

**Alterations of thyroid function tests : not always the thyroid !**

# Case # 1

---

- 36 year-old male, A. D.
- Personal history:
  - Smoker until 2005
  - Hypercholesterolaemia
- Familial history:
  - Thyroidectomy in grand-mother (benign disease)
  - Mother with goiter treated with L-thyroxine

# Case # 1

---

- Headaches, chronic fatigue, dyspnea
  - Biology:
- 

	17/10/2009	19/11/2009	10/04/2010
TSH ( $\mu\text{U/mL}$ ) (N: 0,3-3,5)	3,07	3,61	3,89
fT4 (ng/dl) (N: 0,6-1,6)	0,61	0,62	0,52
fT3 (pg/mL) (N: 2,1- 4,2)		2,25	2,05

---

# Case # 1

---

- 19/11/2009: Ac anti-TPO (+)
- Echography of the thyroid:  
no goiter. Mixed nodule 10 mm left lobe.
- Thyroid Scintigraphy : normal
- Diagnosis : primary hypothyroidism  
→ R/ L-thyroxine

# Case # 1

---

- ↑ L-thyroxine dose up to 100  $\mu\text{g}/\text{day}$
- R/ L-thyroxine 100  $\mu\text{g}/\text{day}$  (3 months)
  - TSH : 0,01  $\mu\text{U}/\text{mL}$  (0,20-3,50)
  - $\text{fT}_4$  : 0,8  $\text{ng}/\text{dl}$  (0,6-1,4)
  - $\text{fT}_3$  : 3,0  $\text{pg}/\text{mL}$  (2,2-4,0)

# Case # 1

---

- Fatigue persisting
- Anorexia, weight loss (6 kgs in 6 months)
- Muscular and bone pain
- Headaches increase
- Loss of libido

# Case # 1

---

- weight: 86 kg; height 182 cm, BMI 25,9 kg/m<sup>2</sup>
- BP 12/8 mmHg; HR 68/min
- Thyroid normal
- Loss of peripheral hair - small testes
- Neurological examination: normal

# Case # 1 : extensive hormonal biology

---

- Somatotrope axis
  - GH 0.13 ng/mL (< 1.50)
  - IGF-1 58 ng/mL (110-338)
- Gonadotrope axis
  - LH 1,0 mUI/mL (1,7-12,1)
  - FSH 1,1 mUI/mL (1,4-9,9)
  - Testosterone 1,4 nM (13,0 - 35,0)
- Corticotrope axis
  - ACTH 16 pg/mL (5-49)
  - Morning cortisol 71 nM (260-540)
- Prolactin 10366,0 ng/mL (< 12)

