

IN THE NAME OF GOD

Case presentation

Dr Zahra daraei

1400/12/2

Patient description

- Gender : female
- Age: 39 years
- Married / with 2 children
- Living in Tehran
- Occupation : housekeeper

- The patient is a 39 y/o woman who has been suffering from pain in her hands especially her fingers for the past 4 years which are mostly in the morning and she was referred to rheumatologist and during the examinations notices high PTH and she was referred to an endocrinologist .
- Simultaneously with the above problems, the patient complained of severe pain in the right lumbar region which right kidney stone was reported on ultrasound and after several examination the patient was diagnosed with Idiopathic hypercalciuria

Laboratory findings

Date	laboratory	Ca mg/dl	P mg/dl	PTH pg/ml	25(OH)vit D ng/ml	ALP u/L	Urine 24h	Mg mg/dl
96/6/28	pars	9.1	3.6	69.5	30.7	-	vol 1050 Ca 404 P 545 Cr 924	-
96/7/2	Pars	8.4	2.5	158.6	39.4	-	V 1850 Ca 226 P 620 Mg 94 Cr 1313	2
96/7/28	Pars	9	3.4	72.4	43.3	-	-	-
96/11/12	Pars	9.5	3.1	64.4	32.4	-	Vol 1350 Ca 203 Cr 1040	-
97/6/1	nilou	-	-	-	7.3	-	-	-
97/12/11	atieh	9.1	2.7	127.8	47.2	-	-	-
97/12/19	danesh	8.8	3.7	108	-	184	Vol 1700 Ca 323 P 765 Cr 1241	-
98/1/25	danesh	8.7	3.5	93.8	-	153	-	2
98/5/16	markazi	8.6	2.5	111.3	36.7	-	-	1.9
99/3/20	pars	9.5	3.4	-	-	52	Vol 1150 Ca 174 P 546 Cr 828	-

Laboratory findings

Date	laboratory	Ca mg/dl	P mg/dl	PTH pg/ml	25(OH)vit D ng/ml	ALP u/L	Urin 24h	Mg mg/dl
99/6/4	pars	8.7	3.2	101	33.4	-	Vol 1900 Ca 110 Na 106 Uric acid 355 Mg 78 Oxa 30.9 citrate 1064	1.9
99/6/28	pars	9.4	2.8	66.6	39.8	59	-	-
1400/3/23	pars	8.8	2.5	-	-	-	Vol 1500 Ca 158 Na 102 Cr 810 Mg 80 Uric Acid 281	1.9
1400/4/27	masoud	9.2	3.5	103.2	60	62	Vol 1500 Ca 246 P 844 Uric Acid 315 Oxalat 0.47(0.32) Citrat 3.6	1.84
1400/8/11	masoud	9	-	80.3	-	-	-	-
1400/10/2	pars	9	3.2	95.5	37.5	54	Vol 2150 Cr 903 Ca 393 P 441	1.9
1400/11/9	pars	8.8	-	135.3	37.5	-	-	-



سن بیمار: 34 سال	شماره بیمار: 961012015	تاریخ مراجعه: 1396/10/12	نام بیمار: خانم سر [REDACTED]
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همکار محترم - جناب آقای دکتر هومن انگورانی

سونوگرافی هر دو پستان و زیر بغل ها

پستان ها یافت فیبروگلدولار طبیعی دارند.

در مقایسه با سونوگرافی قبلی توده ایزواکو به ابعاد 17x5.5mm در LIQ راست . Stable میباشد .
ضایعه کیستیک یا سالیید دیگری و بهم خوردگی نسجی در پستان ها دیده نشد.
نواحی آکزیلاری هر دو طرف طبیعی رویت گردید.

سونوگرافی لگن

رحم یا شکل، موقعیت، اکو و ابعاد نرمال فاقد ضایعه رویت گردید.

آندومتر نازک یا ضخامت تقریبی 2 میلیمتر مشاهده شد.

در کانال سرویکال ضایعه ای دیده نشد.

تخمندانها با ابعاد نرمال مشاهده شدند.

اکوی تخمدانها طبیعی است. ضایعه فضاگیر سالیید یا کیستیک دیده نمیشود.

توده آدنکسال و مایع آزاد لگنی مشاهده نشد.

سونوگرافی کلیه ها و مجاری ادراری

هر دو کلیه از نظر شکل، اندازه، موقعیت، اکو و ضخامت پارانشیمال طبیعی می باشند.

در کلیه راست در نواحی مختلف پنج سنگ با ابعاد مختلف با اقطار 9.5mm , 9.5mm , 6mm

3mm و 4mm بدون ایجاد هیدرونفروز رویت شد .

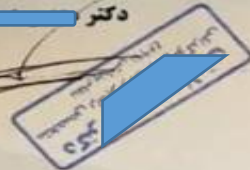
انجام KUB جهت ارزیابی دقیقتر توصیه میشود.

دیلاتاسیون در حالبها دیده نشد.

مثانه شکل ، حجم و ضخامت جداری طبیعی دارد ، سنگ یا ضایعه فضاگیر در آن دیده نشد.

با تشکر و احترام

دکتر [REDACTED]



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No 2374, In front of Keshavarzi Bank
After Saei Park, Valiasr Ave, Tehran, Iran.

www.drvahabaghai.com
Info@drvahabaghai.com

تهران - خیابان ولی عصر، بعد از پارک ساعی
روبروی بانک کشاورزی، نبش کوچه امینی، پلاک ۲۳۷۴

۸۸۷۷ ۷۹۰۷

۸۸۷۸ ۸۶۰۳

نام بیمار:	سیده [redacted]	شماره:	۰۰۰۳۲۹۰۲۴	تاریخ:	۱۴۰۰/۳/۲۹	سن:	۳۸ سال
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همکار گرامی: سرکار خانم دکتر فروهر نژاد

سونوگرافی کبد، کیسه صفرا و مجاری صفراوی:

کبد دارای ابعاد و اکوی نرمال است (Span: 111mm). ضایعه فضاگیر در آن دیده نمی شود. دروریدهای کبدی و پورتال یافته غیر طبیعی دیده نمی شود. کیسه صفرا ضخامت جداری نرمال دارد. سنگ در آن دیده نمی شود. مجاری صفراوی داخل و خارج کبدی دیلاته نیستند.

سونوگرافی کلیه ها و مثانه:

کلیه راست به ابعاد ۳۵×۱۰۰ م م است. ضخامت و اکوی پارانشیمال آن نرمال است. ضخامت پارانشیم کلیه ۱۱ م م است. سنگ: mass یا هیدرونفروز دیده نمی شود.

کلیه چپ به ابعاد ۳۹×۱۰۱ م م است. ضخامت و اکوی پارانشیمال آن نرمال است. ضخامت پارانشیم کلیه ۱۴ م م است. mass یا هیدرونفروز دیده نمی شود. در کالیسهای تحتانی کلیه تصویر یک سنگ به قطر ۳ م م دیده می شود.

حالبها دیلاته نیستند. سنگ در UVJ و ابتدای حالبها دیده نمی شود. ضخامت دیواره مثانه نرمال است. سنگ یا ضایعه تومورال در آن دیده نمی شود.

سونوگرافی رحم و ضامن:

رحم دارای ابعاد و اکوی طبیعی است و ضایعه فضاگیر و میوم در آن دیده نمی شود. (ابعاد رحم ۴۸×۳۹×۷۴ م م).

ضخامت اندومتر ۹ م م است.

تخمدانها دارای ابعاد و اکوی نرمال هستند. کیست یا mass در آنها دیده نمی شود.

ابعاد تخمدان راست: ۲۰×۳۱ م م ابعاد تخمدان چپ: ۱۹×۳۳ م م

در کلدوساک مایع دیده نمی شود.

Alghadir Hospital
Alghadir Sq.
Tehran

Telephone: 021-77249050

Name: [REDACTED]	Sex: Female	Height: 160.0 cm
Patient ID: 8125581	Ethnicity: White	Weight: 52.0 kg
DOB: 18 March 1983		Age: 38

Referring Physician: DR AGHAIE

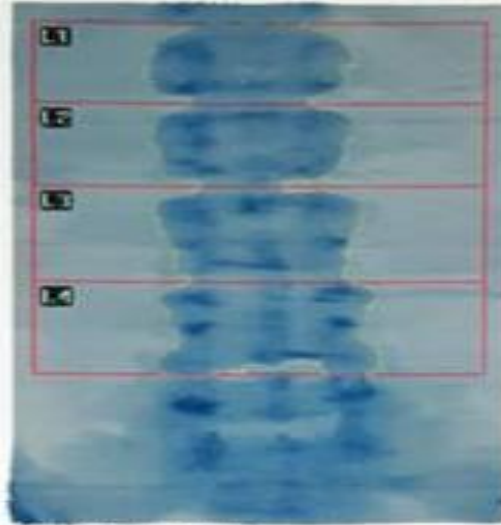


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116 x 137

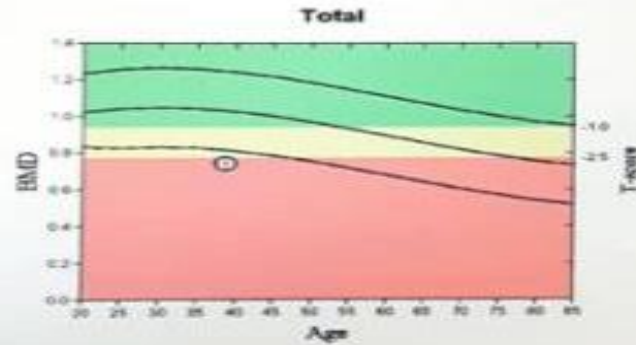
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Scan Date: 02 November 2021 ID: A11022106
 Scan Type: f Lumbar Spine
 Analysis: 02 November 2021 10:40 Version 13.6.0.4
 Spine
 Operator:
 Model: Horizon Wi (S/N 300409M)
 Comment:

DXA Results Summary:

Region	Area (cm ²)	BMC (g)	BMD (g/cm ³)	T-score	PR (%)	Z-score	AM (%)
L1	14.05	10.29	0.732	-2.3	74	-2.2	75
L2	14.32	10.75	0.750	-2.5	73	-2.4	74
L3	17.07	12.24	0.717	-3.3	66	-3.2	67
L4	18.26	13.94	0.764	-2.7	72	-2.5	73
Total	63.70	47.22	0.741	-2.8	71	-2.6	72

Total BMD CV 1.0%
 WHO Classification: Osteoporosis
 Fracture Risk: High



Comment:

T-score vs. White Female, Source 2012 BMES/ologic Z-score vs. White Female, Source 2012 BMES/ologic

Telephone: 021-77249050

Name: [REDACTED]
Patient ID: 8125581
DOB: 18 March 1983

Sex: Female
Ethnicity: White

Height: 160.0 cm
Weight: 52.0 kg
Age: 38

Referring Physician: DR AGHAIE

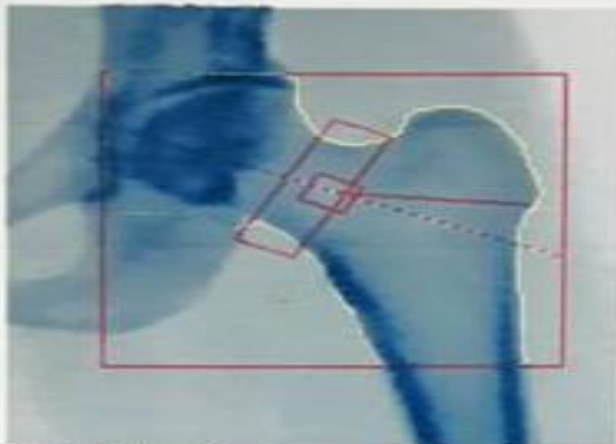


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96 x 101
NECK: 47 x 15

Scan Information:

Scan Date: 02 November 2021 ID: A11022107
Scan Type: f Left Hip
Analysis: 02 November 2021 10:44 Version 13.6.0.4
Hip
Operator:
Model: Horizon Wi (S/N 300409M)
Comment:

DXA Results Summary:

Region	Area (cm ²)	BMC (g)	BMD (g/cm ³)	T-score	FR (%)	Z-score	AM (%)
Neck	4.71	2.79	0.592	-2.3	70	-2.1	72
Troch	9.85	6.17	0.627	-0.8	89	-0.7	90
Inter	20.87	16.17	0.775	-2.1	70	-2.0	71
Total	35.43	25.13	0.709	-1.9	75	-1.8	77
Ward's	1.12	0.49	0.436	-2.5	59	-2.0	65

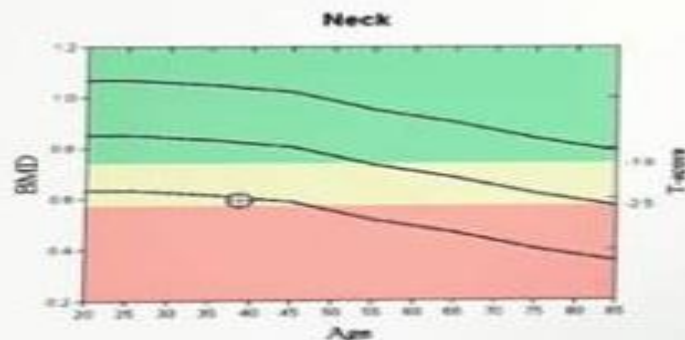
Total BMD CV 1.0%

WHO Classification: Osteopenia

10-year Fracture Risk

FRAX not reported because:

Some T-score for Spine Total or Hip Total or Femoral Neck at or below -2.5



T-score vs. White Female. Source: 2012 BMDCS/NOIANES White Female. Z-score vs. White Female. Source: 2012 BMDCS/NOIANES White Female

Comment:

Alghadir Hospital
Alghadir Sq.
Tehran

Telephone: 021-77249050

Name: [REDACTED] S	Sex: Female	Height: 160.0 cm
Patient ID: 8125581	Ethnicity: White	Weight: 52.0 kg
DOB: 18 March 1983		Age: 38

Referring Physician: DR AGHAIE

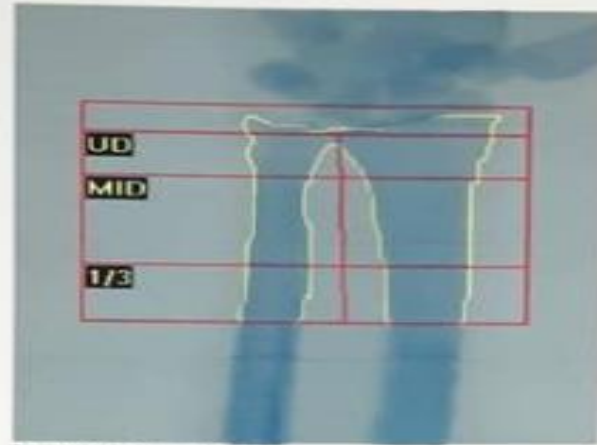


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192 x 77

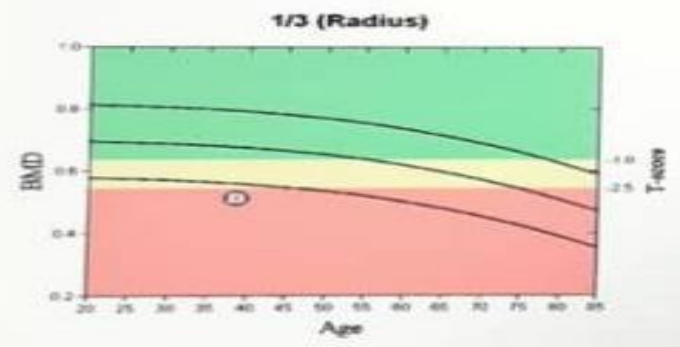
Scan Information:

Scan Date: 02 November 2021 ID: A11022109
 Scan Type: a L Forearm
 Analysis: 02 November 2021 10:50 Version 13.6.0.4
 Left Forearm
 Operator:
 Model: Horizon Wi (S/N 300409M)
 Comment:

DXA Results Summary:

Radius	Area (cm ²)	BMC (g)	BMD (g/cm ³)	T-score	PR (%)	Z-score	AM (%)
UD	3.81	1.34	0.352	-1.6	79	-1.4	82
MID	5.14	2.26	0.439	-3.1	72	-2.8	74
1/3	3.08	1.58	0.511	-3.0	74	-2.7	76
Total	12.03	5.17	0.430	-2.8	74	-2.5	76

Total BMD CV 1.0%
 WHO Classification: Osteoporosis
 Fracture Risk: High



Comment:

T-scores vs. White Female. Source: 2012 BMDC/SFologic Z-score vs. White Female. Source: 2012 BMDC/SFologic

شماره : 804135

پزشک : حاتم [REDACTED]

بیمار : حاتم [REDACTED]

تاریخ : ۱۳۹۷-۵/۱۷

سن : ۱

جنسیت : زن

Color Doppler sonography of thyroid & neck:

Bilateral thyroid lobes have normal size & echopattern.

There is no thyroid nodule.

In color Doppler, benign flow pattern in all nodules is seen.

In central & lateral regions of neck, no significant or pathologic lymph node is present.

No parathyroid adenoma in neck is present.

With Regards

Radiologist, *Dz. p-Mashemi*

MARJAN NUCLEAR MEDICINE CENTER

Patient Name : [REDACTED]

Age : 36 Y

Referring Physician :

Date of the exam : 1398/01/24

PARATHYROID SCAN

Procedure :

Post IV injection of 20 mCi ^{99m}Tc -MIBI, sequential scan from neck and superior mediastinum was performed in anterior projection. The delayed images were obtained after one and three hours.

Description :

Early image (15 min) shows tracer distribution throughout the thyroid lobes. Proper washout from thyroid gland is seen on the delayed images (by 120 min) and no persistent focus of increased uptake was detected in the thyroid bed.

Interpretation :

The study is negative for parathyroid adenoma.



تاریخ پذیرش: 1400/08/11
جنس: زن

شماره پذیرش: 0008003508
سن: 38

نام بیمار: خانم [REDACTED]
پزشک: خانم آقای دکتر [REDACTED]

Color Doppler sonography of thyroid & neck:

Bilateral thyroid lobes have normal size & echopattern.

There is no thyroid nodule.

In color Doppler, benign flow pattern in all nodules is seen.

In central & lateral regions of neck, no significant or pathologic lymph node is present.

There is 5 mm hypoechoic nodule between inferior pole of right thyroid lobe & CCA which is mildly hyper vascular & may be due to parathyroid adenoma.

With Regards

Radiologist: p-Hashemi



Name : [Redacted] خانم سر *

Age : 39 Y

Date : 03/11/1400

Dear Colleague : Farzad Hadaegh

Color Doppler Sonography of Thyroid and Neck:

Findings:

Both thyroid lobes have shown normal size and homogenous normal echopattern.

Right lobe: 49×11×14mm, 4.3cc , Left lobe: 50×10×12mm, 3.5cc.

