



# STATIC CASES

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2020-21

# Case 01

- Immediately after undergoing a right total knee replacement, a 69-year-old woman has severe abdominal pain, non-bloody emesis, and confusion. She has a history of Hashimoto thyroiditis that is well-controlled with levothyroxine and hyperlipidemia that is controlled by diet.



# Case 01

- What is the Dx ?
- Addisons disease
- What are the most common causes ?
- Developing ---- TB                      Developed countries ----- autoimmune
- What is the electrolytes abnormality and acid base balance abnormality in this pt ?
- Low Na   high K   high urea   metabolic acidosis   low glucose
- In CBC the pt will have ?
- neutrophilic leukocytosis with esinophilis

# Case 01

- Differences b/w primary and secondary type
- Hyperpigmentation
- Electrolytes abnormality
- hypotension
- Treatment
- Hydrocortisone
- Fludrocortison

# Case 01

| Primary versus central adrenal insufficiency |                                                                                                                                                                         |                                                                                                                                                                      |
|----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                              | Primary                                                                                                                                                                 | Secondary                                                                                                                                                            |
| Most common cause                            | Autoimmune                                                                                                                                                              | Chronic glucocorticoid therapy                                                                                                                                       |
| Cortisol                                     | ↓                                                                                                                                                                       | ↓                                                                                                                                                                    |
| ACTH                                         | ↑                                                                                                                                                                       | ↓                                                                                                                                                                    |
| Aldosterone                                  | ↓                                                                                                                                                                       | Normal                                                                                                                                                               |
| Clinical features                            | <ul style="list-style-type: none"> <li>• Severe symptoms</li> <li>• Hyperpigmentation</li> <li>• Hyperkalemia</li> <li>• Hyponatremia</li> <li>• Hypotension</li> </ul> | <ul style="list-style-type: none"> <li>• Less severe symptoms</li> <li>• No hyperpigmentation</li> <li>• No hyperkalemia</li> <li>• Possible hyponatremia</li> </ul> |

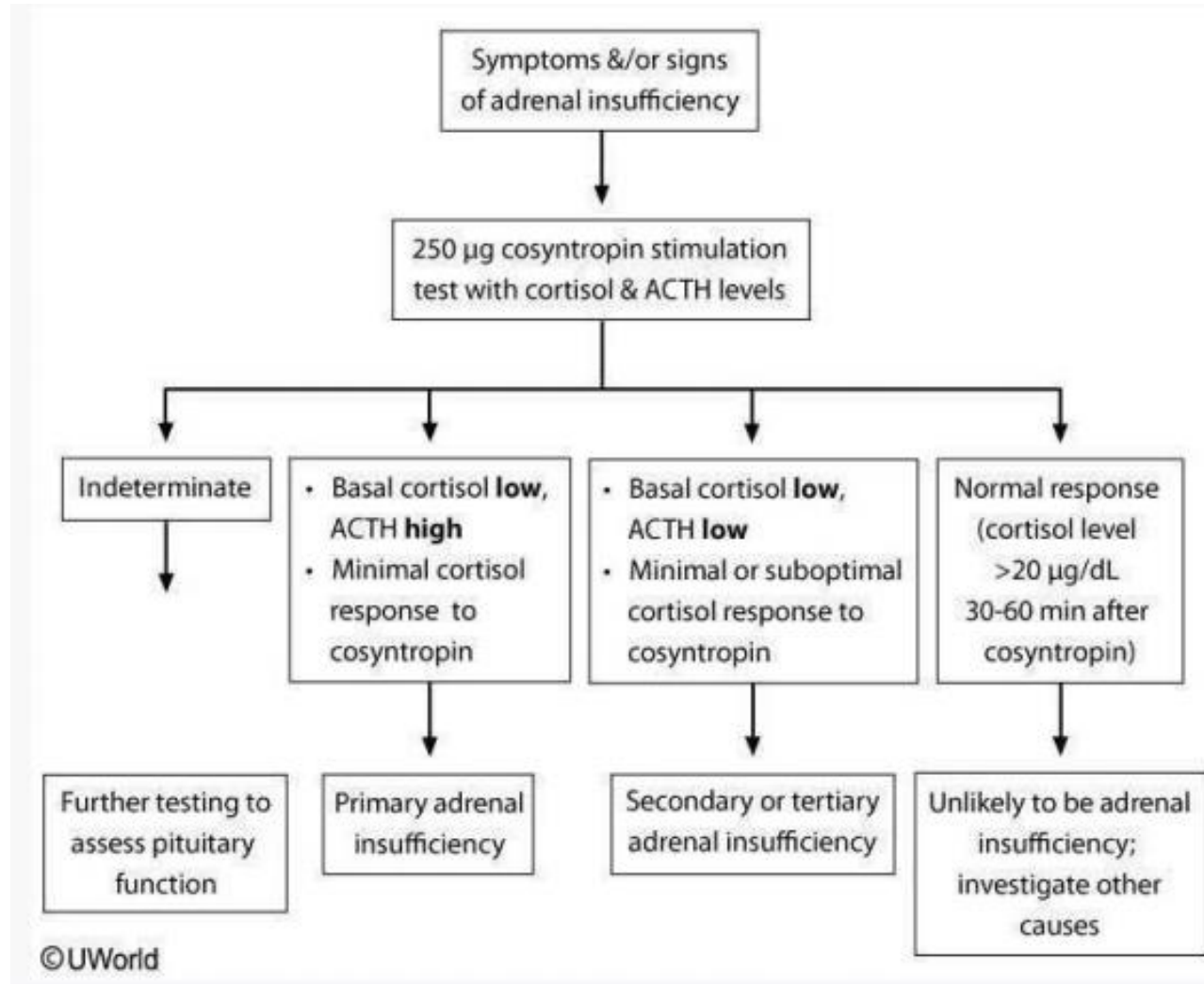
# Case 01

| Chronic primary adrenal insufficiency |                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Etiology</b>                       | <ul style="list-style-type: none"><li>• <b>Autoimmune</b></li><li>• Infections (eg, tuberculosis, HIV, disseminated fungal)</li><li>• Hemorrhagic infarction</li><li>• Metastatic</li></ul>                                                                                                                                                                     |
| <b>Clinical features</b>              | <ul style="list-style-type: none"><li>• Fatigue, weakness, anorexia/weight loss, salt craving</li><li>• Gastrointestinal symptoms</li><li>• Postural hypotension</li><li>• Hyperpigmentation or vitiligo</li><li>• Hyponatremia, hyperkalemia</li><li>• May lead to <b>acute adrenal crisis</b> (abdominal pain, shock, fever, altered mental status)</li></ul> |
| <b>Diagnosis</b>                      | <ul style="list-style-type: none"><li>• <b>ACTH</b>, serum <b>cortisol</b>, and high-dose (250 µg) <b>ACTH stimulation test</b><ul style="list-style-type: none"><li>○ Primary adrenal insufficiency: low cortisol, high ACTH</li><li>○ Secondary/tertiary adrenal insufficiency: low cortisol, low ACTH</li></ul></li></ul>                                    |

# Case 01

| Acute adrenal insufficiency (adrenal crisis) |                                                                                                                                                                                                         |
|----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Etiology</b>                              | <ul style="list-style-type: none"><li>• Adrenal hemorrhage or infarction</li><li>• Acute illness/injury/surgery in patient with chronic adrenal insufficiency or long-term glucocorticoid use</li></ul> |
| <b>Clinical features</b>                     | <ul style="list-style-type: none"><li>• <b>Hypotension/shock</b></li><li>• Nausea, vomiting, abdominal pain</li><li>• Weakness</li><li>• Fever</li></ul>                                                |
| <b>Treatment</b>                             | <ul style="list-style-type: none"><li>• <b>Hydrocortisone or dexamethasone</b></li><li>• High-flow intravenous fluids</li></ul>                                                                         |

# Case 01



## Case 02

- A 30-year-old Caucasian female comes to the physician because of chronic diarrhea and abdominal bloating that started 6 months ago. She also reports increasing fatigue and intermittent tingling in her hands and feet. She lost 5 kg (11 lb) of weight over the past 6 months without changing her diet or trying to lose weight.



# Case 02

- 1- what is this skin lesions ?