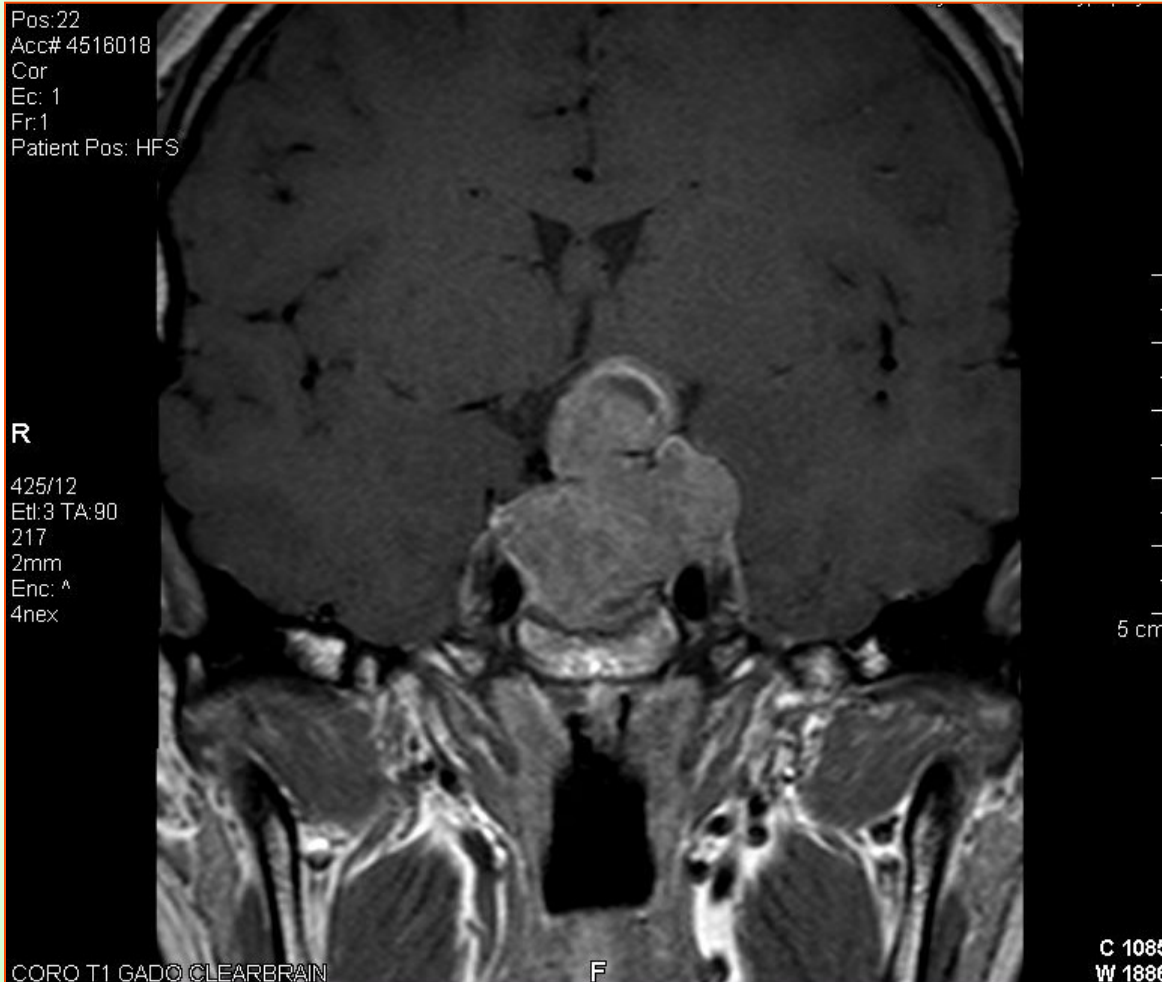


# Case # 1 pituitary MRI



# Case # 1 pituitary MRI

---



