

PHC

432 Team

12

DATA INTERPRETATION (II)



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COLOR GUID: Doctor's Notes Team Notes slides Not important Important 431 team work

Objectives

▶ Not Given

Mind Map

Liver Function Test

- Cases

Diabetes

- Case

Comparison between hypoparathyroidism and Rickets

- Cases

Thyroid Function Test

- Cases

Hepatitis.

- Cases

Components of Liver Chemistry Tests:

1- Indicate Hepatocyte Integrity:

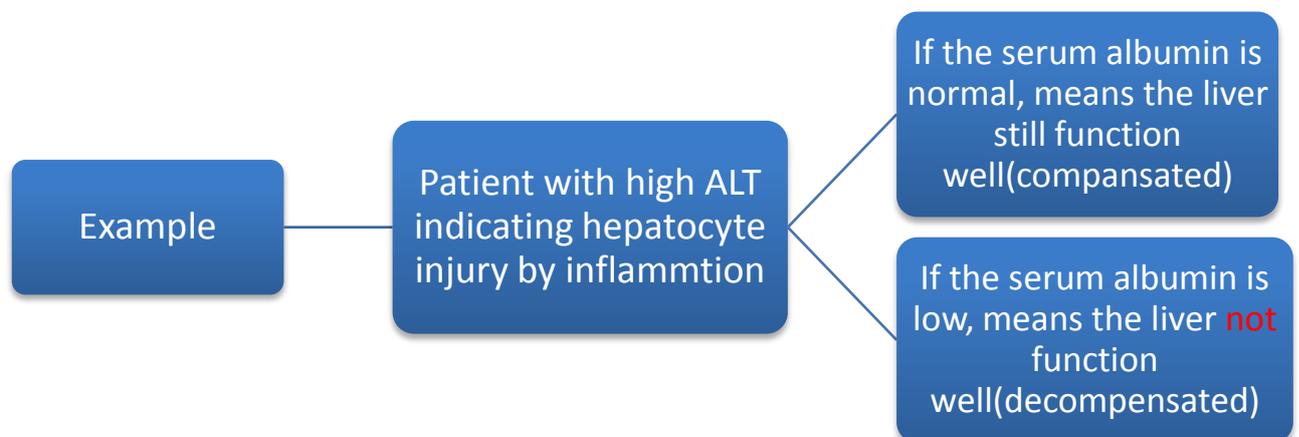
- Alanine amino Transferase **ALT** (Pure liver and the most important one).
- Aspartate amino Transferase **AST** (not specific could rise in muscle damage).

2- Indicate Obstructive Cholestasis:

- Alkaline phosphatase (not specific could rise in bone damage), if the ALT high also, it is more suggestive of liver disease.
- γ -Glutamyl-transpeptidase (could be affected in hepatocyte injury also).
- Bilirubin (Mainly direct indicate obstruction while indirect indicate hemolysis).

3- Indicate Liver Function:

- Serum albumin (indicate decompensation and chronic liver disease).
- Prothrombin time / INR.



▪ **First case: (Common presentation)**

A 40 year old man, came for routine medical check up.

The following LFT is shown below:

| | | |
|-------------------------------|------------|------------------------|
| Total bilirubin | 10 | (3- 17 umol/L) |
| Total protein | 73 | (60-80 g/L) |
| Albumin | 38 | (35-50 g/L) |
| Alkaline phosphatase | 116 | (50-136u/L) |
| Alanine aminotransferase ... | 55 | (20-65 u/L) |
| Aspartate aminotransferase .. | 27 | (10-31 u/L) |
| G.G. Transferase | 198 | High (5-55 u/L) |

Mention two causes for rise of G.G.Transferase Alone?

- Drugs like anti-epileptics e.g. Carbamazepine, **phenytoin most common in KSA**
- Alcohol
- Fatty liver **e.g. Obese patient**

- No need to do anything for this patient – unless there is change in other parameters (e.g. albumin, ...) .
- **Treat the underlying cause.**

▪ **Second case:**

A 32 year old man referred from PHC center because of **jaundice**, LFT done for him as shown:

| | | | |
|---------------------------------|------------------------------|-------------|---------------|
| Total Bilirubin.. | (Mainly indirect)..57 | High | 3 – 17 mmol/L |
| Direct Bilirubin... | (almost normal).....6 | | 0 – 5 umol/L |
| Total Protein | 78 | | 60 – 80 g/L |
| Albumin | 47 | | 30 – 50 g/L |
| Alkaline phosphatase | 69 | | 50 – 136 u/L |
| Alanine Aminotransferase | 63 | | 20 – 65 u/L |
| Asparate Aminotransferase | 31 | | 12 – 37 u/L |
| Gamma Glutamyltransferase | 25 | | 15 – 85 u/L |

How are you going to deal with this gentleman?