## Dermatitis herpetiformis

- 2- what are the typical sites of this skin lesion ?
  - Extensor surfaces of the limbs and back scalp and neck
- 3- this pt most likely have ?
  - Celiac disease
- 4. Deficiencies caused by celiac disease ?
  - Iron deficiency anemia (most common presentation ), Folic acid,  
• Calcium, Vitamin D, • Vitamin B12 (rarely) Vitamin K

# Case 02

- 5. what are the serological tests for it and what is the most specific and sensitive test of them ?
  - IgA antiendomesyal Ab
  - IgG and IgA antigliadine Ab
  - The most SP and SN tissue transglutaminase Ab
- 6. What is the diagnostic test ?  
Duodenal biopsy
- 7. Mention 3 complications of this disease ?
  - 1- intestinal T cell lymphoma
  - 2- carcinoma of the small intestine or esophagus
  - 3- Osteomalacia and ulcerative jejunitis

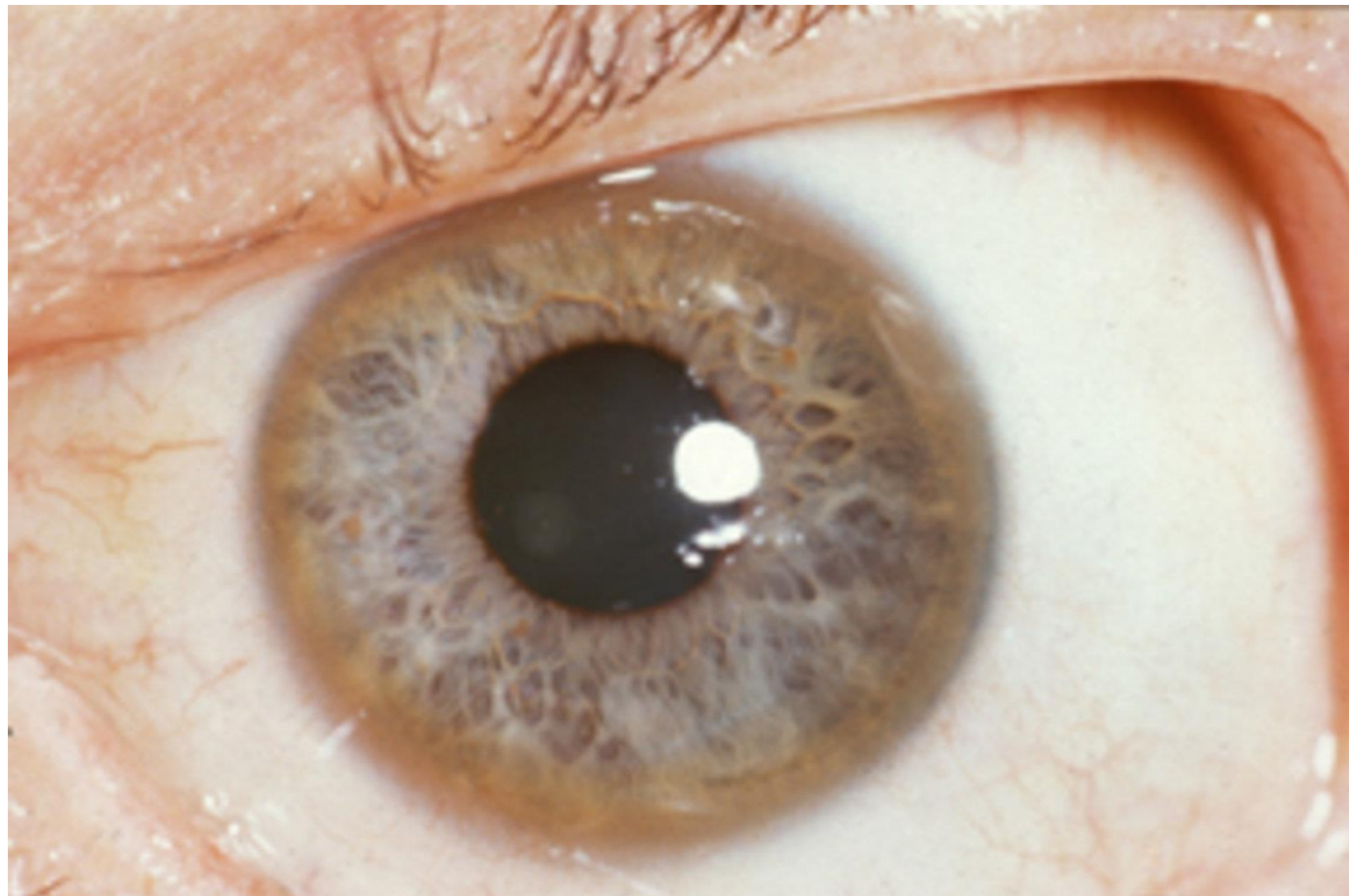
# Case 02

| Features of malabsorption in celiac disease |                                                        |
|---------------------------------------------|--------------------------------------------------------|
| Nutrient                                    | Symptoms                                               |
| General                                     | Bulky, foul-smelling, floating stools                  |
| Fat & protein                               | Loss of muscle mass, loss of subcutaneous fat, fatigue |
| Iron                                        | Pallor (anemia), fatigue                               |
| Calcium & vitamin D                         | Bone pain (osteomalacia), fracture (osteoporosis)      |
| Vitamin K                                   | Easy bruising                                          |
| Vitamin A                                   | Hyperkeratosis                                         |

## Case 03

- A 22-year-old man comes to the physician because of a fall associated with a 6-month history of increasing difficulty walking. Over the last year, his friends have also noticed his speech becoming slower. During this period, he also gave up his hobby of playing video games because he has become clumsy with his hands. His father died of esophageal varices at the age of 40 years.

