TIS 0.1 01/15/2019 18:56:24
1 D: 16.50 mm
2 D: 25.08 mm

CARCINOMA PARATIROIDEO



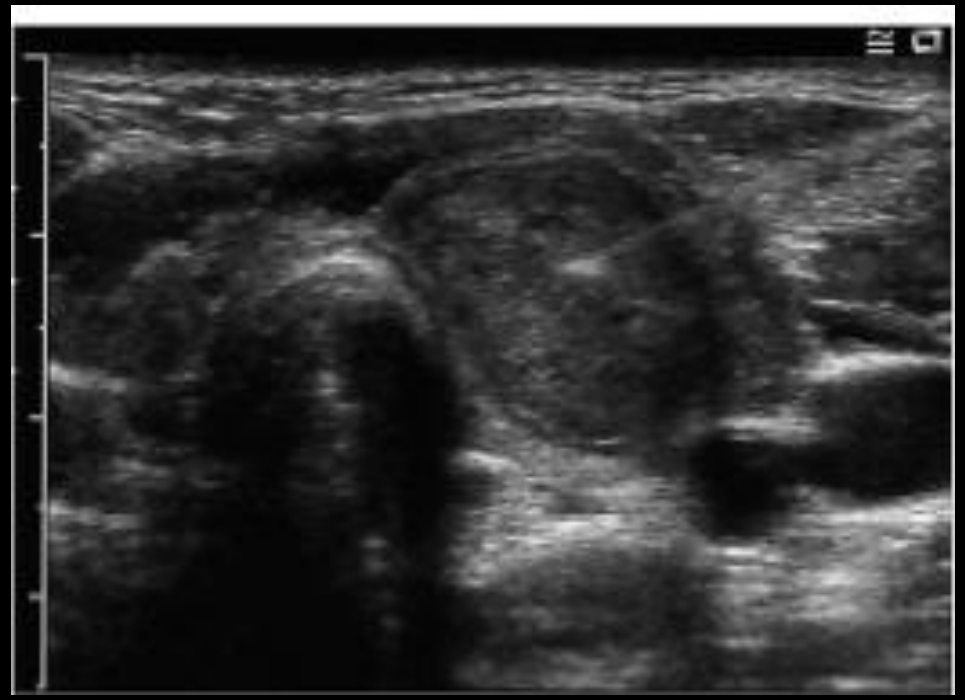
ADENOMA PARATIROIDEO : ECOGRAFIA E SCINTIGRAFIA

		SENSIBIL.	SPECIFIC.	VPP	VPN	ACCUR.	I. C.
Asian Pac J Cancer Prev. 2017 Dec rev. /meta-anal (188 studi)	ECOGRAFIA **SCINTIGRAFIA**	80% **83%**	80% **83%**				**76-83** **96.358-97.412**
Clin Nucl Med. 2017 (54 Pz)	***ECOGRAFIA*** *SCINTIGRAFIA*	69.3% **80.7%**		87.1% **97.6%**		**62.9%,** **79.6%,**	
Send to Eur J Radiol. 2017 Oct (20 Pz)	***ECOGRAFIA*** *SCINTIGRAFIA*	**80%** **81%**				**73%** **78%**	
Eur Radiol.2018 May 7 (57 Pz)	**ECOGRAFIA** **SCINTIGRAFIA** **ECOGRAFIA + SCINTIGRAFIA**	89.1% 83.6% 93.4	83.6% **98.3%** 98.3	93.1% 95.0% **95.0%**	93.1% **93.7%** **98.3**		

AME Position Statement: Primary hyperparathyroidism in clinical practice

Michele Zini[1], Roberto Attanasio[2], Roberto Cesareo[3], Ignazio Emmolo[4], Andrea Frasoldati[1], Laura Gianotti[5], Rinaldo Guglielmi[6], Alessandro Piovesan[7], Massimo Procopio[8], Alfredo Scillitani[9], Annibale Versari[10], Jens Bollerslev[11], Dhanwada Sudhaker Rao[12], Claudio Marcocci[13], and Giorgio Borretta[5]

IL DOSAGGIO INTRANODULARE DEL PTH E'
INDICATO IN CASO DI DISCORDANZA
TRA ESAME ECOGRAFICO E SCONTIGRAFICO



JEI 2013

IPERPARATIROIDISMO:

Quando gli esami di secondo livello?

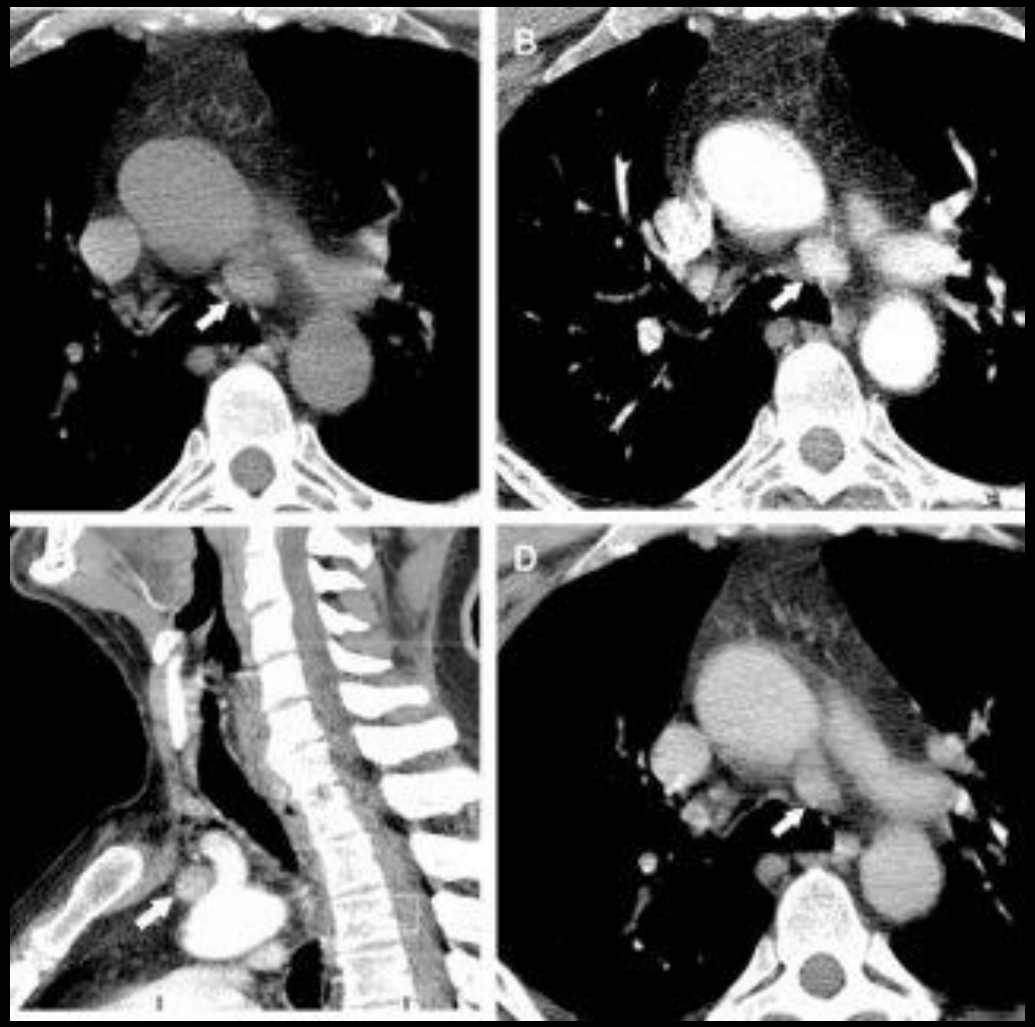
° Esame ecografico-scintigrafico negativo

