Board Review Questions (with a bit of Genetics)

Board Review Course

ACP WA chapter

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How should a person focus study after the course until the ABIM exam?

- Primary certification exam in 3-6 weeks:
  - Decide areas of need: ?practice more questions or expand knowledge
  - Pick a focus of 3-4 topics, ie max 1-2/week
  - Selected areas of course manuals
  - Last week: review all pearl sheets from the course
  - Do computer exam prep via ABIM website!

How should a person focus study after the course until the ABIM exam?

- Maintenance of certification exam in 3 months:
  - Decide areas of need: ?more practice questions or expand knowledge
  - Have time to pick 1 topic per week, review topic and take practice questions
  - Last 1-2 weeks, review all pearl sheets from the course
  - Do computer exam prep via ABIM website!

Selecting priorities for study focus

Study things you don't do anymore…

- Hospitalists, intensivists might focus on outpatient topics
- Primary care MDs – inpatient, ICU
- Specialty areas like HIV if do not have related patient care
- Everyone:

  Topics least confidence in knowledge; important practice changes;

  practice guidelines

What percentage of questions do you need to get correct on MKSAP to pass the primary certifying exam?

- No one knows…!
- MKSAP questions seem to be harder than many of the ABIM exam questions per exam takers

Question Difficulty

- “Core” vs “non-core” type questions
  - Core: straightforward questions; 90% of practicing internists will answer correctly
  - Non-core: more difficult questions about unusual conditions or common conditions with unusual presentations; smaller % will answer questions

What percentage of questions do you need to get correct on MOC modules to pass the recertification exam?

- No one knows
- MOC modules harder than exam per ABIM:
  - It is expected you will need to look up items or seek consultants to solve many questions (part of MOC goal is ability to utilize resources)

Case 1.

A 41 yo male with a history of allergies and asthma presents with fever and cough. He had similar symptoms 2 months earlier. PMH otherwise negative.

Exam: Scattered rhonchi, few crackles lower lobes bilaterally

Labs: WBC 10,000

(20% eosinophils)

IgE level = 10,000 ng/ml.

CXR scattered infiltrates, RUL and L hilar area (new since CXR when illness 2m ago and then bilateral lower lobe infiltrates).

Case 1.
What therapy will be most effective?

A. Prednisone
B. Prednisone + Itraconazole
C. Inhaled steroids
D. Amphotericin IV
E. Levofloxacin IV

Case 1. discussion: Pt with hx allergies, recurrent pulmonary infiltrates

Dx Allergic Bronchopulmonary Aspergillosis

- Usually occurs in atopic asthmatics (occas cystic fibrosis)
- Cough with intermittent pulmonary infiltrates
- Can lead to central bronchiectasis
- Blood and sputum eosinophilia common
- Elevated levels of IgE (>1000ng/ml)
- Colonization with precipitating aspergillus antigen present; hypersensitivity reaction, *A. fumigatus* Ab.
- Rx: Prednisone + oral antifungal Itraconazole

  (+ oral Itraconazole (2016 IDSA guidelines; some data for Voriconazole - better tolerated)

Case 2.

Your 75 yr old patient with DM Type 2 now c/o weakness. He otes weakness with getting out of a chair, then improves with exercise but tires easily. Weight loss of 20 pounds in the past 3 months without diet change.

PMH: DM Rx with oral agent, A1C 7.1
+ 80 pack-yr Tobacco hx, quit last year.

Exam:

Hispanic ethnicity per patient, + temporal wasting

HEENT: No ptosis, has full EOMs

+ weakness proximal UE and proximal LE bilaterally

No increased tone or fasciculations noted. Sensation intact to LT, position and pain.

Labs ESR 26

Case 2.

What is the most likely diagnosis?