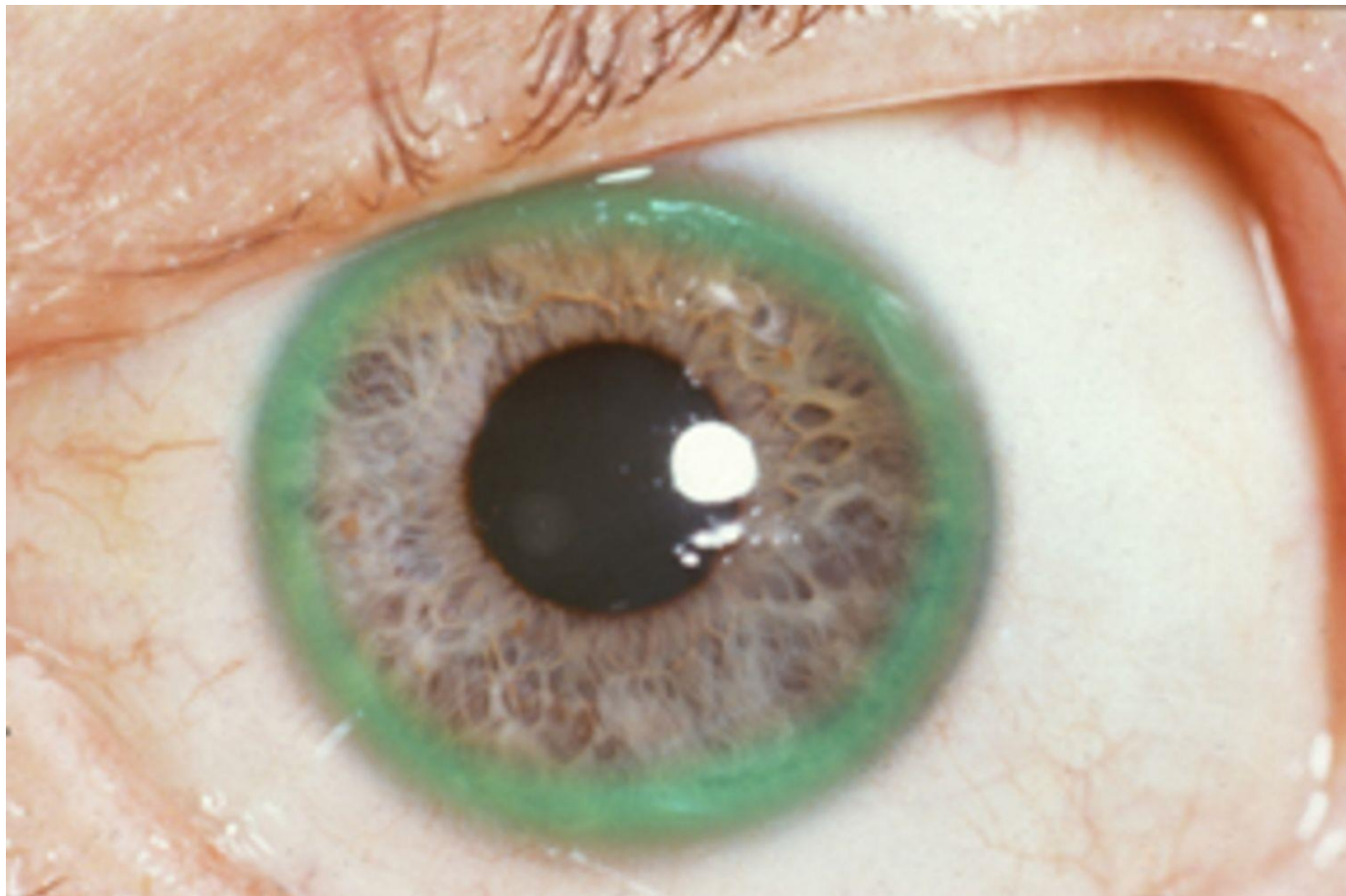
## Case 03



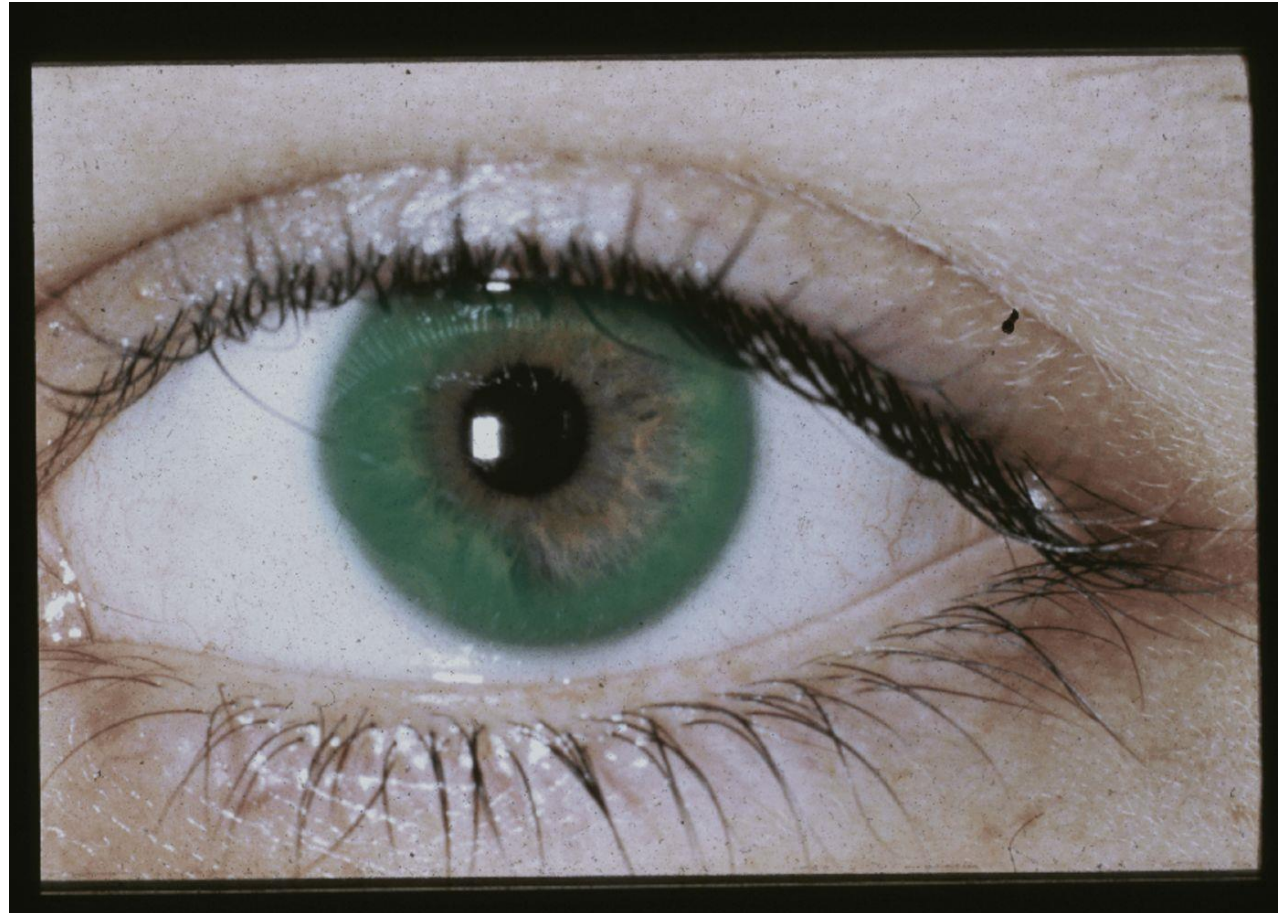
# Case 03



## Case 03



# Case 03



## Case 03

- 1- What is the finding in this picture ?
- **Kayser-Fleischer rings**
- 2- what is the causes of this sign ?
- **Wilson disease**
- **primary biliary cirrhosis, primary sclerosing cholangitis, and cryptogenic cirrhosis**
- 3- if the pt had neurological manifestation then the most likely Dx ?
- **Wilson disease**
- 4- how to confirm the Dx ?
- **Decr in serum ceruoplasmin**
- **Incr in total urine cupper**
- **Incr in hepatic cupper concentration**
- 5 - what is the treatment ?
- **D-pencillamine with pyridoxine**
- **Zinc**

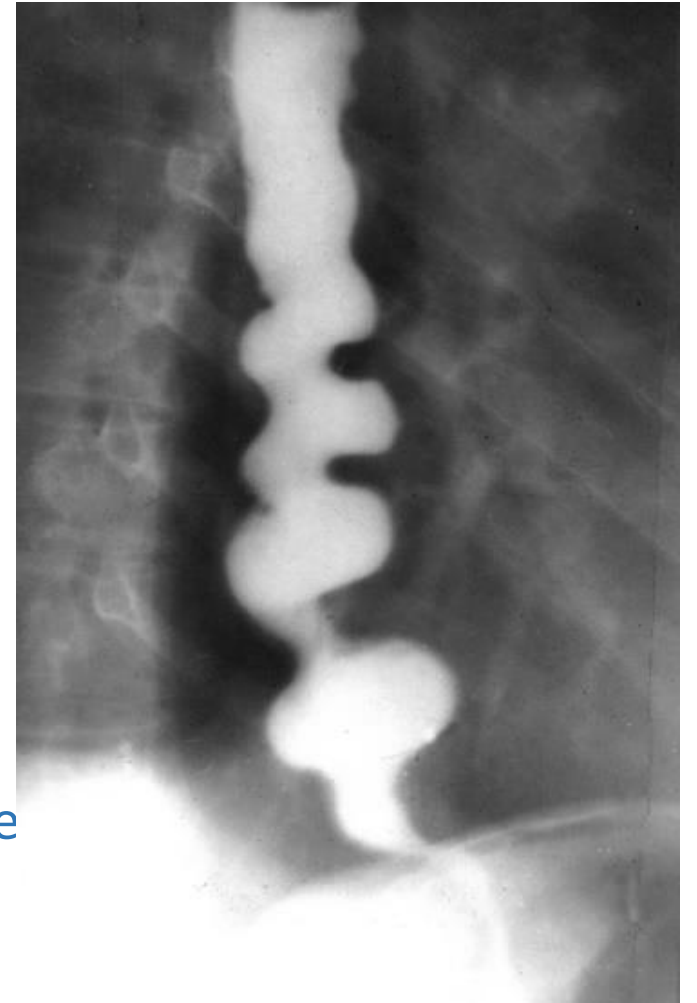
# Case 03

## Diagnostics

- Slit lamp examination: Kayser-Fleischer rings (best initial test)
- Blood tests <sup>[2]</sup>
  - ↑ Transaminases
  - Coombs-negative hemolytic anemia, thrombocytopenia
  - ↓ Serum ceruloplasmin (normal value > 20 mg/dL)
  - ↑ Free serum copper, but ↓ total serum copper
- Urine tests: ↑ Urine copper excretion (over 24 hours)
- Liver biopsy: if other tests are inconclusive
  - copper staining

## Case 04

- 1- name this test
- Barium swallow
- 2- name this sign ?
- Corkscrew pattern
- 3- what is the most likely Dx ?
- DES
- What the other tests should be done ?  
Esophageal endoscope and manometry
- 4- how to confirm the Dx?
- By Esophageal Manometry
- 5- what are the lines of treatment ?
- medical :
  1. 1<sup>st</sup> CCB (Diltazem )
  2. 2<sup>nd</sup> nitroglycerine
  3. 3<sup>rd</sup> botulinum toxin injection
- Life style modification as a avoiding certain foods, like cold beverage
- PPIs if GERD is suspected