Thyroid isthmus measured 2 mm with normal appearance.

Overall vascularity: Symmetrically normal.

Focal lesions at right and left lobes: not seen .

Neck and parathyroid Survey:

No typical parathyroid adenoma is detected at all neck zones so evaluation by 4D parathyroid CT scan is advised .

No pathologic lymph node is seen at all neck zones and retrosternal area and all visible lymph nodes show normal hilum and color Doppler appearance.

Bilateral submandibular and parotid glands are symmetric and normal.

Impression:

- Normal thyroid + No PTA

Dr. [Redacted]
Radiologist-Interventionist

[Redacted Signature]

Dr. Ebrahimi Nik
Radiologist-Interventionist





موسسه تحقیقات پزشکی هسته ای و تصویر برداری مولکولی
بیمارستان شریاتی، تهران

*Research Institute for Nuclear Medicine and
Molecular Imaging*

Shariati Hospital



بیمارستان شریاتی و خدمات
بیمارستانی تهران

Patient Name : Ms [redacted]
Age : 38 Y

Ref Physician :
Date of exam : 1400/09/18

SPECT-CT PARATHYROID SCAN

Procedure :

Post IV injection of 20 mCi ^{99m}Tc-MIBI, sequential scan from neck and mediastinum was performed in anterior projection. The delayed images were obtained after two and three hours. SPECT/CT imaging was also performed.

Description :

Early image (15 min) shows tracer distribution throughout the thyroid lobes. Proper washout from thyroid gland is seen on the delayed images (by 120 and 180 min) and no persistent focus of increased uptake was detected in the thyroid bed.

Interpretation :

- The study is negative for parathyroid adenoma.

R. Manafi-Farid, MD

[redacted] MD
[Signature]

[redacted]
[Signature]

Page 1 of 1

Patient's Name: S. [REDACTED]

Patient's Age: 38 Y/O

Date: January/30/2022 06:04 P.M 1400/11/10 18:04

CT Type: C.T scan axial of neck with & without I.V contrast media

Tech.: Spiral



Dear Dr. [REDACTED]

Clinical information: R/O parathyroid adenoma

Findings

Orbits, paranasal sinuses, and skull base: Normal.

Nasopharynx: Normal.

Suprahyoid neck: Normal oropharynx, oral cavity, parapharyngeal space, and retropharyngeal space.

Infrathyoid neck: Normal larynx, hypopharynx, and supraglottis.

Thyroid: Normal.

Lymph nodes: Normal. No lymphadenopathy.

Vascular structures: Normal.

Other findings: None.

Impression: - Normal examination without cervical mass.

K.Samimi, MD.

دکتر کاوه صمیمی
رادیولوژیست - فوق تخصص ازغراض
نظام پزشکی ۳۱۲۹۳
مرکز تصویر برداری بایگ

مرکز تصویر برداری پایک

SIEMENS 16 Sensation
Patient's File No: 472437
Invoice No: 1-400 - 20676 DR

Page 1 of 1

Patient's Name: [REDACTED]

Patient's Age: 38 Y/O

Date: January 30/2022 06:04 PM 1400/11/10 18:04

CT Type: C.T. Scans of chest without & with I.V. contrast media.

Tech.: Spiral



Dear Dr. Hadaegh

Clinical information: R/O ectopic parathyroid adenoma

Lungs have normal attenuation value and aeration without abnormal density.

Pulmonary vascularity appears without significant pathology.

No pleural thickening, calcification, fluid and air collection in pleural space are noted.

Mediastinum has normal position without mass in all compartment and hilar region.

Trachea & main bronchi are intact.

Heart & visible major vessels are unremarkable.

Thoracic skeleton, soft tissues & diaphragm are visible without significant pathology.

There isn't evidence of pathologic enhancement.

Imp: - Normal C.T. scan of thorax without abnormal enhanced tissue.

[REDACTED], MD.

دکتر کاوه
سیستم پزشکی
مرکز تصویر برداری پایک

Alghadir Hospital
Alghadir Sq.
Tehran,

Phone: 021-77249050

Bone Density Report

Name: JAVADI [REDACTED] Sex: Female Age: 38
Patient ID: 8125581 Ethnicity: White Height: 160.0 cm
Referring Provider: DR AIGHAIE Date of Birth: 03/18/1983 Weight: 52.0 kg

Indication:

Accession number:

Bone Density: Exam date 11/02/2021

Region	BMD (g/cm ²)	T-score	Z-score	Classification
AP Spine(L1-L4)	0.741	-2.8	-2.6	Osteoporosis
Femoral Neck(Left)	0.592	-2.3	-2.1	Osteopenia
Total Hip(Left)	0.709	-1.9	-1.8	Osteopenia
Total Forearm(Left)	0.430	-2.8	-2.5	
1/3 Forearm(Left)	0.511	-3.0	-2.7	
UD Forearm(Left)	0.352	-1.6	-1.4	

World Health Organization criteria for BMD impression classify patients as Normal (T-score at or above -1.0), Osteopenia (T-score between -1.0 and -2.5), or Osteoporosis (T-score at or below -2.5).

10-year Fracture Risk:

FRAX not reported because:
Some T-score for Spine Total or Hip Total or Femoral Neck at or below -2.5

Impression: UNAPPROVED The patient's bone mass is below expected range for age, gender and ethnicity based on the Total Spine Z-score.

Discussion: UNAPPROVED BONE DENSITY IS ABNORMALLY LOW FOR AGE, SEX, AND RACE. This patient's lowest Z-score is -2.0 or more below average for age, sex, and race at one or more sites. This may be due to low peak bone mass or to excessive bone loss. There may be some underlying disease or condition contributing to reduced bone mass. Further evaluation should be considered. Although there is a predictable association between low bone mass and the risk of osteoporotic fractures in untreated postmenopausal women, there are no data relating bone density and fracture risk in younger women. The ISCD position is that the diagnosis of "low bone mass" or "osteoporosis" should not be made on densitometric criteria alone. WHO criteria only apply to postmenopausal women. The 10-year fracture risk calculated by FRAX is less than the threshold recommended by the National Osteoporosis Foundation (NOF) for treatment for postmenopausal women, and no threshold has been established for premenopausal women. All treatment decisions require clinical judgment and consideration of individual patient factors, including patient preferences, comorbidities, previous drug use,

دکتر [REDACTED]
[REDACTED]
[REDACTED]

Alghadir Hospital
Alghadir Sq.
Tehran

Telephone: 021-77249050

Name: [REDACTED]
Patient ID: 7302905
DOB: 18 March 1983

Sex: Female
Ethnicity: White

Height: 163.0 cm
Weight: 50.0 kg
Age: 36

Referring Physician: DR. YADEGARI

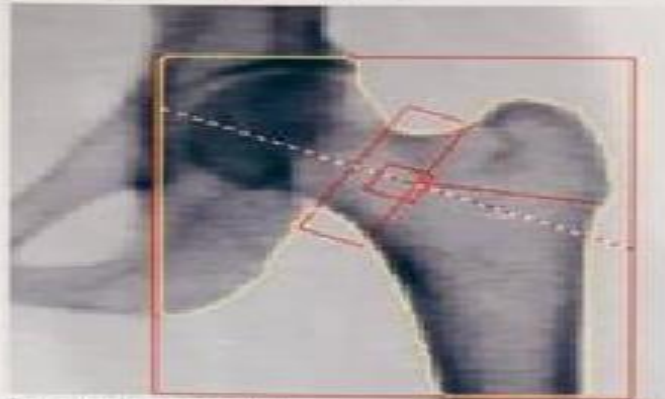


Image not for diagnostic use
92x113
NECK: 47x34

Scan Information:

Scan Date: 13 April 2019 ID: A0413190F
Scan Type: F Left Hip
Analysis: 13 April 2019 15:27 Version: 13.6.0.4
Hip
Operator:
Model: Horizon W1 (S/N 300409M)
Comment:

DXA Results Summary:

Region	Area (cm ²)	BMC (g)	BMD (g/cm ³)	T-score	FR (%)	Z-score	AME (%)
Neck	4.82	2.90	0.602	-2.2	74	-2.0	73
Troch	9.51	5.62	0.591	-1.1	34	-1.1	34
Inter	23.38	15.91	0.809	-1.9	74	-1.9	74
Total	37.71	27.44	0.728	-1.8	77	-1.7	78
Ward's	1.08	0.52	0.478	-2.2	65	-1.8	69

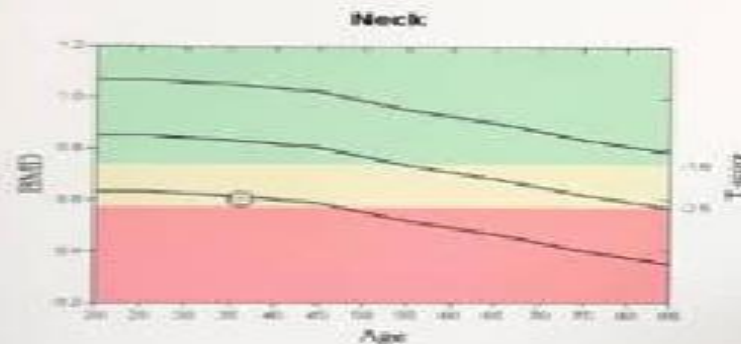
Total BMD CV: 1.0%

WHO Classification: Osteopenia

10-year Fracture Risk

FRAX not reported because:

Some T-score for Spine Total or Hip Total or Femoral Neck at or below -2.5



T-score vs. White Female. Source: 2012 BMDC'SSEANDEX White Female. Z-score vs. White Female. Source: 2012 BMDC'SSEANDEX White Female.