A. Lambert-Eaton myasthenic syndrome
B. Myasthenia gravis
C. Diabetic peripheral neuropathy
D. Meralgia paresthetica
E. Polymyalgia rheumatica

Case discussion: Pt with DM, wt loss, progressive weakness

- Dx Myasthenic (Lambert-Eaton) syndrome
- Condition of the neuromuscular junction
- Most pts have lung cancer (esp SCLC), paraneoplastic “remote” effect
  - Lambert reported that fewer than 1% of all lung cancers but 6% of small cell CA pts have this syndrome
  - Antibodies produced/immune etiology:
    - P/Q type voltage-gated ca-channel AB

Myasthenic (Lambert-Eaton) syndrome

- Features:
  - Motor sx, generalized proximal weakness and fatigue, most pronounced in the pelvic girdle and thigh
  - Muscle strength improves with exercise initially
  - May have dysarthria, dysphagia, dry mouth, parasthesias
  - Less commonly blurred vision, diplopia or ptosis

Lambert-Eaton syndrome
EMG findings

- Characteristic EMG:
  - Confirms increase in muscle action potential with repeated nerve stimulation at rates faster than 10 per sec. A few muscle contractions must be carried out before full strength is reached, after which the patient fatigues.
- Distinguish from true myasthenia gravis, in which full strength is present at the outset.
  - Also in Lambert-Eaton have poor response to Edrophonium (Rx Tensilon)

Case 3.

A 64 yr old man with chronic alcohol abuse is brought in for confusion and ataxia. On exam he has eye findings of left impaired adduction and right nystagmus with abduction.

What is most important in immediate management?

A. Glucose infusion, then thiamine
B. Calcium infusion, then thiamine
C. Give IV alcohol
D. Check thiamine level, if low administer thiamine
E. Thiamine, then glucose

Internuclear ophthalmoplegia

- Gaze abnormality/ horizontal diplopia:
  - Impaired horizontal eye movement
  - Weak adduction of affected eye
  - Nystagmus with abduction of contralateral eye
- Brainstem abnormality
- Lesion in MLF (medial longitudinal fasciculus) in pons or midbrain
- Many causes:
  - Most common multiple sclerosis
  - Brainstem infarct, syphilis, cancer, hepatic encephalopathy, cancer, head trauma, supranuclear palsy
  - Nutritional: Deficiency Thiamine (Vitamin B1): Wernicke's
    - Glucose prior to thiamine may precipitate or worsen neuro deficits
    - Give thiamine IV or IM immediately prior to IV fluids

Case 4.

A 60 yr old patient presents with eyelid droop. Examination shows left eye with 2 mm ptosis and pupil 2mm left compared with 4mm pupil right eye. Pupil reaction is normal direct and consensual.

What is the most likely diagnosis?

A. Third nerve palsy
B. Horner's syndrome
C. Myasthenia gravis
D. Syphilis

Other Options

- Third cranial nerve palsy is associated with ipsilateral ptosis and normal or large pupil
  - Pupil reaction may be delayed
  - Extraocular muscle impairment
- Myasthenia gravis
  - Ptosis without pupil change
- Syphilis
  - Argyll-Robertson pupil: accomodates but doesn’t react
  - Usually not ptosis

Horner's syndrome
(oculosympathetic paresis)

- Miosis (small pupil), ptosis, and anhidrosis
  - Anisocoria more marked in the dark
  - May see associated dilation lag
- Produced by lesion anywhere along the sympathetic pathway that supplies head, eye, and neck.
  - 3 "orders of neurons":
  - First (central): hypothalamus to first synapse in cervical spinal cord
  - Second (preganglionic): sympathetic trunk, through the brachial plexus, over lung apex to superior cervical ganglion
  - Third (postganglionic): Ascends within the adventitia of the ICA through the cavernous sinus, close to 6th cranial nerve; then joins V1, innervates the iris dilator muscle and Muller's muscle partly responsible for upper lid elevation and lower lid retraction "upside-down ptosis"

Horner's syndrome - 2

- The levator palpebrae is unaffected; thus ptosis is less severe (<2mm) than more profound upper lid ptosis seen in 3rd CN palsies (in which levator function is reduced)
  - Third CN palsy not associated with small pupil
- Anhidrosis is not a feature of postganglionic or third-order lesions
  - Often clinically unapparent

Causes of Horner's syndrome – 3
(Kedar, et al, UpToDate Table)

