Medical Mimics

Medical Conditions that may masquerade as mental health problems.

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Background

- I’m a family doc
- I do not diagnose nor prescribe for mental health conditions at my current workplace
- I view the mind-body as a spectrum – some symptoms originate from one end, some from the other, some from both, and no matter where they start from, there is always a lot of interplay – nothing is ever solely one or the other

Emotions/Mental processes clearly have a direct impact on and manifestations within our physical bodies

We see this all the time in student health:

Bodily Symptoms secondary to Emotional Causes

- They often initially present to medical services
- As I evaluate them, I'm trying to "make sure" there isn't a physical/medical/body etiology for a patient's presenting symptoms, or "rule out" a body-origin of the problem
- Common symptoms:
  - Chest pain
  - Fatigue
  - Dyspnea
  - Palpitations
  - Insomnia
  - Weight/appetite changes

But the reverse phenomenon can also happen

- Medical/body/physical etiologies can also often cause what appear to mental/psychological symptoms
  - Anxiety/Agitation
  - Depression
  - Fatigue
  - Insomnia

DSM Criteria for MDD

(1) depressed mood most of the day, nearly every day, as indicated by either subjective report (e.g., feels sad or empty) or observation made by others (e.g., appears tearful). **Note:** In children and adolescents, can be **irritable mood**.

(2) markedly diminished interest or pleasure in all, or almost all, activities most of the day, nearly every day (as indicated by either subjective account or observation made by others)

(3) significant **weight loss** when not dieting or **weight gain** (e.g., a change of more than 5% of body weight in a month), or **decrease or increase in appetite** nearly every day.

(4) insomnia or hypersomnia nearly every day

(5) psychomotor agitation or retardation nearly every day (observable by others, not merely subjective feelings of restlessness or being slowed down)

(6) fatigue or loss of energy nearly every day

(7) feelings of worthlessness or excessive or inappropriate guilt (which may be delusional) nearly every day (not merely self-reproach or guilt about being sick)

(8) diminished ability to think or concentrate, or indecisiveness, nearly every day (either by subjective account or as observed by others)

(9) recurrent thoughts of death (not just fear of dying), recurrent suicidal ideation without a specific plan, or a suicide attempt or a specific plan for committing suicide

DSM Criteria for GAD

A. At least 6 months of "excessive anxiety and worry" about a variety of events and situations. Generally, "excessive" can be interpreted as more than would be expected for a particular situation or event. Most people become anxious over certain things, but the intensity of the anxiety typically corresponds to the situation.

B. There is significant difficulty in controlling the anxiety and worry. If someone has a very difficult struggle to regain control, relax, or cope with the anxiety and worry, then this requirement is met.

C. The presence for most days over the previous six months of 3 or more (only 1 for children) of the following symptoms:

1. Feeling wound-up, tense, or restless
2. Easily becoming fatigued or worn-out
3. Concentration problems
4. Irritability
5. Significant tension in muscles
6. Difficulty with sleep

D. The symptoms are not part of another mental disorder.

E. The symptoms cause "clinically significant distress" or problems functioning in daily life. "Clinically significant" is the part that relies on the perspective of the treatment provider. Some people can have many of the aforementioned symptoms and cope with them well enough to maintain a high level of functioning.

F. The condition is not due to a substance or medical issue

DSM IV Criteria for Panic Attack

A discrete period of intense fear or discomfort, in which four (or more) of the following symptoms developed abruptly and reached a peak within 10 minutes:

1) **palpitations**, pounding heart, or accelerated heart rate
2) **sweating**
3) **trembling or shaking**
4) sensations of **shortness of breath** or smothering
5) feeling of **choking**
6) **chest pain** or discomfort
7) **nausea or abdominal distress**
8) feeling **dizzy, unsteady, lightheaded, or faint**
9) derealization (feelings of unreality) or depersonalization (being detached from oneself)
10) fear of losing control or going crazy
11) fear of dying
12) **paresthesias** (numbness or tingling sensations)
13) **chills or hot flushes**

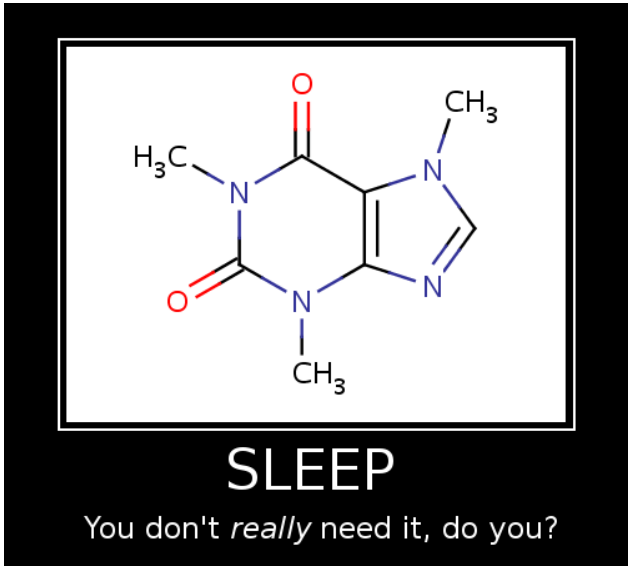
Sorting it all out isn't easy

- My goals today
  - Remind medical clinicians about the conditions they need to consider before "reassuring" a patient that there is not a bodily etiology for their symptoms
  - Inform mental health providers about medical conditions that may mimic behavioral symptoms, so they can be alert to when a referral might be indicated
  - Hopefully arm the integrative practitioner with a relatively comprehensive overview of the realm in-between

Today's Approach

Activating Conditions

Deactivating Conditions



Sleep Disturbances

Panic Attack Mimics

Sleep

- Is necessary!
- Sequellae of poor sleep
  - Decreased cognitive function
  - Mood effects – low mood, irritability, poor judgement
  - Decreased quality of life
  - Increased accidents
  - Increased rates of hypertension and CAD
  - Impaired immune functioning
  - Increased hunger/appetite (esp for carbs and calorie-dense foods)
  - Shorter life expectancy

Sleep Disruptors

- Poor sleep hygiene
- Stimulant use
- Alcohol withdrawal
- Benzodiazepene withdrawal
- Restless Legs Syndrome
- Respiratory problems: sleep apnea and asthma
- Hyperthyroidism
- Nocturia
- Pain
- ? Vitamin D deficiency

Alcohol Withdrawal

- Alcohol's impact on brain function:
  - Sober brain: balance of excitatory (glutamate on NMDA) and inhibitory (GABA) signals
  - Alcohol increases GABA and decreases glutamate
  - The brain tries to adapt, by decreasing GABA receptor sensitivity and increasing NMDA sensitivity to glutamate
- When alcohol level falls, these adaptive brain responses are unmasked, resulting in symptoms of excess excitatory tone:
  - Anxiety, insomnia, agitation, tremor
  - Headache, hypertension, tachycardia, diaphoresis, palpitations
  - Decreased appetite, nausea, vomiting
  - Symptoms may appear in as little as 6 hours after last drink

Alcohol Withdrawal

- Most research focuses on habitual drinkers, but these effects can be seen in even casual or occasional users
  - Young woman drinking a glass of wine with dinner once or twice a week who gets insomnia on those nights
  - Athlete who only drinks on the weekends but then on Monday has agitation, hypertension, diaphoresis, and tachycardia
- So, remember to really ask about alcohol and consider it as a possible etiology of sleep problems and/or anxiety symptoms

Restless Legs Syndrome

- Symptoms:
  - Spontaneous, continuous leg movements accompanied by paresthesias
  - Intense discomfort deep in legs, described as crawling, aching, stretching, creeping, pulling, itching
  - Occur only at rest and relieved by movement
  - Sleep disturbance and periodic limb movements of sleep are common
  - When severe, can interrupt daytime activities as well (attending a meeting or watching a movie)
- Mild symptoms occur in 5-15% of the general population

Restless Legs Syndrome

- Primary – idiopathic, likely genetic
- Secondary – due to underlying medical condition
  - Iron deficiency (even without anemia)
  - Pregnancy, esp 3rd trimester
  - Diabetes, possibly independent of neuropathy
  - Rheumatologic, including fibromyalgia & Sjoegrens
  - B12 deficiency
  - Parkinsons, ESRD, MS, Venous insufficiency, Hereditary neuropathies
- Can be exacerbated by antidepressants, caffeine, alcohol, nicotine, neuroleptics, dopamine-blocking anti-emetics like metaclopromide, and sedating antihistamines

An algorithm for the management of restless legs syndrome. Silber Mhet al. Mayo Clin Proc 2004 Jul;79(7):916-22.