# Case # 1 ophthalmologic examination

---

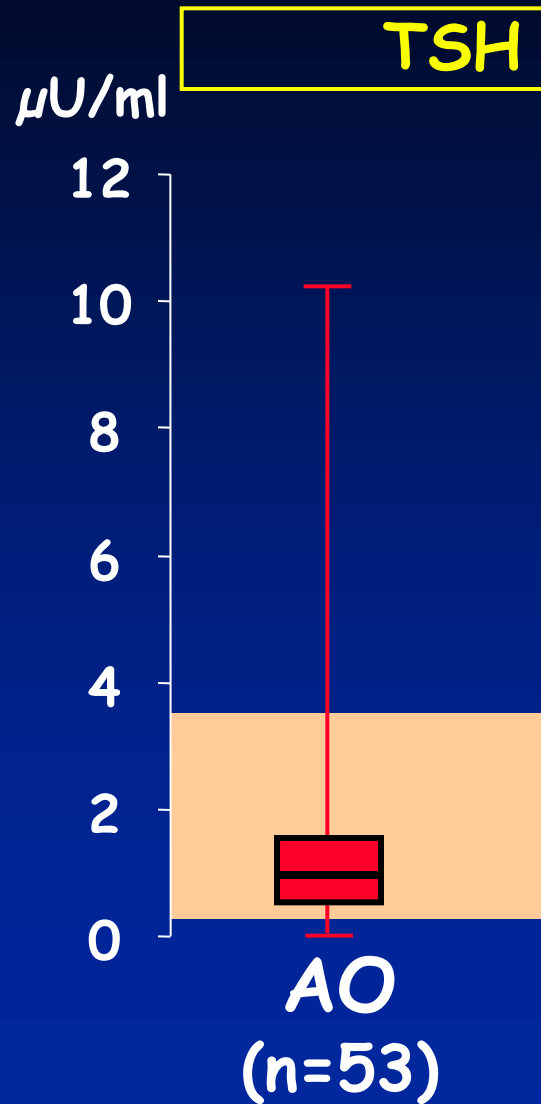
- Normal visual acuity
- Bitemporal hemianopsy