Comment:

Telephone: 021-77249050

Name: [REDACTED]
Patient ID: 7302903
DOB: 18 March 1983

Sex: Female
Ethnicity: White

Height: 163.0 cm
Weight: 50.0 kg
Age: 36

Referring Physician: DR yaDEGARI

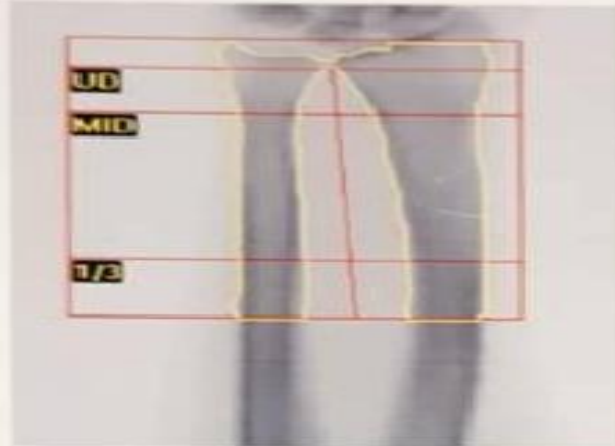


Image not for diagnostic use
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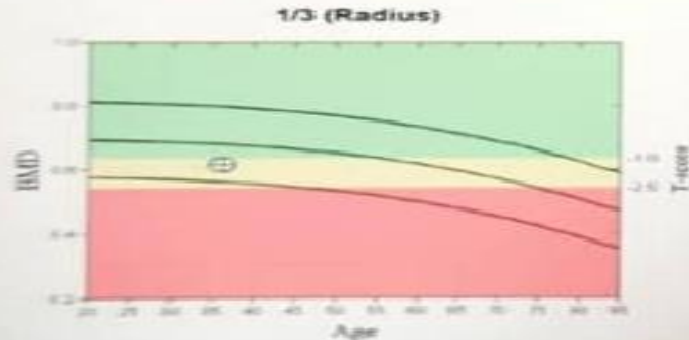
Scan Information:

Scan Date: 13 April 2019 ID: A0413190G
Scan Type: a L Forearm
Analysis: 13 April 2019 15:25 Version 13.6.0.4
Left Forearm
Operator:
Model: Horizon Wi (S/N: 300409M)
Comment:

DXA Results Summary:

Radius	Area (cm ²)	BMC (g)	BMD (g/cm ³)	T-score	PR (%)	Z-score	AM (%)
UD	3.49	1.25	0.358	-1.5	81	-1.3	82
MID	7.60	3.59	0.472	-2.5	78	-2.2	70
1/3	2.81	1.73	0.616	-1.3	89	-1.1	91
Total	13.90	6.57	0.472	-2.0	82	-1.7	83

Total BMD CV 1.07%
WHO Classification: Osteopenia
Fracture Risk: Increased



Comment:

Source: 15. White Female. Source 2012 HMDCS/Hologic Z-score vs. White Female.
Source 2012 HMDCS/Hologic

HOLOGIC

Alghadir Hospital

Alghadir Sq.
Tehran

Telephone: 021-77249050

Name: [REDACTED]
Patient ID: 7302905
DOB: 18 March 1983

Sex: Female
Ethnicity: White

Height: 163.0 cm
Weight: 50.0 kg
Age: 36

Referring Physician: DR yaDEGARI

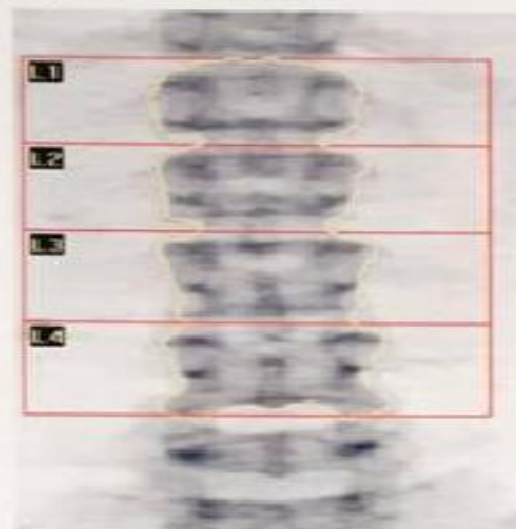


Image not for diagnostic use
116 x 138

Scan Information:

Scan Date: 13 April 2019 ID: A0413190E
Scan Type: L Lumbar Spine
Analysis: 13 April 2019 15:29 Version 13.6.0.4
Spine

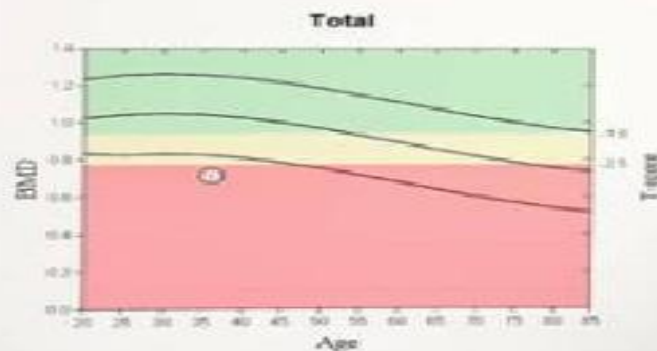
Operator:
Model: Horizon Wi (S/N 300409M)
Comment:

DXA Results Summary:

Region	Area (cm ²)	BMC (g)	BMD (g/cm ³)	T-score	PR (%)	Z-score	AM (%)
L1	14.62	9.91	0.678	-2.8	68	-2.8	69
L2	14.97	10.85	0.725	-2.8	71	-2.7	71
L3	16.57	12.11	0.731	-3.2	67	-3.1	68
L4	17.86	12.90	0.723	-3.1	68	-3.0	69
Total	64.02	45.77	0.715	-3.0	68	-2.9	69

Total BMD CV: 1.0%

WHO Classification: Osteoporosis
Fracture Risk: High



T-score vs. White Female. Source: 2012 HMDX/ST/Integr. Z-score vs. White Female. Source: 2012 HMDX/ST/Integr.

Comment:

HOLOGIC

Bone Density Report

Name: [REDACTED] Sex: Female Age: 36
Patient ID: 7302905 Ethnicity: White Height: 163.0 cm
Referring Provider: DR yaDEGARI Date of Birth: 03/18/1983 Weight: 50.0 kg

Indication:

Accession number:

Bone Density: Exam date 04/13/2019

Region	BMD (g/cm ²)	T-score	Z-score	Classification
AP Spine(L1-L4)	0.715	-3.0	-2.9	Osteoporosis
Femoral Neck(Left)	0.602	-2.2	-2.0	Osteopenia
Total Hip(Left)	0.728	-1.8	-1.7	Osteopenia
Total Forearm(Left)	0.472	-2.0	-1.7	
1/3 Forearm(Left)	0.616	-1.3	-1.1	
UD Forearm(Left)	0.358	-1.5	-1.3	

World Health Organization criteria for BMD impression classify patients as Normal (T-score at or above -1.0), Osteopenia (T-score between -1.0 and -2.5), or Osteoporosis (T-score at or below -2.5).

10-year Fracture Risk:

FRAX not reported because:
Some T-score for Spine Total or Hip Total or Femoral Neck at or below -2.5

Impression: UNAPPROVED The patient's bone mass is below expected range for age, gender and ethnicity based on the Total Spine Z-score.

Discussion: UNAPPROVED BONE DENSITY IS ABNORMALLY LOW FOR AGE, SEX, AND RACE. This patient's lowest Z-score is -2.0 or more below average for age, sex, and race at one or more sites. This may be due to low peak bone mass or to excessive bone loss. There may be some underlying disease or condition contributing to reduced bone mass. Further evaluation should be considered. Although there is a predictable association between low bone mass and the risk of osteoporotic fractures in untreated postmenopausal women, there are no data relating bone density and fracture risk in younger women. The ISCD position is that the diagnosis of "low bone mass" or "osteoporosis" should not be made on densitometric criteria alone. WHO criteria only apply to postmenopausal women. The 10-year fracture risk calculated by FRAX is less than the threshold recommended by the National Osteoporosis Foundation (NOF) for treatment for postmenopausal women, and no threshold has been established for premenopausal women. All treatment decisions require clinical judgment and consideration of individual patient factors, including patient preferences, comorbidities, previous drug use,

بیمارستان الغادر (تهران)
دکتر [REDACTED]
تخصص: رادیولوژی - ماموگرافی
تاریخ: 1398/04/13

Familial history

- She have five siblings who do not have a history of illness or similar problems in her parents and siblings
- Parathyroid disease (-)
- Pancratic disease (-)
- Pituitary disease (-)

R O S

- Fatigue (+)
- Weight loss (-)
- Rash (-)
- Alopecia (-)
- Palpitation (-)
- Faint (-)
- Chest pain (-)

Dyspnea (-)

Paresthesia (-)

Pathologic FX (-)

Seizure (-)

Cough(-)

Drug History

- Hydrochlorothiazide 50 mg/day from 2 years ago
- Calcitriol once /day from 2 years ago
- Calcium carbonate once /day form 2 months ago
- Eplerenon once /day form 2 months ago
- Allopurinol 100 mg/day from 2 months ago

Physical exam

- General : conscious and oriented
- Bp =110/60 PR= 82 RR= 18 T=36.5
- Weight =51kg Height= 160 cm BMI=20
- Skin :normal
- Head and Neck : no lymphadenopathy
- Abdomen : normal
- Extremity : normal