- Unknown 40%
- Of known causes:
  - Central (10-15%):
    - Hypothalamus: tumor, stroke
    - Brainstem: tumor, stroke (laterally medullary/Wallenberg's), demyelination
    - Spinal cord: trauma, tumor, myelitis, syringomyelia, demyelination, AVM, infarct
  - Preganglionic (40+%):
    - Pulmonary apical lesions (Pancoast tumor), subclavian artery aneurysm, mediastinal tumors, cervical rib
    - Iatrogenic: cannulation jugular, CT surgery, chest tube, epidural anesthesia
    - Thyroid cancers
  - Postganglionic (40+%):
    - Trauma to superior cervical ganglion, iatrogenic
    - ICA dissection (acute pain neck or face), aneurysm, trauma, tumor, thrombosis
    - Skull base lesions/cancer, Cavernous sinus lesions, (6th CN often affected), Cluster headache

Case 5.
A 24 yr old woman presents to her college health center with acute dyspnea.
No recent surgery, trauma or airline travel.
Non smoker.

PMH: negative

Meds: OCP (oral contraceptive)

FH Mother with perioperative DVT

Exam:

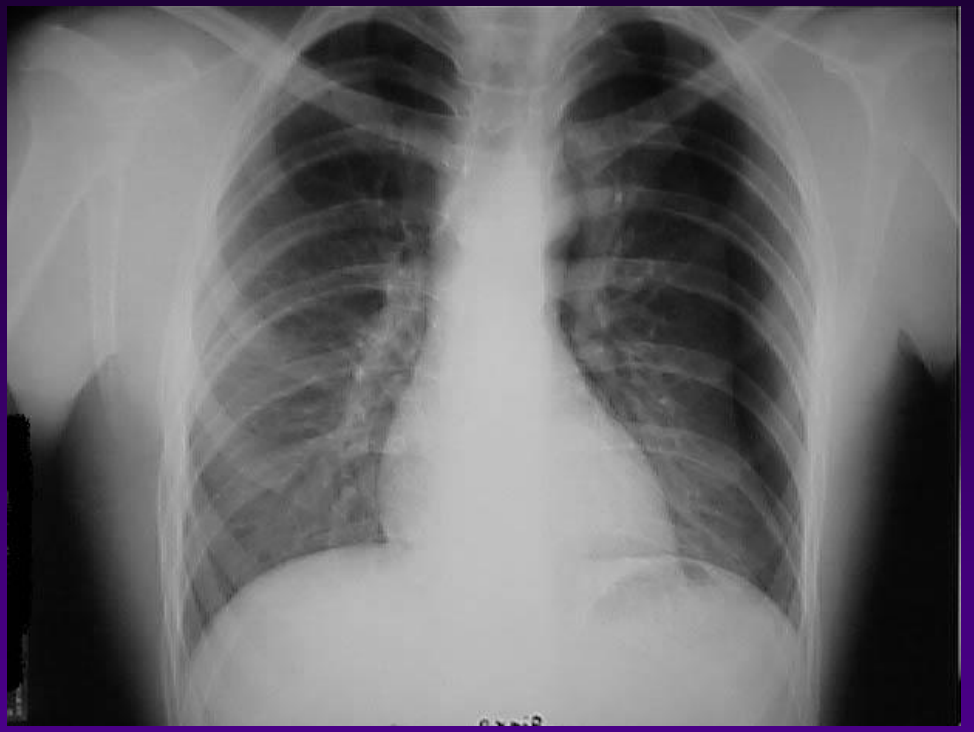
Pt alert, speaking in short sentences, moderate dyspnea, Resp 28 BP 118/62 HR 106

Chest: Shallow BS bilaterally

CV: JVP 8cm, tachy, reg, no m or S3

Ext no edema

CXR is shown



Case 5.

What is the most appropriate next step?

A. D-Dimer and lower extremity duplex
B. Spiral chest CT scan
C. Nuclear medicine VQ scan
D. Chest tube

Case discussion:

Healthy pt, acute dyspnea

Med OCP, FH VTE

Next step choices

A. D-Dimer and lower extremity duplex

B. Spiral chest CT scan

C. Nuclear medicine VQ scan

D. Chest tube

Test taking strategy:

3 of the choices are options for PE work-up

1 of the choices is the option to w/u other cause

CXR is the key to solving the case

Genetics Board Review

Case 6.

An 18year old woman seeks neurologic evaluation. Her mother has severe ataxia and was diagnosed with Charcot Marie Tooth at age 20. The patient has normal gait and neurologic exam. Her father is normal.

What are her odds of developing the same condition?