# Case # 1 conclusions

---

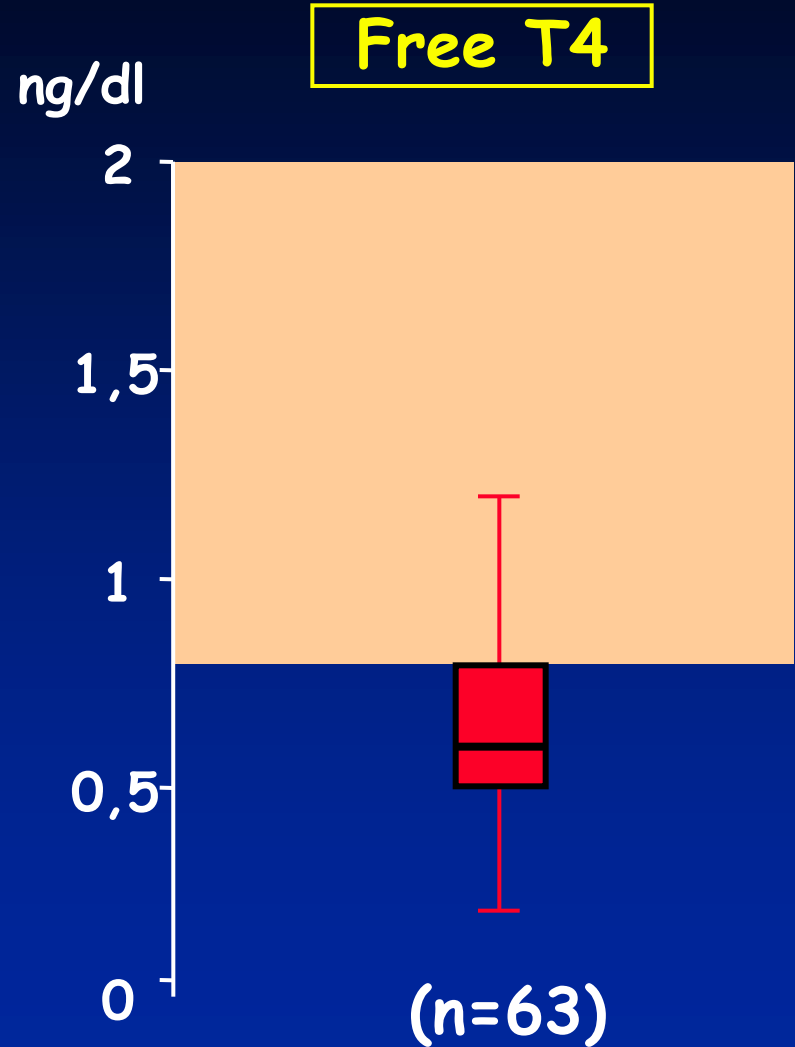
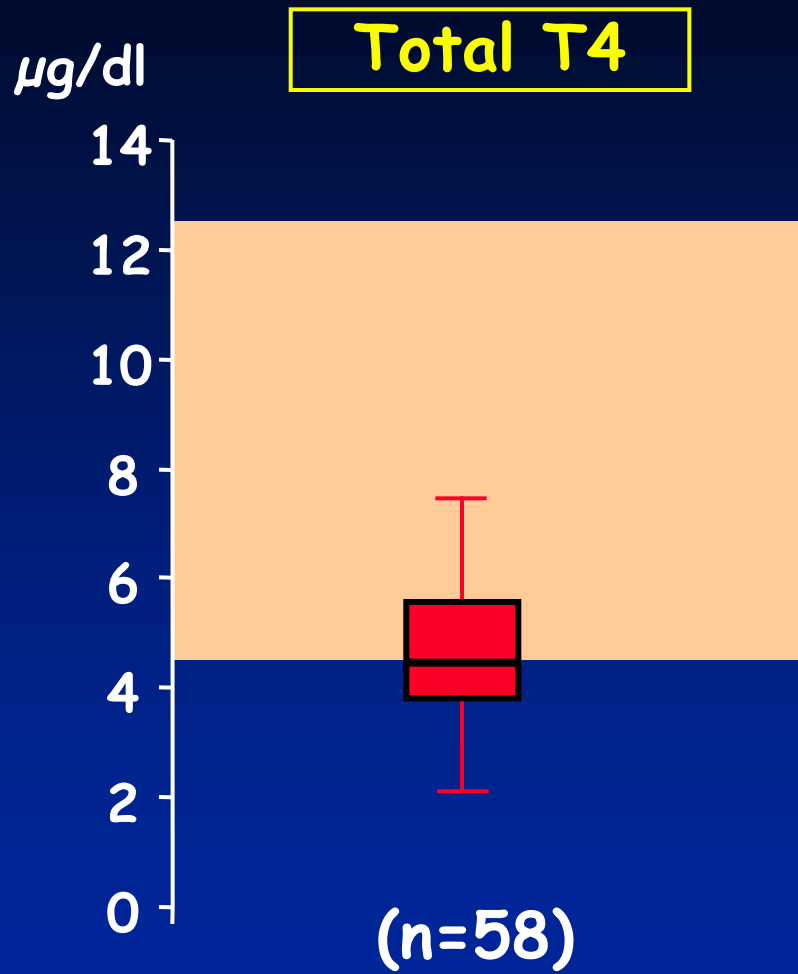
- Invasive macroprolactinoma with :
  - complete pituitary insufficiency  
(including TSH deficiency)
  - optic compression