Problem list

- Renal stone
- Hypercalciuria
- High PTH
- Low bone density

AGENDA

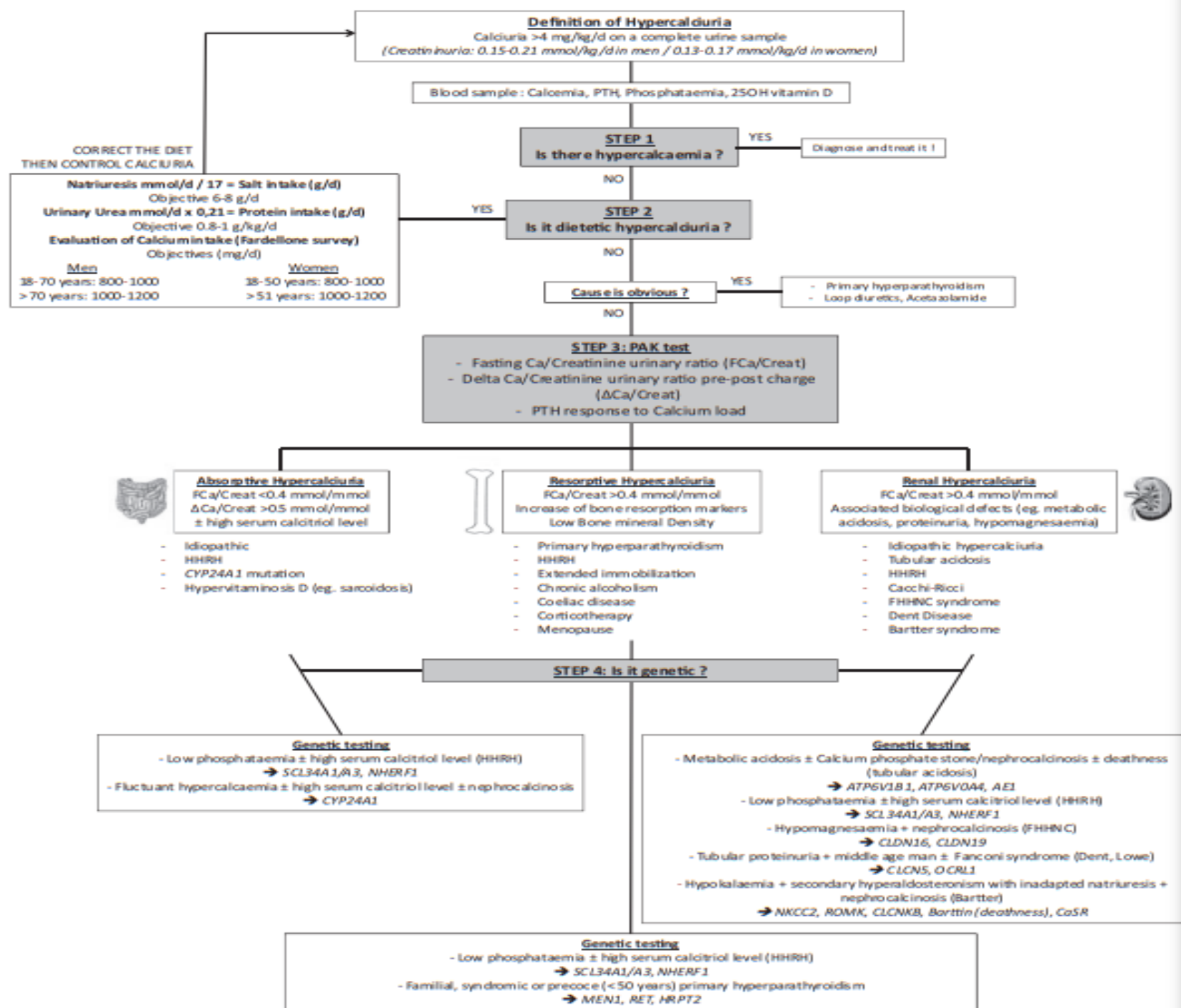
- Hypercalciuria
- Normocalcemic primary hyperparathyroidism
 - pathophysiology
 - Differential diagnosis
 - Imaging study
 - Surgical and medical treatment

AGENDA

- Hypercalciuria
- Normocalcemic primary hyperparathyroidism
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Hypercalciuria

- Hypercalciuria has to be interpreted cautiously according to dietary calcium intake and the patients weight
- In the presence of a normal diet hypercalciuria is defined as **urinary calcium >4 mg/kg/day** in a normal 24-h urine sample
- Hypercalciuria can result in **kidney stones** ; nephrocalcinosis ; chronic kidney failure and **osteoporosis** therefor renal ; blood pressure and bone assessment have to be performed when hypercalciuria is diagnosed



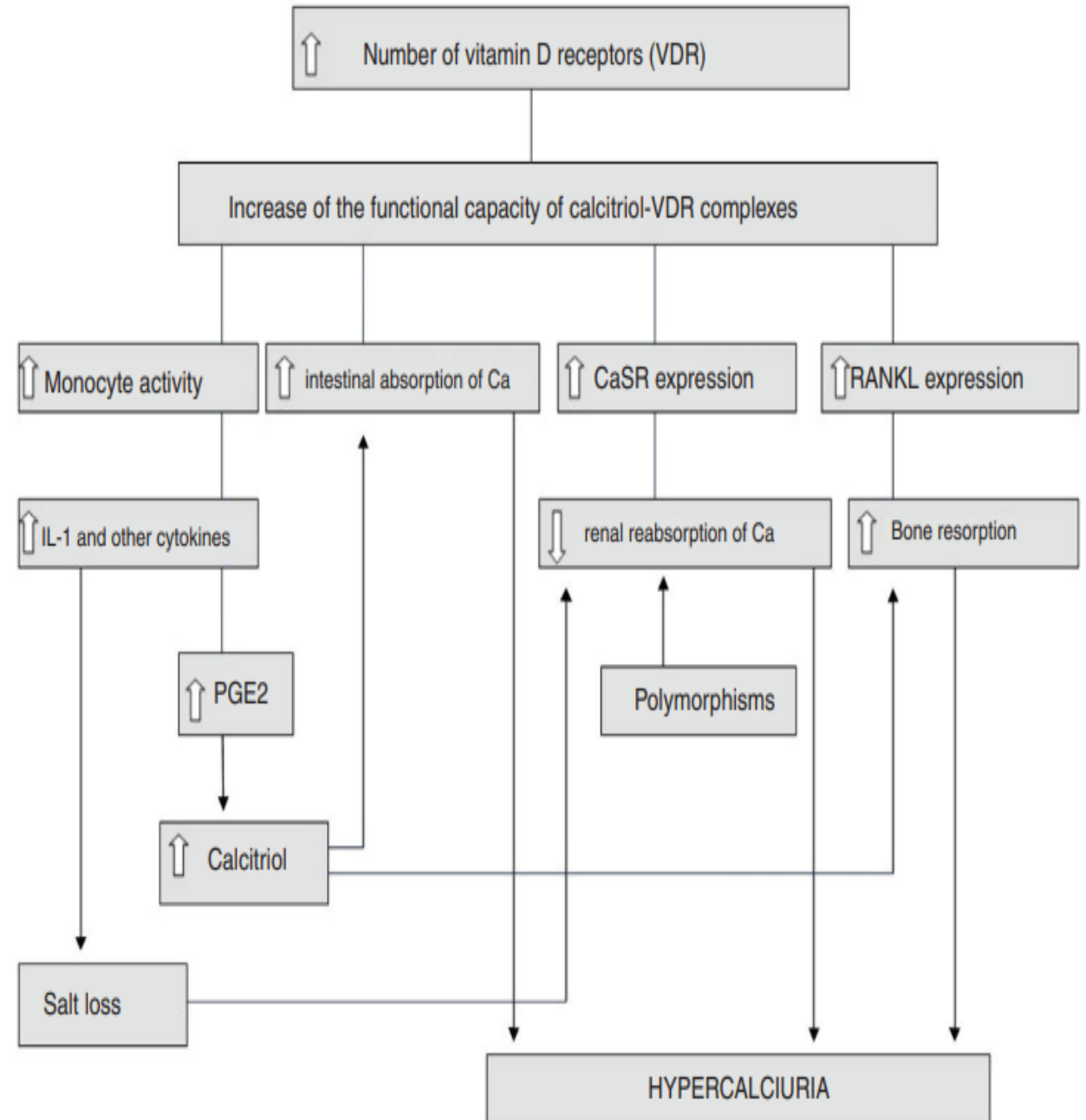
Idiopathic Hypercalciuria

- Idiopathic hypercalciuria is present in **5-10%** of pediatric and adult population
- IH is also an important contributor to developing **low bone density** whether or not subjects develop kidney stones
- Intestinal Ca absorption is increased and serum **1,25 (OH)₂ Vit D level** are **elevated** in one- half to two-thirds of patients
- Serum **PTH levels** are elevated in **less than 5%**
- The revealed a **strong familial occurrence** of IH with high rates of vertical and horizontal penetrance consistent with an **autosomal dominant** mode of inheritance
- If 50% of stone formers have IH and the frequency of stone disease among adult is 0.5% then **80-90%** of **IH patients** are **asymptomatic** and never form kidney stone
- IH may be an important pathogenic factor for development of **low bone mass** even among those who do not form stones