# Case 04

| Diffuse esophageal spasm |                                                                                                                                                                                   |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Pathophysiology          | <ul style="list-style-type: none"><li>• Uncoordinated, simultaneous contractions of esophageal body</li></ul>                                                                     |
| Symptoms                 | <ul style="list-style-type: none"><li>• Intermittent <b>chest pain</b></li><li>• <b>Dysphagia</b> for solids &amp; liquids</li></ul>                                              |
| Diagnosis                | <ul style="list-style-type: none"><li>• Esophagram: "<b>Corkscrew</b>" pattern</li><li>• Manometry: Intermittent peristalsis, multiple <b>simultaneous contractions</b></li></ul> |
| Treatment                | <ul style="list-style-type: none"><li>• Calcium channel blockers</li><li>• Alternate: Nitrates, tricyclics</li></ul>                                                              |

- A 56-year-old man is brought to the emergency department with lethargy and confusion. He has a history of cirrhosis his temperature is 38.00 C
- physical examination, he has a flapping tremor. Abdominal examination shows distension with shifting dullness and diffuse tenderness to palpation.
- His lab work shows the following
- Paracentesis  
wbc 700 neutrophils 450 albumin .08 serum albumin 2.5

## Case 05

- 1. What is the Dx ?
- **SBP**
- 2. Most common causative organism
- **Enteric organisms like E. coli then S. pneumoniae, then Klebsiella**
- 3. What is the empirical management ?
- **cefotaxime antibiotic 2 g TID**
- 4. what is the prophylaxis management ?
- **Oral norofloxacin (quinolone or TMP/SMX)**
- 5. Risk factors for SBP ?
- **Ascites protein < 1.0 g/dL**
- **History of variceal bleed**
- **Prior episode of SBP**

# Case 05

| Spontaneous bacterial peritonitis |                                                                                                                                                                                                                                                                                          |
|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Clinical presentation             | <ul style="list-style-type: none"><li>• Temperature <math>\geq 37.8</math> C (100 F)</li><li>• Abdominal pain/tenderness</li><li>• Altered mental status (abnormal connect-the-numbers test)</li><li>• Hypotension, hypothermia, paralytic ileus with severe infection</li></ul>         |
| Diagnosis from ascitic fluid      | <ul style="list-style-type: none"><li>• PMNs <math>\geq 250/\text{mm}^3</math></li><li>• Positive culture, often gram-negative organisms (eg, <i>Escherichia coli</i>, <i>Klebsiella</i>)</li><li>• Protein <math>&lt; 1</math> g/dL</li><li>• SAAG <math>\geq 1.1</math> g/dL</li></ul> |
| Treatment                         | <ul style="list-style-type: none"><li>• Empiric antibiotics - third-generation cephalosporins (eg, cefotaxime)</li><li>• Fluoroquinolones for SBP prophylaxis</li></ul>                                                                                                                  |

## Case 06

- A 41-year-old man comes to the emergency department with nausea, abdominal discomfort, and diarrhea for the past 2 days. His abdominal discomfort is worse shortly after meals. He has also had progressive perioral numbness and upper-extremity muscle cramping for the past 24 hours. Six months ago, he underwent a Roux-en-Y gastric bypass to treat obesity. He underwent a total thyroidectomy to treat a Hurthle cell lesion 4 days ago.



# Case 06

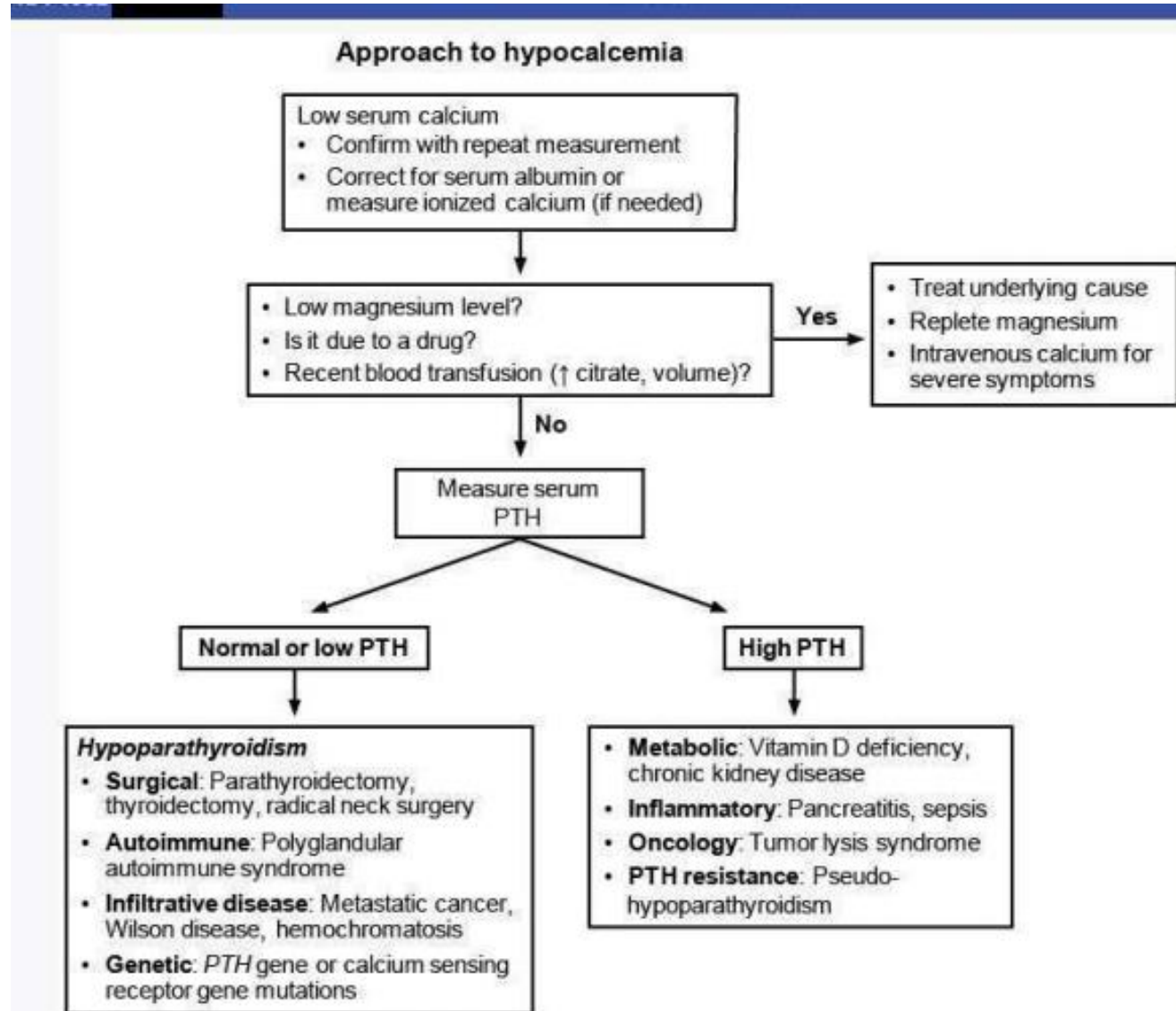
- What are the two signs?
- - Trousseau sign of latent tetany
  - Chvostek's sign

What is the dx?

