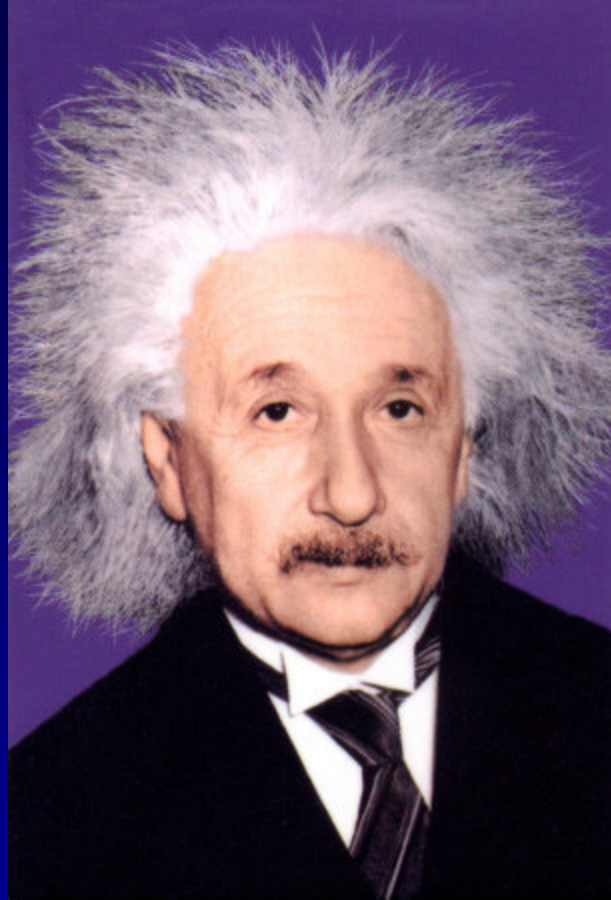


# American Board of Surgery In- Training Exam ABSITE - 2011

Matt Landman

(With lots of material borrowed from  
Bailey and Forbes)

January 7, 2011



“Never memorize what you can  
look up in books”

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# PROCRASTINATION

HARD WORK OFTEN PAYS OFF AFTER TIME,  
BUT LAZINESS ALWAYS PAYS OFF NOW.

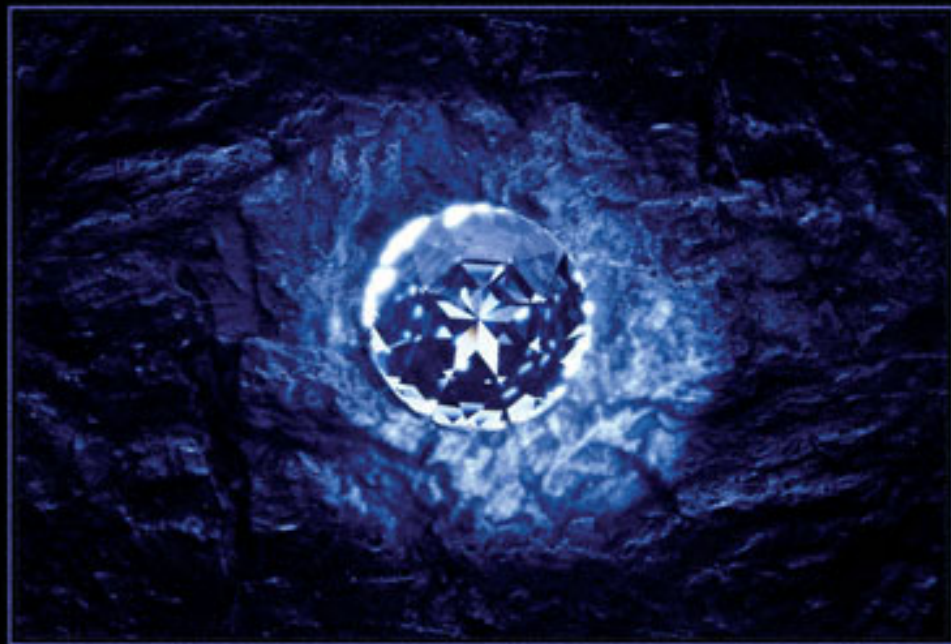
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# WISHES

WHEN YOU WISH UPON A FALLING STAR, YOUR DREAMS CAN COME TRUE.  
UNLESS IT'S REALLY A METEOR HURTLING TO THE EARTH WHICH WILL DESTROY ALL LIFE.  
THEN YOU'RE PRETTY MUCH HOSED NO MATTER WHAT YOU WISH FOR. UNLESS IT'S DEATH BY METEORITE.

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# PRESSURE

IT CAN TURN A LUMP OF COAL INTO A FLAWLESS DIAMOND-  
OR AN AVERAGE PERSON INTO A PERFECT BASKETCASE.