# Central hypothyroidism

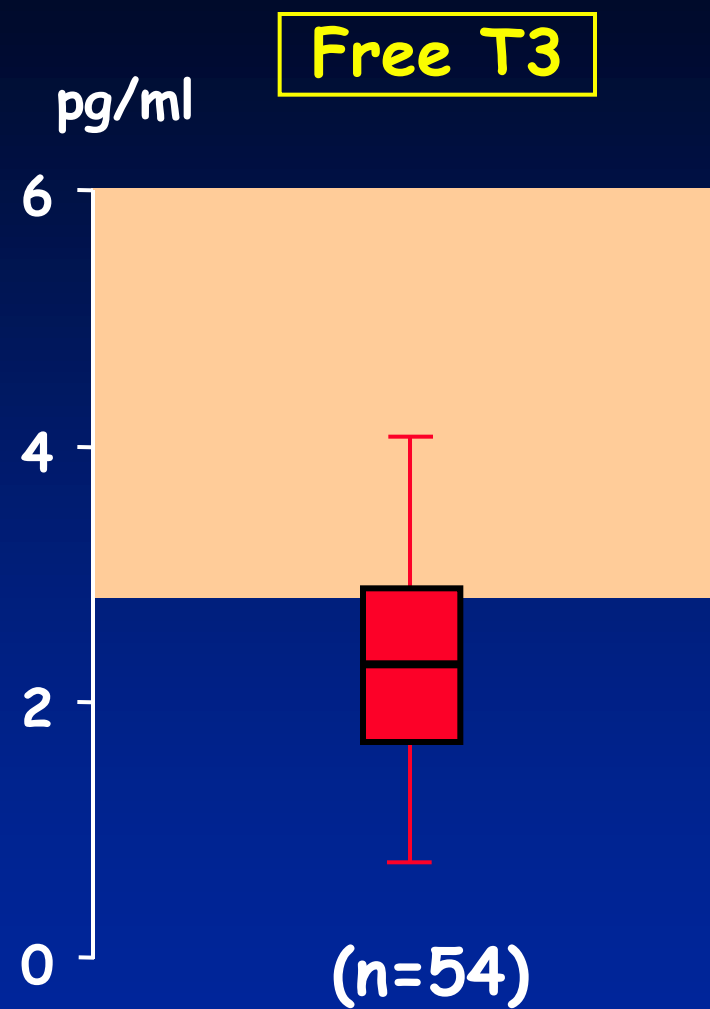
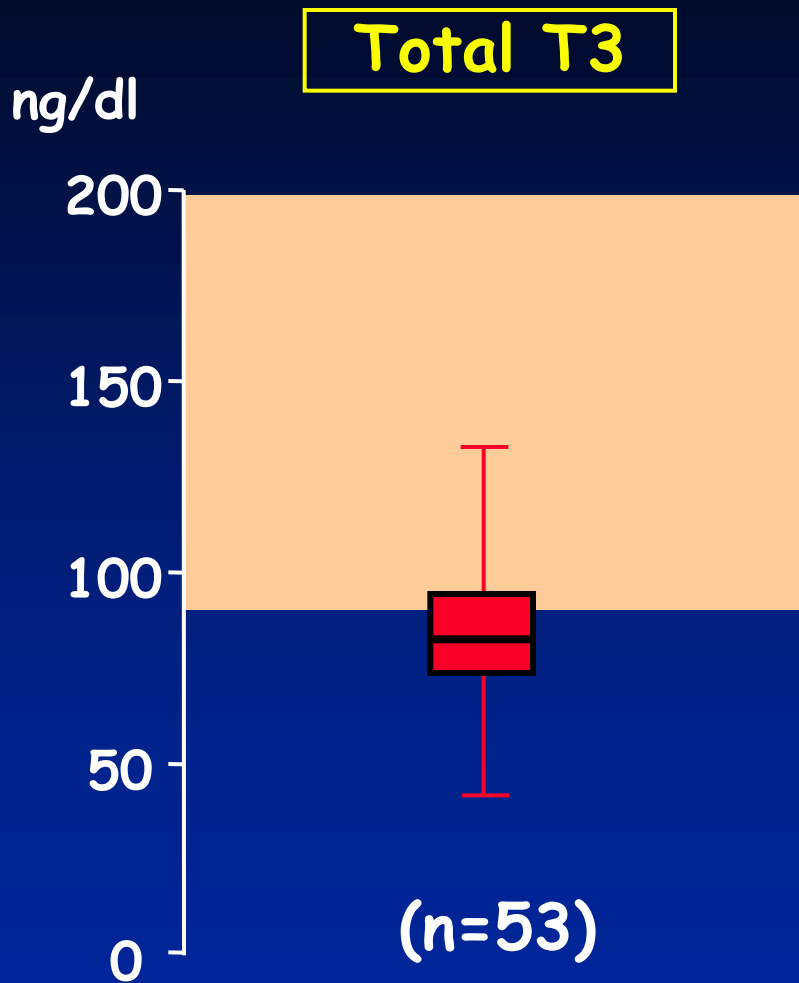


81% normal TSH  
11% low TSH  
8% high TSH!

