CHAPTER 1

How to use this book

Bret P. Nelson, MD

HOW TO USE THIS BOOK

The amount of information that must be transferred from books, patients, journals, mentors, and so on into the brain of an aspiring emergency physician is overwhelming. Many physicians create study plans, purchase books, fall behind schedule, and readjust timelines in an endless process akin to yo-yo dieting. Whatever the means we use to study while not actively caring for patients, inevitably we learn as our forebears did – one patient at a time.

Thus, this book was crafted as a case-based approach to the art and science of emergency medicine. Although the format stresses an approach useful in preparation for the emergency medicine oral boards, the cases serve as a review (or introduction) to the practice of emergency medicine. These pages contain heuristics on the general approach to patient management, pearls on the care of children, tips on performing common bedside procedures, and a litany of cases.

ORAL BOARD PREPARATION

Working with a Partner

As described in Chapter 3, during the oral boards you will be taken through a series of cases by an American Board of Emergency Medicine examiner. To mimic this process as closely as possible, you should review the cases in this book with a partner. Pairing with another emergency physician is ideal, as they will be familiar with the format of the boards and the medical decision making in the cases, and they will have more fun throwing curveballs at you to make the cases more interesting (or difficult)! If you cannot find a colleague with a medical background to take you through the cases, a friend, family member, or significant other will do. The "examiner instructions" for each case are written to help a nonphysician approach the case. It is quite likely that your family and friends already know a lot of the jargon in this book. Like most physicians, you have probably regaled them with enough stomach-turning stories over the dinner table to make them experts. If you are fortunate enough to have a partner (examiner), read through the introductory section and appendices and become familiar with the format for the boards, but do not look at the images or cases. The examiner will take you (the candidate, to use ABEM's term) through the cases. You should read through each case

on your own after working through it with your examiner, and look up any areas you had difficulty with. References for standard emergency medicine texts; Tintinalli's *Emergency Medicine: A Comprehensive Study Guide*, 7th ed. by Tintinalli and colleagues, 2011; *Rosen's Emergency Medicine: Concepts and Clinical Practice*, 8th ed. by Marx and colleagues, 2014, are included for each case. Please ask your partner to read the next section (Examiner Instructions) and the sample case before you tackle the cases in the rest of the book.

Examiner Instructions

Thank you for helping your friend, family member, or colleague (the candidate) to review for the oral board exam. This is the final step in their quest to become a board-certified emergency physician. It is probably not the first (and certainly not the last) time you will ask yourself, "What have I gotten myself into?" when dealing with them. Your efforts will greatly exceed whatever reward you have been offered, especially if you were convinced by dinner in any restaurant they can afford on a resident's salary.

If you are a physician, nurse, emergency medical technician (EMT), or other medical provider, the case-based format should be familiar to you. Your goal is to provide the candidate with bits of information about the case and take the case in different directions based on their actions (or inaction). If you have no medical background, don't be intimidated! You already understand enough about medical care to appreciate the daily struggles the candidate faces in taking care of patients. Keep in mind that none of the actors on today's "doctor shows" ever attended medical school. Yet they can sound convincing, and you can appreciate the medical plot points, with a little coaching.

Each case focuses on a patient presenting with some acute manifestation of illness. Some will have subtle signs such as headache or nausea, and others will be quite obviously sick (vomiting blood, major motor vehicle accident, etc.). Many patients will have straightforward problems such as broken bones, and others will have diagnoses that are difficult to pin down (poisonings, drug reactions, or more rare illnesses). Start by reading the examiner instructions for each case; these will give you an overall picture of what the medical problem and major critical actions are. Within the description there will often be additional points on how to deal with situations that will arise in the course of the case – playing the part of a consultant, when to reveal certain key information, how to deal with common medical errors, and so on. Next, read the case from beginning to end to see the flow, starting with the "chief complaint" (reason for evaluation) to initial impressions (What do I see when I walk into the room?) to basic historical information about the patient and the physical examination, followed by ordering tests, giving medications, interpreting the test results, calling upon consultants, and establishing patient disposition (admitting to the hospital, going to the operating room, discharging them, etc.).

The cases are meant to be fun (in a nerdy sort of way). At first, you'll probably present the cases pretty "straight." You can state the patient's complaint and examination as written in the text, speak about consultants in the third person ("the cardiologist says they will see the patient in the morning"), and "stick to the script." As you become more comfortable with the oral boards' format, feel free to get into the character a bit more. Patients, consultants, nurses, and other "characters" in oral board cases are typically portrayed in the first person by examiners. Instead of saying, "the patient

reports they are in pain," try, "Doctor, my arm still hurts" or "Why isn't my son getting anything for pain? Who's in charge here?" You probably know someone who thought karaoke was stupid but then would not give up the microphone after trying it. Taking a friend through these cases can be similarly entertaining, even without the aid of alcohol.

When you become fairly comfortable with the format (this is easier for medical professionals), you can deviate a bit from the cases to make them more interesting and challenging. Examples of how to do this are given in some cases with a "curveball" described. Some of these curveballs will involve reluctant consultants, patients who aren't forthcoming with the truth, or other factors which can make proper diagnosis and treatment difficult. Many of these types of curveballs can appear on the real oral boards, because the candidate is being tested partially on their ability to work effectively in the emergency medicine practice system. Some are so important that they should be expected in every case, even when not explicitly stated in the instructions. For example, if the candidate orders a medication before checking the patient's allergies, that patient should exhibit an allergic reaction to the medication. This is good practice for the boards (where points can be deducted for such mistakes) but more important in real life, where "points" are people.

