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HIGH-YIELD INTERNAL MEDICINE BOARD EXAM PEARLS

This study guide includes:

- Chapters covering High-Yield pearls for all major categories seen on the Internal Medicine Board Exam / Shelf Exam
- Topics covered include Cardiovascular Disease, Endocrinology & Metabolism, Gastroenterology, General Internal Medicine, Hematology, Infectious Disease, Nephrology / Urology, Oncology, Neurology, Dermatology, Pulmonary Disease & Critical Care, Rheumatology / Orthopedics

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Dear Reader,

Thank you for downloading a copy of this eBook. If you are searching for study materials for the internal medicine board exam, you are on the verge of a significant milestone in your professional journey.

Knowmedge is an interactive platform that was launched in April 2013. It features over 900 questions designed to help you understand and reinforce the key concepts covered on the exam. Each of our questions features a highly interactive audio visual explanation, in which our content experts walk you through the principles underlying each question to methodically arrive at the correct answer.

This book contains high-yield pearls for the Internal Medicine Boards – ABIM Exam and IM Shelf Exam – written by the team of Knowmedge doctors. There are a total of 12 different pearl articles presented in this book – all from topics that are important to pass the Internal Medicine Boards.

We hope you find the pearls in this book to be a valuable asset as you prepare for your upcoming exam. If you are interested in learning more about Knowmedge, please visit us at www.knowmedge.com.

If you have any questions about the contents of this eBook, send me a note at sunir@knowmedge.com

Best of luck in your preparations!

Sincerely,

Sunir

Sunir Kumar, MD
Co-founder, Chief Editor
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5 Cardiology Pearls

By: Dr. Salim Rezaie

Whether studying for emergency medicine, internal medicine, or USMLE board examinations, cardiovascular diseases are by far and away one of the biggest organ systems of which questions get asked. If you pay attention, the first three pearls are all on physical exam findings and the last two pearls are on disease processes with high morbidity and mortality. I have attached a review table for each pearl to help simplify the concepts and buzz phrases.

Pearl #1: Know what the maneuvers are that increase and decrease heart murmurs.

In general, you should know all the different maneuvers, their effect, and how they would affect valve abnormalities. It is helpful to walk yourself through each valve abnormality, and try and explain why murmurs are increased or decreased, instead of just memorizing a table, which you will forget in 1 – 2 weeks. That being said, common murmurs that seem to get the most questions are: HOCM, AS, MVP, and MR.

Maneuver	Effect	HOCM	AS	MVP	MR
Valsalva Standing	Decr Blood Return to LV	Incr	Decr	Incr	Decr
Laying Down Squatting Straight Leg Raise	Incr Blood Return to LV	Decr	Incr	Decr	Incr
Hand Isogrip Phenylephrine	Increased Afterload	Decr	Decr	Decr	Incr
Amyl Nitrate	Decreased Afterload	Incr	Incr	Incr	Decr
Post PVC	Decr Afterload > Incr Vol (Incr Diastolic Time)	Incr	Incr	Decr	Decr



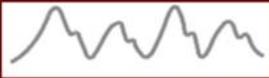
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Cardiac Maneuvers for the Internal Medicine Board Exam

Pearl #2: Know the abnormal arterial pulsations and the disease state with which they are commonly associated.

Arterial pulsations is another physical exam finding that can be very high-yield. Recognizing the buzz phrase (arterial pulse description) and its association to what disorder it is commonly associated can help save you time on questions, which allows you more time on other questions. This is too easy to not know these terms.

Pulses	Morphology	Disease Associated	Description
Pulsus Tardus		<ul style="list-style-type: none"> Aortic Stenosis 	<ul style="list-style-type: none"> Slow Rising Pulse
Pusus Bisferiens		<ul style="list-style-type: none"> HOCM AR 	<ul style="list-style-type: none"> Bifid or Trifid Pulse
Pulsus Alternans		<ul style="list-style-type: none"> Severe Heart Failure 	<ul style="list-style-type: none"> One beat NI, Next beat Abnl
Pulsus Paradoxus		<ul style="list-style-type: none"> Cardiac Tamponade SVC Obstruction Pulmonary Obstruction (COPD, PE) 	<ul style="list-style-type: none"> Decrease pulse wave amplitude with inspiration
Hyperkinetic		<ul style="list-style-type: none"> High Output States (PDA, Thyrotoxicosis, Anemia, Fever) 	<ul style="list-style-type: none"> High Volume Bounding Pulse
Hypokinetic		<ul style="list-style-type: none"> Low Output States (Shock) 	<ul style="list-style-type: none"> Low Volume Low Amplitude

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Heart Pulses

Pearl #3: Know your normal and abnormal heart sounds.