# Central hypothyroidism



# Central hypothyroidism



# Case # 2

---

- 45 year-old male, A.B.
- Personal history:
  - Oesophagitis
  - HTA R/ Nobiten
  - Dyslipidaemia
- Familial history:
  - hyperthyroidism in the mother
- Treatment:
  - Zurcale 20 mg, Nobiten 5 mg



## Case # 2

---

- Since 1 year: general alteration of health status , fatigue, muscular weakness of legs and insomnia
- Biology March 2010: diagnosis of hyperthyroidism  
→ R/Strumazol 2/day

	<b>Strumazol</b> ↓ March 2010	May 2010	<b>Stop Strumazol</b> ↓ August 2010	Sept 2010
TSH (mU/L) N: 0,35 - 5,50	<b>0,06</b>	0,34	0,64	0,29
fT4 (ng/dl) N: 0,6-1,4	1,1	0,6	1,0	0,5
fT3: (pg/mL) N: 2,2 -4,0	2,6	3,0	4,2	2,3

---

## Case # 2

---

- Thyroid Antibodies (-)
- Thyroid echo and scintigraphy:  
normal

## Case # 2

---

- fatigue and proximal muscular weakness
- weight gain (5 kg in 1 year)
- swelling of the face and ankles
- easy bruising of the skin
- loss of libido

## Case # 2

---

- Thyroid function tests

- total T4      4,2  $\mu\text{g}/\text{dl}$  (4,8-12)
- free T4      0,8  $\text{ng}/\text{dl}$  (0,8-1,8)
- free T3      2,3  $\text{pg}/\text{ml}$  (2,4-4,0)
  
- TSH      0,12  $\mu\text{U}/\text{ml}$  (0,2-3,5)

# Case # 2 extensive hormonal biology

---

- Somatotrope axis

- GH 1,03 ng/mL (< 1,50)
- IGF-1 123 ng/mL (110-338)

- Gonadotrope axis

- LH 0,9 mUI/mL (1,7-12,1)
- FSH 4,3 mUI/mL (1,4-9,9)
- Testosterone 3,5 nM (13,0 - 35,0)

- Prolactin 8,6 ng/mL (< 12)

- Corticotrope axis

- ACTH 89 pg/mL (5-49)
- Cortisol 868 nM (8h:260-540)
- 24h-urinary free cortisol : > 1500  $\mu\text{g/L}$

## Case # 2 extensive hormonal biology

---

- Cortisol - ACTH profile

	8h	12h	16h	20h	24h
Cortisol (nM)	675	708	674	739	642
ACTH (pg/mL)	81	70	88	101	98