° In fase pre-chirurica per ricerca di paratiroidi ectopiche

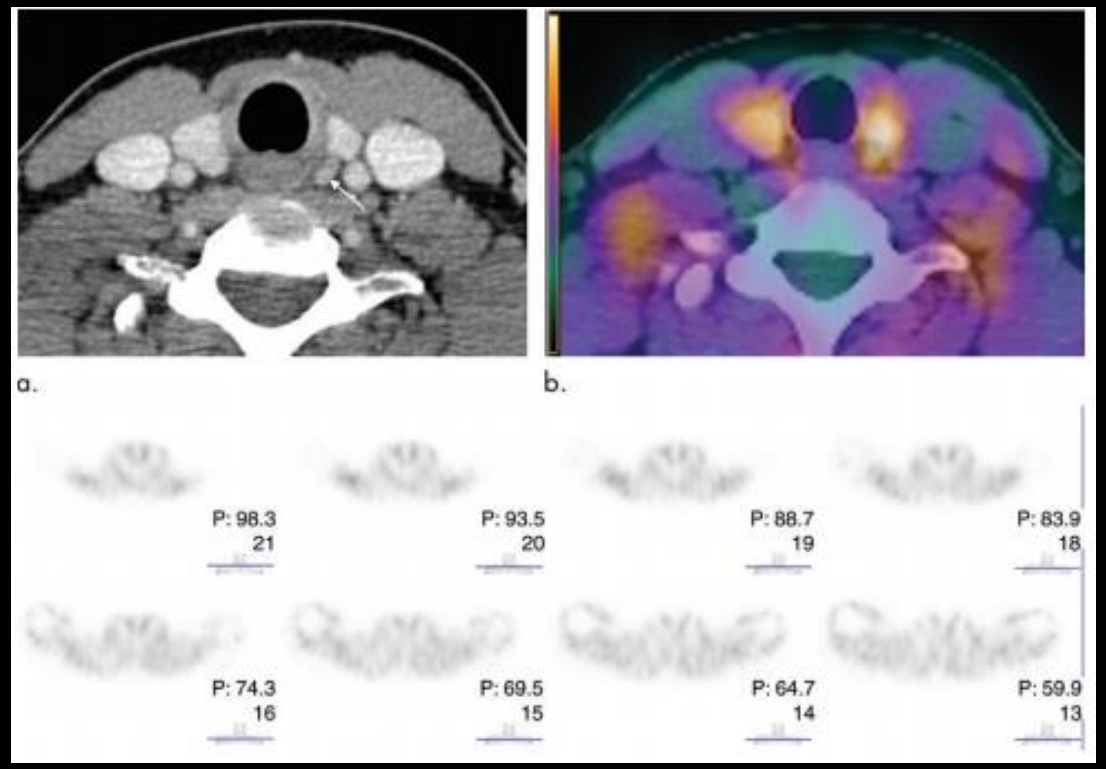
° In fase post chirurgica in persistenza di ipercalcemia

° Coesistente patologia tiroidea soprattutto se multinodulare

4D-TC: paratiroide ectopica mediastinica



Diagnostic Performance of 4D CT and Sestamibi SPECT/CT in Localizing Parathyroid Adenomas in Primary Hyperparathyroidism



Summary

Four-dimensional CT (noncontrast, contrast agent–enhanced, arterial, and delayed phases) provides superior preoperative localization in patients with primary hyperparathyroidism compared with sestamibi SPECT/CT in a direct head-to-head comparison. The combination of four-dimensional CT and sestamibi does not improve diagnostic performance compared with four-dimensional CT alone.

Radiology 2019

PET paratiroidea

- tomografia ad emissione di positroni
- abbinata a studio TC con miglioramento della risoluzione spaziale
- Imaging anatomo-funzionale

Traccianti: **11C-metionina** e **18F-colina**

IPERPARATIROIDISMO NORMOCALCEMICO

UFFICIALMENTE RICONOSCIUTO NEL 2008 NEL THIRD INTERNATIONAL WORKSHOP ON THE MANAGEMENT OF ASYMPTOMATIC

MA RICEVE ATTENZI
NELLA CONFEREN

Normocalcemic PHPT is now a well-recognized variant of PHPT. These subjects have normal total and ionized serum calcium levels without any known etiologies for a secondary elevation of PTH. Knowledge of the natural history of normocalcemic PHPT is incomplete, but some individuals become hypercalcemic, and some show evidence of target organ involvement (eg, reduced BMD). Others, however, appear to be stable over time with persistently elevated PTH levels and normal serum calcium concentrations.

of Asymptomatic
mmary Statement
rkshop

tell, Shonni J. Silverberg,
Potts Jr

CRITERI DIAGNOSTICI

Nat Rev Dis Primers. ; 2: 16033. doi:10.1038/nrdp.2016.33.