A. 0%
B. 25%
C. 50%
D. 75%
E. 100%

Hallmarks of Autosomal Dominant Disease

- Vertical transmission (involving several generations
- Risk to each child of an affected individual is 50%
- Male to male transmission observed
- Normal parents don't transmit trait*

*Exceptions:

- Reduced penetrance
- New mutations
- Gonadal mosaicism
- Non paternity

Case 7.
Dad is color blind. Mom has normal color vision, but her father was color blind.
What are the odds of their daughter having the gene for color blindness?

A. 25%
B. 50%
C. 75%
D. 100%

Case 7. Case discussion: Color blindness

- Sex-lined recessive
- In this case 100% of daughters have the gene (carriers and affected)
- Daughter will get gene from father as he is affected and passing that x to her
- In this case, daughter may get gene from mother (mother must have gene as her own father affected and he would have transmitted that affected-x to her)
  - (100% have 1 gene, 50% have 2 genes)

Case 8.

Dad is color blind. Mom has normal color vision, but her father was color blind.

What are the odds of their son being color blind?

A. 0%
B. 25%
C. 50%
D. 100%

X-lined recessive

- Dad is affected, will pass Y to son, not x
- Mom's father had condition and must have given that x to her (assume Mom got normal x from her mother: she has 50% chance of passing x-affected gene to her son)
- Risk of son with color-blindness:
  - .5 (50%)
  - Affected sons have the condition (single x)

Hallmarks of X-lined recessive

- Inheritance of trait is male>>female
- All daughters of affected males will be carriers
- Males never pass gene onto their sons
- Heterozygotes will usually be unaffected

Case 9.

Mom has six café aulait spots. Dad is normal.

What are the odds of their child having the condition?

A. 0%
B. 25%
C. 50%
D. 75%
E. 100%

Case 9.
Mom has six café aulait spots. Dad is normal.

Discussion:
Neurofibromatosis: Autosomal Dominant

- Dx by number/size of café' aulait spots
- 50% chance of Mom passing gene to child
- Findings: Neurofibromas, axillary freckling

Case 10.

A couple seeks genetic counseling. Mom has a grandfather (her mother's father) with hemophilia. Dad is normal.

What are their odds of having a son with hemophilia?

A. 0%
B. 25%
C. 50%
D. 75%
E. 100%

Case discussion: Hemophilia

- Hemophilia A and B are both sex-linked recessive
- Mom's mother known to be a carrier (Mom's grandfather had hemophila)
- Mom has a 50% chance of obtaining gene from her mother and being a carrier
- If Mom had gene, her son would have 50% chance of obtaining gene from her (and would have the disease):
- .5 x .5 = .25

Case 11.

A 27-year-old woman has a brother who died of cystic fibrosis. She is married to a 25-year old-man whose sister (age 16) has CF.

What is the risk that their first child will have cystic fibrosis?

A. 1/2

B. 1/4

C. 1/3

D. 1/9

E. 1/16

Genetics Post-birth Probability

- Carrier 2/3
- Normal 1/3

Case discussion: Cystic fibrosis

- Autosomal recessive
- Remember post-birth genetics (these parents do not have the disease)
- Each parent has 2/3 chance (66%) of being a carrier
- Risk of child getting both genes for CF is ¼
- Risk of first child having CF is:
  - 2/3 x 2/3 x ¼ = 4/36 = 1/9

Cystic Fibrosis

- Population incidence among caucasians is ~1/2000, carrier frequency 1/20

Clinical features

- Chronic pulmonary disease with bronchiectasis, recurrent pneumonias
- Pulmonary infection with *Pseudomonas* species and *Staph aureus* common
- Nasal polyps/ sinusitis
- Pancreatic insufficiency
- Absence of vas deferens (sterility in males)
- Females thick cervical mucous (decreased fertility but not sterile)
- Mean survival now >age 35

Case 12.

Klinefelter Syndrome is associated with which of the following:

A. Increased risk of breast cancer
B. Increased risk of hepatocellular cancer
C. Increased risk of prostate cancer
D. No increased risk of malignancy

Klinefelter Syndrome

- Incidence 1/500 men
- Karyotype 47 XXY or mosaic 46XY/47XXY

<u>Clinical features</u>

- Decreased testicular size
- Azoospermia
- Decreased facial hair
- Increased height
- Elevated gonadotropins (LH, FSH)
- Gynecomastia (increased risk of breast CA)
  - Agrawal, et al. Breast Cancer Res Treat. 2007 103(1):11-21.
- Increased risk of testicular cancer

Inheritance Patterns I

Compiled from text Clinical Genetics Handbook
(National Genetics Foundation, Inc.)