Respiratory problems

- Asthma
  - Night-time cough or dyspnea is a common symptom of poorly controlled asthma
  - Student may not give a history of asthma
    - “prone to bronchitis”
    - Cough-variant asthma often undiagnosed
- Obstructive sleep apnea
  - Often in overweight individuals, but not always (structure of oropharynx, allergies/chronic rhinosinusitis, adenoids/tonsils)
  - Mechanical obstruction of airway causes hypoxia and poor sleep / frequent arousals of which the patient may not be aware (are just really sleepy during the day)
  - Often snore, partner may report periods of apnea
- Night-time cough due to reflux
- Night-time cough due to allergic rhinitis / post-nasal drip

Hyperthyroidism

- In children and adolescents, onset is often insidious, can take years to develop and be diagnosed
- Overall prevalence in adults is 1.3% of population, 5:1 ratio of women to men
- Symptoms:
  - Insomnia
  - Anxiety
  - Irritability, mood swings
  - Hyperactivity, inattention, decreased concentration
  - Tremor, hyperreflexia
  - Weight loss
  - Hair loss or thinning
  - Diaphoresis
  - Weakness

Hyperthyroidism

- Graves Disease
  - Most common cause of hyperthyroidism in children and adults
  - affects 1 in 5000 kids, mostly aged 11-15
  - Thyrotropin (TSH) receptor stimulating antibodies (TRS-Ab)
- Hashimoto's Thyroiditis
  - Very common in young women
  - Inflammatory problem, release of pre-formed thryroid hormone
  - Alternating cycles of hypo-and hyper-thyroidism
- Subacute thyroiditis (deQuervain's)
  - Painful thyroid, release of preformed hormone
  - Usually due to a viral infection (eg Coxsackie)

Hyperthyroidism

- Diagnosis:
  - TSH low/suppressed
  - free T4 & free T3 will be high
- Caveats:
  - TSH levels can take 4-6 weeks to reflect thyroid status, therefore may miss an acute problem if only measure TSH
  - Measure fT4 and fT3 in patients in whom you have a high clinical suspicion for hyperthyroidism, as some hyperthyroid conditions will cause only elevated T3 in the early stages
- Management : I refer to endocrine

Causes of thyrotoxicosis in children and adolescents

Name	Synonyms	Mechanism	Antibody tests	RAI	Thyroid exam
Thyroid gland hyperfunction (increased synthesis of thyroid hormones)					
Graves' disease	Hyperthyroid goiter von Basedow's disease	Thyrotopin receptor-stimulating antibodies (TRS-Ab)	TRS-Ab positive; TPO-Ab positive or negative; TBII positive	High, diffuse	Symmetric nontender goiter
Multinodular hyperthyroid goiter	Toxic multinodular goiter	Autonomous overproduction of thyroid hormone by nodules	All negative	Normal or high, multifocal	Nodular
Autonomous nodule	Plummer's disease Toxic nodule	Same	All negative	High, single focus; rest of gland suppressed	Single nodule
TSH-producing pituitary adenoma		Autonomous overproduction of TSH	All negative	High	Normal or symmetric goiter
Pituitary resistance to thyroid hormone		Overproduction of TSH	All negative	High, diffuse	Symmetric goiter

Causes of thyrotoxicosis in children and adolescents

Name	Synonyms	Mechanism	Antibody tests	RAI	Thyroid exam
Thyrotoxic phase of chronic lymphocytic (Hashimoto's) thyroiditis	Hashitoxicosis Lymphadenoid goiter	Autoimmune; release of preformed hormone. Predominantly women.	TPO-Ab positive; Thyroglobulin positive; TRS-Ab positive or negative	Low in majority, but can be elevated if TRS-Ab positive; inhomogeneous pattern	Firm goiter, sometimes tender
Subacute lymphocytic thyroiditis	Painless sporadic thyroiditis Silent thyroiditis	Autoimmune; release of preformed hormone. May also be associated with drugs (IFN-alpha, IL-2, lithium).	TPO-Ab positive	Low (during thyrotoxic phase)	Firm nontender, mildly enlarged thyroid
Subacute granulomatous thyroiditis	Subacute thyroiditis Painful subacute thyroiditis de Quervain's thyroiditis Granulomatous giant cell thyroiditis	Viral; release of preformed hormone	TPO-Ab negative; Elevated ESR	Low (during thyrotoxic phase)	Painful goiter

Causes of thyrotoxicosis in children and adolescents

Name	Synonyms	Mechanism	Antibody tests	RAI	Thyroid exam
Drug-induced thyrotoxicosis					
Factitous thyroiditis	Thyrotoxicosis factitia		Low TSH	Low or absent	No goiter
Iodine-induced hyperthyroidism		Underlying multinodular goiter; thyroid hormone release triggered by exposure to iodine (eg, contrast agents, amiodarone)		Increased	Often multinodular

TRS-Ab: Thyrotropin-receptor stimulating antibodies; TPO-Ab: Thyroid peroxidase antibodies; TBII: Thyrotropin binding inhibitor immunoglobulin

Nocturia

- Rare in the college-age population
- Nocturia more than once per night is usually abnormal in this age group
- Patient may or may not perceive that the need to urinate is what's waking them up and may just complain of poor sleep
- Possible etiologies:
  - Behavioral (drinking too much before bed!)
  - Polyuria/polydipsia (diabetes mellitus, diabetes insipidus, psychogenic polydipsia)
  - GU: Urinary tract infection, Interstitial cystitis, urinary retention/incomplete emptying (meds, urethral stricture, constipation), prostate problems, endometriosis, vaginitis

Deactivating Conditions / Depression Mimics (Fatigue, Low energy, Difficulty Concentrating)

- Hypothyroidism
- Mononucleosis, Post-mono
- Other viral infections
- Chronic Fatigue Syndrome
- Vitamin D deficiency
- B12 deficiency
- Iron deficiency, even in absence of anemia
- Malnutrition (due to eating d/o, malabsorption, or increased requirements)
- Disordered eating
- Concussion
- Herbals, OTCs
- Poor or insufficient sleep (see section on sleep)

Hypothyroidism

- Symptoms & Clinical Manifestations
  - Cool, pale, dry skin
  - Coarse, brittle hair, hair loss, thinning of eyebrows
  - Hypertension, hyperlipidemia
  - Constipation
  - Menstrual problems (too little or too much)
  - Decreased libido, erectile dysfunction, delayed ejaculation
  - Joint pain/stiffness, carpal tunnel syndrome
  - Fatigue, weakness
  - weight gain (usu not significant)
  - Depressed mood

Hypothyroidism

- Diagnosis:
  - High TSH
  - Low free T4 and T3
  - If very recent onset, TSH may not yet be significantly elevated, but hypothyroidism is rarely an acute-onset problem
  - Diagnosis in patients who formerly had hyperthyroidism can be tricky

Mononucleosis

- Classic triad: fever, tonsillar pharyngitis, LAD
- EBV present in saliva
- Peak incidence of clinically symptomatic mono is the 15-24 age group
- Usually asymptomatic in children, who then are immune
- 90-95% of adults are eventually seropositive
- EBV virus can persist in oropharynx for months to years after infection and can transmit the virus to others (which is why most infected individuals cannot recall a sick contact)
- Virus has also been found in cervical cells and seminal fluid (? Sexually transmitted)

Clinical manifestations of infectious mononucleosis

Symptoms and signs	Frequency, percent
Symptoms	
Malaise and fatigue	90-100
Sweats	80-95
Sore throat, dysphagia	80-85
Anorexia	50-80
Nausea	50-70
Headache	40-70
Chills	40-60
Cough	30-50
Myalgia	12-30
Ocular muscle pain	10-20
Chest pain	5-20
Arthralgia	5-10
Photophobia	5-10

Signs	
Adenopathy	100
Fever	80-95
Pharyngitis	65-85
Splenomegaly	50-60
Bradycardia	35-50
Periorbital edema	25-40
Palatal enanthem	25-35
Liver and spleen tenderness	15-30
Hepatomegaly	15-25
Rhinitis	10-25
Jaundice	5-10
Skin rash	3-6
Pneumonitis	<3

Modified from Chervenik, PA. Dis Mon 1974; 1:29.