Idiopathic Hypercalciuria

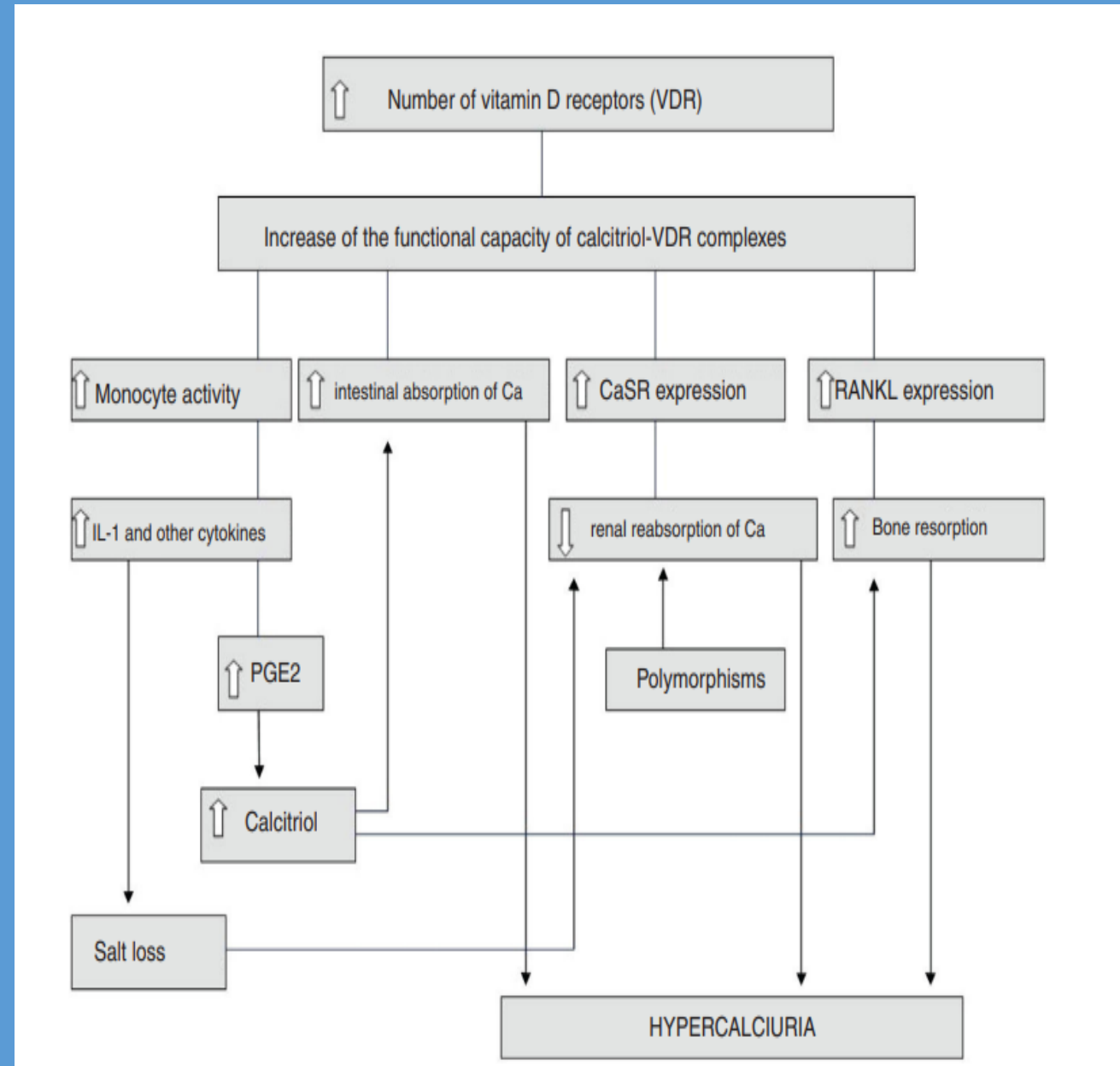
- Some authors have suggested the use of a **short term** of **low dose thiazide** as a useful tool to differentiate between a NPHPT and elevated PTH secondary to hypercalciuria
- Several regimens for the thiazide challenged have been proposed varying from **12/5 to 50 mg /day** for **two weeks** when PTH levels drop to normal range after thiazide administration it suggests a secondary etiology
- However the usefulness of the systematic thiazide administration for this purpose **has not been clearly established** and the main role of thiazide for hypercalciuria **is not diagnostic** but therapeutic aiming to reduce hypercalciuria

- In this study it was known that the IH observe in cases with hyperproduction of **PGE2** was reduced after treatment with indomethacin
- Buck et al treated 43 patients with IH with this prostaglandin inhibitor for 2-4 weeks and it was found a normalization of calciuria which would implicate of **PGE2** in the **origin of hypercalciuria**
- Shortly after ward it was suggested that the osteopenia observe in patients with IH could be secondary to **boneresorptive** effect of **PG E2**
- However to confirm that a hypercalciuria is an IH ; levels of calcemia ; intact PTH ions (incuding chlorid) and acid base balance must be normal



➤ In a longitudinal study our group observed that the improvement of **bone mineral density** was more related to the increase in body mass than to use of **thiazides**

➤ Although therapeutic details are beyond the scope of this review a marketed product based on phytate and 3 types of drugs are available; namely **thiazides**; **potassium citrate** and **biphosphonates**



Persistent elevation of PTH levels with normal albumin-corrected calcium and ionized calcium levels.

Evaluate causes of secondary hyperparathyroidism

Vitamin D deficiency

Drugs: bisphosphonates, denosumab, diuretics...

Hypercalciuria (>4 mg/Kg/day)

Impaired renal function (GFR < 60 mL/min/1.73m²)

Malabsorption: celiac disease, gastric bypass...

Vitamin D levels replacement (> 30 mg/dL 3 months).

Consider withdraw treatment if possible.

"Thiazide challenge".

Target therapy. Low doses of 1,25-OH vitamin D.

Consider target therapy.

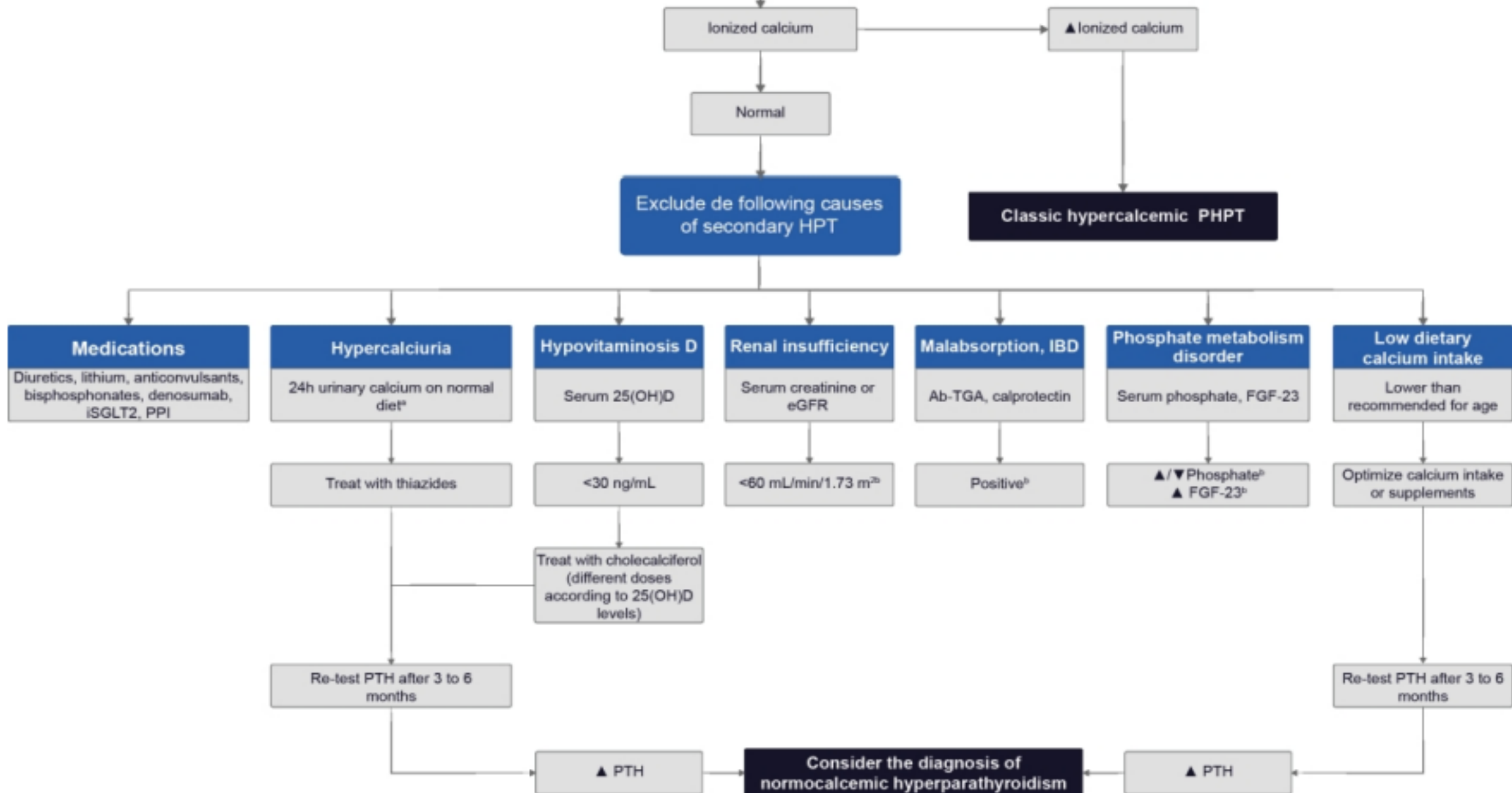
Reevaluate PTH level

PTH levels remain increased in absence of secondary causes:
NORMOCALCEMIC PRIMARY HYPERPARATHYROIDISM

Normalization of PTH levels:
SECONDARY HYPERPARATHYROIDISM

PTH levels slightly elevated: consider reevaluate confounding factors (calcium intake, longer vitamin D replacement, free vitamin D measurement, PTH levels associated with age...)