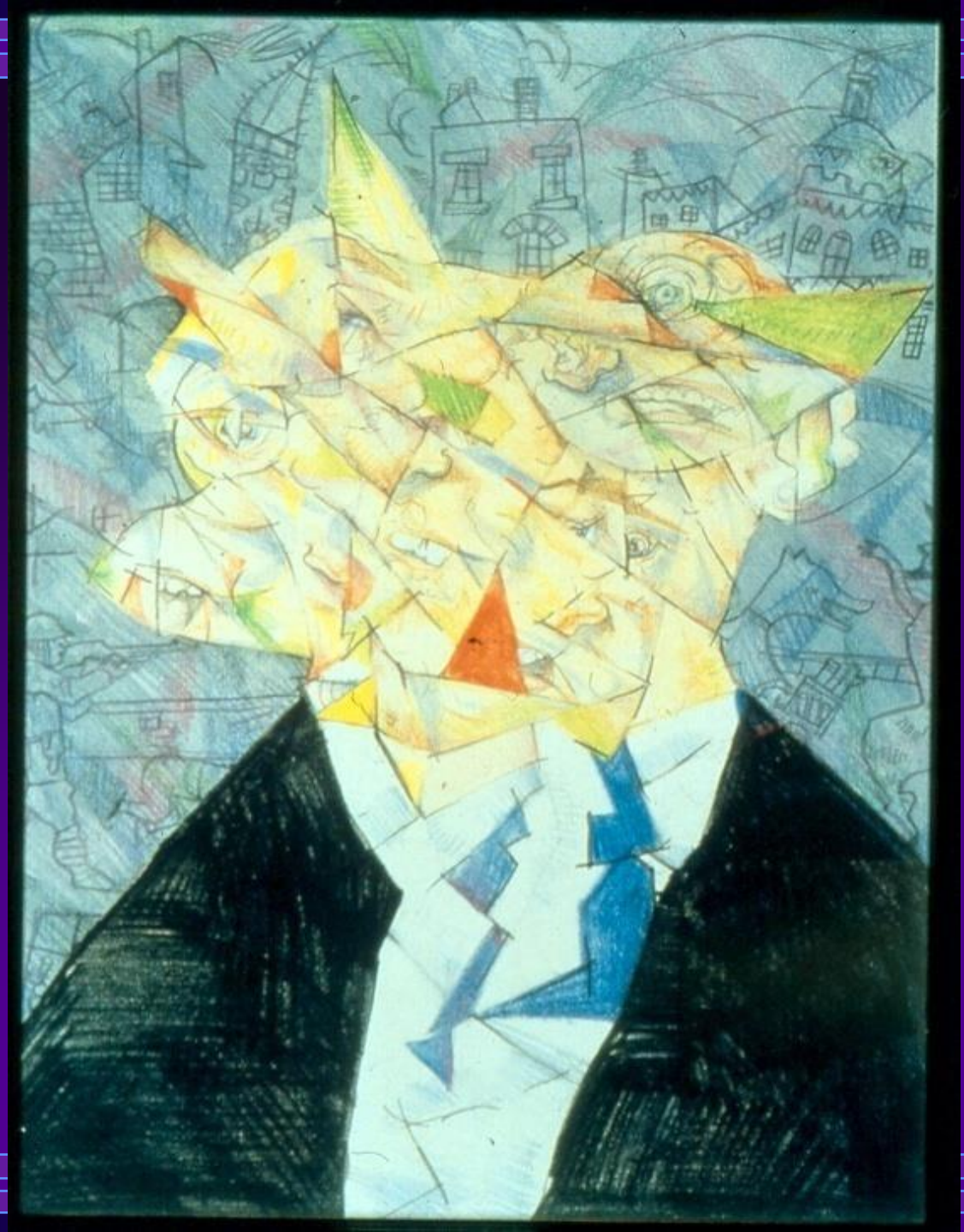
- Autosomal Dominant
  - Polycystic Kidney Disease
  - BRCA 1& 2 mutations
  - Familial Hypercholesterolemia
  - Familial Hypertriglyceridemia
  - Hereditary Non-polyposis colorectal cancer (HNPCC)
  - Charcot Marie Tooth
  - Neurofibromatosis
  - Huntington's Disease
  - Acute Intermittent Porphyria
  - Peutz-Jeghers syndrome
  - Tuberous Sclerosis