# ABSITE Review – January 2011

- **January 7**
  - Endocrine surgery
  - Surgical principles
  - Hepatobiliary & Transplant surgery
  - Surgical oncology
- **January 14**
  - Practice questions
- **January 21**
  - Thoracic surgery
  - Vascular Surgery
  - Surgical Critical Care and Trauma
  - Head & Neck
  - Peds Surgery
- **January 28**
  - High Yield ABSITE Topics
- **January 29 - ABSITE**

# How It's Broken Down?

- 220 questions
  - Junior level (PGY 1 & 2) Exam
    - 60% Basic Science
    - 40% Clinical Management
  - Senior Level ( $\geq$  PGY 3) Exam
    - 20% Basic Science
    - 80% Clinical Management

# Break down . . .

| Content Category                                                   | Junior Level | Senior Level |
|--------------------------------------------------------------------|--------------|--------------|
| Body as a whole<br>(General Surgery and<br>Surgical Critical Care) | 67%          | 25%          |
| GI Tract                                                           | 10%          | 25%          |
| CV/Respiratory                                                     | 7.8%         | 16.7%        |
| GU, Head/Neck, Skin, MS,<br>CNS                                    | 7.8%         | 16.7%        |
| Endocrine, Spleen,<br>Lymphoma, Breast                             | 7.8%         | 16.7%        |



# Endocrine surgery

# Endocrine

- Asymptomatic Adrenal Mass
  - Rule out pheochromocytoma before biopsy
  - Surgery is indicated if:
    - > 4-6cm
    - Functioning
    - Enlarging
  - Breast cancer most common metastases to adrenal gland.

# Endocrine

- Adrenal insufficiency
  - #1 cause is withdrawal of exogenous steroids
- Cushing syndrome
  - Diagnosis:
    1. 24-hour urine cortisol
    2. Low dose dexamethasone suppression test
    3. Measure ACTH
    4. If serum ACTH high—high dose dexamethasone suppression test
  - Etiology:
    1. Pituitary adenoma
    2. Ectopic ACTH (small cell lung CA)
    3. Adrenal adenoma

# Endocrine

- Thyroid Hormones
  - Thyroxine (T4)
  - Triiodothyronine (T3)
  - Calcitonin
  - T4 → T3 peripherally by deiodinase
  - T3 10x more active
  - Calcitonin produced by parafollicular cells
    - Opposes PTH

# Endocrine

- Hashimoto Thyroiditis
  - Autoimmune disease with lymphocytic fibrosis and painless goiter
  - Eventually degenerates into hypothyroidism
  - Also associated with thyroid lymphoma (usually B cell)
  - Rx:
    - Thyroid hormone replacement
    - Surgery for symptomatic goiters refractory to med management

# Endocrine

- Asymptomatic thyroid nodule
  - Thyroid Function Test
  - Fine-needle aspiration (FNA)
- Papillary thyroid carcinoma
  - Most common thyroid CA (~70%)
  - Unfavorable prognosis
    - Age over 50 (women) or 40 (men)\*
    - Lymphatic invasion
    - Tall cell variant

# Endocrine

- Hypoparathyroidism
  - s/p parathyroidectomy or thyroidectomy, radiation, autoimmune syndromes, defects in calcium-sensing receptor
  - Symptoms
    - Seizures
    - Personality changes
    - Chvostek sign (facial twitching with facial n. stim)
    - Trousseau sign (carpal spasm due to blood pressure cuff)
  - Primary disease – low PTH and Ca
  - Secondary disease – low PTH, high calcium
  - Pseudohypoparathyroidism
    - Due to genetic defects leading to low Ca, high phosphate, high PTH and insensitivity to PTH
    - Rare
  - Rx – calcium and vitamin D

# Endocrine

- Primary Hyperparathyroidism
  - Elevated PTH
  - Elevated serum Ca
  - Elevated urine Ca
- Secondary Hyperparathyroidism
  - Elevated PTH
  - Normal serum Ca
  - Elevated urine Ca
- Familial Hypercalcemic Hypocalciuria (defective PTH receptor)
  - Normal PTH (or slightly elevated)
  - Elevated serum Ca
  - Low urine Ca



# Endocrine

- Hypercalcemia
  - Most common presentation of general population and outpatients (cancer more common in inpatients)
  - Serum phosphate reduced
  - Symptoms
    - CNS changes (psychiatric overtones)
    - Nausea/abdominal pain (groans)
    - Nephrolithiasis (stones)
    - Bone pain (bones)
    - Bradycardia and shortened QT intervals
  - Other causes
    - Excess vitamins A & D, milk-alkali syndrome, thiazide diuretics

# Endocrine

- MEN I
  - MENIN gene
  - 3 P's
    - Parathyroid hyperplasia
    - Pancreatic islet cell tumors
    - Pituitary adenoma

# Endocrine

- MEN IIa
  - Pheochromocytoma
  - Medullary CA of thyroid
  - Parathyroid hyperplasia
- MEN IIb
  - Pheochromocytoma
  - Medullary CA of thyroid
  - Mucosal neuromas
- Correct pheochromocytoma 1st
- RET protooncogene