Primary hyperparathyroidism

John P Bilezikian[1], **Natalie E. Cusano**[1], **Aliya A. Khan**[2], **Jian-Min Liu**[3], **Claudio Marcocci**[4], and **Francisco Bandeira**[5]

An overview of normocalcemic primary hyperparathyroidism

Monika Pawlowska[a] *and Natalie E. Cusano*[b]

1°*STEP*
CONFERMA BIOCHIMICA

VALORE DI PTH AUMENTATO IN DUE MISURAZIONI CONSECUTIVE IN UN PERIODO DI 3-6 MESI

CALCEMIA TOTALE CORRETTA PER ALBUMINEMIA E CALCIO IONIZZATO NEL RANGE DI NORMALITA’

CRITERI DIAGNOSTICI

2°STEP
ESCLUSIONE CONDIZIONI SECONDARIE

Vitamina D

- correzione di eventuali deficit
- obiettivo terapeutico > 20 ng/ml (50 nmol/l)
- alcuni esperti propongono> 30 ng/ml (75nmol/l)

  Eastell R et al. Diagnosis of Asyntomatic Primary Hyperparathyroidism: proceedings of the Fourth International Workshop. JCEM 2014

- La correzione del deficit slatentizza PHPT

  Cusano NE et al. Normocalcemic primary hyperparathyroidism. J Clin Densitom 2013..

Box 2

Causes of secondary hyperparathyroidism

Secondary hyperparathyroidism includes conditions in which the parathyroid hormone (PTH) level is increased because of a stimulus that expectedly would increase the levels of PTH.

Decreased intestinal calcium absorption

- Vitamin D deficiency: serum 25-hydroxyvitamin D levels of <20 ng per ml
- Bariatric surgery
- Malabsorption syndromes
- Decreased calcium intake

Renal insufficiency (eGFR of <60 ml per minute)

- Hypercalciuria
- Loop diuretics

Hungry bone syndrome

- After successful parathyroid surgery for symptomatic primary hyperparathyroidism with overt skeletal involvement (osteitis fibrosa cystica), a period of time can follow when PTH levels are increased. This is a response to the body's need to accrue skeletal calcium and, in this setting, endogenous PTH is overproduced temporarily to meet this need

Pseudohypoparathyroidism

- This genetic disease of PTH resistance is associated with hypocalcaemia and increased levels of PTH

Drugs

- Short-term lithium use
- Hydrochlorothiazide
- Anticonvulsants, occasionally, if associated with vitamin D deficiency
- Antiresorptive agents (for example, bisphosphonates and denosumab)

eGFR, estimated glomerular filration rate.

CRITERI DIAGNOSTICI

2°STEP
ESCLUSIONE CONDIZIONI SECONDARIE

JAMA Intern Med. 2015 January ; 175(1): 137–138. doi:10.1001/jamainternmed.2014.5857.

Association of Loop Diuretic Use With Higher Parathyroid Hormone Levels in Patients With Normal Renal Function

Kristin M. Corapi, MD, MMSc, **Gearoid M. McMahon, MBBCh**, **Julia B. Wenger, MPH**, **Julian L. Seifter, MD**, and **Ishir Bhan, MD, MPH**

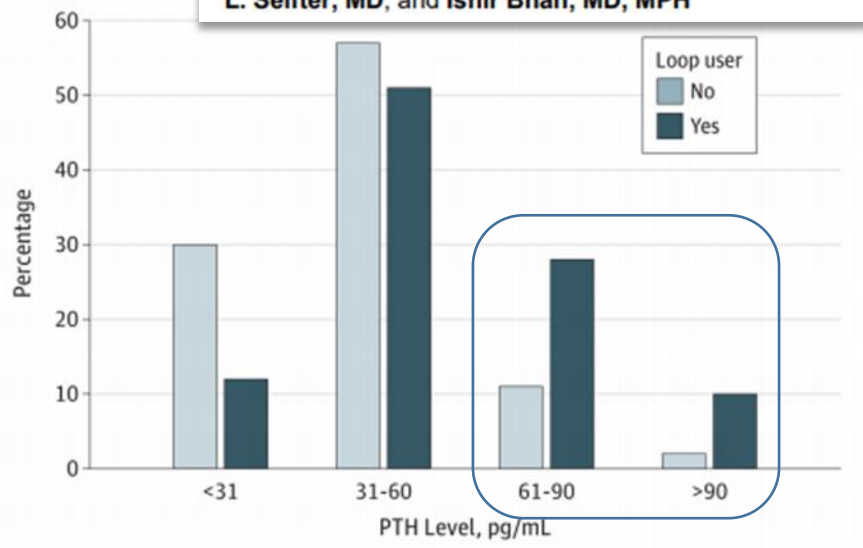


Figure. The Range of Parathyroid Hormone (PTH) Levels Among Loop Users and Nonusers
Levels are depicted in increments of 30 pg/mL. More loop users have PTH values above the upper limit of normal.

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eGFR, estimated glomerular filtration rate.

ASPETTI CLINICI

Prima caratterizzazione del NPHPT

0021-972X/07/$15.00/0
Printed in U.S.A.

The Journal of Clinical Endocrinology & Metabolism 92(8):3001–3005

doi: 10.1210/jc.2006-2802

Normocalcemic Primary Hyperparathyroidism: Further Characterization of a New Clinical Phenotype

H. Lowe, D. J. McMahon, M. R. Rubin, J. P. Bilezikian, and S. J. Silverberg

37 soggetti
57% osteoporosi
11% fratture da fragilità

follow-up 3 anni
43% riduzione BMD

- assenza di correlazione del PTH con BMD basale e dopo *follow-up*
- no predisposizione a perdita di osso corticale (radio ultradistale)

Clinical, Biochemical, and Radiological Profile of Normocalcemic Primary Hyperparathyroidism

Andrea Palermo,[1,*] Anda Mihaela Naciu,[1,*] Gaia Tabacco,[1] Stefania Falcone,[2] Assunta Santonati,[3] Daria Maggi,[1] Luca D'Onofrio,[4] Silvia Irina Briganti,[1] Domenico Castellitto,[5] Alessandro Casini,[5] Claudio Pedone,[6] Diana Lelli,[6] Andrea Fabbri,[2] John P Bilezikian,[7] Nicola Napoli,[1] Paolo Pozzilli,[1] Silvia Manfrini,[1,*] and Roberto Cesareo[5,*]