- Request CBC and Reticulocytes to roll out **haemolytic anaemia** due to rise indirect bilirubin(**Reticulocytes will be high**).
- If normal so it is mostly due to **Gilbert Syndrome**.

▪ **Third case:**

A 25 year old man on 4 drug anti-tuberculous treatment. On 2 months follow up visit, he presents with mildly elevated transaminases. Physical examination is unremarkable.

| | | | |
|--|-----------|-------------|--|
| Total bilirubin | 10 | | (3- 17 umol/L) |
| Total protein | 71 | | (60-80 g/L) |
| Albumin | 37 | | (35-50 g/L) |
| Alkaline phosphatase | 126 | | (50-136u/L) |
| Alanine aminotransferase..(imp).. | 99 | High | (20-65 u/L) increase 1.5 fold which is mild (below 3 fold not risk) |
| Aspartate aminotransferase | 65 | High | (10-31 u/L) |
| G.G. Transferase | 98 | High | (5-55 u/L) |

What is the most likely diagnosis?

- Drug induced Hepatitis, mostly due to Isoniazide.

High ALT and AST and G.G Transferase indicate hepatocytes injury (hepatitis in this case due to anti-tuberculous drug).

- In this case, as long as his LFT is mildly increase, we consider it normal until he finishes his treatment .

▪ **Forth case:(very common presentation)**

A 58 year old asymptomatic woman presents with elevated liver enzymes on routine screening. Her past medical history is significant for HTN, DM 2 and dyslipidaemia. On examination, her BMI is 38 and there is significant acanthosis nigricans on her neck.

| | | | |
|---------------------------------|------------|-------------|-------------------------------------|
| CBC | Normal | | |
| U&E | Normal | | |
| Total bilirubin | 10 | | (3- 17 umol/L) |
| Total protein | 69 | | (60-80 g/L) |
| Albumin | 38 | | (35-50 g/L) (the liver compensated) |
| Alkaline phosphatase | 146 | High | (50-136u/L) (mild=liver injury) |
| Alanine aminotransferase ... | 112 | High | (20-65 u/L) (mild=more specific) |
| Aspartate aminotransferase | 61 | High | (10-31 u/L) |
| G.G. Transferase | 126 | High | (5-55 u/L) (not important here) |

Total cholesterol.....6.1
Triglycerides. .. 3.2
INR1.2 (Normal)

Mention two investigations of significance?

- 1- Viral serology B & C (Negative)
- 2- U/S liver (increased echogenicity(fatty liver))

- Tell the patient to change life style and reduce her weight
- Give Metformin (for DM + fatty liver)

What is the most likely diagnosis?

- NAFLD (non-alcoholic fatty liver disease)

▪ **Fifth case:**

A 19 year old girl presents with new onset fatigue, jaundice and mild pruritus. Her past medical history is significant for acne, which is being treated with minocycline for the past 2 months. There is no history of travel or contact with patients with viral hepatitis. On examination there is mild icterus, no organomegaly.

| | | | |
|--------------------------------|-----|------|--|
| Total bilirubin | 58 | High | (3- 17 umol/L) (mild)(obstruction) |
| Indirect bilirubin | 5 | | |
| Albumin | 38 | | (35-50 g/L) |
| Alkaline phosphatase | 346 | High | (50-136u/L) (significant high) (obstruction) |
| Alanine aminotransferase ... | 116 | High | (20-65 u/L) (mild 1.5 folds) |
| Aspartate aminotransferase ... | 91 | High | (10-31 u/L) |

Viral serology for B and C (hepatitis) is Negative
U/S is within normal

What is the most likely diagnosis?

- Drug induced cholestasis- secondary to minocycline.
Symptoms resolve within 2 weeks of drug discontinuation
Liver profile normalize within 8 weeks.

- We just reassure the patient and stop the medication.
- The patient asks you, when is the jaundice going away? 2 week but repeat investigations after 6-8 week
- Do you know other drugs that can causes cholestasis? OCP, phenothiazenes (antipsychotics), androgens.

▪ **Sixth case:**

A 38-year-old lady presented with 2 weeks H/O yellowish discoloration of sclera together with weakness.

The following investigations are shown below:

| | | | |
|--------------------------------|--------|------|--------------------------------|
| Total bilirubin | 98 | High | (3- 17 umol/L) |
| Indirect bilirubin | 43 | | |
| Albumin | 36 | | (35-50 g/L) |
| Alkaline phosphatase | 356 | High | (50-136u/L) (significant high) |
| Alanine aminotransferase ... | 316 | High | (20-65 u/L) (significant high) |
| Aspartate aminotransferase ... | 291 | High | (10-31 u/L) (significant high) |
| G.G. Transferase | 286 | High | (5-55 u/L) (significant high) |
| INR | Normal | | |

So the liver is compensating but there is (hepatocytes injury by inflammation+ obstruction)

What are the possible differential diagnosis?