## Hypocalcaemia

- What are the causes?
- - Hypocalcemia is most often due to hypoparathyroidism or vitamin D deficiency (e.g., malabsorption, chronic kidney disease).
- Corrected Ca?
- Corrected calcium (mg/dL) = measured total Ca (mg/dL) + 0.8 (4.0 - serum albumin [g/dL]),

# Case 06



# Case 06

| PTH level | Additional findings                                                                                                           | Conditions                                                                                                                                |
|-----------|-------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| Low PTH   | <ul style="list-style-type: none"> <li>• ↑ Phosphate</li> </ul>                                                               | <ul style="list-style-type: none"> <li>• <a href="#">Hypoparathyroidism</a> (e.g., postsurgical)</li> </ul>                               |
| High PTH  | <ul style="list-style-type: none"> <li>• Low or normal phosphate</li> <li>• ↓ 25-hydroxyvitamin D (calcidiol) [16]</li> </ul> | <ul style="list-style-type: none"> <li>• <a href="#">Vitamin D deficiency</a></li> </ul>                                                  |
|           | <ul style="list-style-type: none"> <li>• ↑ Phosphate</li> </ul>                                                               | <ul style="list-style-type: none"> <li>• <a href="#">Hyperphosphatemia</a></li> <li>• <a href="#">Pseudohypoparathyroidism</a></li> </ul> |
|           | <ul style="list-style-type: none"> <li>• ↑ Phosphate</li> <li>• ↑ Creatinine</li> </ul>                                       | <ul style="list-style-type: none"> <li>• <a href="#">Chronic kidney disease</a></li> </ul>                                                |
|           | <ul style="list-style-type: none"> <li>• ↓ Magnesium</li> </ul>                                                               | <ul style="list-style-type: none"> <li>• <a href="#">Malabsorption</a> or <a href="#">alcoholism</a></li> </ul>                           |

## Pseudohypoparathyroidism type 1A (PHP1A)

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- **Definition:** end-organ (i.e., bones and kidneys) resistance to parathyroid hormone (PTH) despite sufficient PTH synthesis due to a defective G<sub>s</sub> protein  $\alpha$  subunit
- **Inheritance**
  - Autosomal dominant
  - Inherited from the mother (GNAS gene imprinting)
- **Pathophysiology:** mutations in GNAS1 → impaired encoding of  $\alpha$  subunit → missing activation of adenylate cyclase when PTH binds to G<sub>s</sub> → resistance to PTH in kidney and bone tissue
- **Clinical features**
  - Albright hereditary osteodystrophy (AHO)
    - Round face
    - Short stature
    - Obesity
    - Brachydactyly of the 4<sup>th</sup> and 5<sup>th</sup> fingers
    - Intellectual disability
    - Subcutaneous ossifications
  - Symptoms related to low calcium and high phosphate levels
    - Seizures
    - Numbness, tetany
    - Cataracts
    - Dental problems

## Case 07

- A 56-year-old woman comes to the physician because of increasing muscle weakness in her shoulders and legs for 1 month. She has difficulties standing up and combing her hair. She also has had a skin rash on her face and hands for the past week.

# Case 07



# Case 07

- **1. What are the findings in this pics?**

Gottron papules, Heliotrope rash

- 2. What is the diagnosis?**

Dermatomyositis

- 3. Which antibodies present in theses cases?**

Anti-Jo-1 antibodies (histidyl-tRNA synthetase)

Anti-Mi-2 antibodies (helicase)

- 4. Screening?**

(non-Hodgkin lymphoma; lung, stomach, colorectal, or ovarian cancer)

# Case 07

| Clinical features of dermatomyositis |                                                                                                                                                                                                                                     |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Muscle weakness                      | <ul style="list-style-type: none"><li>• Proximal, symmetric</li><li>• Weakness in UE = LE</li></ul>                                                                                                                                 |
| Skin findings                        | <ul style="list-style-type: none"><li>• Gottron's papules</li><li>• Heliotrope rash</li></ul>                                                                                                                                       |
| Extramuscular findings               | <ul style="list-style-type: none"><li>• Interstitial lung disease</li><li>• Dysphagia</li><li>• Myocarditis</li></ul>                                                                                                               |
| Diagnosis                            | <ul style="list-style-type: none"><li>• ↑ CPK, aldolase, LDH</li><li>• Anti-RNP, anti-Jo-1, anti-Mi2</li><li>• Diagnostic uncertainty<ul style="list-style-type: none"><li>◦ EMG</li><li>◦ Biopsy (skin/muscle)</li></ul></li></ul> |
| Management                           | <ul style="list-style-type: none"><li>• High-dose glucocorticoids <b>PLUS</b> glucocorticoid-sparing agent</li><li>• Screening for malignancy</li></ul>                                                                             |

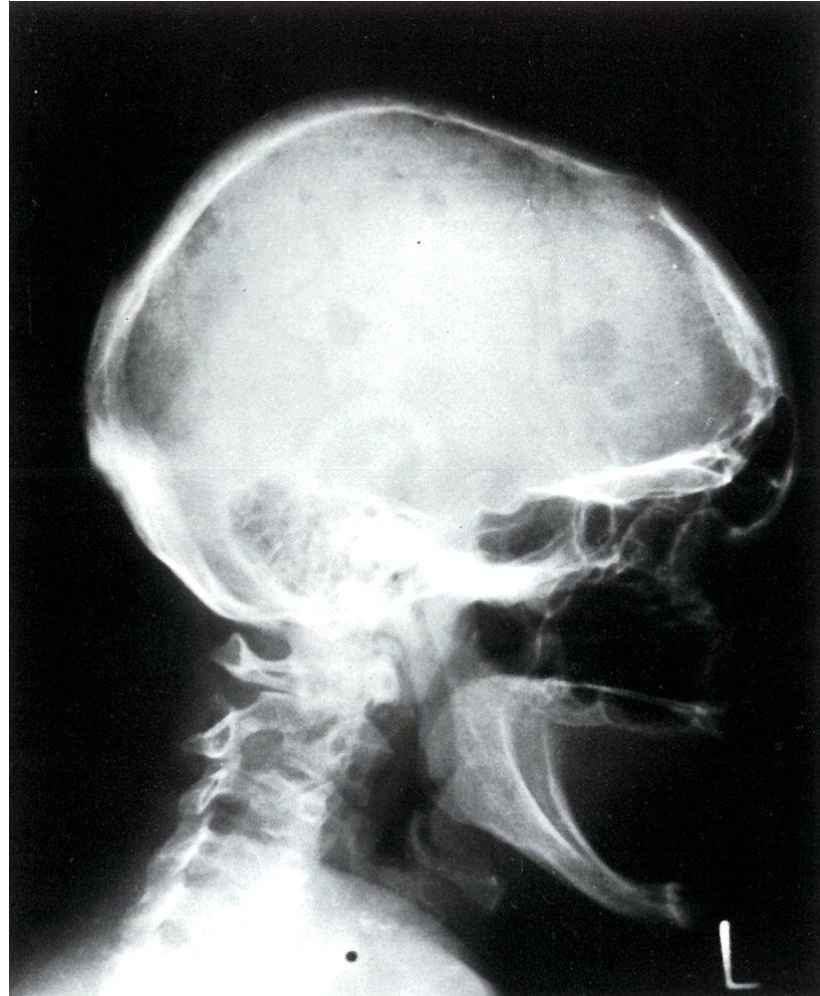
## **Case 08**

- **A 70-year-old man comes to the physician because of progressive fatigue and lower back pain for the past 4 months. The back pain worsened significantly after he had a minor fall while doing yard work the previous day. For the past year, he has had a feeling of incomplete emptying of his bladder after voiding.**