Heart sounds such as S1 and S2 are also a big part of the cardiovascular physical exam on boards. Know what happens with inspiration/expiration as well as other pathologies. Don't forget about S3 and S4. Remember, sometimes an S3 can be normal (i.e. pregnancy and children).

Heart Sound	Association
S1	<ul style="list-style-type: none"> • Atrial Valve Closure (mitral & tricuspid valves) • Loud (MS, Short PR) • Soft (MR, Long PR)
S2	<ul style="list-style-type: none"> • Ventricular Valve Closure (aortic & pulmonic valves) • Soft (Calcified AS)
S3 (Increased Flow/ventricular filling)	<ul style="list-style-type: none"> • Chronic MR, CHF, TR, PDA • Benign in kids and pregnancy • Poor prognostic factor in CHF
S4 (Decreased Compliance)	<ul style="list-style-type: none"> • Acute MR, HOCM, LVH, AS, Ischemia
Inspiration (Physiological Split)	<ul style="list-style-type: none"> • A2 closes before P2
Expiration	<ul style="list-style-type: none"> • A2 & P2 close at the same time (Single S2)
Fixed Split	<ul style="list-style-type: none"> • ASD
Paradoxical Split (Increased split with expiration)	<ul style="list-style-type: none"> • Aortic Stenosis & LBBB
Increased Split	<ul style="list-style-type: none"> • A2 closes sooner (MR, VSD) and/or P2 closes later (PS, Pulmonary HTN, RBBB, PE)



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Heart Sounds to know for the Internal Medicine Boards

Pearl #4: The number one killer in the world is ischemic heart disease, so know what medications improve morbidity and mortality.

First and foremost, be sure to fix modifiable coronary artery disease risk factors such as diabetes mellitus, hypertension, hyperlipidemia, and smoking. Next, know what medications decrease mortality in ischemic heart disease and acute coronary syndrome. Also be sure to know the contraindications for thrombolytics in STEMI.

Therapy in CAD/ACS (Part I)	
Aspirin	<ul style="list-style-type: none"> • Decreases mortality • Onset = minutes • If truly allergic, may use clopidogrel
Clopidogrel Ticlopidine	<ul style="list-style-type: none"> • Decreases mortality in patients with recent ACS or stent placement • Onset = hours • Consider not giving in patients in which CABG within 5d expected
Nitroglycerin	<ul style="list-style-type: none"> • Decreases preload and afterload • Dilates coronary arteries • Decreases myocardial oxygen demand • Contraindications: SBP <100mmHg, RV infarct, Use of erectile dysfunction meds, & Severe AS
Morphine	<ul style="list-style-type: none"> • Decreases myocardial oxygen demand • No proven decrease in mortality
Heparin	<ul style="list-style-type: none"> • Synergistic effect with ASA • LMWH preferred agent in UA/NSTEMI



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CAD ACS Therapy Table for the Internal Medicine Boards – Part I

Therapy in CAD/ACS (Part II)	
Statins	<ul style="list-style-type: none"> • Decreases mortality • Decreases risk of acute cardiac events • Goal LDL <70mg/dL in pts with CAD
Beta Blockers	<ul style="list-style-type: none"> • Decreases mortality • All patients with CAD should be on a beta blocker • Within 24 hours of ACS not emergently in ED
ACE Inhibitors	<ul style="list-style-type: none"> • Decreases mortality • Decreases risk of MI and stroke • If not tolerated, consider an ARB
Glycoprotein IIb/IIIa Inhibitors	<ul style="list-style-type: none"> • Benefits in patients undergoing PCI
Thrombolytics	<ul style="list-style-type: none"> • Used in STEMI <12h from onset and no PCI within 120 min
Primary Coronary Intervention	<ul style="list-style-type: none"> • Preferred over lytics in STEMI if: door to cath <90min, > 3h since onset, and/or uncertain of diagnosis