- Viral Hepatitis
- Autoimmune Hepatitis (the diagnosis of this case)
- Primary biliary cirrhosis. **most likely in 45 years old patient or older**
- Alcoholic hepatitis
- Drug induced

What are essential investigations needed to help to reach diagnosis?

- Viral markers (screening) for B, C and A
- Ultrasound liver
- Autoimmune antibodies (ANA, Anti mitoch. Ab and Anti smooth musc. Ab)
- Liver biopsy
- We have to admit this patient

▪ **Seventh case:**

A 62-year-old man is a known case of HCV +ve.

The following investigations are shown below:

| | | | |
|---|------|------|--------------------|
| Total bilirubin | 6 | | (3- 17 umol/L) |
| Indirect bilirubin | 3 | | |
| Albumin | 23 | Low | (35-50 g/L) |
| uncompensated(impaired function) | | | |
| Alkaline phosphatase | 180 | High | (50-136u/L) |
| Alanine aminotransferase .. | 71 | High | (20-65 u/L) |
| Aspartate aminotransferase .. | 77 | High | (10-31 u/L) |
| G.G. Transferase | 111 | High | (5-55 u/L) |
| INR | 1.36 | High | (0.8 - 1.2) |
| RBC..... | 3.08 | Low | 4.2 - 5.5 X10e12/L |
| HGB..... | 88 | Low | 120 - 160 g/L |
| HCT..... | 26.7 | Low | 42 - 52% |
| MCV..... | 86.7 | | 80 - 94 fl |
| MCH..... | 28.5 | | 27 - 32 pg |

What is your diagnosis?

- Chronic liver disease (CLD), uncompensated, post HC virus.
- Normocytic Normochromic Anaemia due to Chronic Liver Disease.

Diagnosis of Diabetes:

(If Fasting Plasma Glucose Test is requested)

FPG \leq 5.5 mmol/L = normal

FPG \geq 5.6 mmol/L to 6.9 mmol/L = Impaired Fasting Glucose

FPG \geq 7 mmol/L = DM

(If Oral Glucose Tolerance Test is requested)

2-h post 75 gm glucose $<$ 7.8 mmol/L = normal GTT

2-h post 75 gm glucose \geq 7.8 mmol/L and $<$ 11.1 mmol/L = impaired GTT

2-h post 75 gm glucose \geq 11.1 mmol/L = DM

▪ **Case:**

A 53-year-old man known case of dyslipidemia. As a routine investigation:

FPG: 6.2 mmol/L
5.9 mmol/L

What is your diagnosis?

- Impaired FPG.

If impaired:
Diet, exercise and
Metformin.

OGTT is requested (FPG and 2 hr post 75 gm glucose)

FPG: 6.9 mmol/L

2 hr: 13.4 mmol/l

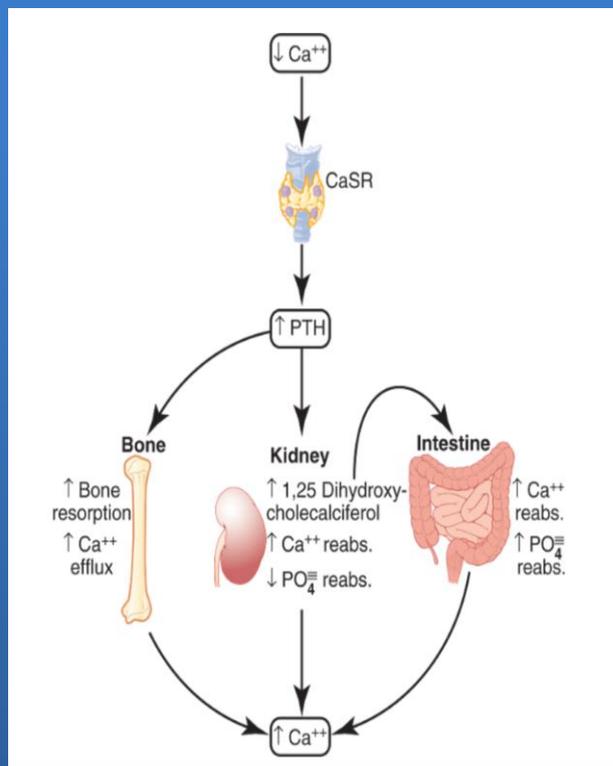
What is your diagnosis?

- Diabetes.