Mononucleosis

- Most symptoms resolve within 1 month
- Fatigue, however, is often very persistent
  - 13% still fatigued at 6 months

2001 J Am B Family Practice

Prospective Study of the Natural History of Infectious Mononucleosis Caused by Epstein-Barr Virus, *Thomas D. Rea*

Table 1. Frequency of Symptoms of Infectious Mononucleosis at Four Time Points for 140 Patients Who Completed All Four Visits

Symptom	Initial No. (%)	1 Month No. (%)	2 Months No. (%)	6 Months No. (%)
Sore throat	104 (74)	22 (16)	16 (11)	16 (11)
Fatigue	108 (77)	39 (28)	29 (21)	18 (13)
Fever	63 (45)	3 (2)	3 (2)	2 (1)
Sleeping too much	64 (45)	26 (18)	20 (14)	12 (9)
Painful nodes	80 (57)	15 (11)	8 (6)	5 (4)
Headache	71 (50)	21 (15)	21 (15)	23 (16)
Rash	21 (15)	5 (4)	4 (3)	5 (4)
Cough	31 (22)	15 (11)	14 (10)	11 (8)
Sore muscles	39 (28)	19 (14)	16 (11)	15 (11)
Sore joints	33 (23)	21 (15)	9 (6)	13 (9)
Nausea	38 (27)	11 (8)	11 (8)	8 (6)

2001 J Am B Family Practice
Prospective Study of the Natural History of Infectious Mononucleosis Caused by Epstein-Barr Virus, *Thomas D. Rea*

Table 3. Functional Status in Infectious Mononucleosis at Four Time Points for 140 Participants Who Completed All Four Visits.

	Mean Score (±SD)*			
SF-36 Subscale	Initial	1 Month	2 Months	6 Months
General health	69 (±18)	71 (±19)	72 (±19)	73 (±19)
Physical functioning	70 (±21)	84 (±16)	90 (±12)	93 (±10)
Social functioning	48 (±25)	72 (±26)	82 (±21)	87 (±20)
Emotional well-being	66 (±18)	71 (±17)	72 (±17)	76 (±17)
Pain	51 (±25)	79 (±21)	85 (±17)	89 (±15)
Vitality	33 (±19)	50 (±21)	60 (±20)	66 (±20)
Physical role limitation	21 (±29)	55 (±43)	77 (±34)	88 (±28)
Emotional role limitation	62 (±41)	70 (±40)	78 (±36)	85 (±30)

*Range from 0 = poorest function to 100 = best function.
SF-30—Medical Outcomes Study Short-Form General Health Survey.

Mono and CFS

Chronic Fatigue Syndrome After Infectious Mononucleosis in Adolescents
Ben Z. Katz, Yukiko Shiraishi, Cynthia J. Mears, Helen J. Binns and Renee Taylor
Pediatrics 2009;124;189-193

- 301 teens w/ mono
- Followed 2 yrs
- Severity of fatigue and female gender were risk factors for developing CFS

TABLE 1 Rates of CFS According to Gender

	Cases of CFS, *n* (%)		
	6 mo	12 mo	24 mo
Female	35 (11.6)	22 (7.3)	13 (4.3)
Male	4 (1.3)	0 (0)	0 (0)
Total	39 (12.9)	22 (7.3)	13 (4.3)

At 6 months, $\chi^2 = 8.21$ and $P = .004$.

Mononucleosis

- Clinical diagnosis: fever, malaise, pharyngitis, LAD
- Laboratory diagnosis:
  - CBC : lymphocytosis, atypical lymphocytes
  - Positive monospot (heterophile antibodies)
    - Highly specific, although can persist for up to 1 year
      - False pos are rare: HIV, lymphoma, leukemia, lupus
    - Not highly sensitive, especially early
      - 25% false negative in week 1
      - 5-10% false negative in week 2
  - Positive/high IgM for EBV VCA
    - Usually present at onset of clinical illness due to long incubation
    - Confirms acute or recent infection (within 1-3 months)
    - IgG to EBV VCA will persist for life, indicates current or past infection

Mononucleosis

- Non-EBV Causes
  - HIV
  - CMV
  - Toxoplasmosis
  - Herpesvirus

Vitamin D Deficiency

- Many studies demonstrate an association between vitamin D deficiency and depression
  - J Psychopharmacol. 2010 Sep 7. Lower vitamin D levels are associated with depression among community-dwelling European men. Lee DM
  - Depression Is Associated With Decreased 25-Hydroxyvitamin D and Increased Parathyroid Hormone Levels in Older Adults. Witte J. G. Hoogendijk, *Arch Gen Psychiatry.* 2008;65(5):508-512.
  - Clinical Rheumatology, Vol 26 (4) 551-554. Vitamin D deficiency is associated with anxiety and depression in fibromyalgia, DJ Armstrong
- Vitamin D deficiency can also cause non-specific musculoskeletal pain (osteomalacia)
- Vitamin D deficiency prevalence is approximately 30-50% in our populations
- There are now several randomized trials looking at vitamin D supplementation's impact on well-being

Vitamin D Deficiency

- Vieth et al, Randomized comparison of the effects of the vitamin D3 adequate intake versus 100 mcg (4000 IU) per day on biochemical responses and the wellbeing of patients. Nutrition Journal 2004, 3:8
  - Supplemented 100 patients with either 4000 IU daily or 600 IU daily
  - Measured serum levels, biomarkers, and administered well-being questionnaire
  - All patients had improvements in both serum levels and in well-being scores, but significantly more in the 4000 IU group
  - There were no adverse effects in the 4000 IU group, demonstrating its safety

Vitamin D Deficiency

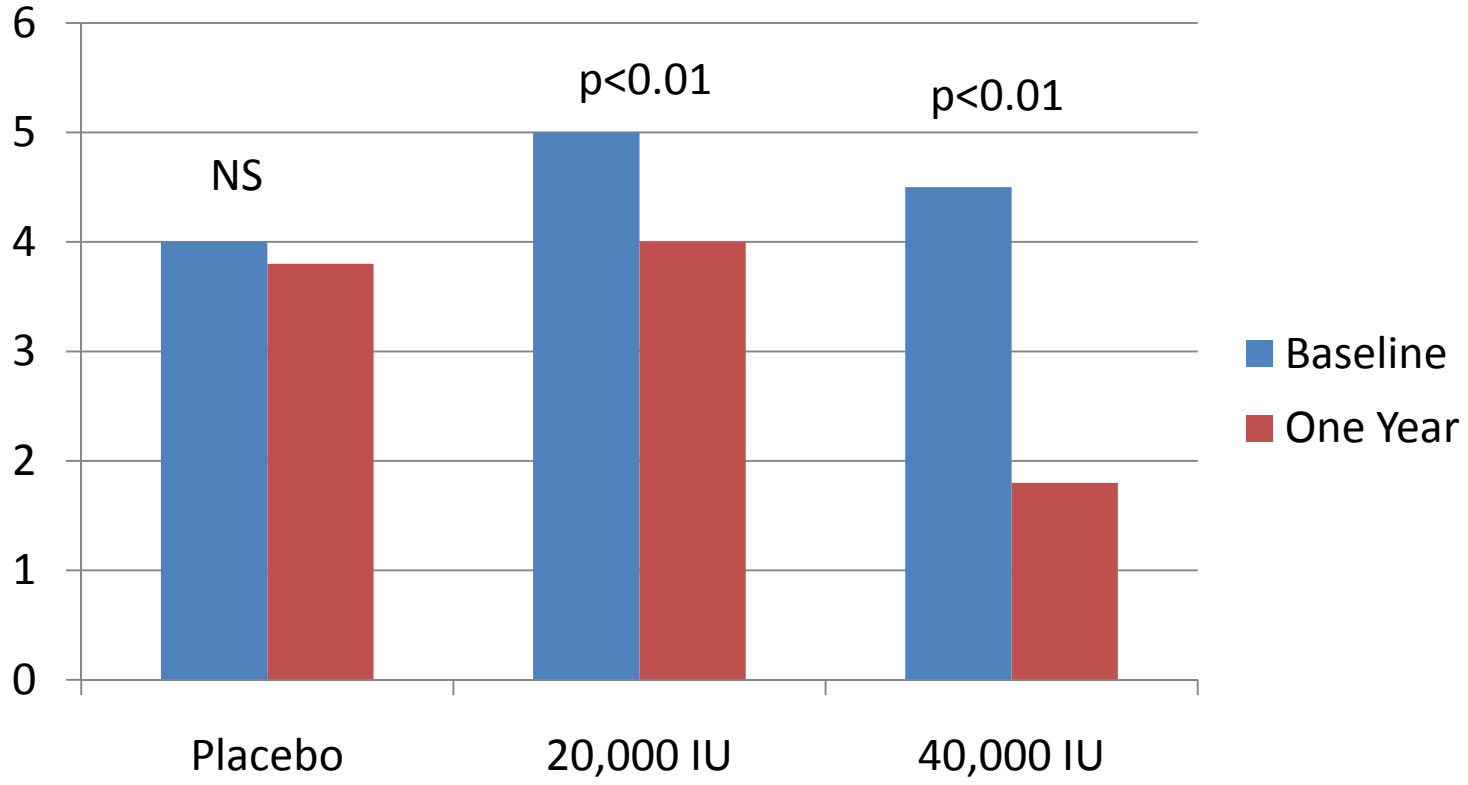
- Gloth and Alam, Vitamin D vs broad spectrum phototherapy in the treatment of seasonal affective disorder. J Nutr Health Aging. 1999;3(1);5-7
  - 15 patients with SAD randomized to either phototherapy or 100,000 IU vitamin D
  - Administered HAM-D, SIGH-SAD, and SAD-8 at baseline and 1 month
  - Both groups had improved vitamin D levels, but more so in the Vit D group
  - All subjects in Vit D group improved in all outcome measures
  - Phototherapy group had no significant improvement on depression measures