Inheritance Patterns II

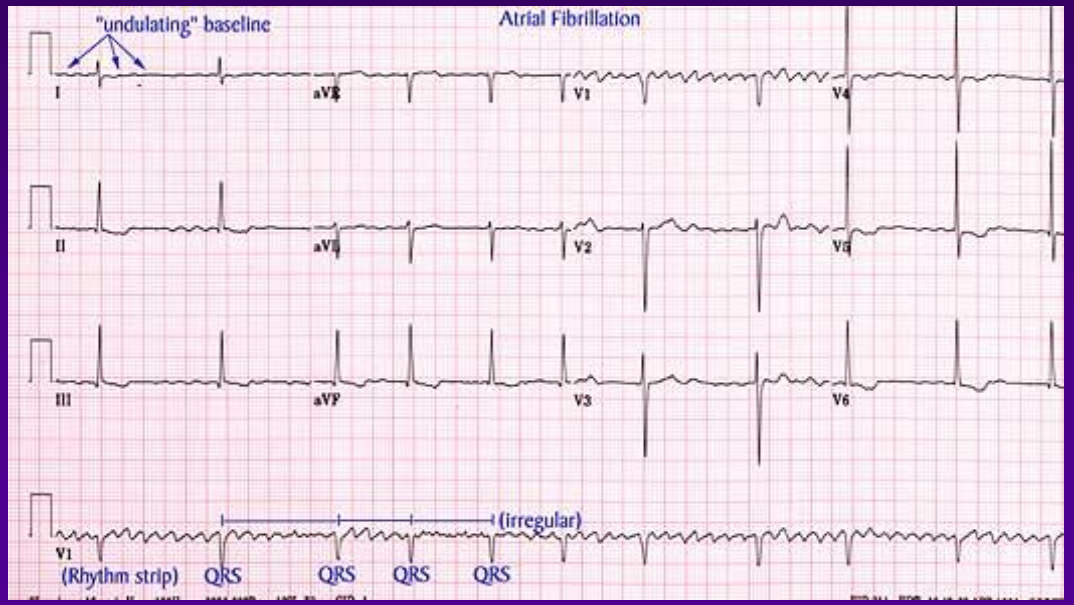
- X-Linked recessive
  - Color Blindness
  - Hemophilia A and B
  - G-6-PD deficiency
  - Duchenne's Muscular Dystrophy
  - Fabry's disease

Inheritance Patterns III

- Autosomal Recessive
  - Cystic Fibrosis
  - Hemochromatosis
  - a-1 anti-trypsin deficiency
  - Sickle cell anemia
  - Thallasemia
  - Tay-Sach's disease
  - Albinism



Atrial Fibrillation



Case 13.

Pt is a 76-year-old man with known chronic Atrial fibrillation. PMH: GER, HTN, DM T2. He is admitted for evaluation of a TIA with transient left-sided vision loss 3 hrs ago, duration 5 minutes.

Exam: BP 146/98. Normal neuro exam

Studies

Carotid duplex:	ECA <15% R stenosis
TCD:	Normal
CT Scan:	Normal
2-D ECHO:	No thrombus

Case 13, Cont'.

Pt with AF and recent TIA.
No hx of previous stroke. What is the patient's annual stroke risk and recommended management?