Now HB1c 6.5 and
above is diagnostic

Comparison between hypo-parathyroidism and Rickets:

PTH secretion in response to decreased extracellular fluid calcium ion concentration: (1) PTH stimulates bone resorption, causing release of calcium into the extracellular fluid; (2) PTH increases reabsorption of calcium and decreases phosphate reabsorption by the renal tubules, leading to decreased excretion of calcium and increased excretion of phosphate; and (3) PTH is necessary for conversion of 25-hydroxycholecalciferol to 1,25-dihydroxycholecalciferol, which, in turn, increases calcium absorption by the intestines.



| Rickets / Osteomalacia | Hypoparathyroidism |
|---------------------------|-----------------------------|
| Low calcium | Low calcium |
| Low or Normal phosphate | High phosphate |
| High alkaline phosphatase | Normal alkaline phosphatase |

▪ **First case:**

A 70-year-old blind man known case of hypothyroidism+ vitiligo (= autoimmune) and left ventricular dysfunction (this is the most serious and I should care about it first) presents with 2 month H/O SOB, bouts of dry and irritating cough, loss of appetite, hoarseness of voice and low mood.

| | | | |
|----------------------|-------------|------|--------------------------|
| TSH: | 0.288 miu/L | | (0.25 – 5) |
| T4: | 20.5 pmol/L | | (10.3 – 25.8) |
| Ca. | 1.4 mmol/L | Low | (2.10 – 2.55) (very low) |
| Ph. | 1.67 mmol/L | High | (0.74 – 1.30) |
| Alb. | 35 gm/L | | (30 – 50)(normal) |
| Alkaline phosphatase | 86 u/l | | (50 – 136) (normal) |

What is your diagnosis?

- Primary hypoparathyroidism. (most likely in this case Autoimmune)

What is the next investigation of choice?

- Parathyroid hormone 0.353pmol/L Low (1.65 – 6.9) (very low)

What is your management?

- Vitamin D
- Oral Calcium

What other organs or diseases you may screen for?

- Diabetes (FPG)
- Adrenal gland (Cortisol level)

▪ **Second case:**

A 14-year-old girl presents with 1 year H/O pain in lower limbs.

O/E: unremarkable. The following results are shown:

| | | | |
|----------------------------|-----------------------|------|--------------------------|
| Calcium | 1.62 | Low | 2.10 – 2.55 mmol/L |
| Corrected calcium... | 1.6 (we rely on this) | Low | 2.10 – 2.55 mmol/L |
| Inorganic Phosphorus | 1.13 | | 0.87 – 1.45 mmol/L |
| Albumin..... | 39 | | 35 – 50 g/L |
| Alkaline phosphatase.. | 1191 | High | 195 – 476u/L (very high) |
| Vit D | 4.0 | Low | nmol/L (very low) |

[Deficiency < 25 Insufficiency 25 – 75
 Suffcient 75 – 250 Toxicity > 250]



Widened growth plate with fraying, splaying and cupping of the metaphysis Involving both distal both femurs and proximal tibiae and fibulae suggestive of Rickets.

What is your diagnosis and management?

- **Rickets, we have to give her calcium and Vit D supplements.**

She was put on Vit.D3 and calcium carbonate for 2 months. Results were:

| | | | |
|----------------------------|-------------------------------|--|--------------------|
| Calcium | 2.27 (become normal) | | 2.10 – 2.55 mmol/L |
| Corrected calcium | 2.30 (become normal) | | 2.10 – 2.55 mmol/L |
| Inorganic Phosphorus | 2.00 (High) | | 0.87 – 1.45 mmol/L |
| Albumin | 39 | | 35 – 50 g/L |
| Alkaline phosphatase | 687 (still high but now mild) | | 195 – 476 u/L |

▪ **Third case:**

A 15-year-old girl referred to obesity clinic. BMI 34.
The following investigations are shown below:

| Test | Result | Unit | Range |
|-----------------------------|---|--------|-------------|
| <i>Serum - SAMPLE: 1</i> | | | |
| 1 Prolactin | 165.900 | MIU/L | 102 - 496 |
| 2 Lutenizing Hormone | 3.150 | IU/L | - |
| 3 Follicle Stimulating Horm | 1.550 | IU/L | - |
| 4 Para Thyroid Hormone | 9.020 H | PM/L | 1.65 - 6.9 |
| 5 FT4 | 13.040 | PM/L | 10.3 - 25.8 |
| 6 Thyroid Stimulating Hormo | 3.860 | MIU/L | 0.25 - 5 |
| 7 VITAMIN D - T | 27.870 L | nmol/L | 75 - 250 |
| 8 Insulin | 103.500 H | MIU/L | 2.6 - 24.9 |
| 9 Cortisol | 194.000 | NM/L | 193 - 690 |
| 10 Vitamin B12 | 277.800 | PM/L | 145 - 637 |
| 11 Ferritin | 97.350 | ug/L | 13 - 150 |
| 12 Folate | 25.670 H | NML | 4.5 - 20.7 |

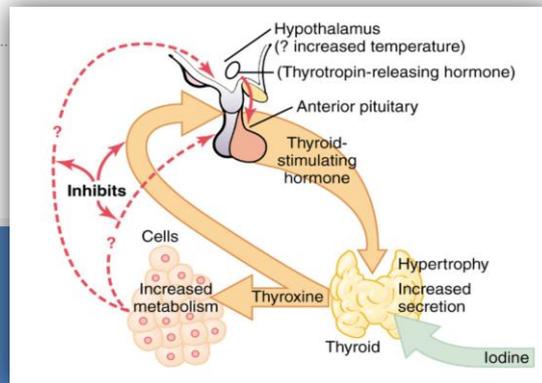
| # | Test | Result | Unit | Range |
|--------------------------|---------------|---|--------|-------------|
| <i>Serum - SAMPLE: 1</i> | | | | |
| 1 | C-PEPTIDE | 3.560 H | NM/L | 0.37 - 1.47 |
| 2 | Fasting Sugar | 4.3 | mmol/L | 3.3 - 5.5 |

What is the diagnosis?