Approach to the patient with confirmed elevated PTH and normal corrected total calcium levels



AGENDA

➤ Hypercalciuria

➤ Normocalcemic primary hyperparathyroidism

pathophysiology

Differential diagnosis

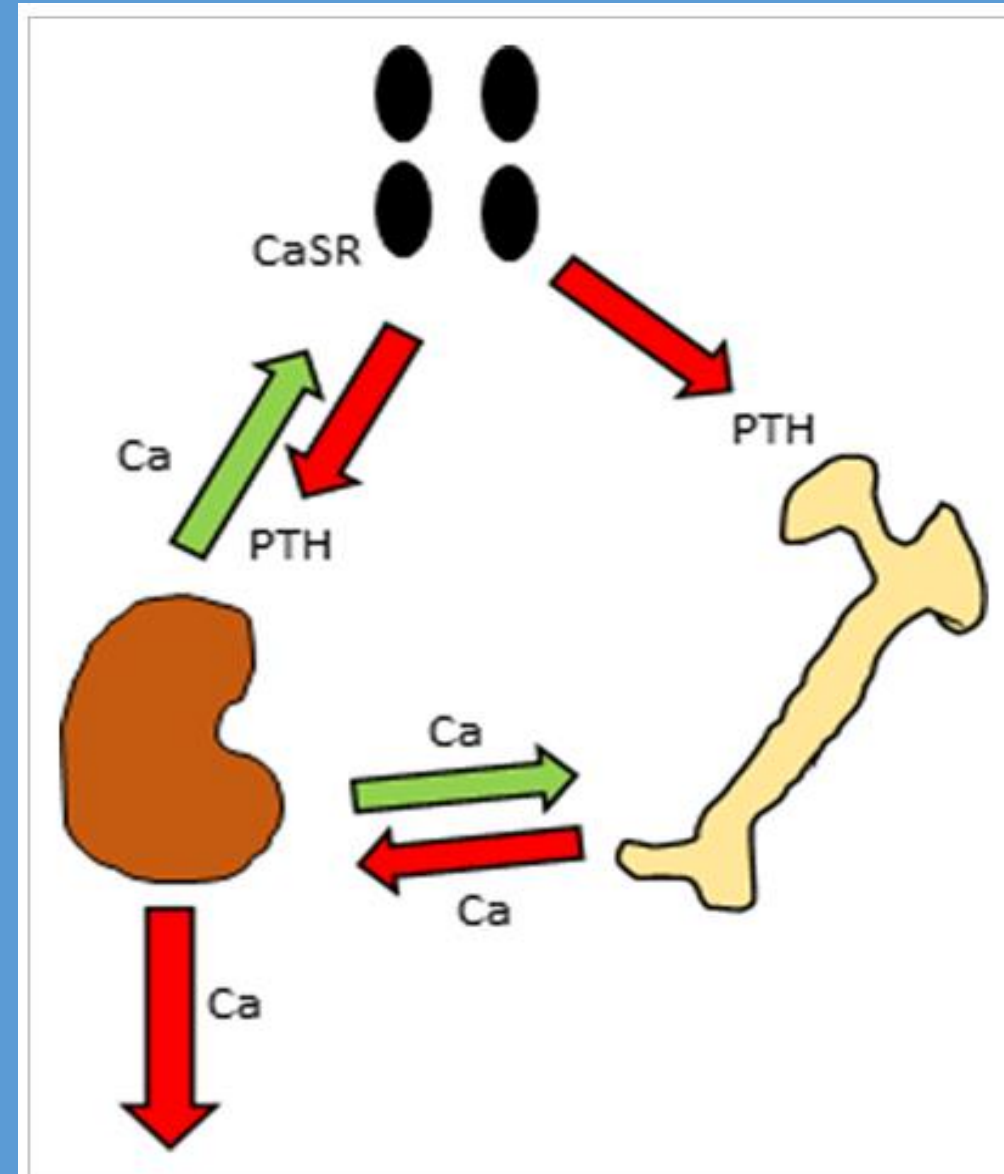
Imaging study

Surgical and medical treatment

NPHPT

- NPHPT is characterized by **persistently increased PTH level** in the setting of **normal** albumin adjusted and ionized **serum Ca** after secondary causes of PTH elevation have been excluded
- The consensus statement from the fourth international workshop indicated that these laboratory finding should be confirmed at the **least two occasion** over a time frame of at **least 3 to 6 month** because PHPT is often characterized by fluctuating serum Ca levels in the upper normal and above normal range ; a single Ca measurement in the upper normal range with high PTH should be interpreted as suspicious for PHPT rather than NPHPT
- The **mechanism** underlying development to **NPHPT** are currently not yet known

The American Society for Bone and Mineral Research (2020)

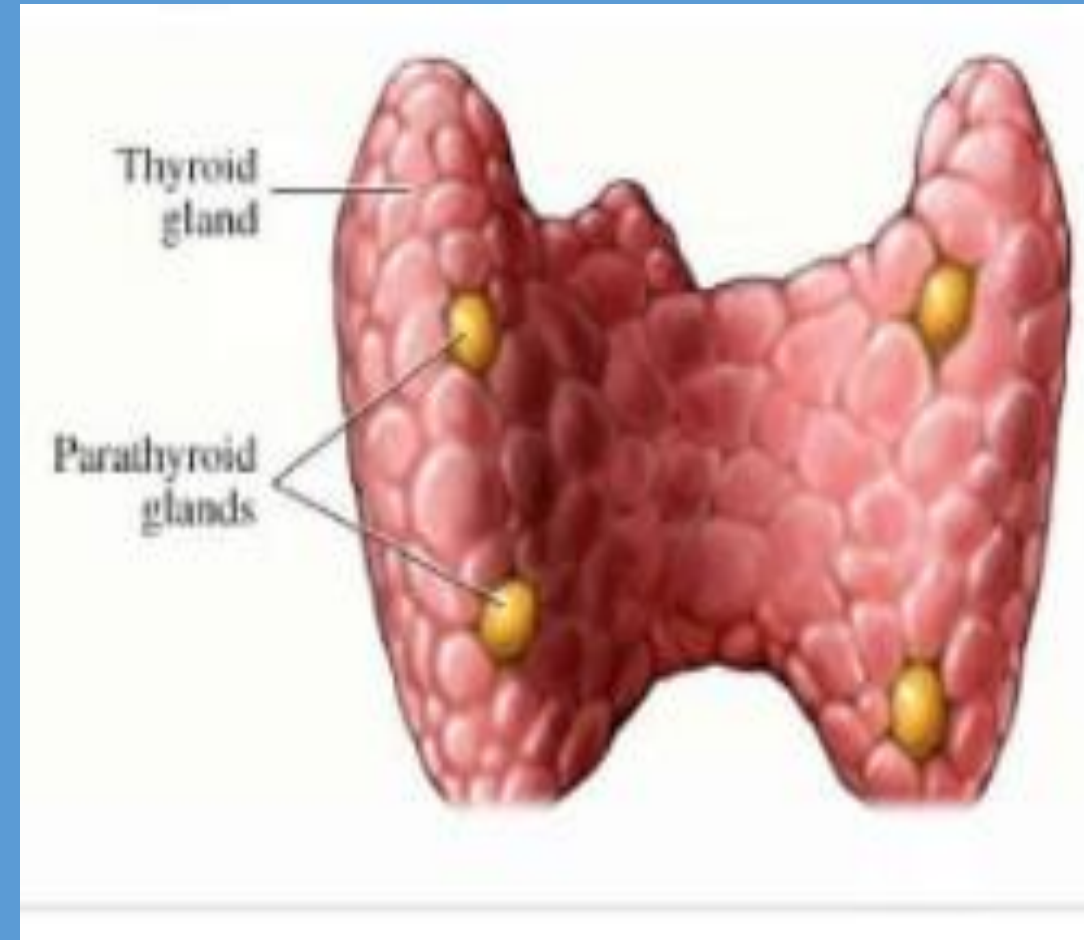


The most hypothesis about NPHPT

- Given that the normal population has mean serum Ca concentration ranging over an approximately **2 mg /dl interval** ; it is possible that **increased** serum **PTH level** increased serum Ca to a mild extent within the normal range that is not clinically detectable within the general population ; but significant enough to explain the pathophysiology of patients with NPHPT
- This hypothesis presumes that those with serum Ca in the upper normal range might be more likely to convert to the hypercalcemic phenotype over time

NPHPT

- NPHPT can be caused by a single adenoma ; multiple adenoma or multi gland hyperplasia of the parathyroid just as in the classical type of primary hyperparathyroidism
- In a recently published prospective study NPHPT comprised **15.4% of all PHPT** patients with a **higher female to male** ratio
- NPHPT incidence patients were **younger** and had parathyroid glands that weighed **less** biochemically and histologically they were less hyperfunction and secreted less PTH
- It therefor suggested that NPHPT is an **earlier form** of PHPT



AGENDA

- Hypercalciuria
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Pathophysiology