Vitamin D Deficiency

- Jorde et al. Effects of vitamin D supplementation on symptoms of depression in overweight and obese subjects: randomized double blind trial. J Int Med 2008
  - 441 subjects w/BMIs 28-47
  - All subjects had borderline mean baseline Vit D status
  - Randomized to placebo, 20,000 IU Vit D per week, or 40,000 IU Vit D per week for 1 year
  - Administered Beck Depression Inventory

Vitamin D Deficiency

Jorde et al, BDI Scores by Group



Vitamin D Deficiency

- Arvold et al, Correlation of symptoms with vitamin D deficiency and symptom response to cholecalciferol treatment: a randomized controlled trial. Endocr Pract. 2009 Apr;15(3):203-12
  - 100 patients with mild-moderate deficiency (10-25 ng/ml)
  - Randomized to 50,000 IU weekly or placebo x 8 weeks
  - 38 severely deficient (<10) patients were treated
  - Patients in RCT treatment group showed significant improvement in fibromyalgia assessment scores (p=0.03)
  - Severely deficient patients did not show improvement at 8 weeks

Vitamin D Deficiency

- Is common in our populations
- Is strongly associated with depression and may actually be causative or contributory
- Consider checking levels and/or supplementing patients who present with fatigue, nonspecific musculoskeletal pain, or depression

Vitamin B12 Deficiency

- Neuropsychiatric symptoms:
  - Paresthesias, numbness
  - Weakness, los of dexterity
  - Impaired memory, dementia
  - Personality changes, irritability
- B12 deficiency has long been reported as associated with depression, but recent studies question the assumption of causality
- Low B12 and folate, and high homocysteine are predictive of risk for depression
- Some controversy over what level actually constitutes normal B12 (some say >200, others say >300-500)

Iron deficiency without anemia

- NHANES III : 13% of women aged 16-19 are iron deficient (2% in men)
- Risk factors:
  - Menorrhagia (how long does it take to soak a pad/tampon on heaviest day?)
  - low/no meat intake
  - undernourished
  - chronic illness
  - athletes (esp endurance)
  - obesity
  - celiac disease

Iron deficiency without anemia

- Can cause:
  - fatigue
  - poor concentration
  - poor cognitive performance
  - decreased athletic performance
  - restless leg syndrome
- Test of choice – ferritin
  - “technically” normal if above 10-12
  - Most studies show symptoms and decreased performance at levels below 40
  - Can be falsely normal in inflammatory states (is an acute phase reactant, so will be increased)

Laboratory tests in iron deficiency of increasing severity

	Normal	Fe deficiency without anemia	Fe deficiency with mild anemia	Severe Fe deficiency with severe anemia
Marrow reticulo-endothelial iron	**2+ to 3+**	**None**	None	None
Serum iron, µg/dL	60 to 150	60 to 150	**<60**	<40
Iron binding capacity (transferrin), µg/dL	300 to 360	300 to 390	350 to 400	**>410**
Saturation (SI/TIBC), percent	20 to 50	30	**<15**	<10
Hemoglobin, g/dL	**Normal**	**Normal**	**9 to 12**	**6 to 7**
Red cell morphology	Normal	Normal	Normal or slight hypochromia	Hypochromia and microcytosis
Plasma or serum ferritin, ng/mL	40 to 200	**<40**	<20	<10
Erythrocyte protoporphyrin, ng/mL RBC	30 to 70	30 to 70	**>100**	100 to 200
Other tissue changes	None	None	None	Nail and epithelial changes

Note: Test results outlined in bold type are the ones most likely to define the various stages of iron deficiency. Thus, the presence or absence of iron stores (marrow reticuloendothelial iron) in a non-anemic patient serves to distinguish normal subjects from those with iron deficiency without anemia, respectively.

Disordered Eating & Malnutrition

- Disordered eating
  - Insufficient intake, anorexia nervosa
  - Purging
  - Binge eating, even with sufficient intake
  - Excessive or high level exercise
  - Strange diets or eating patterns
- Malnutrition
  - Celiac disease
  - Inflammatory bowel disease (Crohn's, Ulcerative Colitis)
  - Prolonged intestinal infections (giardia)
  - Chronic, serious, or prolonged illnesses
  - Strange diets or eating patterns

Disordered Eating & Malnutrition

- Either one can result in a hypometabolic state (conserving resources & energy)
  - Decreased bone density
  - Amenorrhea or oligomenorrhea
  - Low energy / fatigue
  - Poor concentration
  - Mood changes
  - Decreased GI peristalsis and decreased absorption
  - Decreased pulse, BP, temperature
  - Decreased peripheral circulation (purple toes)

Concussion

- Mild traumatic brain injury
- May result from blow to the head or from a whiplash injury
- Results in dysfunction and altered function within the brain
- May or may not be associated with loss of consciousness
- Hallmark symptoms are headache, fatigue, difficulty concentrating after an injury
- Symptoms may persist for weeks to months
- Not all patients with concussion will actually endorse that they have had a concussion (many don’t realize it)

Concussion Symptoms

Table 5
Items most commonly endorsed as severe by MTBI patients

Rank	Item	% endorsement
1	Fatigue	31
2	Headaches	25
3	Forgetfulness	19
4	Poor concentration	14
5	Word-finding difficulties	13
6	Irritability	13
7	Mood swings	12
8	Doing things slowly	9
9	Temper outbursts	9
10	Dizziness, Noise sensitivity, Restlessness	8

$N = 118$. MTBI = Mild Traumatic Brain Injury.
None of the PCL items were endorsed as severe by more than four (3.4%) of the control participants, and as such, were not at a sufficient level to warrant inclusion in the table.

Concussion Symptoms

Table 2
Endorsement of PCL items for MTBI patients and controls

Item	Control severity	MTBI severity	Control experience (%)	MTBI experience (%)
1. Visual problems; difficulty seeing	1.19 (1.78)	1.21 (1.86)	40	35
2. Hearing difficulties	0.57 (1.18)	0.54 (1.18)	22	20
3. Poor balance	0.31 (0.80)	1.94 (2.01)**	14	59**
4. Doing things slowly	0.25 (0.88)	2.61 (2.17)**	10	69**
5. Difficulty pronouncing words clearly (dysarthria)	0.28 (0.91)	1.03 (1.75)**	12	33**
6. Problems with coordination	0.27 (0.77)	1.29 (1.72)**	12	42**
7. Fatiguing quickly; getting tired easily	1.07 (1.71)	4.02 (2.08)**	33	91**
8. Headaches	1.53 (1.63)	3.54 (2.52)**	58	78**
9. Dizziness/vertigo	0.54 (1.14)	2.11 (2.21)**	22	59**
10. Sensitivity to noise	0.70 (1.42)	1.72 (2.16)**	25	46**
11. Sensitivity to light	0.81 (1.49)	1.48 (1.93)*	30	44*
12. Problems with taste or smell	0.19 (0.78)	0.44 (1.30)	8	13
13. Difficulty remembering the right word (word-finding)	1.18 (1.51)	2.42 (2.35)**	47	61*
14. Expressing self in a wordy, roundabout way	0.75 (1.37)	1.60 (2.10)**	29	43*
15. Being easily distractible (e.g., in a noisy room)	1.37 (1.81)	2.19 (2.20)*	46	59*