- **Hyper**-parathyroidism 2ndry to Vit.D deficiency (in this case there is high Ca and low phosphate not shown in the table)
- Insulin resistance (high insulin+c-peptide) (hyperinsulinemia) C-peptide is precursor of insulin

Thyroid function test:

Increased thyroid hormone in the body fluids decreases secretion of TSH by the anterior pituitary. When the rate of thyroid hormone secretion rises to about 1.75 times normal, the rate of TSH secretion falls essentially to zero. Almost all this feedback depressant effect occurs even when the anterior pituitary has been separated from the hypothalamus. Therefore, as shown in, it is probable that increased thyroid hormone inhibits anterior pituitary secretion of TSH mainly by a direct effect on the anterior pituitary gland itself. Regardless of the mechanism of the feedback, its effect is to maintain an almost constant concentration of free thyroid hormones in the circulating body fluids.



First case:

A 50 year- old man presents to your office with 6-month H/O of **fatigue and weakness**. O/E: no objective positive findings.

| | | |
|------------------|--------|--------------|
| TSH: 12.2 miu/l | High | (0.25—5) |
| FT4: 11.6 pmol/l | normal | (10.3—25 .8) |

What is your diagnosis?

- a- Primary Hypothyroidism
- b- Subclinical Hyperthyroidism
- c- Subacute Thyroiditis
- d- Subclinical Primary Hypothyroidism**
- e- Secondary Hypothyroidism

If TSH < 10 and asymptomatic:

- Repeat TSH after 6 – 12 months
- Request thyroid antibodies, if high +ve then treat.

Indication of treatment:

- Clinical symptoms
- Presence of goiter
- TSH > 10 miu/l
- High positive antithyroid antibodies

In this case, TSH>10 And the patient is symptomatic. So treat and start with Thyroxin 25ugm OD

▪ **Second case:**

A 19-year-old lady presents with 3 weeks H/O a neck swelling discovered incidentally. The swelling move with deglutition and related to left lobe of thyroid and no LN swellings.

She is euthyroid (normal thyroid function).

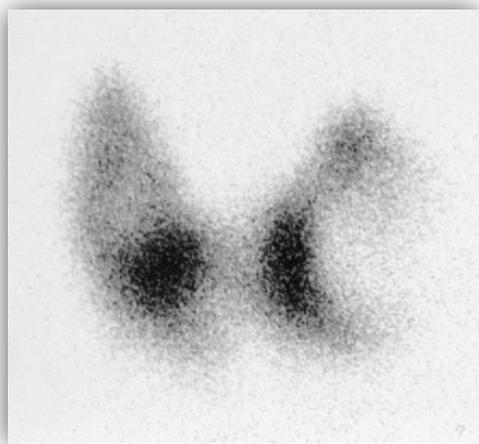
What is the **most appropriate first step** in management?

- A- TSH and T4
- B- Ultrasound Thyroid
- C- Thyroglobulin antibodies
- D- Fine needle aspiration under U/S guide.**
- E- Technetium thyroid scan

(Note: U/S is requested to see if there is one nodule or more and also to localize the nodule for biopsy)

Technetium-99m pertechnetate thyroid scan is shown. 

Cold nodule of left lobe of thyroid, we have to do fine needle aspiration with the US.



▪ **Third case:**

A 32-year-old lady, nurse, single presented with one-month H/O palpitation and loss of weight.

O/E: pulse 116 / min Bp 140 / 70
Apart from fine tremors nothing was significant.
The following investigations are shown:

WBC :8.4 ESR :4

TSH: < 0.01 miu/l **Primary** (0.25—5)

FT4: 92.6 pmol/l **Hyperthyroidism** (10.3—25 .8)

Thyroid scan (we do it for all Hyperthyroidism cases): **Reduced iodine uptake**

Mention three causes of reduced iodine uptake.

- Subacute thyroiditis. (no tenderness)
- Post-partum thyroiditis.
- Factitious thyroiditis. (iatrogenic) most likely the diagnosis.

▪ **Forth case:**

A 42-year-old man booked recently in the clinic. Followed in a private psychiatry clinic because of depression mainly insomnia, weakness and fatigue, on 40 mg Paroxetine. Still not improving, so another antipsychotic drug was added. The patient has good insight and very cooperative.