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CAD ACS Therapy Table for the Internal Medicine Boards – Part II

Contraindications to Thrombolytics

Absolute Contraindications

- Prior intracranial hemorrhage
- Known cerebral arteriovenous malformation
- Known cerebral neoplasm (primary or metastatic)
- Ischemic stroke within 3 months
- Suspected aortic dissection
- Active bleeding or bleeding diathesis (Excludes menses)
- Significant trauma within past 3 months

Relative Contraindications

- Severe uncontrolled HTN on presentation (SBP >180mmHg or DBP >110mmHg)
- Prolonged (>10min) CPR
- History of prior ischemic stroke >3 months
- Major surgery <3 weeks
- Recent internal hemorrhage (Within 2 to 4 weeks)
- Noncompressible vascular punctures
- Pregnancy
- Active peptic ulcer
- Current use of anticoagulants



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Contraindications – Thrombolytics

Pearl #5: Congestive Heart Failure (CHF) is common, so know which medications affect mortality

CHF is a common disease process seen in hospitalized, elderly patients due to improvements in revascularization techniques. 40% of these patients die from arrhythmias and sudden cardiac death; therefore knowing what medications can improve mortality is essential.

Medications in CHF	
Medications that IMPROVE Mortality	<ul style="list-style-type: none">• ACE Inhibitors• Angiotensin II Blockers• Spironolactone for NYHA III and/or IV• Hydralazine + Nitrates• Beta Blockers
Medications that DO NOT IMPROVE Mortality	<ul style="list-style-type: none">• Digoxin → Improves functional capacity and decreases hospitalizations• Calcium Channel Blockers• Diuretics• Nesiritide (May increase mortality)