# Endocrine

- Pituitary
  - Anterior and Posterior
    - Anterior – adenohypophysis
      - Controlled by hypothalamic releasing factor/hormones
      - TSH, ACTH, LH, Growth Hormone, Prolactin, FSH
    - Posterior – neurohypophysis
      - Innervated directly by the hypothalamus
      - Oxytocin (paraventricular nucleus)
      - Vasopressin/Antidiuretic hormone (supraoptic nucleus)
        - Secretion initiated by hypotension/increased osms

# Endocrine

- Diabetes Insipidus
  - Central (decreased production of ADH) vs. nephrogenic (decreased renal response to ADH)
  - Central
    - Most common cause trauma
    - Loss of other anterior pituitary hormones
    - Inability to concentrate urine, dilute urine, hypernatremia
    - Compare urine to plasma osmolarity
    - Nephrogenic if no response to ADH admin
  - Rx
    - Central – ADH
    - Nephrogenic – HCTZ, amiloride or chlorthalidone

# Endocrine

- Secretion of Inappropriate ADH (SIADH)
  - Ectopic secretion (ex lung ca)
  - CNS trauma
  - Medications
- Dilutional hyponatremia and high urine Na
- Urine Na above 20 mEq/L
- Renin-angiotensin system suppressed
- Rx:
  - Fluid restriction
  - Lasix for “water” diuresis
  - Saline infusion if Na falls below 110 mEq/L (rare)
  - If correct Na too fast = central pontine myelinolysis

# Endocrine

- Endocrine pancreas
  - Insulin (beta cells)
    - Low C peptide levels – exogenous insulin
  - Glucagon (alpha cells)
    - Leads to glucose release and provides energy during times of physiologic stress
    - Glycogenolysis
    - Present in early septic shock
  - Somatostatin (delta cells)
    - Inhibitory hormone
    - Octreotide is synthetic form

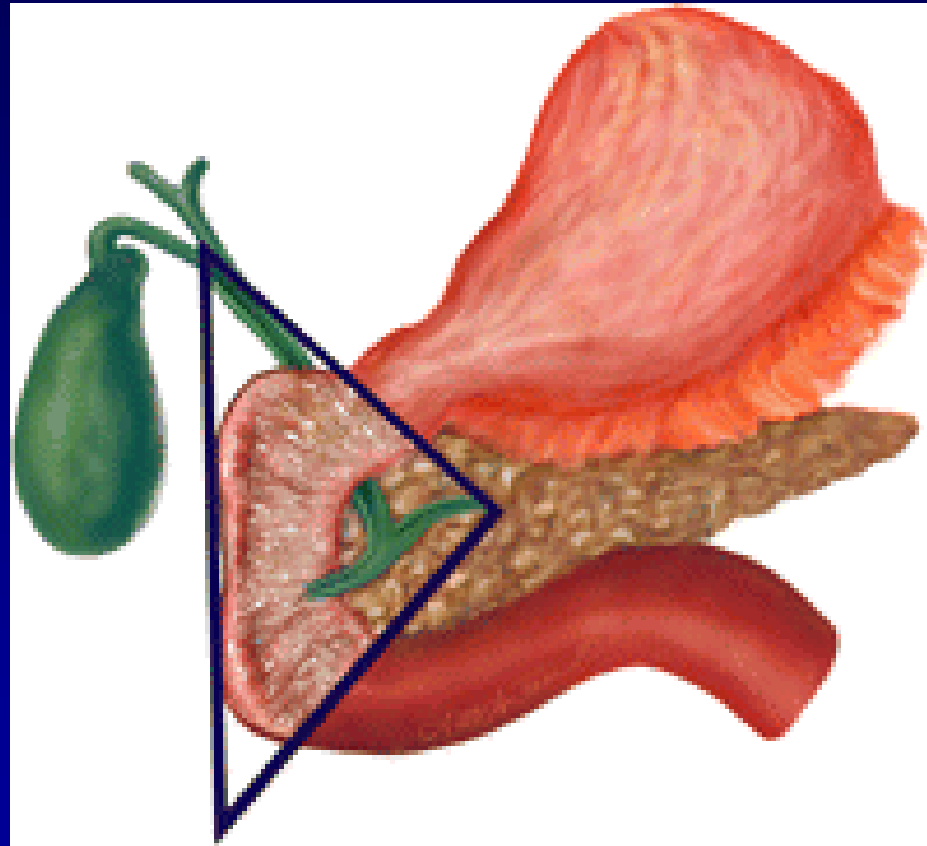
# Endocrine

- Endocrine cancers of pancreas
  - Workup
    - Triple-phase CT of pancreas
    - Full biochemical workup
    - EUS – location and tissue sample
    - Octreotide scan
    - If unable to locate on imaging, portal venous sampling