Mention one investigation of importance for this patient:

- Thyroid function test

TSH: **329.0** mIU/L **High Primary** (0.25 – 5)
 FT4: **2.87** pmol/L **Low Hypothyroidism** (10.3 - 25.8)
 Cholesterol: **9.86** mmol/L **High**
 Tri-g: 3.12 mmol/L

▪ **Fifth case:**

A 27-year-old man presents with 3 months H/O weakness and tendency to sleep. The following investigation is shown.

| # Test | Result | Unit | Range |
|-----------------------------|----------------|----------------|-------------|
| <i>Serum - SAMPLE: 1</i> | | | |
| 1 FT4 | 0.87 | PM/L L | 10.3 - 25.8 |
| 2 Thyroid Stimulating Hormo | 1653.00 | MIU/L H | 0.25 - 5 |
| 3 FT3 | 1.69 | PM/L | 3.96 - 6.8 |
| 4 Lutenizing Hormone | 2.10 | IU/L | - |
| 5 Follicle Stimulating Horm | 5.81 | IU/L | - |

After 1 month of treatment

| # Test | Result | Unit | Range |
|-----------------------------|----------------|----------------|-------------|
| <i>Serum - SAMPLE: 1</i> | | | |
| 1 FT4 | 14.69 | PM/L | 10.3 - 25.8 |
| 2 Thyroid Stimulating Hormo | 1549.00 | MIU/L H | 0.25 - 5 |
| 3 FT3 | 1.75 | PM/L | 3.96 - 6.8 |
| 4 Prolactin | 549.20 | MIU\L H | 86 - 324 |
| 5 Cortisol | 476.40 | NM/L | 193 - 690 |
| ACTH | 8.63 | PM/L | |

After about 4 month of treatment

| # Test | Result | Unit | Range |
|-----------------------------|---------------|----------------|-------------|
| <i>Serum - SAMPLE: 1</i> | | | |
| 1 FT4 | 13.63 | PM/L | 10.3 - 25.8 |
| 2 Thyroid Stimulating Hormo | 0.59 | MIU/L | 0.25 - 5 |
| 3 Prolactin | 334.80 | MIU\L H | 86 - 324 |

- In case of hypothyroidism High TSH stimulate prolactin secretion.

▪ **Sixth case:**

A 30-year-old lady with menstrual irregularities:

| | | | |
|-----------------------|------|-----------------------------------|--------------|
| TSH: 44.58 mIU/l | High | Primary (autoimmune in this case) | (0.25 - 5) |
| FT4: 5.58 pmol/l | Low | Hypothyroidism | (10.3- 25.8) |
| Prolactin: 1499 mIU/l | High | | (102 - 496) |

3 months later: (after 100 micgm thyroxin)

| | | |
|-----------------------|--------------------------|--------------|
| TSH: 7.37 mIU/l | Decreased but still high | (0.25 - 5) |
| FT4: 10.68 pmol/l | Normal | (10.3- 25.8) |
| Prolactin: 1161 mIU/l | Decreased but still high | (102 - 496) |

3 months later: (after 125 micgm thyroxin)

| | | |
|-----------------------|-----------|--------------|
| TSH: 2.59 mIU/l | Normal | (0.25 - 5) |
| FT4: 12.58 pmol/l | Normal | (10.3- 25.8) |
| Prolactin: 1557 mIU/l | increased | (102 - 496) |

MRI sellaturcica: No significant Macro or Microadenoma = **idiopathic prolactinemia**.

Cabergoline (dopamine agonist) was started 0.5 mg once weekly.

▪ **Seventh case:**

A 27-year-old woman presents with one month H/O weight loss, sweating and tremors. She has diffuse neck swelling.

| | | |
|-------------------|----------------------|--------------|
| CBC: normal | Pulse: 124 bpm | ESR: 12 mm/h |
| TSH: <0.001 mIU/l | Low Primary | (0.25 -5) |
| FT4: 139.2 pmol/l | High Hyperthyroidism | (10.3-25.8) |

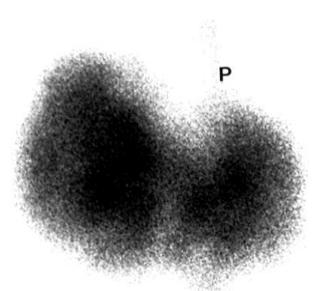
What are the differential diagnosis?

- 1- Graves' disease. Most common cause
- 2- Subacute thyroiditis
- 3- Multinodular toxic goiter
- 4- Toxic nodule /adenoma

Never say FNA unless you had a NODULE.

Mention 1 appropriate investigation to reach the diagnosis:

Thyroid Scan.