# Case 08



# Case 08



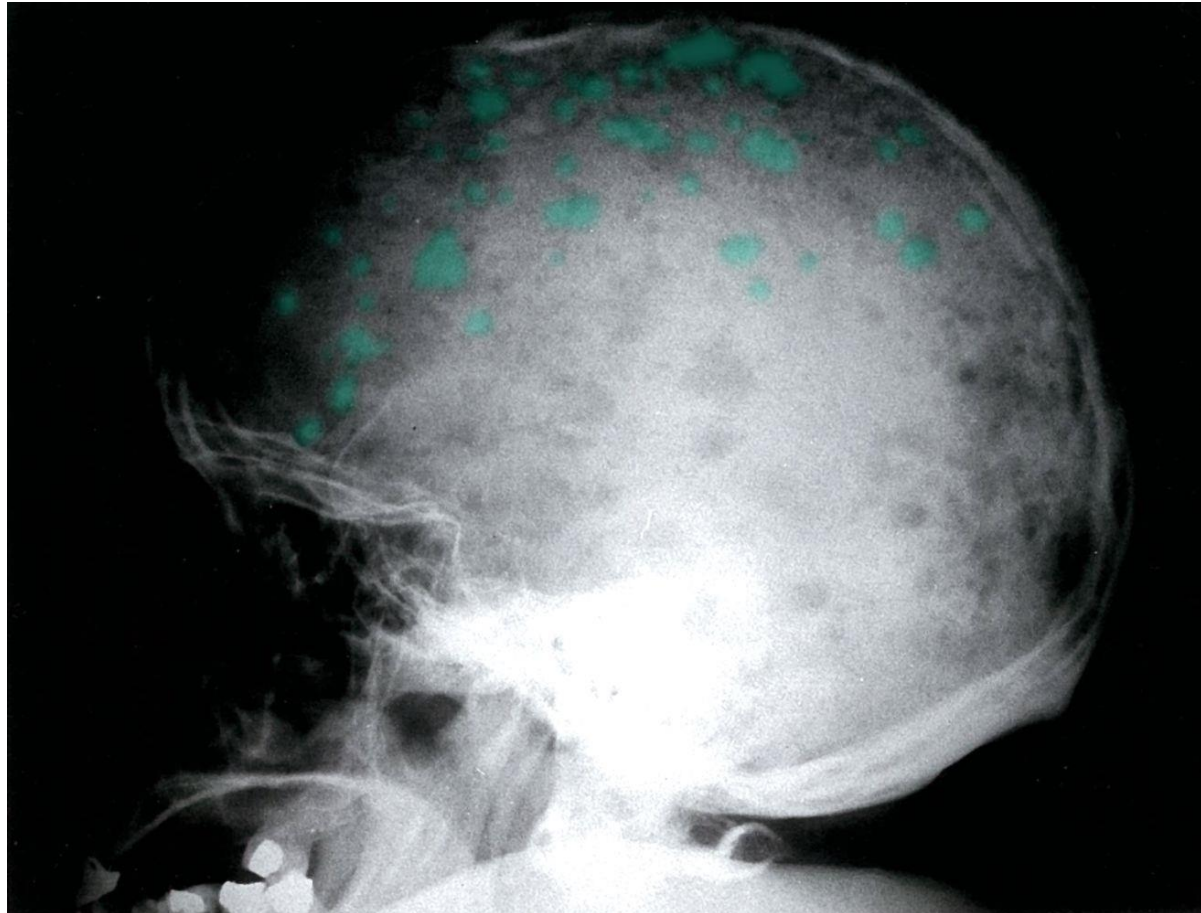
# Case 08



# Case 08



# Case 08



# Case 08

- 1.What is the finding in this pics?
- **multiple lytic lesions ("punched-out" holes), e.g. in the skull**
- 2. What is the diagnosis?
- **Multiple Myeloma**
- 3. What are the main features of this disease?
- Organ damage (**CRAB**)
- **Calcium** > 11 mg/dL
- **Renal** insufficiency: creatinine clearance < 40 mL/min or serum creatinine > 2 mg/dL
- **Anemia** (Hb < 10 g/dL)
- **Bone** lesions on MRI
- 4.Complications ?
- **AL amyloidosis**
- **Infections**
- **Hypercalcemic crisis**
- **Myeloma cast nephropathy (myeloma kidney)**
- **Secondary plasma cell leukemia**

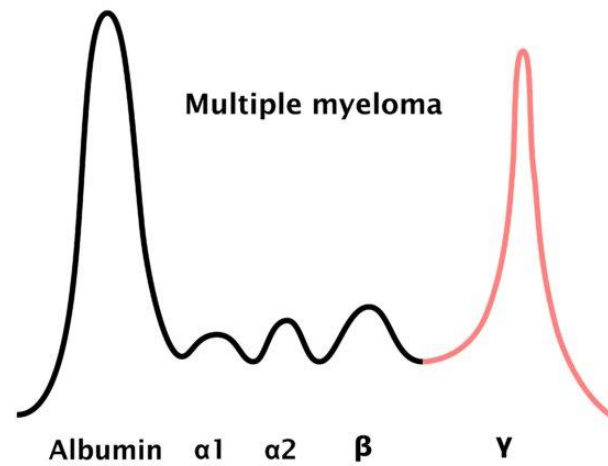
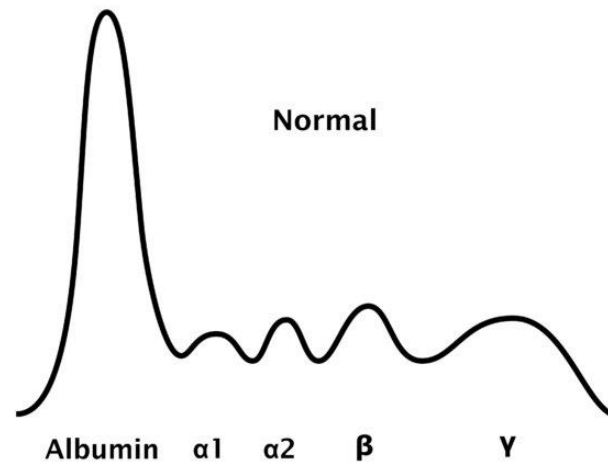
# Case 08

- **Hypercalcemic crisis**: life-threatening condition that should be suspected at total **calcium levels > 14 mg/dL** (3.5 mmol/L) or ionized calcium > 10 mg/dL (2.5 mmol/L); patients present with
  - Dehydration (due to ADH resistance and vomiting)
  - Oliguria/anuria
  - Altered consciousness
  - Psychosis

# Case 08

| Multiple myeloma |                                                                                                                                                                |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Pathophysiology  | <ul style="list-style-type: none"><li>• Monoclonal plasma cell proliferation</li></ul>                                                                         |
| Manifestations   | <ul style="list-style-type: none"><li>• Bone pain, fractures</li><li>• Constitutional symptoms (weight loss, fatigue)</li><li>• Recurrent infections</li></ul> |
| Laboratory       | <ul style="list-style-type: none"><li>• Normocytic anemia</li><li>• Renal insufficiency</li><li>• Hypercalcemia</li><li>• Monoclonal paraproteinemia</li></ul> |
| Radiology        | <ul style="list-style-type: none"><li>• Osteolytic lesions/osteopenia (osteoclast activation)</li></ul>                                                        |

# Case 08



## **Case 09**

- **A woman in her mid thirties has suffered from episodes of pleurisy and has been told she may have SLE.**
- **Her prior blood cell counts have been normal. She now complains of exertional dyspnea, fatigue and yellowing of her eyes. Physical exam is normal except for mild scleral icterus, and moderate splenomegaly.**