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CHF – Medications

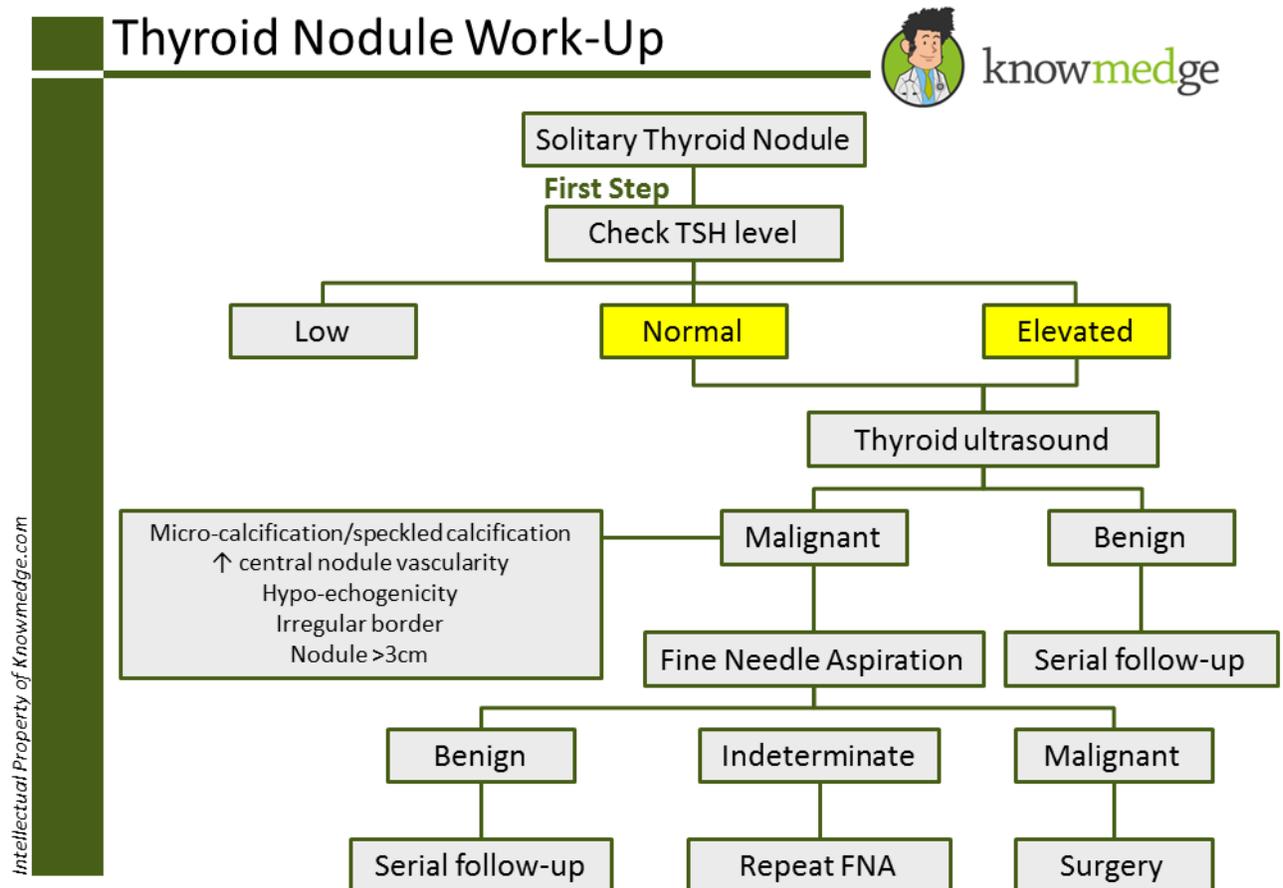
5 Endocrinology Pearls

By: Dr. Sunir Kumar

Endocrinology is an essential part of the Internal Medicine Medical Clerkship and ABIM Board exam. According to the ABIM exam blueprint, questions testing endocrinology topics comprise ~8% of the exam. Approximately ~5-10% of the NBME Clerkship exam is composed of endocrinology questions.

Pearl #1: Don't let thyroid nodules intimidate you.

This systematic approach will help you workup a thyroid nodule.



Pearl # 2: Workup of hirsutism is not as difficult as it seems. Follow this approach and you will be able to diagnose the cause of hirsutism.

- Hirsutism is caused by either excessive testosterone or excessive 17-OH steroids (DHEA-S) production.
- Excessive Testosterone production is seen in ovarian cancer or polycystic ovarian syndrome (PCOS)
 - **Ovarian cancer:** worked up with trans-vaginal ultrasound to look for adnexal mass. In addition, CA-125 marker is usually elevated in ovarian cancer.
 - **PCOS:** Amenorrhea, insulin resistance, and LH:FSH ratio of greater than equal to 3:1
- Excessive DHEA-S production is seen in congenital adrenal hyperplasia (CAH), Cushing's disease, or adrenal carcinoma
- **CAH:** Usual cause is 21 beta hydroxylase deficiency, which is used to convert 17-OH progesterone to cortisol. Since this enzyme is deficient, 17-OH progesterone levels remain elevated. Decreased cortisol levels will cause an elevated ACTH level through a negative feedback mechanism. With increased ACTH, hyperpigmentation will also occur.
- **Cushing's disease:** Defect in anterior pituitary causes increased ACTH, which increases cortisol. MRI of pituitary is ordered to work up Cushing's. If suspicion is high for Cushing's disease despite negative MRI of the pituitary, perform inferior petrosal sinus sampling.
- **Adrenal carcinoma:** Problem occurs in the adrenal gland, which will lead to elevated cortisol levels. The elevated cortisol level will suppress the ACTH level. Since ACTH is suppressed, hyperpigmentation will not occur.