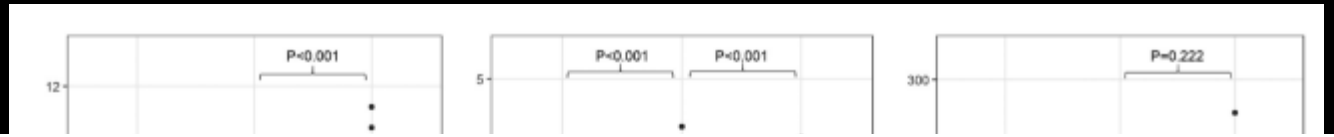
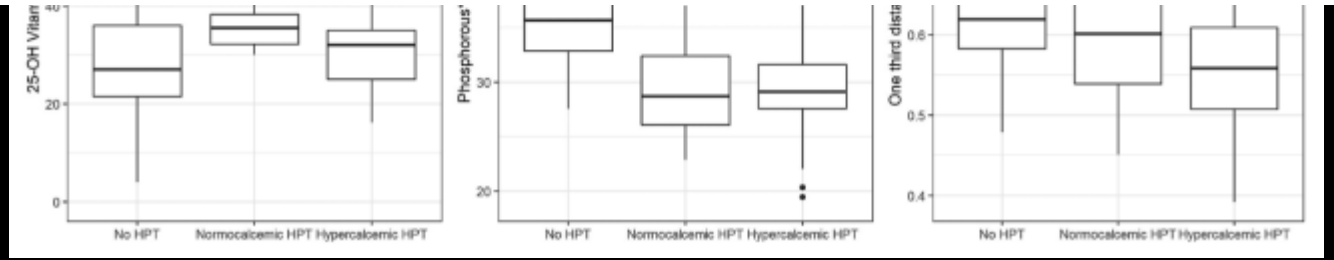


Table 3. Relative risk of more than 1 fracture: hyperparathyroid subjects versus controls

	Crude (95% CI)	Adjusted (95% CI)[a]
Overall fractures		
Control group	1	1
Normocalcemic	1.13 (0.57-2.29)	1,12 (0.56-2,27)
Hypercalcemic	2.37 (1.30-4.56)	2.24 (1.22-4.32)
Moderate-severe fractures		
Control group	1	1
Normocalcemic	0.83 (0.23-2.98)	0.83 (0.23-2.97)
Hypercalcemic	2.73 (1.04-8.45)	2.60 (0.99-8.08)



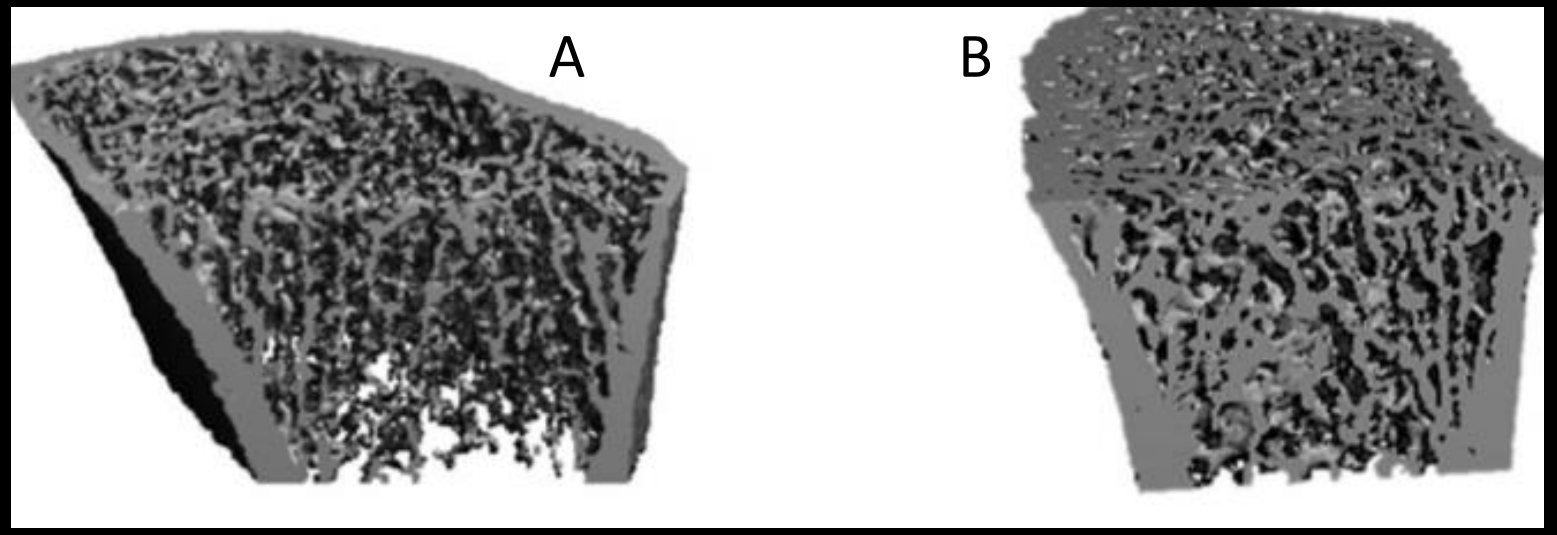
JCEM 2020

	Control group N = 39	Normocalcemic HPTN = 47	Hypercalcemic HPTN = 41
Age, mean (SD) (years)	64.7 (7)	63.8 (9.3)	63.9 (12)
Female, %	90	91	93
BMI, mean (SD) (kg/m^2)	26.2 (4.7)	26.7 (4.9)	27.6 (5.3)
Time from menopause, mean (SD) (years)	14 (7.6)	13.7 (9.8)	14 (9.6)
eGFR, mean (SD) (mL/min/1.73 m^2)	86.866 (15.656)	83.447 (23.682)	92.115 (24.466)
Serum calcium concentration, mean (SD) (mg/dL)	9.5 (0.4)	9.4 (0.4)$^{++}$	10.8 (0.4)**
Serum calcium ion concentration, mean (SD) (mmol/L)	1.22 (0.05)	1.19 (0.05)$^{++}$*	1.35 (0.05)**
24-hour calcium, mean (SD) (mg/24 hours)	192.3 (76)	196.1 (49.2)$^{++}$	293.5 (146.3)**
Serum phosphate concentration, mean (SD) (mg/dL)	3.8 (0.4)	3.2 (0.5)**$^{++}$	2.8 (0.5) **
Serum PTH concentration, mean (SD) (pg/mL)	52.4 (15.4)	126.8 (29.5) **	139.1 (49.7)**
25-OH vitamin D concentration, mean (SD)] (ng/mL)	28.6 (12.8)	36.7 (6.6)**	31.1 (7.8)*
Calcium × phosphorus, mean (SD)	35.66(3.84)	29.55 (4.42)**	29.78 (5.26)**
Serum CTX concentration, mean (SD) (ng/mL)	0.33 (0.21)	0.37 (0.18)	0.49 (0.27)*
Serum P1NP concentration, mean (SD) (ng/mL)	50.12 (24.14)	61.33(25.41)	73.09 (42.09)*
Lumbar spine BMD, mean (SD)	0.904 (0.149)	0.893 (0.186)	0.880 (0.184)
Lumbar spine T score	−1.3 (1.3)	−1.4 (1.7)	−1.5 (1.6)
Total hip BMD, mean (SD)	0.872 (0.097)	0.819 (0.125)	0.795 (0.126)*
Total hip T score	−0.6 (0.7)	−1.1 (0.9)	−1.2 (1)*
Femoral neck BMD, mean (SD)	0.671 (0.075)	0.659 (0.108)	0.633 (0.107)
Femoral neck T score	−1.6 (0.7)	−1.8 (0.9)	−2 (1)
One-third distal radius BMD, mean (SD)	0.620(0.065)	0.605 (0.08)$^{+}$	0.563 (0.078)*
One-third distal radio T score	−1.3 (0.8)	−1.6 (1.2)$^{+}$	−2.3 (1.3)**
Asymptomatic HPT, %	–	79	59
Vertebral fractures, %	23	28	60*
Renal lithiasis, %	3	13	10