# Endocrine

- Gastrinoma → Zollinger Ellison syndrome
  - Elevated gastrin
    - GERD, abdominal pain, diarrhea, PUD
    - Serum gastrin  $>1,000$  pg/mL diagnostic
    - Must be done off H2 blockers or PPI
    - Serum gastrin b/w 200-1000 require secretin stimulation test
  - Gastrinoma triangle
    - confluence of the cystic and CBD
    - junction of the 2<sup>nd</sup> & 3<sup>rd</sup> portions of duodenum,
    - junction of the neck and body of the pancreas
- Rx: resection
  - Unresectable – PPI possible gastrectomy



# Endocrine

- Insulinoma
  - Hypoglycemia during fasting (glucose levels below 50 mg/dL)
  - Insulin-to-glucose ratio over 0.4
  - Elevated C peptide
  - 10% malignant
  - Whipple's triad
    - Symptoms of hypoglycemia
    - Low glucose measured at times of symptoms
    - Relief of symptoms with glucose
- Rx: enucleation vs. pancreatic resection depending on location
  - Unresectable disease – octreotide vs. diazoxide

# Endocrine

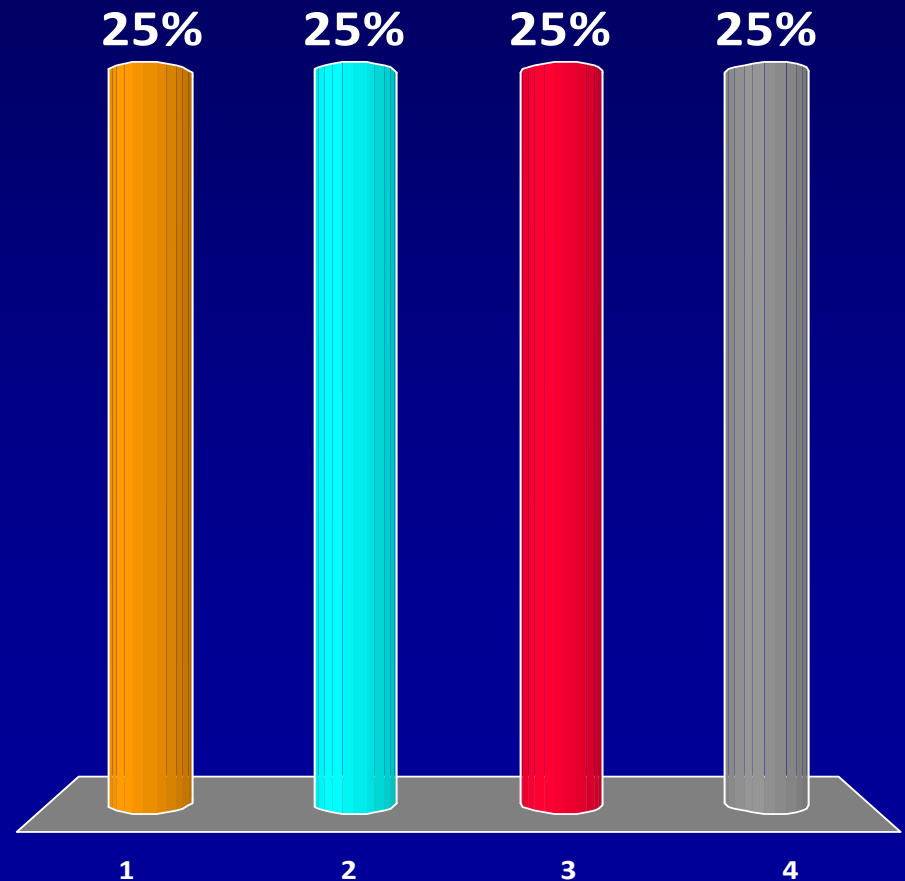
- Glucagonoma
  - Present with necrolytic migratory erythema, diabetes, anorexia, angular stomatitis
  - Diagnosis – elevated glucagon during fasting
  - Most in body or tail of pancreas
  - Rx: resection
    - Unresectable disease – octreotide

# Endocrine

- VIPoma (Verner Morrison Syndrome)
  - WHDA syndrome
    - Watery diarrhea (profound and chronic)
    - Hypokalemia
    - Achlorhydria with acidosis
  - Most within body or tail of pancreas
- Rx: resection
  - Unresectable disease - octreotide

You take a 35m to the OR for resection of a pheochromocytoma however after very careful inspection of both adrenal glands, you cannot find the tumor.  
The most likely location for the missing tumor is:

1. Lung
2. Liver
3. Aortic Bifurcation
4. Spleen



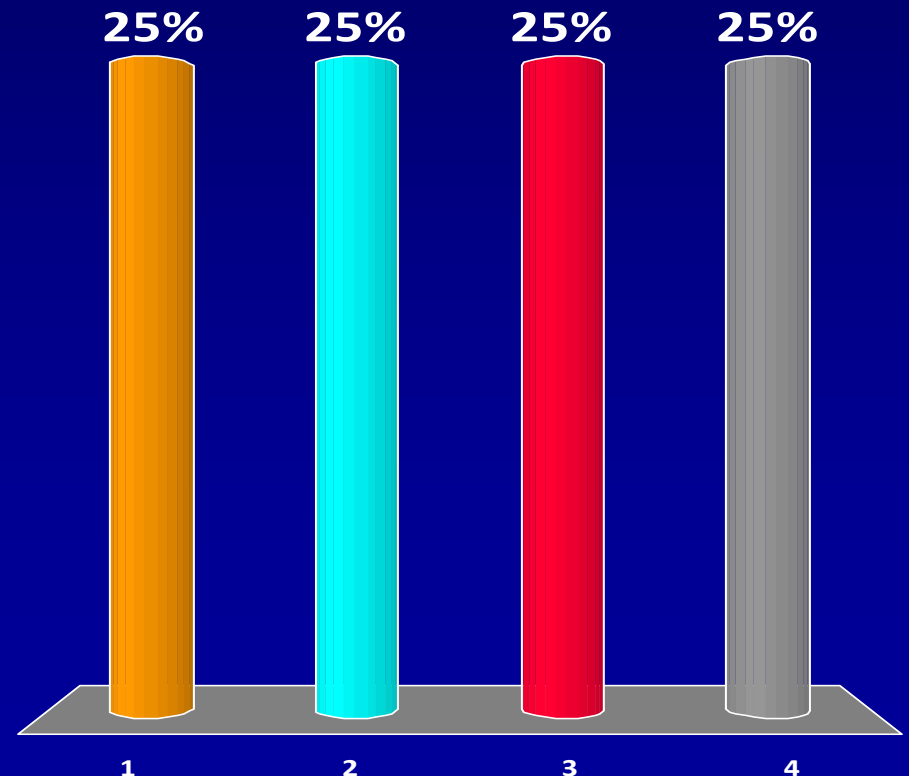
# Answer: Aortic Bifurcation

- Most common location for an extra-adrenal pheochromocytoma is the **Organ of Zuckerkandl** which is located at the aortic bifurcation.
- 10% of pheochromocytomas are extra-adrenal.
  - Most likely to be malignant compared to adrenal pheochromocytoma.

A 30f recently diagnosed with MEN I syndrome develops confusion, somnolence, and a shortened QT on EKG.

The next appropriate step is:

1. Alpha-blockade
2. Beta-blockade
3. Calcium
4. IVF and Lasix





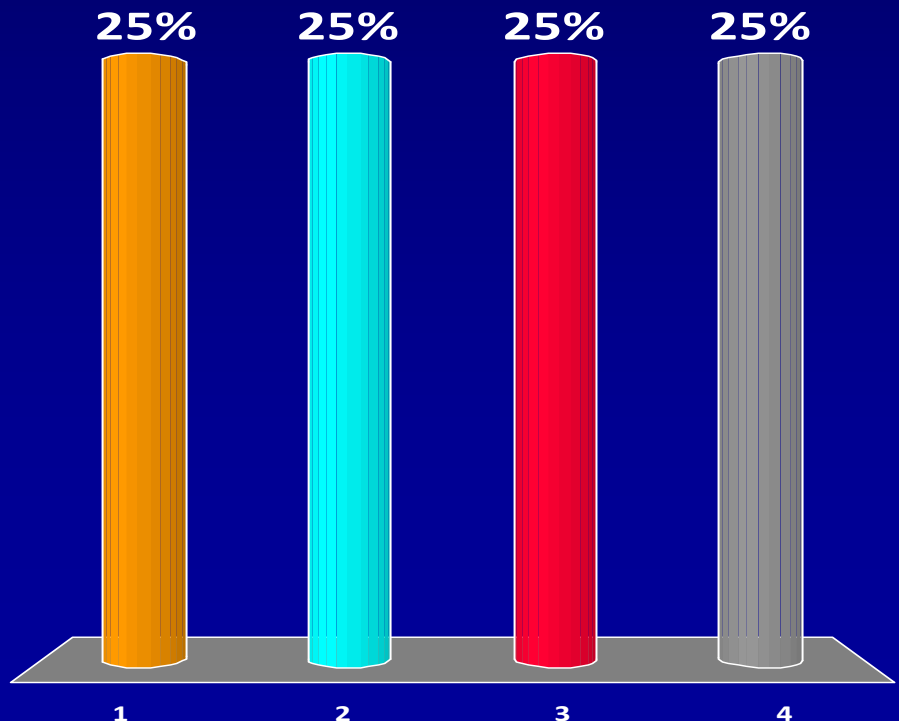
# Answer: IVF and lasix

- MEN I syndrome includes parathyroid hyperplasia, pancreatic tumors, and pituitary tumors.
- Symptoms of hypercalcemia:
  - Somnolence
  - Shortened QT on EKG
  - Confusion
- Treatment for hypercalcemia is IVF (NS) and lasix

After thyroidectomy, an opera singer has a loss of voice pitch.