A. His annual stroke risk is 3% – Rx with ASA 325mg/d
B. His annual stroke risk is 5% – Rx with oral anticoagulant
C. His annual stroke risk is 10% – Rx with oral anticoagulant
D. His annual stroke risk is 10% – Rx with ASA given high risk of CNS hemorrhage

Nonvalvular AF overall stroke risk: 5% per year

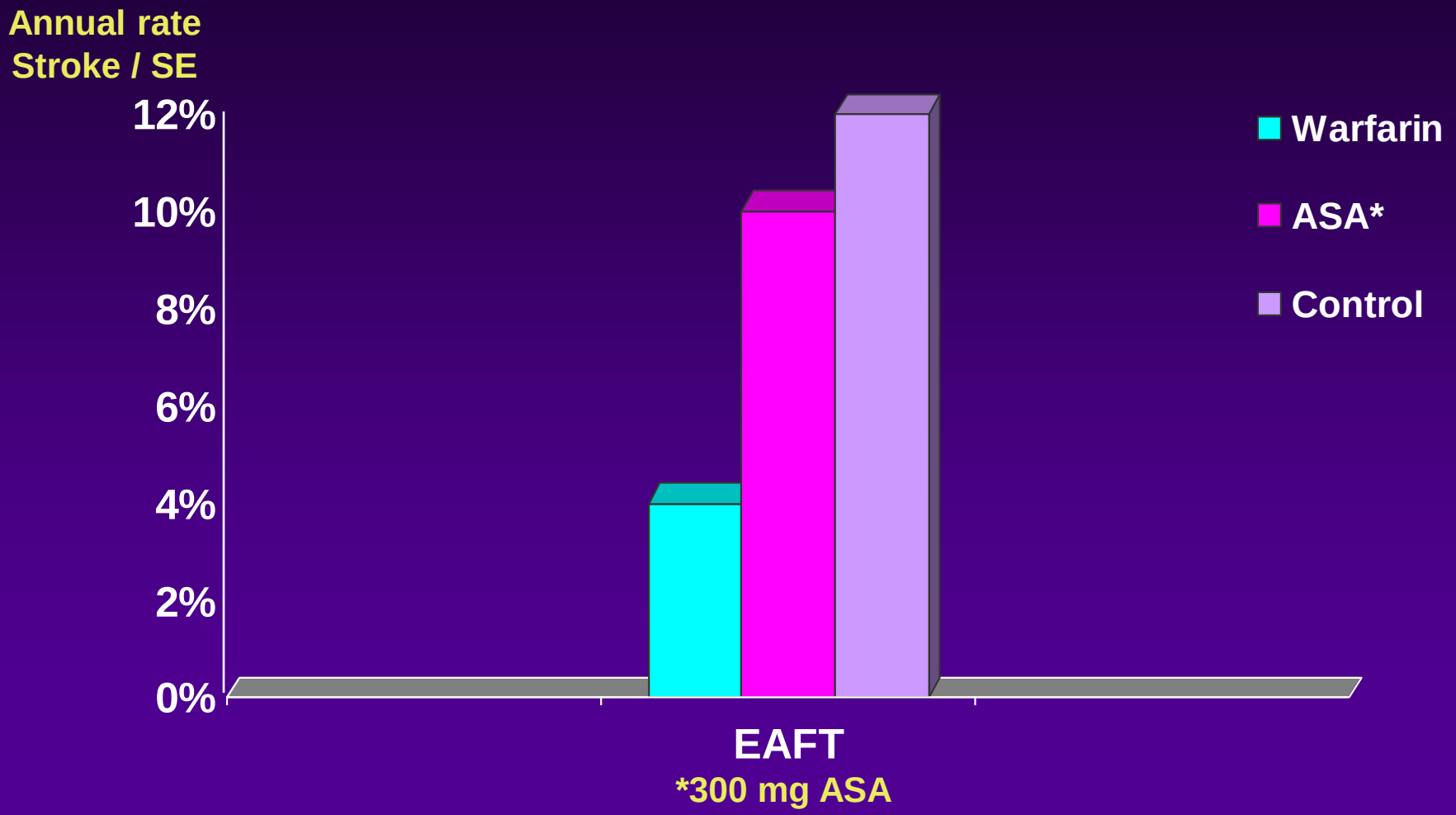
Can stratify NVAF pts into high and low risk groups

Stroke Risk

Afib without CV or other conditions:	<0.5% per yr risk
Nonvalvular AF:	5% per yr avg 5-6x controls NSR
Hx stroke and AF:	~10+% per yr
Valvular heart disease/ AF: (mitral valve)	18x controls

SECONDARY STROKE PREVENTION:

AF & Hx Recent TIA / CVA (European AF Trial)



CHA_2DS_2-VASc score?