**$P < .001$ vs control group; *$P < .05$ vs control group; $^{++}P < .001$ vs PHPT; $^{+}P < .05$ vs PHPT.

JCEM 2020

Primary Hyperparathyroidism is Associated with Abnormal Cortical and Trabecular Microstructure and Reduced Bone Stiffness in Postmenopausal Women



High-resolution peripheral quantitative computed tomography (HRpQCT) in hyperpaparathyroid patients (A) and control group (B)

J Bone Mineral Res 2014

Bone quality, as measured by trabecular bone score in normocalcaemic primary hyperparathyroidism

Anda Mihaela Naciu[1*] MD, Gaia Tabacco[1*] MD, Stefania Falcone[2] MD, Giosuè Giordano Incognito[1] MD, Iacopo Chiodini[3] MD, Daria Maggi[1] MD, Claudio Pedone[4] MD, PhD, Diana Lelli[4] MD, PhD, John P Bilezikian[5] MD, PhD, Nicola Napoli[1] MD, PhD, Silvia Manfrini[1] MD, Roberto Cesareo[6*] MD and Andrea Palermo[1*#] MD, PhD

Diagnostic Performance of DXA-Derived Parameters and TBS in Detecting Moderate-Severe VFs in NHPT Participants

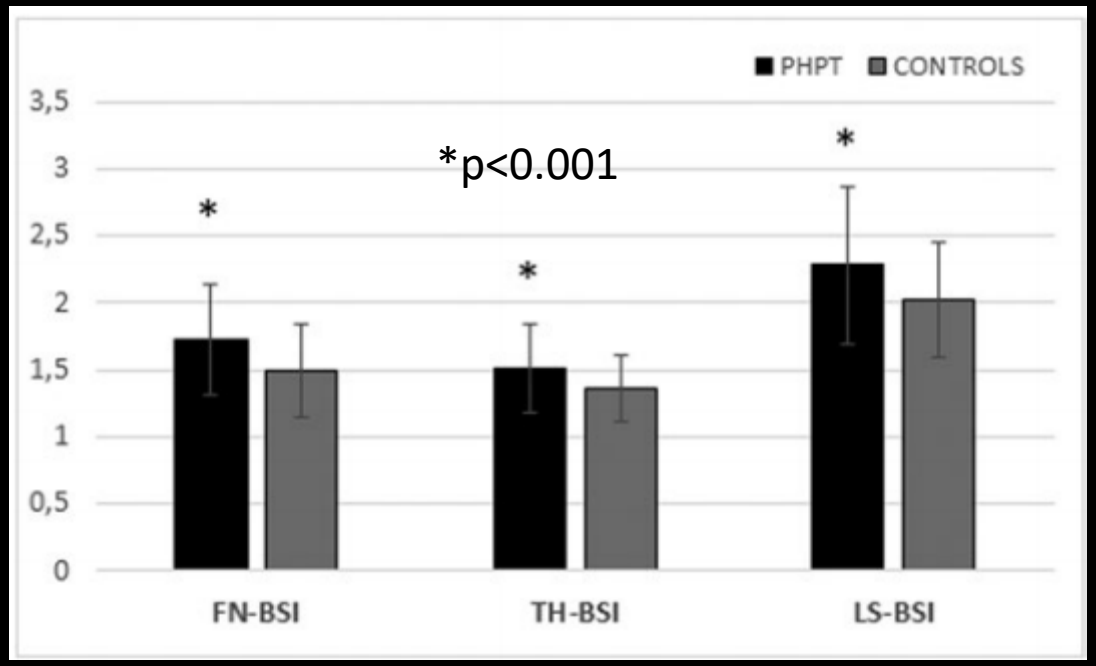
	AUC (95% CI)	Threshold	Specificity	Sensitivity	Accuracy
TBS	0.714 (0.461-0.967)	1.304	0.667	0.8	0.681
LS Z score*TBS	0.81 (0.62 0.996)	0.55	0.833	0.8	0.83
LS T-score*TBS	0.719 (0.464-0.952)	-0.85	0.857	0.6	0.83
LS Z-score	0.705 (0.497-0.913)	-0.05	0.463	1	0.522
Radial Z-score	0.71 (0.54-0.88)	0.2	0.634	1	0.667
FN Z-score	0.624 (0.364-0.885)	-0.95	0.293	1	0.37
TH Z-score	0.544 (0.291-0.797)	-0.5	0.317	1	0.630

Endocr Pract 2021

DXA-Based Bone Strain Index: A New Tool to Evaluate Bone Quality in Primary Hyperparathyroidism

Gaia Tabacco, Anda M Naciu, Carmelo Messina, Gianfranco Sanson, Luca Rinaudo, Roberto Cesareo, Stefania Falcone, Silvia Manfrini, Nicola Napoli, John P Bilezikian ...

Conclusion: BSI, a DXA-derived bone quality index, is impaired in PHPT and may help to identify PHPT subjects at high risk of fractures.