▪ **Eight case:**

A 28 year old woman presents to your office with 10 days H/O palpitation, sweating and neck discomfort. O/E: Wet hands and neck tenderness

| | | | |
|------------------|-----------|----------------------|-------------------|
| Pulse: 116/m | Temp. 37. | CBC: normal | ESR: 82 mm/h High |
| TSH: <0.01 miu/l | | Low Primary | (0.25 -5) |
| FT4: 89.2 pmol/l | | High Hyperthyroidism | (10.3-25.8) |

What is the most likely diagnosis?

- A- Graves' disease
- B- Subacute thyroiditis (there is neck tenderness AND high ESR)**
- C- Hashimotos thyroiditis
- D- Multinodular toxic goiter

Select one investigation to confirm your diagnosis.

- A- Ultrasound neck
- B- Thyroid antibodies
- C- Free T3 level
- D- Radioactive Iodine thyroid uptake**
- E- Fine needle aspiration

What is the treatment? Choose one or more.

- A- L- Thyroxin
- B- B Blockers (for sympathomimetic and reduce pulse rate)**
- C- NSAID (due to inflamed thyroid gland)**
- D- Iodine therapy

Previously we have mentioned that **low calcium** and **high phosphate** is a feature of **hypoparathyroidism**, on the other hand **high calcium** and **low phosphate** is a feature of **hyperparathyroidism**

▪ **Case:**

A 52- year- old woman presents to your office with 6 month H/O **polyuria** and **lethargy**.

O/E: looks **dehydrated and has a neck** swelling (she has the swelling for years and informed to be a simple goiter)

| | | |
|-----------------------------|-------------|-------------|
| Ca: 3.4 mmol/L | High | (2.1 - 2.6) |
| Ph: 0.62 mmol/L | Low | (0.8 - 1.4) |
| Urea: 9.2 mmol/L | High | (2.6 - 6.6) |
| Chloride: 113 mmol/L | High | (95 - 105) |

What is your diagnosis?

Hyperparathyroidism due to parathyroid adenoma (admit the patient, the Ca level is high and could lead to cardiac arrest).



A 48 year old woman presents with 5 month H/O difficulty in raising from sitting position. The following investigation is shown below:

| | | |
|------------|-------------|-------------|
| Calcium | 1.65 mmol/L | (2.1 – 2.6) |
| Phosph. | 1.52 mmol/L | (0.8 – 1.4) |
| Alk. Phos. | 134 mmol/L | (43 – 154) |
| Albumen | 38 g/L | (35 – 50) |

What is your diagnosis?

Hypoparathyroidism

Hepatitis:

The 5 most important markers we care about here are:

1. Hepatitis B Surface antigen **it means this patient is infected with HBV.**
2. Anti-Hepa B Core IgG **means there is a history of exposure at least 6 month or more.**
3. Hep-B e Antigen **Indicate (high activity), high replication of the virus.**
4. Anti- Hepa B e Antigen **is Anti body for e virus (indicate low infectivity).**
5. Anti- Hepa B Surface **means this patient is now immune.**

▪ **First case:**

A 28 year old man, referred from Blood Bank because of being **HBsAg positive**.

The following HB markers are shown below:

- Hepatitis B S antigen.....(**infected**).....**Positive**
- Anti-Hepa B Core IgG(**exposure**)..... **Positive**
- Hep-B e Antigen **Negative**
- Anti- Hepa B e Antigen(**low infectivity**)..... **Positive**
- Anti- Hepa B Surface **Negative**

Chronic history of hepatitis B exposure + viral infection

What is your next step?

LFT, U/S liver, PCR.

- ▶ HEPATITIS B DNA QUALITATIVE **Positive**
- ▶ HEPATITIS B DNA QUANTITATIVE 889796 IU/ML

How are you going to deal with patient?

Measure for Family Contacts, advice
NO blood donation, if married
NO contact, screen the family and referral to hepatologist.

▪ **Second case:**

A 35 year old man came to the clinic for screening, as one member in his family is HBV positive.

The following HB markers are shown below:

- Hepatitis B S antigen.....Negative
- Anti-Hepa B Core IgG(exposure)..... Positive
- Hep-B e Antigen Negative
- Anti- Hepa B e Antigen Negative
- Anti- Hepa B Surface(Immune).....Positive

What is your diagnosis?

Immune post exposure to HB virus

How are you going to deal with patient?

Reassurance, No further actions could be taken, NO blood donation.

▪ **Third case:**

A 23-year-medical student came to the clinic for screening.

The following HB markers are shown below:

- Hepatitis B S antigen.....Negative
- Anti-Hepa B Core IgG Negative
- Hep-B e Antigen Negative
- Anti- Hepa B e Antigen Negative
- Anti- Hepa B Surface(Immune).....Positive

What is your diagnosis?

Immune post Vaccination

▪ Forth case: **(Important case)**

A 32-year old man presents to your clinic for routine check up.

The following viral markers are shown below:

- Hepatitis B S antigen.....Negative
- Anti-Hepa B Core IgG(exposure)..... **Positive**
- Hep-B e Antigen Negative
- Anti- Hepa B e Antigen Negative
- Anti- Hepa B SurfaceNegative

Interpret the results.