Concussion Symptoms

16. Poor concentration for extended periods of time (e.g., reading in a quiet room)	1.02 (1.59)	2.48 (2.37)**	35	64**
17. Being forgetful; difficulty remembering things	1.32 (1.66)	3.03 (2.44)**	47	73**
18. Difficulty thinking clearly and efficiently	0.47 (1.08)	2.42 (2.38)**	20	59**
19. Difficulty planning and organizing things	0.48 (1.23)	1.73 (2.17)**	18	46**
20. Difficulty setting realistic goals	0.60 (1.35)	0.96 (1.83)	22	25
21. Difficulty following through or finishing things	0.89 (1.53)	1.53 (2.02)*	31	42
22. Apathy, lack of interest in things	0.74 (1.28)	1.69 (2.18)**	33	47*
23. Lack of initiative, do not start things up	0.95 (1.41)	1.47 (2.00)*	39	42
24. Irritability	1.14 (1.50)	2.36 (2.29)**	47	62*
25. Restlessness	1.09 (1.52)	2.14 (2.20)**	42	59*
26. Temper outbursts	0.76 (1.47)	1.41 (2.26)*	30	35
27. Mood swings, quick emotional shifts	1.03 (1.67)	1.95 (2.36)**	38	51*
28. Difficulty bringing emotions under control once expressed	0.58 (1.28)	1.14 (2.06)*	21	28
29. Getting into arguments with others	0.58 (1.19)	0.99 (1.93)*	25	25
30. Being physically violent	0.17 (0.77)	0.16 (1.01)	6	3
31. Getting bored easily	0.97 (1.50)	1.59 (2.12)*	38	42
32. Complaining about things	1.18 (1.51)	1.24 (1.93)	53	35*

Concussion Symptoms

33. Dependency on others	0.50 (1.24)	1.15 (2.00)*	22	31
34. Needing supervision	0.03 (0.16)	0.36 (1.20)*	3	9*
35. Anxiety/tension	1.69 (1.67)	2.58 (2.35)**	60	63
36. Depression	0.90 (1.62)	1.36 (2.00)	33	40
37. Loneliness	0.88 (1.52)	0.83 (1.74)	34	25
38. Loss of confidence	0.95 (1.55)	1.46 (2.11)*	36	41
39. Changes in appetite	0.68 (1.48)	1.67 (2.21)**	22	48**
40. Sleep disturbance	1.50 (1.94)	2.86 (2.44)**	48	70**
41. Low sexual drive	0.33 (1.01)	1.05 (2.10)**	13	26*
42. High sexual drive	0.57 (1.30)	0.14 (0.79)*	24	5**
43. Changed personality	0.31 (1.03)	1.19 (2.06)**	11	31**

Patient complaints within 1 month of mild traumatic brain injury: A controlled study. Chris Paniak. Archives of Clinical Neuropsychology: 17 (2002) 319–334

Activating Conditions / Anxiety Mimics Irritability, Tremulousness

- Hyperthyroidism
- Alcohol withdrawal
- Benzodiazepene withdrawal
- Pheochromocytoma (very rare)
- Carcinoid tumor (very rare)
- Anemia (tachycardia, dyspnea)
- Substance/stimulant use
- Concussion

Pheochromocytoma

- Catecholamine-secreting tumor (adrenaline)
- Classic symptom triad:
  - Episodic headache
  - Sweating
  - Tachycardia
- Hypertension is the most common sign (present in 90%): half have paroxysmal, the other half have sustained
- Rare:
  - Occur in less than 0.2% of patients with hypertension (1 in 500)
  - Overall incidence is about 1 in 500,000 in general population
- May also have palpitations, weakness, dyspnea, and panic-attack-like symptoms
- Screening test: 24-hour urinary catecholamines and metanephrine

Pheochromocytoma

Pheochromocytoma should be considered in patients who have one or more of the following:

- Hyperadrenergic spells (eg, self-limited episodes of nonexertional palpitations, diaphoresis, headache, tremor, or pallor)
- Resistant hypertension
- A familial syndrome that predisposes to catecholamine-secreting tumors (eg, MEN2, NF1, VHL)
- A family history of pheochromocytoma
- An incidentally discovered adrenal mass
- Hypertension and diabetes
- Pressor response during anesthesia, surgery, or angiography
- Onset of hypertension at a young age (eg, <20 years)
- Idiopathic dilated cardiomyopathy
- A history of gastric stromal tumor or pulmonary chondromas (Carney triad)

Carcinoid tumor

- These tumors synthesize, store, and release a variety of polypeptides, biogenic amines, and prostaglandins, which can cause carcinoid syndrome
- Symptoms:
  - Episodic cutaneous flushing, sudden onset, lasts 20-30 seconds
  - Diarrhea, often severe (30 stools per day)
  - Wheezing and dyspnea (in 10%)
  - Rarely can have tremor, anxiety, and disorientation if have rare bronchial form

Acute Symptoms / Panic Attack Mimics (Chest pain, Dyspnea, Palpitations)

- Asthma
- Pulmonary embolus
- Cardiac disease
  - Myocarditis
  - Pericarditis
  - **Arrhythmia**
  - Valvular disease
  - Congenital heart disease
- Pneumonia
- Serositis or pleural effusion
- Costochondritis
- Pneumothorax
- Esophageal spasm

Asthma

- Can have sudden onset of symptoms
- Can be nocturnal, awaken from sleep
- Usually pt has a known history of asthma, but not always
- Can cause chest tightness and pain, dyspnea
- May or may not have abnormal peak flows or wheezing on exam
- Usually have history of symptoms over time, or associated with a respiratory illness

Pulmonary Embolus

- Sudden onset pleuritic chest pain +/- dyspnea
- Risk factors:
  - Combined hormonal contraceptive (pills, ring, patch)
  - Hypercoagulable state (hereditary, pancreatitis)
  - Recent immobilization (travel, surgery)
- May or may not have concurrent DVT
- Sinus tachycardia, hypoxia, and S1,Q3,T3 on EKG can be suggestive
- Initial test: d-dimer, if positive, Spiral Chest CT
- If high clinical suspicion, go straight to CT

Arrhythmia

- Premature Atrial Contractions (PACs)
  - Found in 60% of normal adults, usually asymptomatic
  - Can be associated with palpitations and can trigger PSVT
  - Can be precipitated by caffeine, alcohol, tobacco, & stimulants
  - Rarely require treatment unless highly symptomatic
- Premature Ventricular Contractions (PVCs)
  - Also present in 60% of normal adults
  - Can cause palpitations
  - Rarely require treatment unless highly symptomatic
- Ventricular tachycardia
  - very rare in pts without underlying cardiac disease

Arrhythmia

- Atrial fibrillation
  - Can be paroxysmal
  - Can be seen in normal patients in response to stress, post-surgery, exercise, and acute alcohol intoxication
- Atrial flutter
  - Can also be paroxysmal
  - Uncommon in patients without underlying cardiac disease
  - r/o pericarditis if young patient presents with this

Arrhythmia

- Paroxysmal Supraventricular Tachycardia (PSVT)
  - Episodic, narrow-complex tachycardia
  - May be sudden in onset and offset
  - More common in women
  - Approx 90% are caused by re-entry
    - 60% AV nodal
    - 30% accessory pathway such as WPW

Arrhythmia

Paroxysmal supraventricular tachycardia in the general population

LA Orejarena, H Vidaillet, Jr, F DeStefano, DL Nordstrom, RA Vierkant, PN Smith, and JJ Hayes

J. Am. Coll. Cardiol. 1998;31;150-157

Table 2. Incidence Rates of Paroxysmal Supraventricular Tachycardia per 100,000 Person-Years by Age and Gender

Age (yr)	Males		Females		Total	
	No.	Rate	No.	Rate	No.	Rate (95% CI)
≤19	1	7	3	21	4	13 (0–27)
20–64	4	15	10	38	14	27 (13–40)
≥65	5	98	10	139	15	122 (60–184)
Total (95% CI)	10	21 (8–35)	23	48 (28–67)	33	35 (23–47)
Adjusted (95% CI)		24 (9–39)*		46 (27–65)*		36 (23–48)†