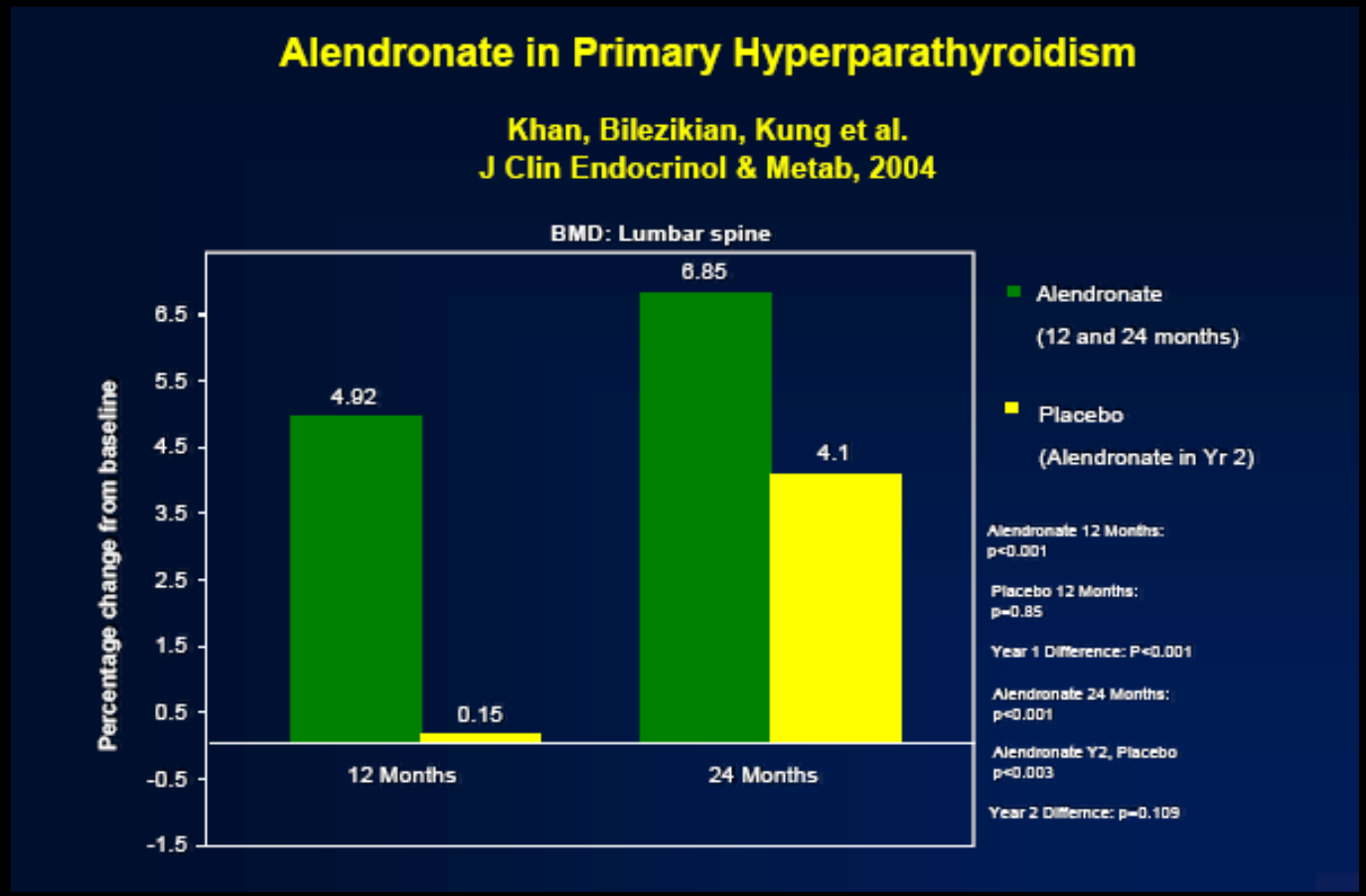


JCEM 2021

SUBCLINICAL AND NORMOCALCEMIC HYPERPARATHYROIDISM

- Alendronate
- Denosumab
- Cinacalcet

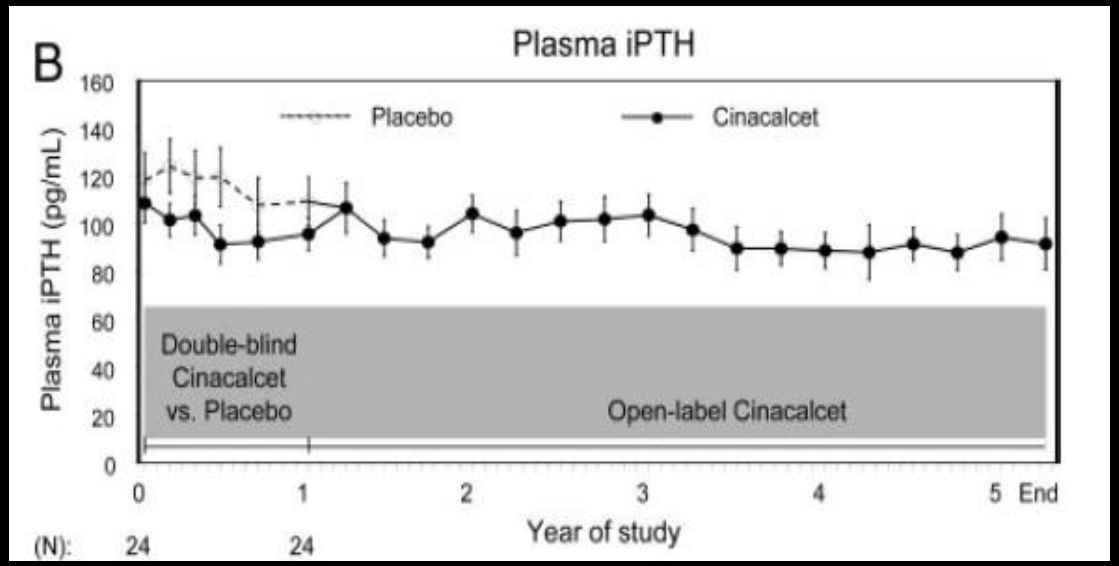
Alendronate in Primary Hyperparathyroidism: A Double-Blind, Randomized, Placebo-Controlled Trial



JCEM THE JOURNAL OF CLINICAL ENDOCRINOLOGY & METABOLISM

Cinacalcet Treatment of Primary Hyperparathyroidism: Biochemical and Bone Densitometric Outcomes in a Five-Year Study