H/O chronic exposure to HB virus

▶ **What Explanations/options do we have in this case?**

- 1- May be recovering from acute HBV infection (window period). **between the acute infection and complete clearance (antibody no shown yet) ask him to came 6 month later.**
- 2- May be distantly immune and test is not sensitive enough to detect very low level of anti-HBs in serum.
- 3- May be undetectable level of HBsAg present in the serum and the person is actually a carrier. **Very low viral load, order PCR, if negative he is ok, if positive the virus active.**
- 4- May be a false positive anti-HBc. **Repeat the test after 6 month if same result it is not false +ve.**

After ordering PCR:

- ▶ HEPATITIS B DNA QUALITATIVE **Positive**
- ▶ HEPATITIS B DNA QUANTITATIVE <20 IU/ML

Very low viral load, can not be detected in the screening.

Actions:

Measures to Contacts. No blood donation. Not candidate for treatment by e.g. Interferon.

Fifth case:

A 26-year-old female came for premarital check up.
The following hepatitis B markers are shown:

- Hepatitis B S antigen.....(Infected).....Positive
- Anti-Hepa B Core IgG(exposure)..... Positive
- Hep-B e Antigen(High infectivity).....Positive
- Anti- Hepa B e Antigen Negative
- Anti- Hepa B SurfaceNegative

PCR:

- ▶ HEPATITIS B DNA QUALITATIVE Positive
- ▶ HEPATITIS B DNA QUANTITATIVE >110 million IU/ML

LFT:

| | | |
|----------------------------------|-----|----------------|
| Total bilirubin | 15 | (3- 17 umol/L) |
| Albumin | 39 | (35-50 g/L) |
| Alkaline phosphatase | 225 | (50-136u/L) |
| Alanine aminotransferase | 960 | (20-65 u/L) |
| Aspartate aminotransferase | 296 | (10-31 u/L) |
| G.G. Transferase | 235 | (5-55 u/L) |

What is your diagnosis and what actions are you going to do?

Chronic viral Hepatitis with active replication and highly infectious (e antigen is positive).

The patient came one and half year after treatment

PCR:

- ▶ HEPATITIS B DNA QUALITATIVE Positive
- ▶ HEPATITIS B DNA QUANTITATIVE 31 IU/ML

LFT: Normal

Summary

- **ALT is the most important and specific marker in LFT** which indicate hepatocyte integrity.
- AST indicate hepatocyte integrity but not specific for liver.
- Alkaline phosphatase, G.G.Transferase and direct bilirubin indicate obstructive cholestasis.
- Indirect bilirubin indicate hemolysis.
- Serum albumin, prothrombin time and INR indicate liver function.
- **The main difference between hypoparathyroidism and Rickets is that rickets with high Alkaline phosphatase while it is normal in hypoparathyroidism.**
- In case of neck swelling with normal thyroid function test most appropriate first test to do is fine needle aspiration under US guide.
- We have to do thyroid scan for all cases of hyperthyroidism.
- **Subacute thyroiditis came with neck tenderness and high ESR.**
- High cholesterol level may due to hypothyroidism.
- **Prolactenemia in hypothyroidism due to high TSH.**
- Hepatitis B Surface antigen it means this patient is infected with HBV.
- Anti-Hepa B Core IgG means there is a history of exposure at least 6 month or more.
- Hep-B e Antigen Indicate (high activity), high replication of the virus.
- Anti- Hepa B e Antigen is Anti body for e virus (indicate low infectivity).
- Anti- Hepa B Surface means this patient is now immune.

Questions

- 1) Patient came with high ALT, AST, ALP and G.G.Transferase while the albumin was 23 g/L. This indicate which on of the following?
 - a. Chronic liver disease, compensated.
 - b. Drug induced cholestasis.
 - c. Chronic liver disease, uncompensated.
 - d. Primary biliary cirrhosis.

- 2) Patient came with Low Ca and the phosphate level 1.60mmol/L. What test of choice would you like to order in this case?
 - a. TSH Level.
 - b. Parathyroid hormone level.
 - c. Alkaline phosphatase level.
 - d. Vit D level.

- 3) Patient came for routine check up, on screening only Anti-Hepa B Core IgG was positive. The most appropriate next step is?
 - a. Repeat the test after 6 mounth.
 - b. Order PSR level.
 - c. Reassure the patient.
 - d. Measure for Family Contacts andadvice NO blood donation.

- 4) Patient came with neck swelling that move with deglutition, he has normal thyroid function test. The most appropriate next step is?
- a. Order Ultrasound.
 - b. Order Technetium thyroid scan.
 - c. Reassure the patient.
 - d. Fine needle aspiration under US guide.

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Answers:

1st Questions: C
2nd Questions: B
3rd Questions: B
4th Questions: D