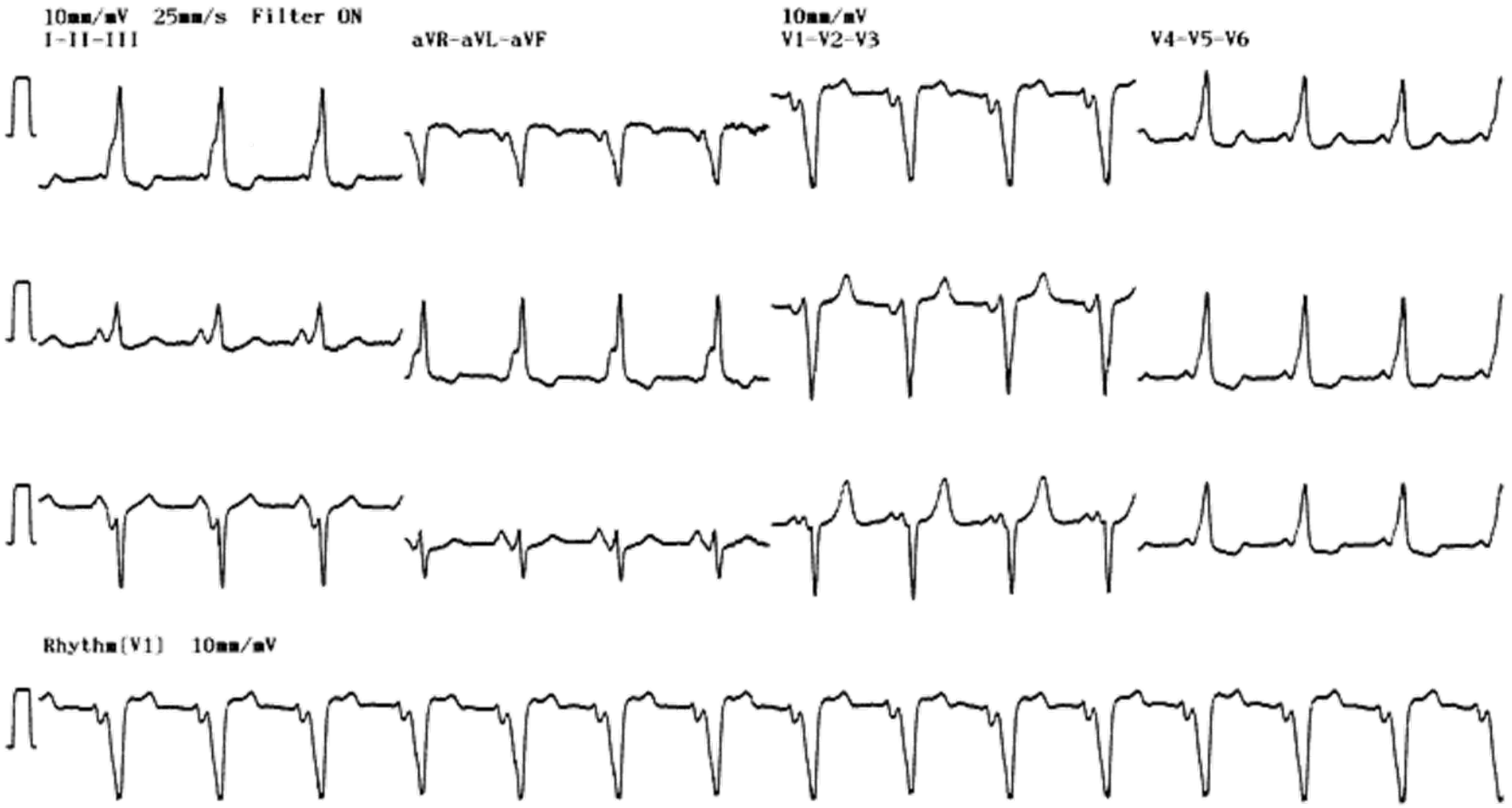
*Age adjusted to the 1990 U.S. census. †Age and gender adjusted to the 1990 U.S. census. CI = confidence interval.

Arrhythmia

- Diagnosis
  - Teach patient to take their pulse during episodes or have a friend do it for them (or listen to their heart) – count for 15 sec, then multiply by 4
  - EKG: may not be helpful if patient not actively having palpitations
    - Exception: WPW
    - May see PACs or PVCs
    - May see atrial fibrillation
    - May need to refer patient for Holter or Event monitor
      - High clinical suspicion
      - High level severity (syncope, near-syncope)