Munro Peacock, Michael A. Bolognese, Michael Borofsky, Simona Scumpia, Lulu Ren Sterling, Sunfa Cheng and Dolores Shoback



JCEM 2009

JCEM THE JOURNAL OF CLINICAL ENDOCRINOLOGY & METABOLISM

Cinacalcet Treatment of Primary Hyperparathyroidism: Biochemical and Bone Densitometric Outcomes in a Five-Year Study

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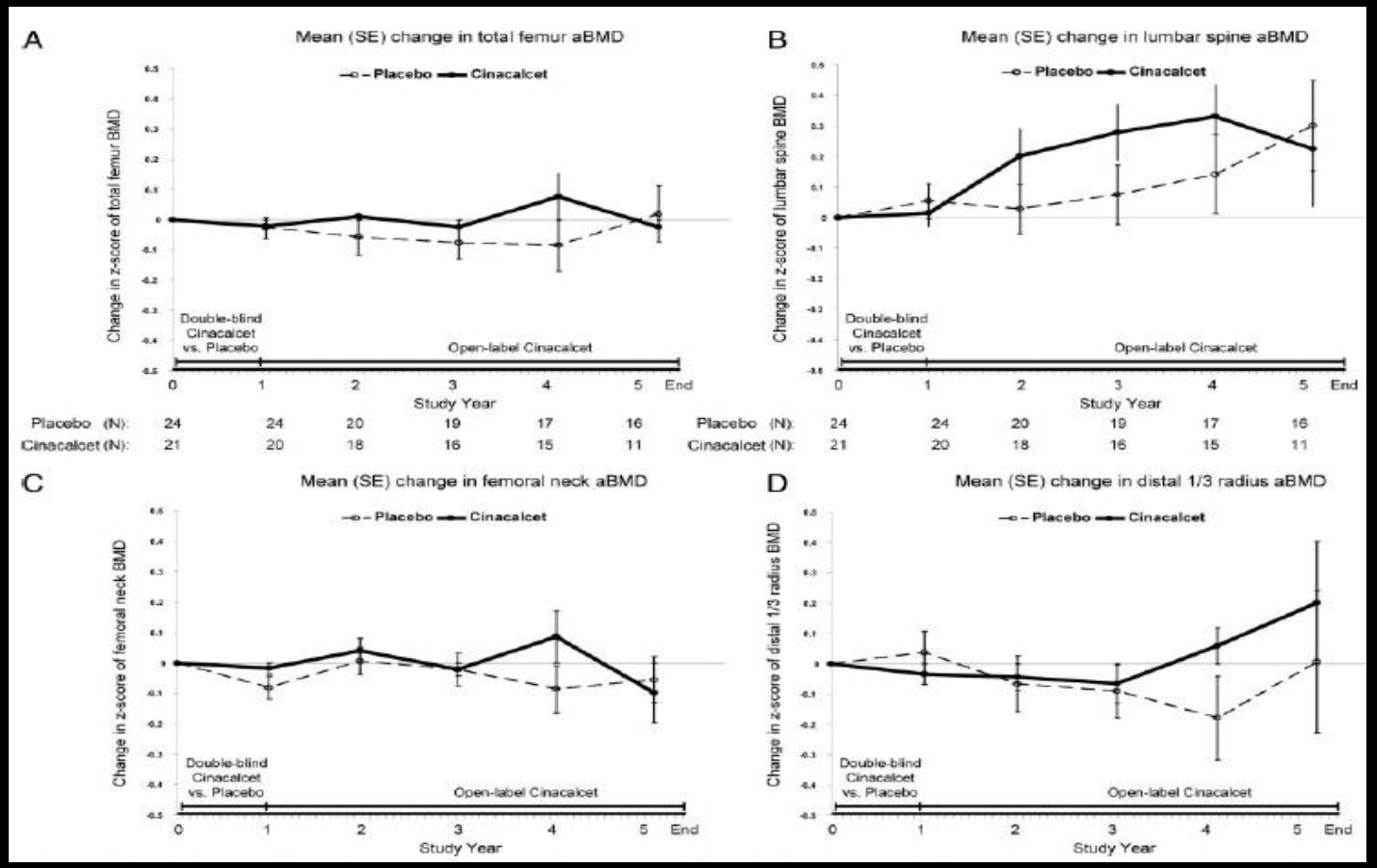
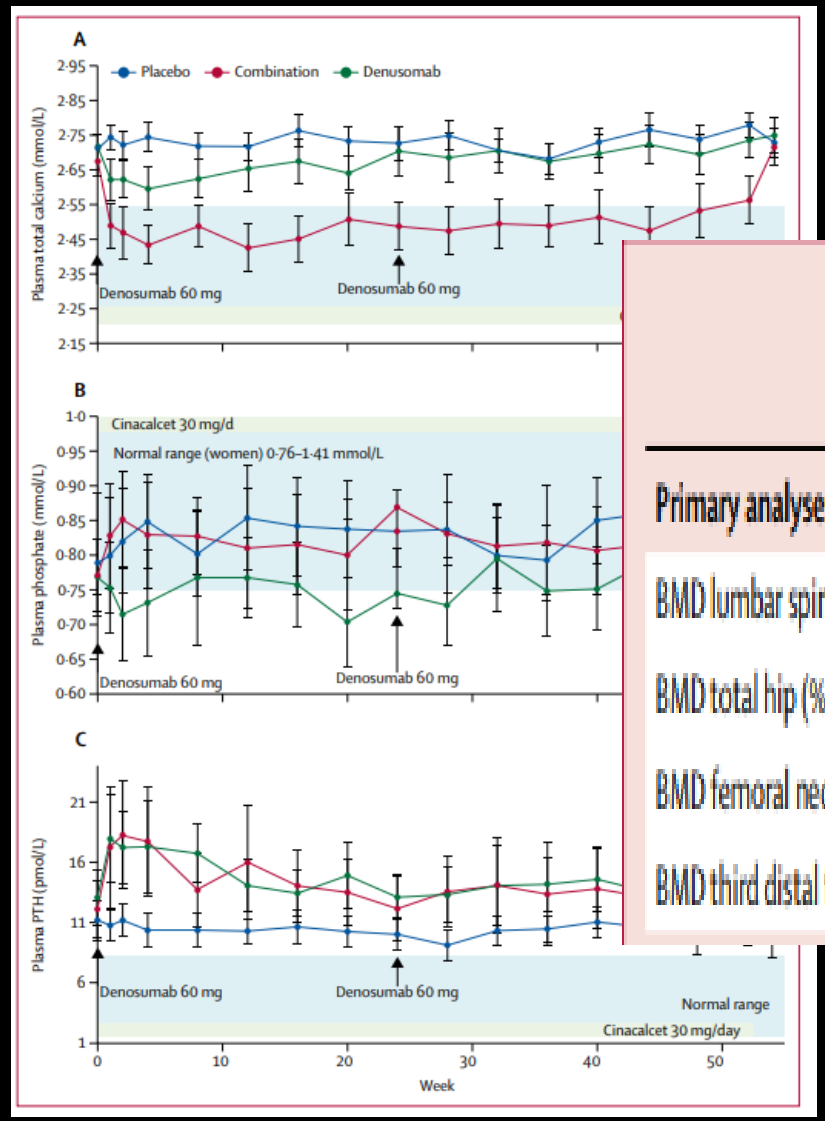