This is most likely due to injury of the:

1. Superior laryngeal nerve
2. Recurrent laryngeal nerve
3. Vagus nerve
4. Hypoglossal nerve

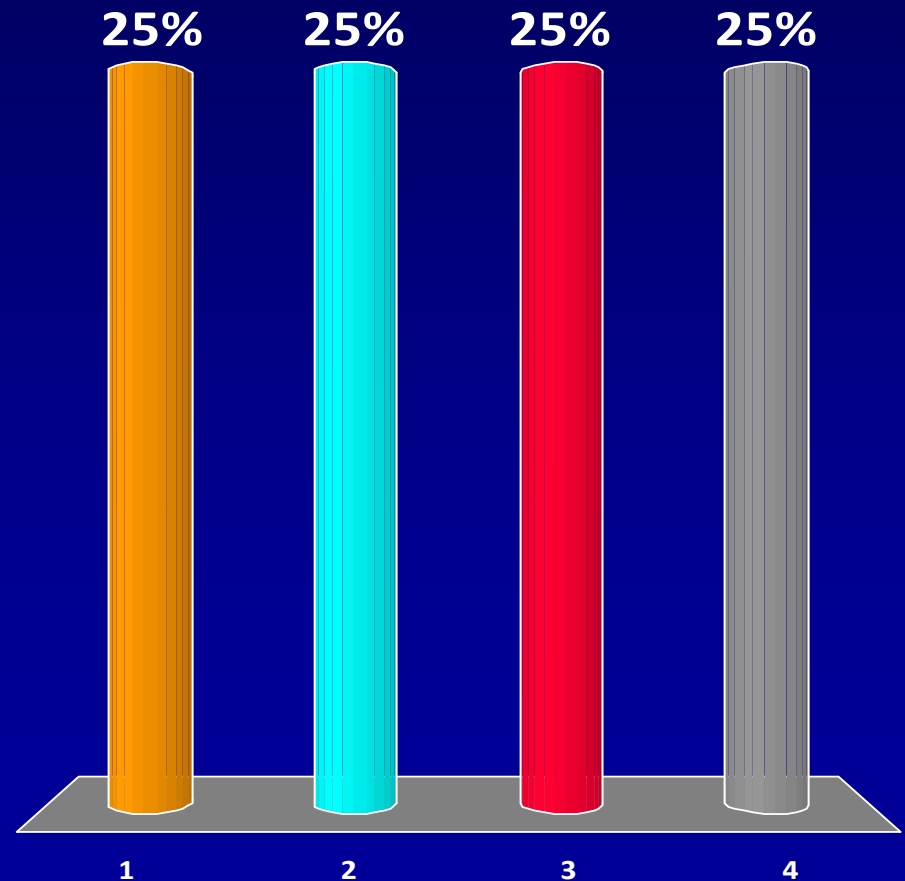


# Answer: Superior laryngeal nerve

- Superior laryngeal nerve injury
  - Loss of projection and easy voice fatigability
- Recurrent laryngeal nerve injury
  - Results in hoarseness
  - Bilateral injury can obstruct the airway

# Which of the following is most consistent with secondary hyperparathyroidism?

1. Ca 11, PTH 200, Increased Ca
2. Ca 8, PTH 200, Increased urine Ca, serum creatinine 7
3. Ca 11, PTH 400, decreased urine Ca
4. Ca 8, PTH 45, nl urine Ca



Answer: Ca 8, PTH 200, elevated urine Ca, serum creatinine 7

- Secondary hyperparathyroidism occurs primarily in dialysis patients who have chronic loss of Ca.
- Secondary hyperparathyroidism is associated with:
  - Elevated PTH
  - Normal serum Ca
- The most common indication for operation is bone pain as a result of Ca resorption.