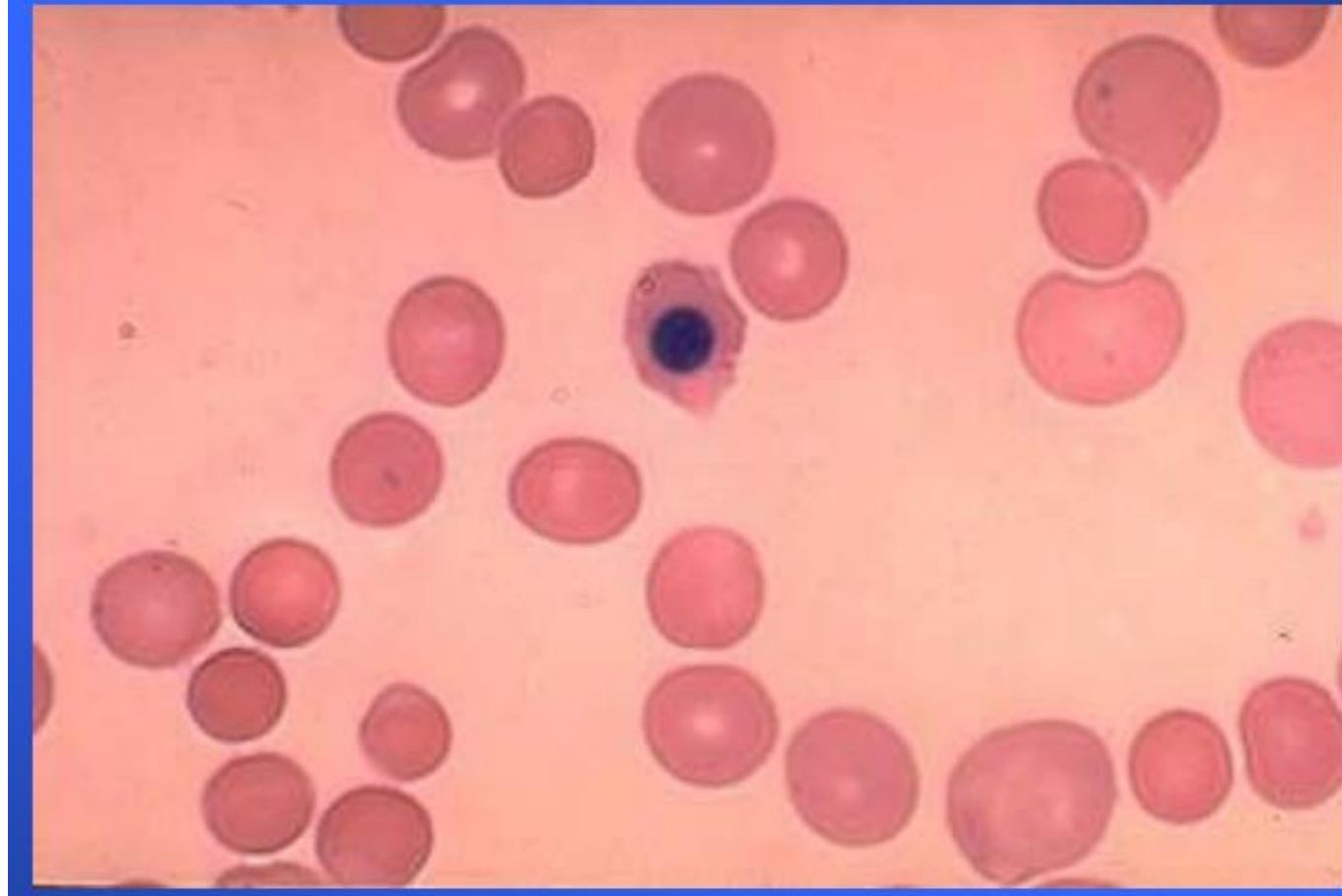
# Case 09

- Initial labs reveal:
- hgb=7.9 gm/dl
- hct=23.9%
- wbc=4000 /mm<sup>3</sup> with a normal differential
- platelet=138,000 /mm<sup>3</sup>
- 
- What other initial labs / values would you like to see?

## **Case 09**

- **MCV=114 cubic microns**
- **Retic count=14.2% uncorrected**
- **LDH=2343 U/L**
- **Bilirubin=4.3 mg/dl, .8 direct mg/dl**
- **The peripheral blood smear reveals macrovalocytes, polychromasia and an occasional nucleated red blood cell.**

# Case 09



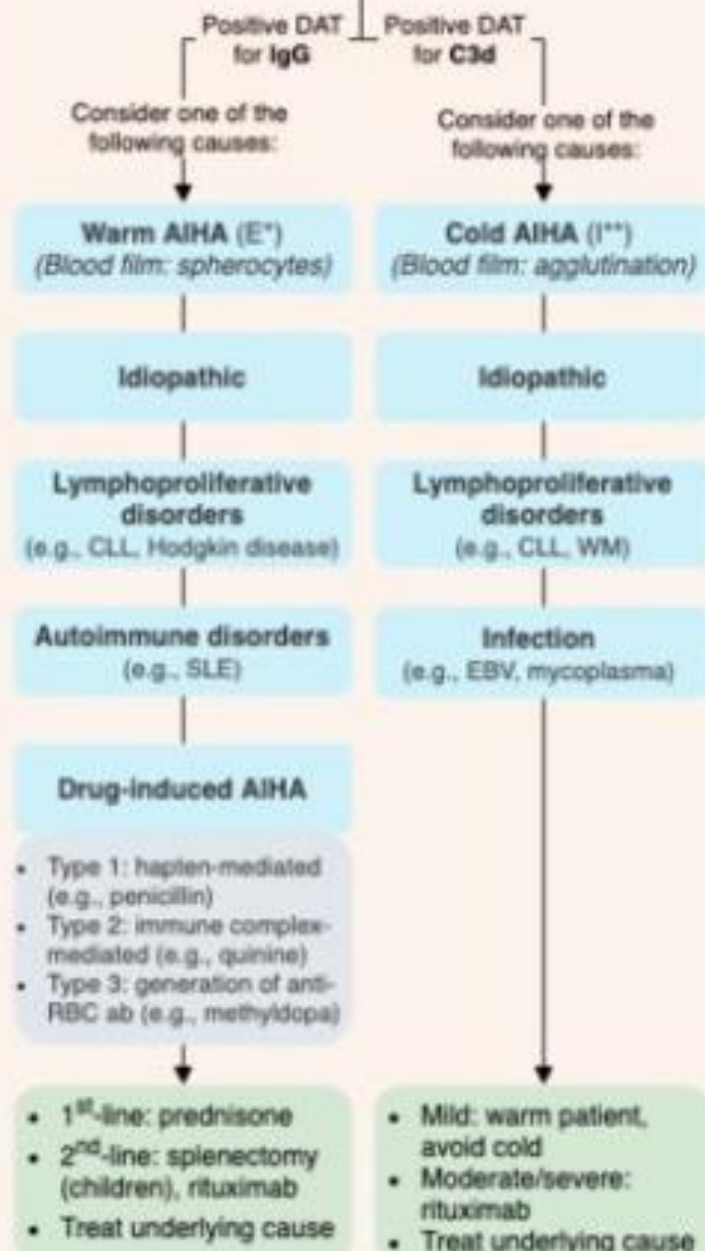
## **Case 09**

- **You suspect an autoimmune hemolytic anemia based on her history, PE, labs and smear.**
- 
- **What further tests would you like to order?**

# Case 09

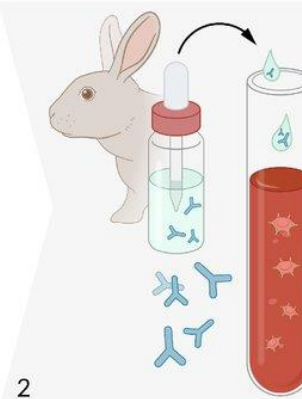
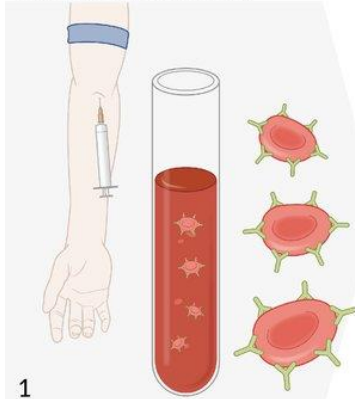
- **Direct Coombs test results are as follows:**
  - 
  - **DAT: Positive 3+**
  - **IgG: Positive 3+**
  - **Complement: Negative**
  -
- **What type of autoantibody is this?**
- **What conditions are typically associated with this type of antibody?**

## Autoimmune hemolytic anemias (AIHAs)

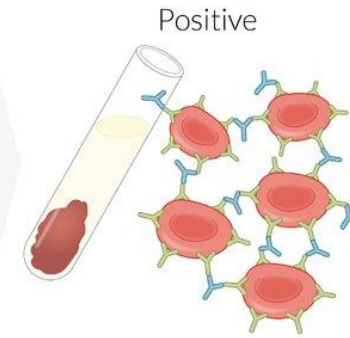


# Case 09

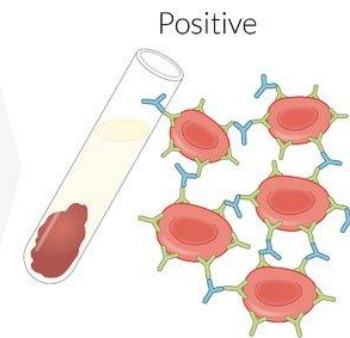
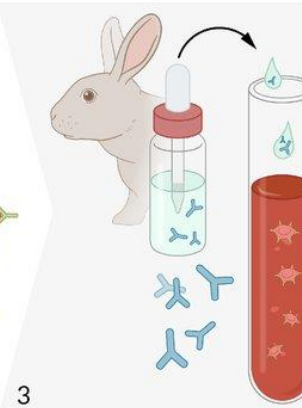
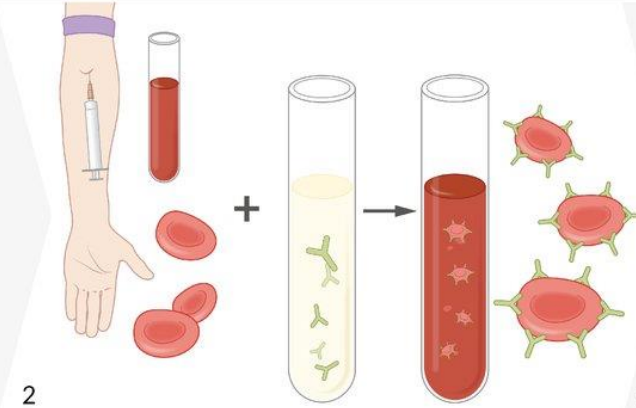
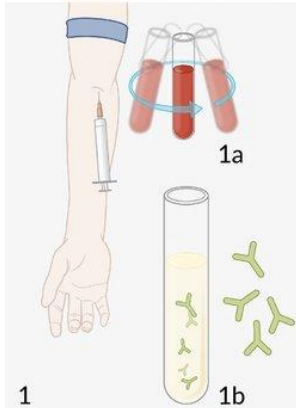
Direct Coombs test