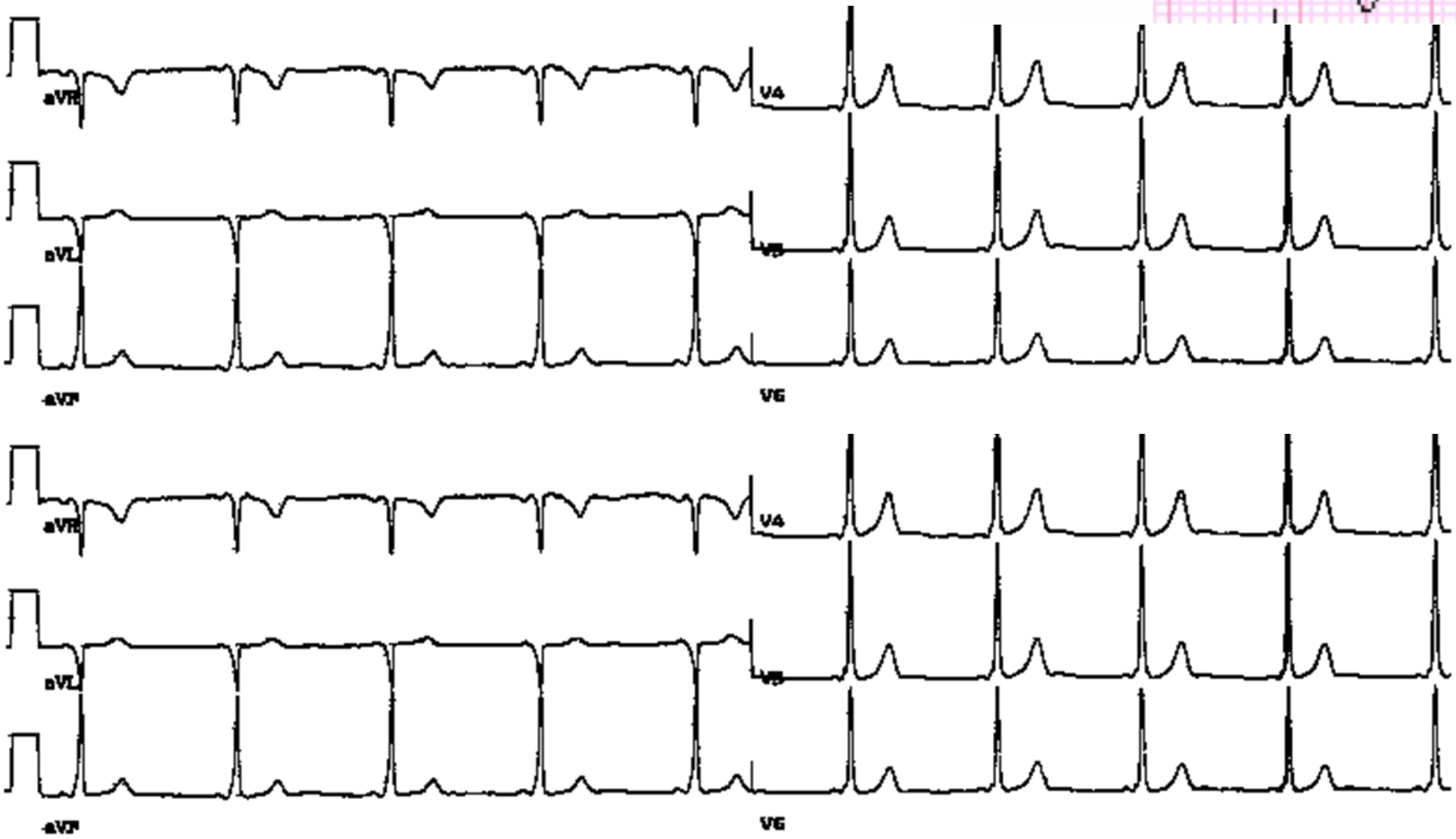
Arrhythmia - EKG

WPW: short PR interval, delta wave

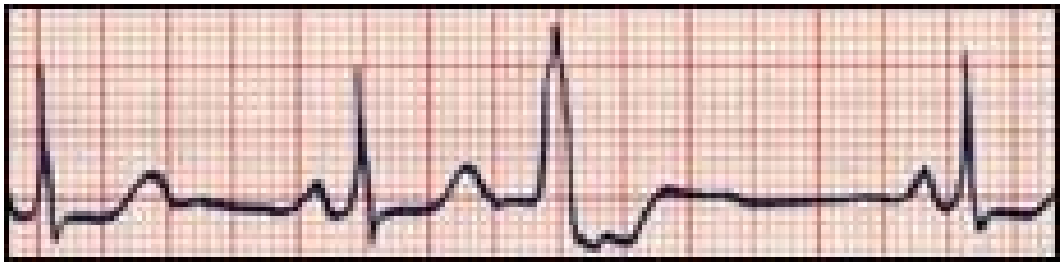


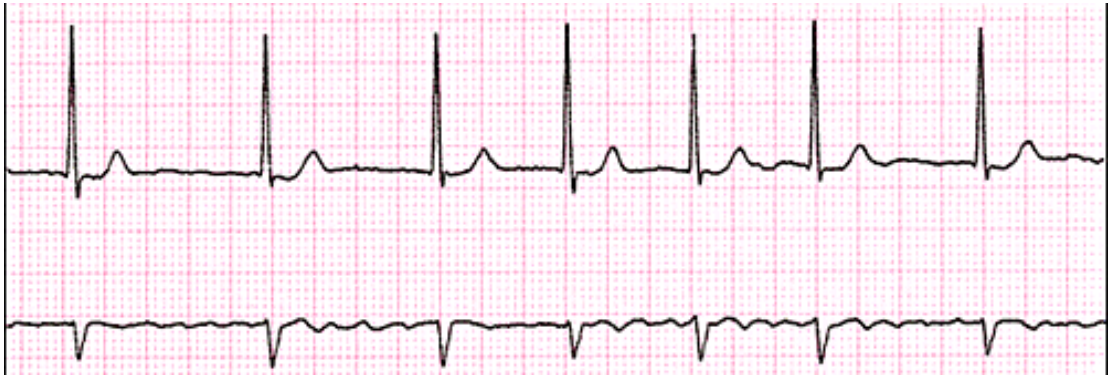
Arrhythmia - EKG

WPW: short PR interval, delta wave



Arrhythmia - EKG





Arrhythmia

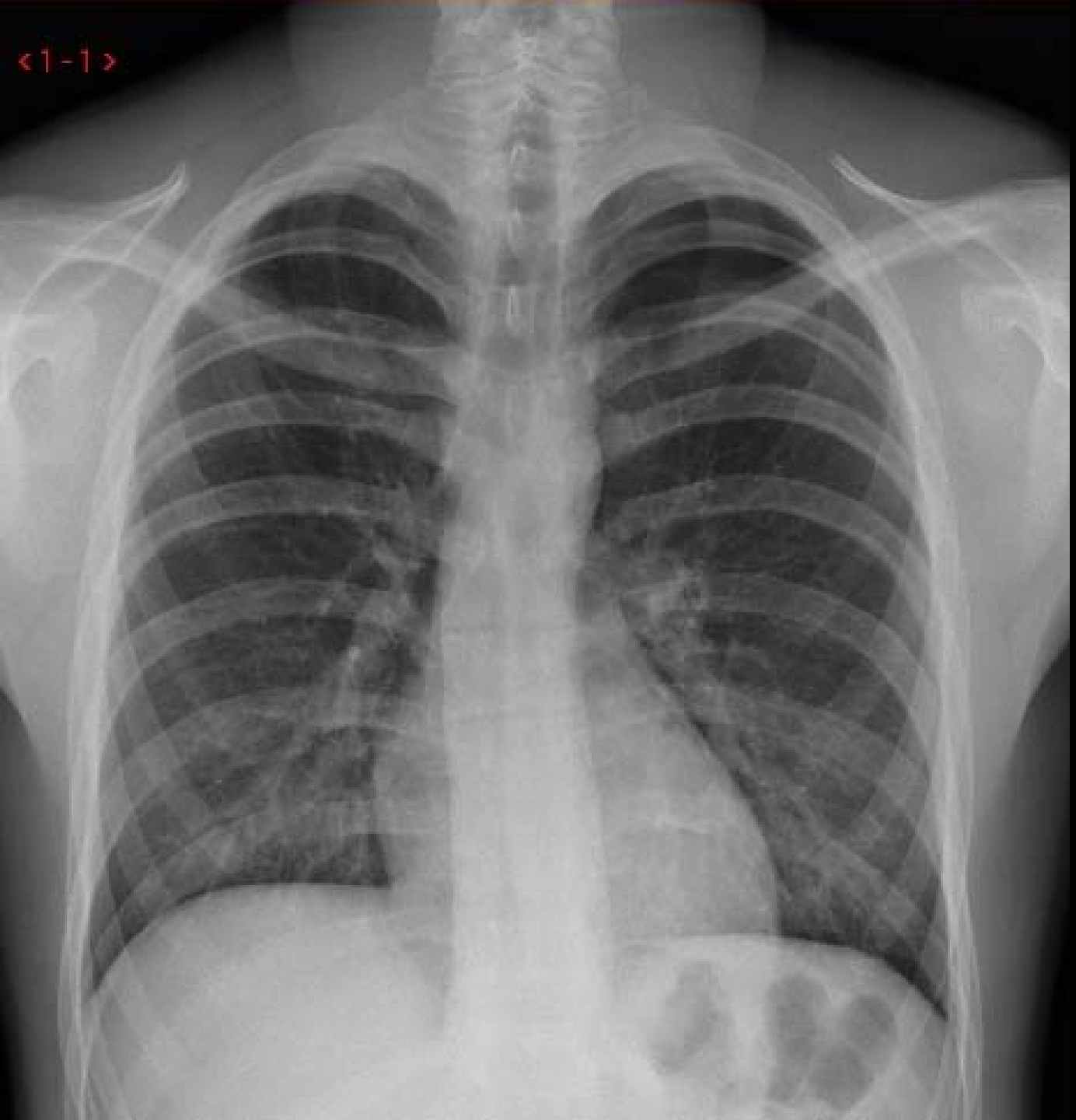
- PSVT treatment (outpatient/ HD stable)
  - None
  - Vagal maneuvers
    - Bearing down
    - Ice water to face
    - Carotid massage
  - Beta blockers (preventive)
  - Radiofrequency ablation for severe cases

Esophageal Etiology

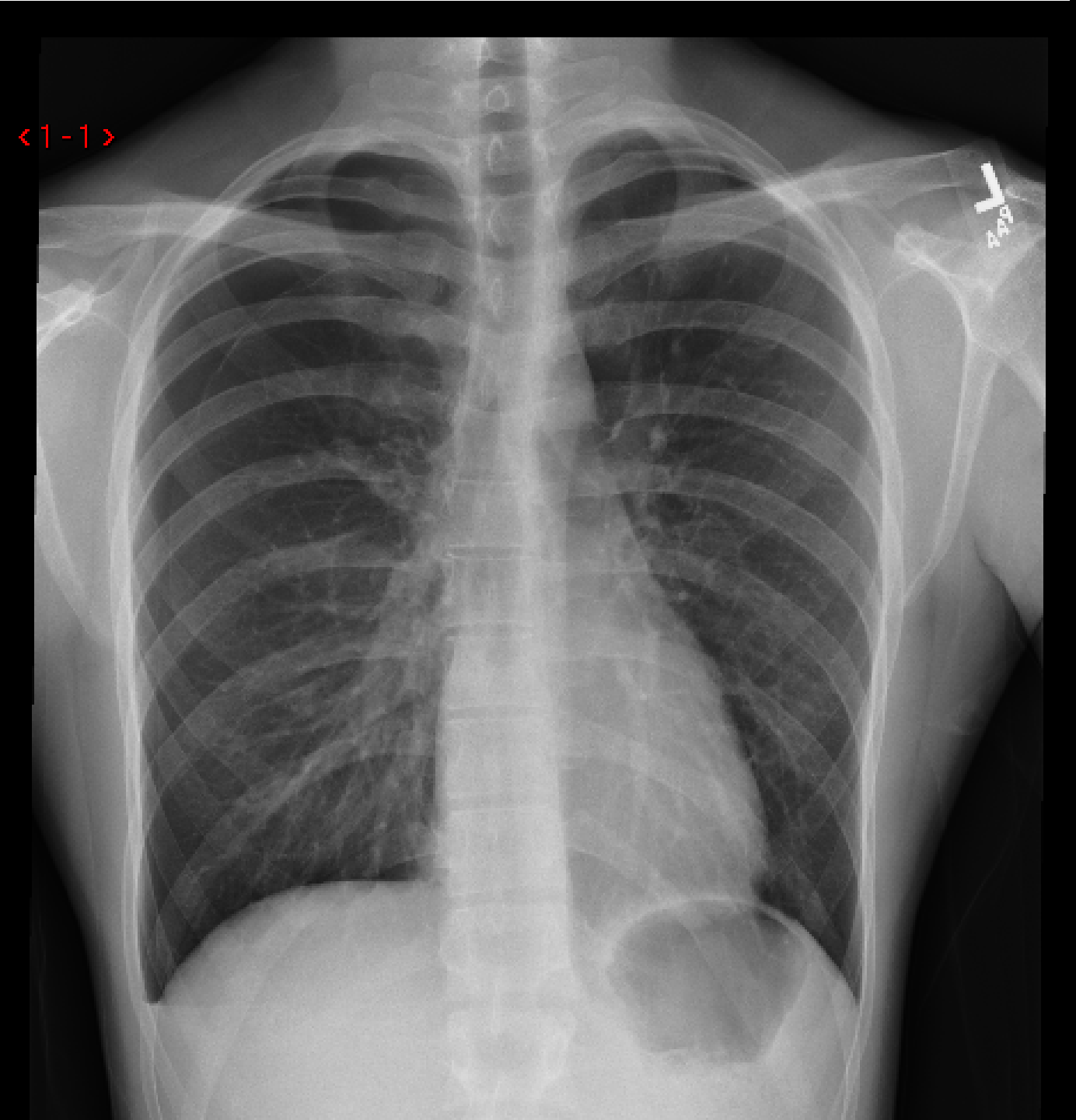
- Esophageal irritation
  - GERD: by far the most common cause of esophageal pain
  - Irritation or abrasion from a swallowed substance – sharp potato chips, fish bones, doxycycline, etc.
  - Treat empirically with H2 blocker or PPI
  - Consider in-office GI cocktail to help diagnose
- Esophageal hypersensitivity
- Esophageal motility disorders
  - Esophageal spasm, Nutcracker Esophagus, Hypertonic lower esophageal sphincter
  - Diagnose with manometry
  - Treat emprically with nifedipine or TCA