Risk factor-based approach expressed as a point-based scoring system, with the acronym CHA_2DS_2-VASc
(Note: maximum score is 9 since age may contribute 0, 1, or 2 points)

Risk factor	Score
Congestive heart failure/LV dysfunction	1
Hypertension	1 X
Age ≥75	2 X
Diabetes mellitus	1 X
Stroke/TIA/thrombo-embolism	2 X
Vascular disease* (MI, PVD, Aortic plaque)	1
Age 65 to 74	1
Sex category (ie, female sex)	1
Maximum score	**9**

***UpToDate* 2022**

Stroke risk with CHA_2DS_2-VASc

(UpToDate Camm et al, EuropCardiol S)

CHA_2DS_2-VASc score	Patients (n = 7329)	Adjusted stroke rate (percent/year)•
0	1	0 %
1	422	1.3 %
2	1230	2.2 %
3	1730	3.2 %
4	1718	4.0 %
5	1159	6.7 %
6	679	9.8 % X Patient Case
7	294	9.6 %
8	82	6.7 %
9	14	15.2 %

Case 14.

Pt age 45 is admitted with atrial fibrillation with RVR. Dx hyperthyroidism 3 months ago. No hx of previous stroke. Calculation of CHA_2DS_2-VASC is done = 0.

What is the optimal management for anticoagulation?

A. No anticoagulation needed
B. Aspirin
C. Clopidogrel
D. Aspirin + Clopidogrel
E. Anticoagulation with direct oral anticoagulant

Case 14 Discussion

Atrial fibrillation with RVR.
Dx hyperthyroidism 3 months ago.
Calculation of CHA2DS2-VASC is done = 0.

Optimal management for anticoagulation:

- Rx Anticoagulation with direct oral anticoagulant
  - **Atrial Fibrillation in Hyperthyroidism has increased stroke risk.**
  - (CHADS2 and CHA2DS2-VASc scores are derived from studies of Afib with Non-valvular CV disease and do not apply here)

CONTRAINDICATIONS TO ANTICOAGULATION

Absolute

- Hemorrhagic diathesis
- Recent neurosurgery
- HTN diastolic persistently > 105
- Acute hemorrhagic CVA
- Recent major trauma
- Major bleeding from GI, GU, respiratory tracts

Use anticoagulants with caution:

Hx GI bleed, active alcoholism, falls, significant renal/hepatic disease, Rx with anti -plt agents (ASA >325 mg), med noncompliance, unable to closely monitor pt

Case 15.

A 68 yr old man is admitted for lethargy and new onset of confusion, noted to have urinary retention and obstructive uropathy 2nd to BPH. Creat 4.9/ BUN 92, K+ 7.0.

What is the earliest evidence on ECG of hyperkalemia?

A. T-wave inversion
B. Peaked T waves
C. Widening of the QRS interval
D. PR prolongation and P wave flattening
E. Prolonged QT interval

ECG abnormalities in Hyperkalemia (sequential)

- Peaked T waves across entire 12-lead
- PR interval prolonged and P wave flattening
- QRS complex progressively widens, until it merges with the T wave (sine-wave pattern)
- Ventricular fibrillation

(any change requires immediate Rx)

Bonus question! Case 16.

Which of the following medications for hypertension is contraindicated in pregnancy?

A. Nifedipine sustained release
B. Hydralazine
C. Labetalol
D. Losartan
E. Methyldopa

Case: HTN management during pregnancy

- Do not use ARBs, ACE-Inhibitors
  - (some data that these are sometimes given despite widespread caution not to use!)
- Diuretics controversial, sometimes continued if were on pre-pregnancy
- Calcium-channel blockers: long acting nifedipine ok (avoid short acting due to rapid drop in BP)
  - less data with amlodipine
- Beta blockers: labetalol most studied, occas used
- Methyldopa long-used (weak anti-HTN effect)
- Hydralazine especially used in severe HTN

Thank you!

Olympic Sculpture Park

Practice Questions: Answers to Cases

Case 1. B
Case 2. A
Case 3. E
Case 4. B
Case 5. D
Case 6. C
Case 7. D
Case 8. C
Case 9. C
Case 10. B
Case 11. D
Case 12. A
Case. 13. C
Case 14. E
Case 15. B
Case 16. D