Denosumab and cinacalcet for primary hyperparathyroidism (DENOCINA): a randomised, double-blind, placebo-controlled, phase 3 trial

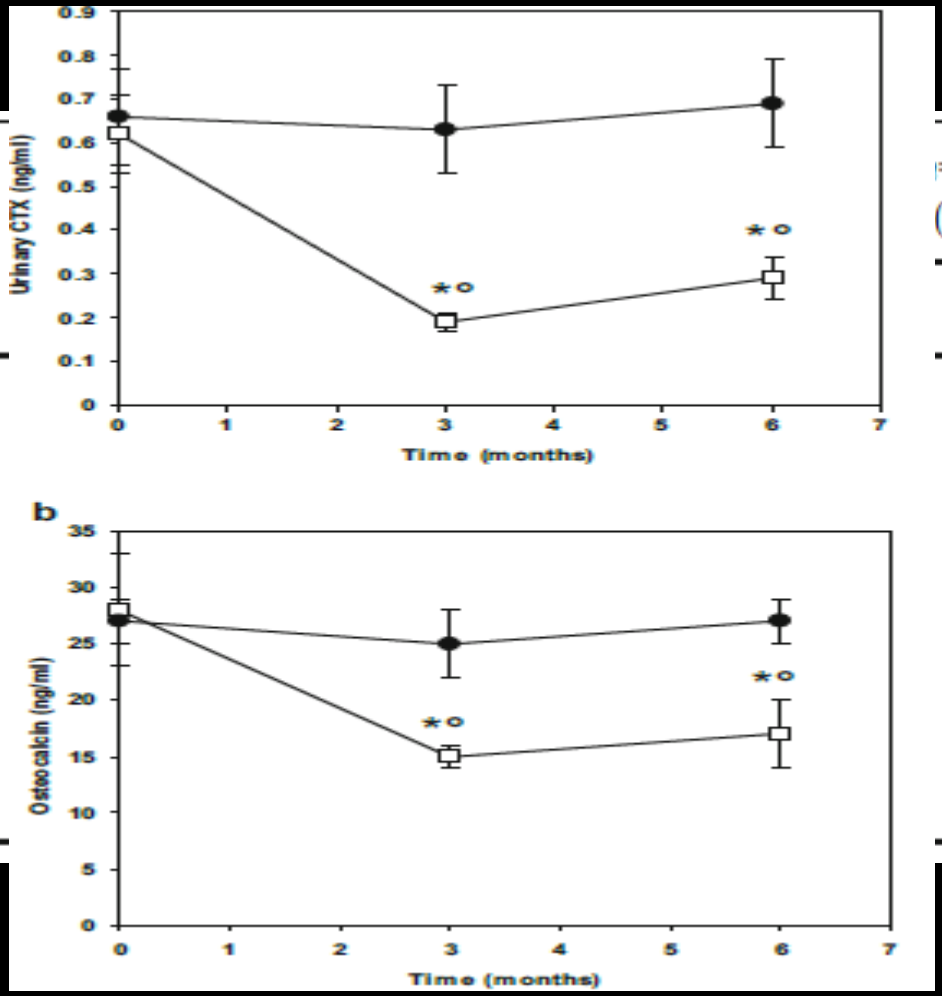


	(Cinacalcet + denosumab) − (placebo + placebo)	(95% CI); p value	(Denosumab + placebo) − (placebo + placebo)	(95% CI); p value
Primary analyses, percentage change*				
BMD lumbar spine (%)	5·4 (1·4)	(2·7 to 8·1); p<0·0001	6·9 (1·4)	(4·2 to 9·6); p<0·0001
BMD total hip (%)	5·0 (1·0)	(3·0 to 6·9); p<0·0001	4·1 (0·8)	(2·5 to 5·8); p<0·0001
BMD femoral neck (%)	4·5 (1·3)	(1·9 to 7·9); p=0·0008	3·8 (1·2)	(1·4 to 6·3); p=0·0022
BMD third distal forearm (%)	1·9 (1·0)	(−0·1 to 3·8); p=0·06	1·8 (0·9)	(0·1 to 3·5); p=0·04

Lancet Diab Endo 2020

Effects of alendronate and vitamin D in patients with normocalcemic primary hyperparathyroidism

R. Cesareo · E. Di Stasio · F. Vescini · G. Campagna · R. Cianni · V. Pasqualini · F. Romitelli · F. Grimaldi · S. Manfrini · A. Palermo



BMD			=15) (%)]	
			12 months	*p*
Lumbar L1–L4 (g/cm^2)			0.759±0.072 [0.013; (−1.6)]	0.001
T-score			−2.5±0.2	
Femoral neck (g/cm^2)			0.632±0.083 [0.011; (−1.7)]	0.001
T-score			−2.0±0.3	
Total femur (g/cm^2)			0.700±0.080 [0.010; (−1.4)]	0.001
T-score			−2.0±0.2	

Osteop Int 2015

Take home messages

- L’iperparatiroidismo primitivo nelle forme conclamata e subclinica si correla ad una aumentata mortalità e morbilità
- La diagnosi di laboratorio e l’utilizzo dei test di «imaging» costituiscono un corretto presupposto al successivo percorso terapeutico
- Le complicanze ossee e quelle renali risultano quelle maggiormente rilevanti in particolare nella forma subclinica
- L’iperparatiroidismo normocalcemico sembra essere una entità nosologica a sé stante dove le complicanze, in particolare quelle ossee, sembrano essere decisamente inferiori rispetto alla forma conclamata e subclinica