Spontaneous Pneumothorax

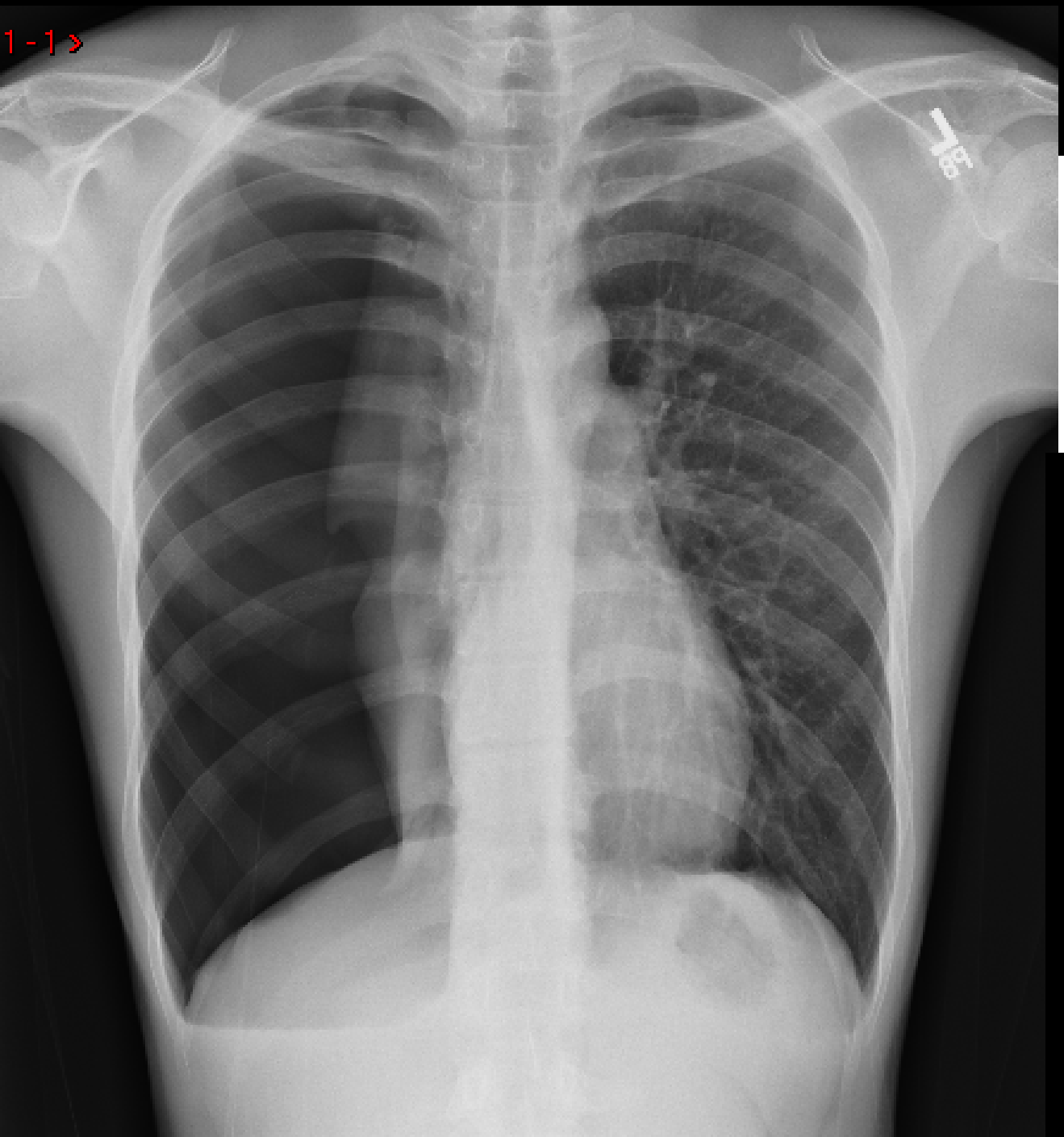
- Sudden onset of pleuritic chest pain (often unilateral) and dyspnea (may be mild)
- More common in tall, thin young men
- Can be familial, is often recurrent
- Symptoms will be persisent (unlike panic attack)
- Small PTX will resolve spontaneously over time
- Larger PTX require chest tube drainage



22 yo male
Chest pain
Dyspnea on exertion
O2 sat 99% on RA
Pulse 88
RR 14



21 yo male
Chest pain and SOB
RR 16
Pulse 78

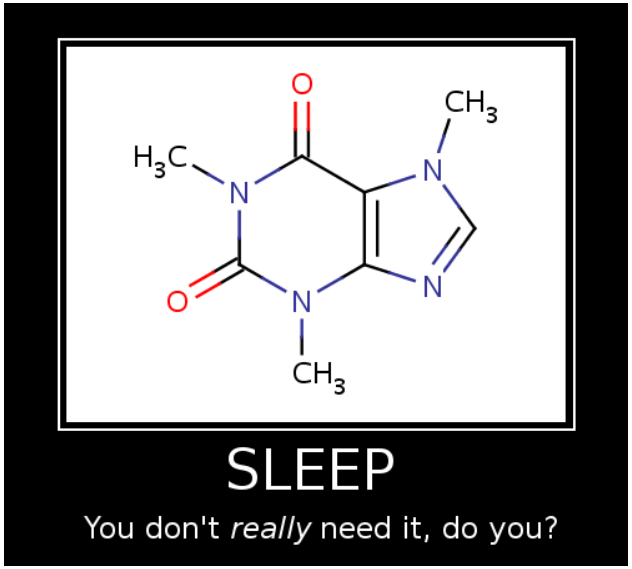


23 yo male
Sudden onset chest pain, dyspnea 2 d ago
T98.8, HR 78, R 16 BP 115/77
93% O2 on RA
No distress

Today's Approach

Activating Conditions

Deactivating Conditions



Sleep Disturbances

Panic Attack Mimics

My list of things to consider

Sleep	Fatigue/Depression	Anxiety	Panic Attack
TSH	TSH	TSH	TSH
CBC	CBC	Ferritin if RLS	CXR if dyspneic
Ferritin	Ferritin	EKG if palpitations	EKG
Vitamin D	Vitamin D	CBC if palpitations	
	Vitamin B12	Free T3 and T4 if recent onset	
	Monospot or EBV IgM	Vitamins B12 and D if paresthesias	
		Empiric trial of famotidine if chest or abd pain c/w gastritis or esophageal irritation	
ALWAYS ask about eating habits, alcohol, substance use including otc's and herbals, and sleep. ALWAYS do a thorough physical exam.			
Celiac panel if Vitamins D and B12 are low or if unexplained iron deficiency			

Thank you.

Questions, please!