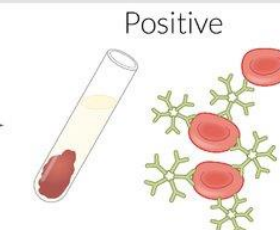
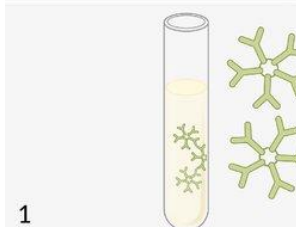
Test results



Indirect Coombs test



Indirect Coombs test (variant)



# **Case 10**

- **A 35-year-old woman comes to the physician because of a 2-month history of progressive fatigue and intermittent abdominal pain. During this time, she has noticed that her urine is darker when she wakes up in the morning. Her stool is of normal color. Five months ago, she was diagnosed with type 2 diabetes mellitus, for which she takes metformin. Physical examination shows pallor and jaundice. There is no splenomegaly. Laboratory studies show:**

# Case 10

|                       |                         |
|-----------------------|-------------------------|
| Hemoglobin            | 7.5 g/dL                |
| WBC count             | 3,500/mm <sup>3</sup>   |
| Platelet count        | 100,000/mm <sup>3</sup> |
| Serum                 |                         |
| Creatinine            | 1.0 mg/dL               |
| Total bilirubin       | 6.0 mg/dL               |
| Direct bilirubin      | 0.2 mg/dl               |
| Lactate dehydrogenase | 660 U/L                 |
| Haptoglobin           | 18 mg/dL (N = 41-165)   |

# Case 10

- Her urine is red, but urinalysis shows no RBCs. A Coombs test is negative. Peripheral blood smear shows no abnormalities. This patient is at greatest risk for which of the following complications?
- A. Cholesterol gallstones
  - B. Acrocyanosis
  - C. Hepatocellular carcinoma
  - D. Venous thrombosis
  - E. Chronic lymphocytic leukemia
  - F. Seizures

# Case 10

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- A. Cholesterol gallstones
  - B. Acrocyanosis
  - C. Hepatocellular carcinoma
  - D. Venous thrombosis
  - E. Chronic lymphocytic leukemia
  - F. Seizures

# Case 10

- **Venous thrombosis is the leading cause of mortality in PNH.**  
Thrombosis occurs in **atypical locations**, such as hepatic veins (Budd-Chiari syndrome), portal veins, and cerebral veins (headaches, stroke).

# Case 10

| Clinical features of paroxysmal nocturnal hemoglobinuria |                                                                                                                                                                                                                                                                                                                                                                      |
|----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Clinical manifestations                                  | <ul style="list-style-type: none"><li>• Hemolysis → fatigue</li><li>• Cytopenias (impaired hematopoiesis)</li><li>• Venous thrombosis (intraabdominal, cerebral veins)</li></ul>                                                                                                                                                                                     |
| Workup                                                   | <ul style="list-style-type: none"><li>• Complete blood count (<b>hypoplastic/aplastic anemia</b>, thrombocytopenia, leukopenia)</li><li>• Elevated lactate dehydrogenase &amp; low haptoglobin (hemolysis)</li><li>• Indirect hyperbilirubinemia</li><li>• Urinalysis (<b>hemoglobinuria</b>)</li><li>• Flow cytometry (<b>absence of CD55 &amp; CD59</b>)</li></ul> |
| Treatment                                                | <ul style="list-style-type: none"><li>• Iron &amp; folate supplementation</li><li>• <b>Eculizumab</b> (monoclonal antibody that inhibits complement activation)</li></ul>                                                                                                                                                                                            |

# Case 11

- A 62-year-old man comes to the physician for decreased exercise tolerance. Over the past four months, he has noticed progressively worsening shortness of breath while walking his dog. He also becomes short of breath when lying in bed at night. His temperature is 36.4°C (97.5°F), pulse is 82/min, respirations are 19/min, and blood pressure is 155/53 mm Hg.

# Case 11

- Cardiac examination shows a high-pitch, decrescendo murmur that occurs immediately after S2 and is heard best along the left sternal border. There is an S3 gallop. Carotid pulses are strong. Which of the following is the most likely diagnosis?
- A. Mitral valve stenosis
  - B. Mitral valve regurgitation
  - C. Tricuspid valve regurgitation
  - D. Aortic valve regurgitation
  - E. Mitral valve prolapse
  - F. Aortic valve stenosis

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# Case 11

|                              | Maximum point                                                                                                                          | Murmur                                                                                                                                                         | Characteristics                                                                                                                                                       |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <u>Aortic stenosis</u>       | <ul style="list-style-type: none"> <li>Aortic valve (parasternal 2<sup>nd</sup> right intercostal space)</li> <li>Erb point</li> </ul> | <ul style="list-style-type: none"> <li>Harsh crescendo-decrescendo systolic ejection murmur 🗣️</li> </ul>                                                      | <ul style="list-style-type: none"> <li>Radiation to the carotids</li> <li>Soft S<sub>2</sub></li> <li>Possibly ejection click 🗣️</li> </ul>                           |
| <u>Aortic regurgitation</u>  | <ul style="list-style-type: none"> <li>Aortic valve (parasternal 2<sup>nd</sup> right ICS)</li> <li>Erb's point</li> </ul>             | <ul style="list-style-type: none"> <li>Diastolic murmur with a decrescendo 🗣️</li> <li>Possible additional quiet systolic murmur</li> </ul>                    | <ul style="list-style-type: none"> <li>Immediately following the 2<sup>nd</sup> heart sound ("immediate diastolic murmur")</li> <li>Austin Flint Murmur 🗣️</li> </ul> |
| <u>Mitral stenosis</u>       | <ul style="list-style-type: none"> <li>Heart apex (midclavicular 5<sup>th</sup> left ICS)</li> </ul>                                   | <ul style="list-style-type: none"> <li>Delayed diastolic murmur with a decrescendo 🗣️</li> </ul>                                                               | <ul style="list-style-type: none"> <li>"Tympanic" 1<sup>st</sup> heart sound</li> <li>Mitral opening murmur/opening snap (OS)</li> </ul>                              |
| <u>Mitral valve prolapse</u> | <ul style="list-style-type: none"> <li>Heart apex (midclavicular 5<sup>th</sup> left ICS)</li> </ul>                                   | <ul style="list-style-type: none"> <li>Late-systolic crescendo 🗣️</li> </ul>                                                                                   | <ul style="list-style-type: none"> <li>Midsystolic high-frequency click (due to the tensing of the chordae tendinae)</li> <li>Loudest before S<sub>2</sub></li> </ul> |
| <u>Mitral regurgitation</u>  | <ul style="list-style-type: none"> <li>Heart apex (midclavicular 5<sup>th</sup> left ICS)</li> <li>Left axilla 🗣️</li> </ul>           | <ul style="list-style-type: none"> <li>Holosystolic murmur 🗣️</li> <li>3<sup>rd</sup> heart sound audible</li> <li>Quiet 1<sup>st</sup> heart sound</li> </ul> | <ul style="list-style-type: none"> <li>Blowing</li> <li>Radiation into the axilla</li> </ul>                                                                          |

# Case 11

|        | Venous Return / Preload |          | Afterload                 |                | Drugs           |       |
|--------|-------------------------|----------|---------------------------|----------------|-----------------|-------|
|        | Increase                | Decrease | Increase                  | Decrease       | Diuretic        | ACEIs |
|        | (Leg raise / Squat)     |          | (Handgrip)                | (Amyl Nitrate) |                 |       |
| MS, AS | ↑                       | ↓        | ↓(AS)                     | ↑(AS)          | Yes, but better |       |
|        |                         |          | Negligible Effect in (MS) |                | AS (Replace)    | ×     |
|        |                         |          |                           |                | MS(Ballon)      |       |
| MR, AR | ↑                       | ↓        | ↑                         | ↓              | ✓               | ✓     |
| VSD    | ↑                       | ↓        | ↑                         | ↓              | ✓               | ✓     |
| HOCM   | ↓                       | ↑        | ↓                         | ↑              | ×               | ×     |
| MVP    | ↓                       | ↑        | ↓                         | ↑              | ×               | ×     |