- A previous study has suggested that the maintenance of a normal serum total calcium concentration in patients with primary hyperparathyroidism could be the consequence of a **renal tubular resistance** to the action of **PTH**
- In addition the ability of PTH to **decrease tubular phosphat reabsorption** and stimulate synthesis of **1;25(OH)₂ vit D** is also **blunted** in the patients who remain normocalcemic compared with those who are hypercalcemic
- Therefore at least three PTH dependent functions of the kidney are attenuated in the normocalcemic hyperparathyroid patients despite an identical a partial renal resistance to the physiological actions of PTH

Resistance to PTH

- The study also proposed combined renal and bone **resistance to PTH** as a mechanism to explain NHPT because after matching the cohorts of PHPT and NHPT for PTH level the normocalcemic cohort showed **lower markers of bone turnover** and **lower serum 1;25 (OH)₂ vit D** levels as well as **lower capacity** to increased **urinary Ca reabsorption** and **blunted ability** to increased **urinary PO₄ excretion**

Calcium sensing receptor(CaSR)

- The study demonstrated that the **A 986 S polymorphism in the CaSR** was an independent predictor of PTH level in NHPT ;but not in asymptomatic PHPT
- This polymorphism affects the intracellular domain of the CaSR and appears to cause **reduced CaSR function** ; thereby **inducing lower sensitivity** to **extracellular serum Ca** and **stimulating increased PTH** secretion in response
- **This resistance** inducing polymorphisem was **not observed** in the control group with **asymptomatic PHPT** suggesting that these disorders might have different pathogenetic mechanism

Serum free 25(OH) vit D levels

- Lower serum free 25(OH) vit D measured by an immunometric assay
- These patients and controls all had normal serum total 25(OH) vitD level in the range of 30 to 40 ng/ml
- PTH levels correlated with free but not total 25(OH)vitD level
- The study concluded that some NHPT patients might have a form of secondary hyperparathyroidism caused by lower serum free 25(OH)vit D level ;this finding could be explained by higher concentration of vitamin D-binding protein that might mask vitamin D deficiency

Pathophysiology

- PHPT and NHPT may be diagnosed more commonly in post **menopausal women** based on the unmasking of mild hyperparathyroidism caused by loss of the **protective effect** of **estrogen** on bone leading to a negative Ca balance

AGENDA

➤ Hypercalciuria

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pathophysiology

Differential diagnosis

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Differential diagnosis

- **NSHPT** also present with a similar biochemical picture and must be ruled out before embarking on a diagnosis of NPHPT
- Cause of NSHPT included **vit D deficiency** ; consumption of **lithium** ; **bisphosphonates** and **denosumab**
- NSHPT caused by **hypercalciuria** can result from **excess sodium intake** ; excess **tea** and **coffee** consumption ; **loop diuretics** like furosemide and a thorough history will exclude these causes
- **Genetic defects causing hypercalciuria** are rare and detected by genetic testing
- **Lithium** ; decreased special mention it can desensitize the CaSR to Ca and thereby shift the setpoint to the right and released PTH and cause NSHPT

Calcium loading test

- One gram of oral calcium is given and serum Ca and PTH values are measured at regular intervals from 0 to 120 minutes
- In patients with **NPHPT** there is only **minimum suppression** of **PTH** from baseline whereas in normal individuals and **NSHPT** there is a **marked decrease**

AGENDA

➤ Hypercalciuria

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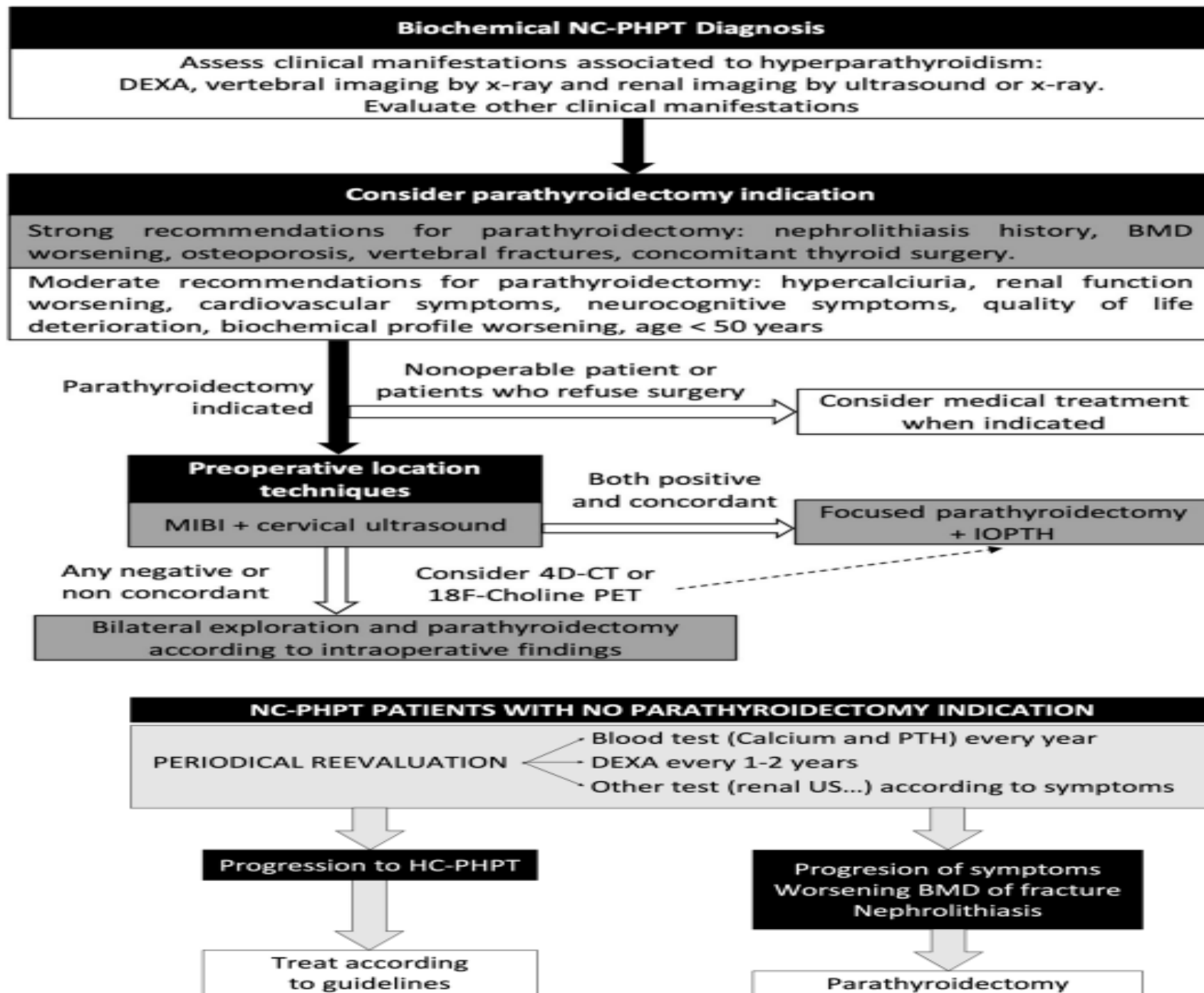
Imaging study

Surgical and medical treatment

Imaging study

- Ultrasound is less efficient in detecting smaller lesions ; multi gland disease and ectopic adenoma in retro esophageal ; retrotracheal and mediastinal location and is highly operator dependent
- In Tc 99m sestamibi ; an earlier washout of the nuclear material from the smaller adenomas or parathyroid hyperplasia can lead to a negative scan as found in NPHPT
- In many cases Tc 99m sestamibi complements ultrasound and the two together successfully localized many lesions than has poor concordance in NPHPT
- Some studies report greater success in NPHPT with 4D CT and novel PET tracers like 11C-methionine and 18F-FDG but these have to be tested in larger patients population to be routinely recommended
- Finally patients with negative or equivocal scans but a biochemically confirmed NPHPT who have indication for surgery will still need a referral to an endocrine surgeon

Imaging study



AGENDA

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Surgical and medical treatment

- In the largest study Pandian and colleagues confirmed that **NPHPT** is characterized by a higher prevalence of **multigland disease** ; which has been **associated with lower cure rates**
- **Smaller gland size** may also be more common in NPHPT as compared with PHPT ; these findings have implications for the preoperative and surgical localization of the pathological glands
- To address this issue Pandian and Colleagues concluded that **routine bilateral neck exploration** was necessary in addition to using intraoperative PTH monitoring in all patients affected by NPHPT
- **A large surgical single-center retrospective** study found that after parathyroidectomy as many as **41.7% and 40%** of patients showed improvement in **BMD and kidney stones** ; respectively
- However this study did not provide T-scores or BMD percentage change

Surgical and medical treatment

- In contrast two studies have been published regarding pharmacologic treatment of bone and renal complications associated with NPHPT
- One study evaluated the effect of oral **alendronate** and **cholecalciferol** in a small cohort of post menopausal women ; all skeletal sites improved with alendronate therapy after 12 month with lumbar spine BMD improving by 4% and femoral neck BMD improving by 2.6%
- The other study investigated the improving nephrolithiasis ; although the study consisted of only 10 patients with hyperparathyroidism ; 6 of whom were normocalcemic ; **cinacalcet** reduce the number and size of urinary stones in both the hypercalcemic and normocalcemic groups over follow up period of 10 months

Surgical and medical treatment

- **Caution** should be used in recommending **surgery** for NPHPT but when surgery is done **multigland disease** has been reported
- This evidence suggests that patients with NPHPT associated with osteoporosis **might benefit more from pharmacologic therapy than surgical** treatment



Thanks for your attention