Pearl # 3: Workup of an adrenal mass and management depends on the size and the functional status of the mass

- Many times, adrenal masses are found incidentally on a CT scan. These are known as an "adrenal incidentalomas."
- Rules to remember:
 - If the adrenal mass is either greater than 6 cm in size OR is functional (regardless of size) → surgical intervention is recommended

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- If an adrenal mass is less than 4 cm AND is non-functional → serial CT scans are recommended every 4-6 months to assess the size of the adrenal mass to make sure it is not growing
- How to determine functional status of an adrenal mass? Remember the 3 layers of the adrenal cortex and the one layer of the adrenal medulla and know what is produced in each layer to determine if it is functioning or not.
- Adrenal Cortex layers (remember by mnemonic GFR as in **g**lomerular **f**iltration **r**ate):
 - Zona **G**lomerulosa → check to see if aldosterone:renin ratio is elevated (usually more than 20:1)
 - Zona **F**asciculata → check 24 hour urine cortisol levels and if greater than 100 mg/dl → Cushing problem should be suspected
 - Zona **R**eticularis → Check 17 OH steroid (DHEA-S) levels. If elevated, this layer is functioning.
 - Adrenal Medulla: Check urine VMA or urine metanephrine levels. If either of these metabolites are elevated, concern is for pheochromocytoma

Pearl # 4: Systematic approach to workup hypercortisolism

- First check 24 hour urine cortisol. If greater than 100 mg/dl, then you either have Cushing syndrome, Cushing's disease, or ectopic production of ACTH.
- Next step is to check the ACTH level. If the ACTH level is suppressed, then the problem is Cushing syndrome; CT or MRI of adrenals should be done. If ACTH level is elevated, the patient has either Cushing's disease (pituitary problem) or ectopic production of ACTH (like lung cancer)
- To distinguish between Cushing's disease and ectopic production of ACTH, perform a high dose (8mg) dexamethasone suppression test.
 - If high dose dexamethasone suppresses cortisol, problem is Cushing's disease. MRI of the pituitary should be performed. If MRI of the pituitary is negative, perform inferior petrosal sinus sampling.
 - If high dose dexamethasone suppression test fails to suppress cortisol, the problem is ectopic production of ACTH. Check CT scan of chest to rule out lung cancer.

Pearl # 5: Must know diabetes mellitus high yield facts

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- Type 1 DM → lack of insulin because of destruction of pancreatic beta cells → associated with antibodies to glutamic acid decarboxylase
- Type 2 DM → more common in obese individuals and can occur later in life. Insulin resistance occurs.
- Diagnose of DM is made when patient has two fasting glucose levels greater than or equal to 126 mg/dl or a random glucose level greater than 200 mg/dl especially in the context of signs and symptoms like polyuria, polydipsia, or unintentional weight loss.
- Goal Hgba1C is less than 7%. Hgba1C is an average glucose in a 3 month period.
- Pre-prandial glucose goal in a DM patient is 90-130 mg/dl. 2 hour post-prandial glucose goal is less than 180 mg/dl.
- Monofilament foot testing is the best way to prevent diabetic foot ulcers from occurring. A common organism that causes diabetic foot ulcers is Staph aureus or beta hemolytic streptococcus.
- Eye exams in DM patients are recommended every 1 to 2 years
 - If eye exam reveals hard exudates or microaneurysms → patient has non-proliferative retinopathy → management is by tighter glucose control
 - If eye exam reveals neovascularization or cotton-wool spots → patient has proliferative retinopathy → treat with photocoagulation

Once again, the folks who write the Internal Medicine licensing exams don't expect you to have the depth of knowledge regarding hormone-related conditions, metabolism and diabetes that an endocrinologist possesses. However, topics such as the ones mentioned in the pearls above should assist you with the endocrinology section of the med school clerkship shelf and ABIM board exams.

5 Gastroenterology Pearls

By Dr. Sunir Kumar

Gastroenterology and Hepatology comprises about 9% of the ABIM Internal Medicine exam, making it one of the more critical subjects on the boards. Below, we review 5 High Yield Gastroenterology / Hepatology Pearls that may help you score a few extra points on your ABIM or Internal Medicine shelf examination.

Pearl # 1: Remembering Hepatitis B markers can be difficult, but is worth it

Start with these key points:

- Hepatitis B surface Antigen (HBsAg) → active infection
- Hepatitis B surface Antibody (HBsAb) → past infection or vaccination against hepatitis B
- Hepatitis Be Antigen (HBeAg) → active replication of the virus
- Anti Hepatitis B core IgM Antibody (Anti-HBc IgM) → acute infection
- Anti Hepatitis B core IgG Antibody (Anti-HBc IgG) → chronic infection

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