---

# Case # 2 extensive hormonal biology

---

- Dexamethasone suppression tests

- 4 x 0,5 mg dexamethasone/day for 2 days

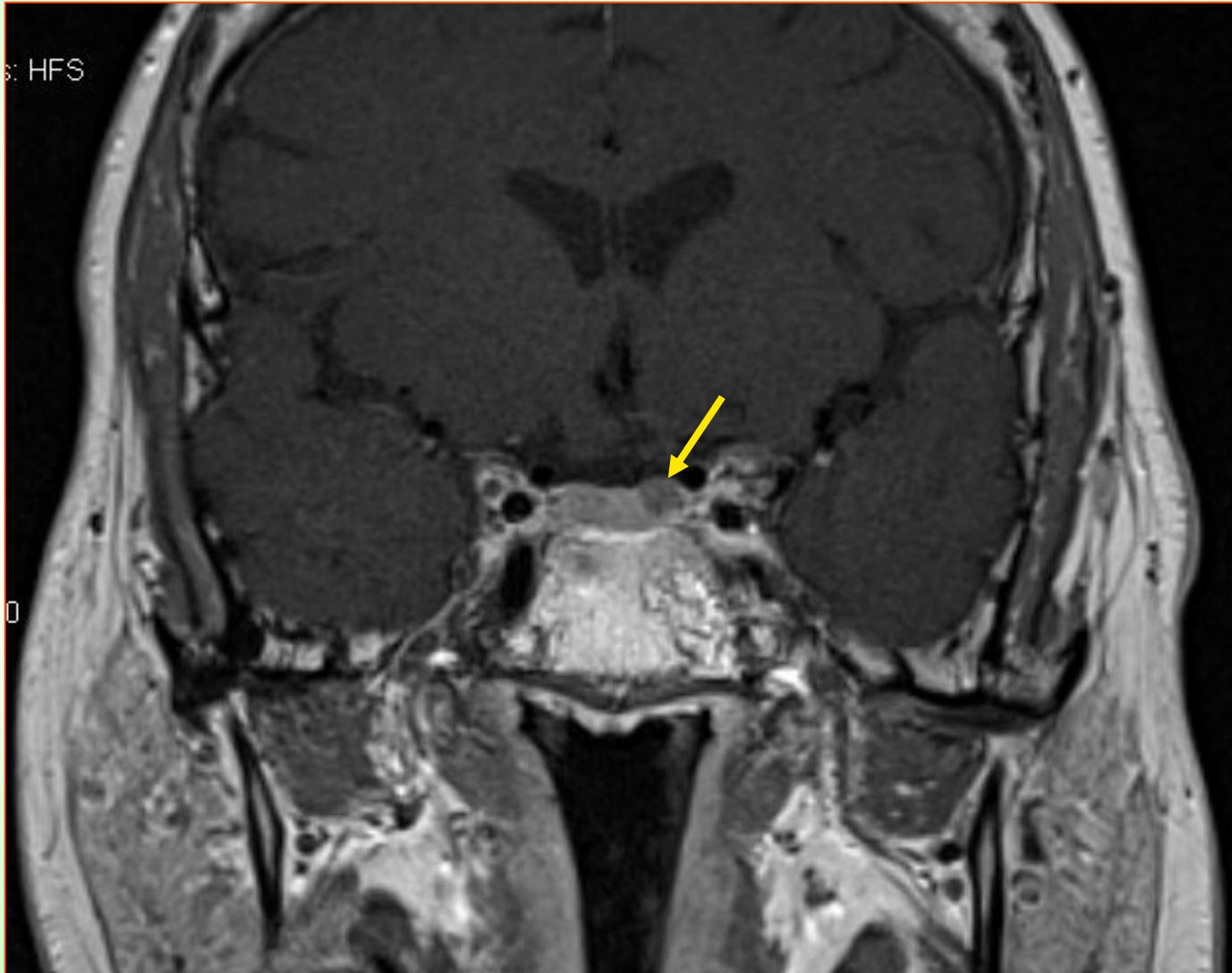
- Cortisol (8h): 559 nM (nl < 140)

- dexamethasone 8 mg at 23h00

- Cortisol (8h): 313 nM (nl ↓ de 50%)

# Case # 2 pituitary MRI

---





## Case # 2 conclusions

---

- Cushing's disease related to a pituitary microadenoma
- Chronic cortisol excess often induces :
  - a low TSH concentration with euthyroidism
  - a hypogonadotrope hypogonadism
  - a glucose intolerance
  - a dyslipidaemia
  - high blood pressure

# Causes of low TSH

---

- All causes of primary hyperthyroidism
  - Basedow/grave's disease, multinodulaire goiter, autonomous adenoma, thyroiditis, « iod-Basedow », factitious hyperthyroidism, amiodarone, lithium, gestational hyperthyroidism, struma ovarii, ...
- 1st trimester of pregnancy (hCG peak)
- pituitary disease with TSH deficiency (isolated/multiple pit def)
- Severe malnutrition, cachexia, prolonged fasting
- Infectious diseases and cancers
- Cushing's syndrome
- Drugs → low TSH with euthyroidism
- (assay interference : very uncommon)

# Low TSH

---

- Drugs
  - Dopamine and dopamine agonists, dobutamine
  - Somatostatine et somatostatine analogues
  - Glucocorticoids
  - cytokines, interferon
  - phenylhydantoine
  - metformine ? (only 1 publication...)