# Surgical Principles

# Surgical Principles

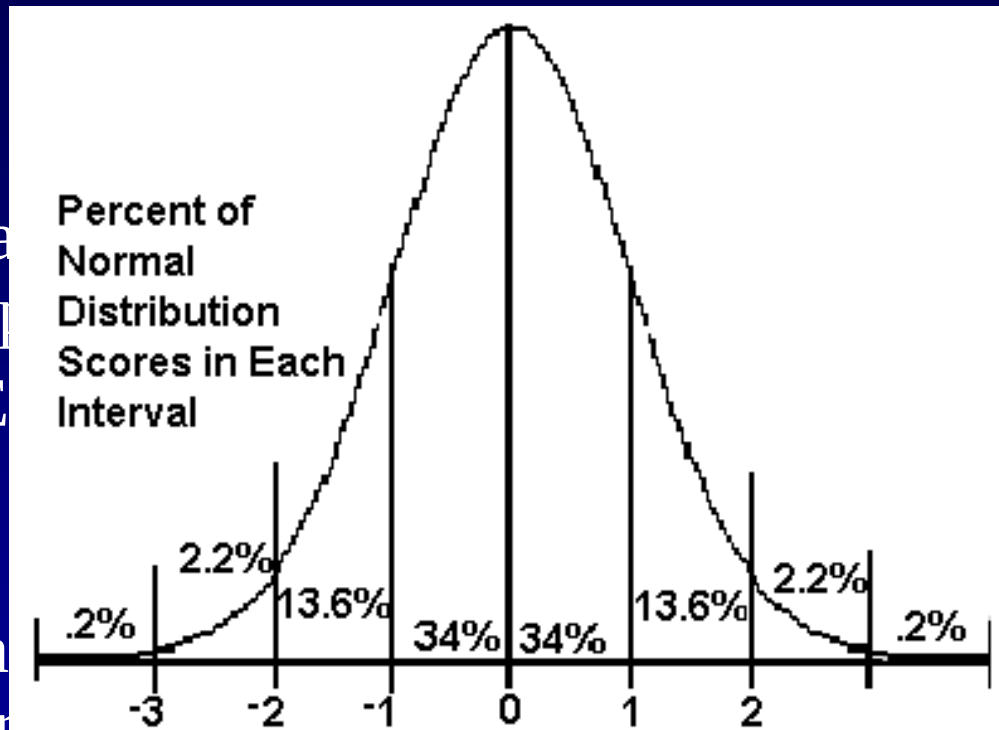
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- 1<sup>st</sup> st. deviation – 68% of all values
- 2<sup>nd</sup> st. deviation – 95.5% of all values
- 3<sup>rd</sup> st. deviation – 99.7% of all values

# Surgical principles

- Prevalence
  - Measure of the number of cases of a particular disease or condition at a particular time point
  - Cross-section of a population
- Incidence
  - Measure of the rate of occurrence of new cases of a disease or condition in a specified period of time (usually one year)



# Surgical Principles

- Sensitivity, Specificity, Positive predictive value and negative predictive value
- Sensitivity – in patients with a disease the proportion of true positives to all with the disease ( $TP/(TP + FN)$ )
  - High sensitivity – good for screening tests b/c miss few who actually have the disease
- Specificity – in patients without a disease, the proportion of who test negative ( $TN/(TN+FP)$ )
- Trade off b/w sensitivity and specificity demonstrated in a receiver operator curve (ROC curve)

|                 |                 | Condition<br>(as determined by "Gold standard") |                                                  |                             |
|-----------------|-----------------|-------------------------------------------------|--------------------------------------------------|-----------------------------|
|                 |                 | <i>Positive</i>                                 | <i>Negative</i>                                  |                             |
| Test<br>outcome | <i>Positive</i> | <b>True Positive</b>                            | <b>False Positive</b><br>(Type I error, P-value) | → Positive predictive value |
|                 | <i>Negative</i> | <b>False Negative</b><br>(Type II error)        | <b>True Negative</b>                             | → Negative predictive value |
|                 |                 | ↓<br><b>Sensitivity</b>                         | ↓<br><b>Specificity</b>                          |                             |

# Surgical Principles

- Null hypothesis ( $H_0$ ) = treatment being evaluated will have no effect – i.e. no difference b/w groups
- Type I error
  - Incorrectly rejecting  $H_0$
  - P-value
- Type II error
  - Incorrectly failing to reject  $H_0$  – failing to see a treatment effect when one exists
  - Avoided by increasing the power of a study (done by increasing sample size)
  - Power = probability that a test will detect true differences

# Surgical Principles

- T-test
  - Compares means of two groups (assumes normally distributed data)
- ANOVA
  - Similar to t-test but used for 3 groups
- Precision
  - Measure of reliability of a testing instrument – the degree to which further measurements will show the same result
- Accuracy
  - Ability of a test to obtain a result that closely resembles the true result

# Surgical Principles

- Primary prevention
  - Prevent the development of the disease
- Secondary prevention
  - Reduce the progression of the disease
  - Focuses on early disease detection
- Tertiary prevention
  - Efforts to reduce the negative impact an existing disease has on a patient's life
    - Ex: treatment of heart disease to reduce symptoms of dyspnea

# Surgical Oncology

# Surgical Oncology

- Breast Disease – important nerves relative to mastectomy
  - Long thoracic nerve
    - Winged scapula
  - Thoracodorsal nerve
    - Weak arm pullups and adduction
  - Intercostobrachial nerve
    - Provides sensation to medial arm and axilla

# Surgical Oncology

## Workup of breast mass

- Evaluation is influenced by the patient's age, the physical findings, and the perceived level of breast cancer risk.
  - <30 years old:
    - Diagnostic US
  - 30-39:
    - Bilateral diagnostic mammogram and/or targeted US
  - $\geq 40$ :
    - Bilateral diagnostic mammogram with targeted views + US



# Surgical Oncology

## Breast Cancer treatment options

- Simple mastectomy
  - Not indicated for Breast CA treatment
  - Used for DCIS and LCIS
- Lumpectomy and SLNB (or ALND), postop XRT
- Modified radical mastectomy
  - Removes all breast tissue including the nipple areolar complex and level I axillary LN
- Radical mastectomy
  - Rarely performed

# Surgical Oncology

- BRCA 1 and 2
- Tumor suppressor genes; DNA repair
- Increased risk of breast cancer (40-85%)
- BRCA I
  - Ovarian cancer – 40% lifetime risk
  - Male breast cancer – 1% lifetime risk
  - Associated with endometrial cancer
- BRCA II
  - Ovarian cancer – 10% lifetime risk
  - Male breast cancer – 10% lifetime risk
- Considerations for prophylactic mastectomy
  - Family history + BRCA gene
  - LCIS

# Surgical Oncology

- Indications for XRT:
  - Skin or chest wall involvement
  - + margins
  - Tumor > 5 cm
  - Inflammatory CA
  - Advanced nodal disease
- Chemotherapy indicated if + nodes or tumor > 1cm
- Tamoxifen indicated for PR or ER + tumors

# Surgical Oncology

- LCIS
  - No calcifications, no palpable mass
  - Marker for the development of breast CA (not premalignant)
  - 5% risk of having a synchronous breast CA at the time of diagnosis

# Surgical Oncology

- Phyllodes tumor
  - Fibroepithelial breast tumor
  - Majority are benign
  - 1cm margins
  - Some malignant and behave like sarcomas in that they spread hematogenously (i.e. no SLNBx/ALND required)

# Surgical Oncology

- Pseudoangiomatous Hyperplasia (PASH)
  - Benign, enlarging breast mass
  - Extensive empty spaces on histology (surrounded by stromal cells)
  - Endothelial markers are negative (as opposed to angiosarcoma which has markers for VEGF)
  - Rx: typically observation

# Surgical Oncology

- Familial adenomatous polyposis (FAP) is autosomal dominant and all have cancer by 40.
- APC gene on chromosome 5.
- With FAP, need total colectomy prophylactically by age 20.
- With FAP, check duodenum for polyps or CA q 2years.
- Most common cause of death is periampullary tumors.
- In Gardner's syndrome, patients get colon CA (associated with APC gene) and desmoid tumors/osteomas.

# Surgical Oncology

- Lynch syndrome (hereditary nonpolyposis colon cancer) are autosomal dominant and associated with DNA mismatch repair gene.
- HNPCC has predilection for R-sided and multiple CAs.
- Lynch I is just colon CA risk and Lynch II patients also have an increased risk of ovarian, endometrial, bladder, and stomach CA.
- With HNPCC, need surveillance colonoscopy starting at age 25 or 10 years before primary relative got CA.



# Surgical Oncology

- The quinolone antibiotics (ciprofloxacin) work by inhibiting DNA production (DNA gyrase).
- Tamoxifen works by binding to and inhibiting the estrogen receptor.
- Taxol (Paclitaxel) is a tubulin inhibitor, thus it inhibits microtubules.
- Proscar (Finasteride) works by inhibiting steroid 5-alpha reductase.
- Plasmids are the most common mechanism of acquiring antibiotic resistance.

# Surgical Oncology

## Chemotherapy Toxicities

- Bleomycin – pulmonary fibrosis
- Cyclophosphamide – hemorrhagic cystitis
- Doxorubicin – cardiomyopathy
- Vincristine – peripheral neuropathy
- Cyclosporine – renal toxicity

# Transplant Surgery

# Hypersensitivity Reactions

- Type 1 – Immediate Hypersensitivity
  - IgE-mediated – leads to activation of mast cells and granulocytes
  - Ex: allergic reactions = hives, wheals, urticaria, itching
  - anaphylaxis

# Hypersensitivity Reactions

- Type II – antibody mediated hypersensitivity
  - IgG and IgM against cell surface or extracellular proteins
  - Tissue injury via cell opsonization and phagocytosis and/or complement activation of leukocytes
  - Ex: autoimmune hemolytic anemia, Graves, Bullous pemphigoid

# Hypersensitivity Reactions

- Type III – complex mediated hypersensitivity
  - Immune complexes of circulating IgG and IgM deposit in tissues
  - Tissue damage via complement and Fc receptor recruitment and activation of leukocytes
  - Ex: serum sickness, polyarteritis nodosum, rheumatoid arthritis

# Hypersensitivity Reactions

- Type IV – T Cell mediated hypersensitivity
  - Activation of CD4+ T cells (delayed hypersensitivity) and CD8+ T cells
  - Damage via cytokine-mediated inflammation, macrophage activation and direct cell lysis
  - Ex: TB skin test, contact dermatitis