Working Alone

Don't worry if you couldn't convince anyone to nurse you through all of the cases. You can still use this book effectively to engage in "active learning," which is much more effective for adult learners than flipping through pages and passively reading the text. You'll have to use a bit of discipline in approaching the cases and force yourself to think about your management for each case.

After reading the sample case, take each case one by one. Read through the chief complaint and think about what you would do with that patient immediately. Usually, the next question to ask is, "What do I see when I look at the patient?" After the text reveals the answer, stop and think of your next action. For example, if you saw an ashen, unresponsive patient, you will want to move immediately toward resuscitation. For a well-appearing patient in no distress, you will likely start with a primary survey, history, and physical examination.

Try to think ahead as much as possible, focusing on what specific historical or physical examination items you are especially interested in. You will get more out of asking yourself, "Does this patient have a carotid bruit?" than simply thinking, "Now I'll examine the patient." Remember that the real oral board examiners will not just give away the entire examination; they will often ask for what specific actions you would like to perform. There are no tricks in this book, and there should not be any on the boards either. When a test or physical examination is described as "normal," move on with the case as if it is.

By the end of each case, you will see a checklist of critical actions. These types of actions are the basis for scoring on the real oral boards. The examiner instructions are near the end. These will often provide insights into the case, confirming or revealing the diagnosis, and often elucidating why certain actions were or were not mandated, why that computed tomography (CT) scan was never available, or why the consultant gave you such a hard time. While the case is fresh in your mind, refer to the appropriate chapters in Rosen's or Tintinalli's to ensure you are comfortable with the material.

EMERGENCY MEDICINE STUDY GUIDE

Emergency Medicine Residents, Medical Students, Nurses, EMTs, PAS, and Other Providers

Sometimes it's more interesting and engaging to go through cases rather than to read textbook chapters. An individual case can be reviewed in a very short time, making it ideal for reading on public transportation or when you have only a few minutes. Ideally, use the "active" reading method described in the board review section. You can also give the cases a straight read-through, though it's not as effective as engaging your limbic system a bit by challenging yourself to think, "What should I do next?"

The cases should then be used as a springboard for further reading or discussion. Primary textbook references are given, but these should be supplemented by a search for more current literature (using PubMed, UptoDate, or other online research tool). Ask colleagues or mentors about similar cases they've encountered and how they managed them. The management decisions in this book are meant to represent "textbook" answers, but real-world management often differs significantly. By anchoring your supplemental reading in cases, you will have a greater retention of the management pearls and other facts discussed.

SAMPLE CASE

The following sample case is presented twice. First, the case is written in the standard format used throughout the book. Next, a sample dialogue describes the case as it would be presented by an examiner to a candidate. By looking back and forth between the case and the dialogue, you should get some sense of how the book can be used and how the oral boards are administered.

CASE A: Back Pain

A. Chief complaint

a. 55-year-old male with backache

B. Vital signs

a. Blood pressure (BP): 165/90, heart rate (HR): 90, respiratory rate (RR): 16, temperature (T): 36.8°C orally oxygen saturation (Sat): 98% on room air (RA)

C. What does the patient look like?

a. Patient lying on stretcher, appears stated age; appears in mild distress as he attempts to find a position of comfort

D. Primary survey

a. Airway: speaking in full sentences
b. Breathing: no respiratory distress, no cyanosis
c. Circulation: warm and moist skin, normal pulses, and capillary refill

E. History

a. History of present illness (HPI): the patient is a 55-year-old male with no significant past medical history who presents with a backache for several hours. He reports

walking to work when he noted a sharp, burning pain in his mid to lower back, worse on the left than the right side. The pain began rather abruptly and was severe. He felt that it radiated up to his posterior chest and down to his leg when it was most pronounced. It has since improved a bit. There is no position that makes the pain better or worse, and the patient is unable to localize the pain to an exact point on his back. He denies any difficulty urinating, blood in the urine, or trauma.

b. Past medical history (PMHx): none
c. Past surgical history (PSHx): none
d. Allergies: none
e. Medications: none
f. Social: lives with wife; drinks alcohol socially, smokes one-half pack of cigarettes per day, denies the use of other drugs. Works as a manager at a box company
g. Family history (FHx): no significant family history
h. Primary medical doctor (PMD): Dr Underhill

F. Action

a. Oxygen via nasal cannulae (NC) or nonrebreather mask
b. Two large-bore peripheral intravenous (IV) lines
c. Monitor: BP: 165/95 HR: 95 RR: 18 Sat: 100% on 2L NC

G. Secondary survey

a. General: mild pain, discomfort
b. Head: normocephalic, atraumatic
c. Eyes: normal
d. Ears: normal
e. Nose: normal
f. Neck: supple, nontender, normal range of motion, no carotid bruit
g. Pharynx: normal dentition, no lesions, no swelling
h. Chest: nontender, no lesions
i. Lungs: normal air movement, clear breath sounds bilaterally
j. Heart: normal rate, rhythm regular; no murmurs, rubs, or gallops
k. Abdomen: normal bowel sounds, soft, nontender or distended
l. Rectal: normal tone, brown stool, occult blood negative
m. Urogenital: normal examination
n. Extremities: full range of motion; no deformity; normal femoral, radial, and dorsalis pedis pulses
o. Back: nontender, no costovertebral angle tenderness, no muscle spasm, no signs of trauma
p. Neurologic: alert and oriented; cranial nerves intact; normal strength, sensation, gait
q. Skin: warm to touch. No rash noted
r. Lymphatic: no lymphadenopathy

H. Studies

a. CBC, BMP, coagulation studies, blood type and cross-match
b. Lactate, UA
c. EKG (electrocardiogram, also known as ECG)

I. Nurse

a. EKG (Figure 1.1)

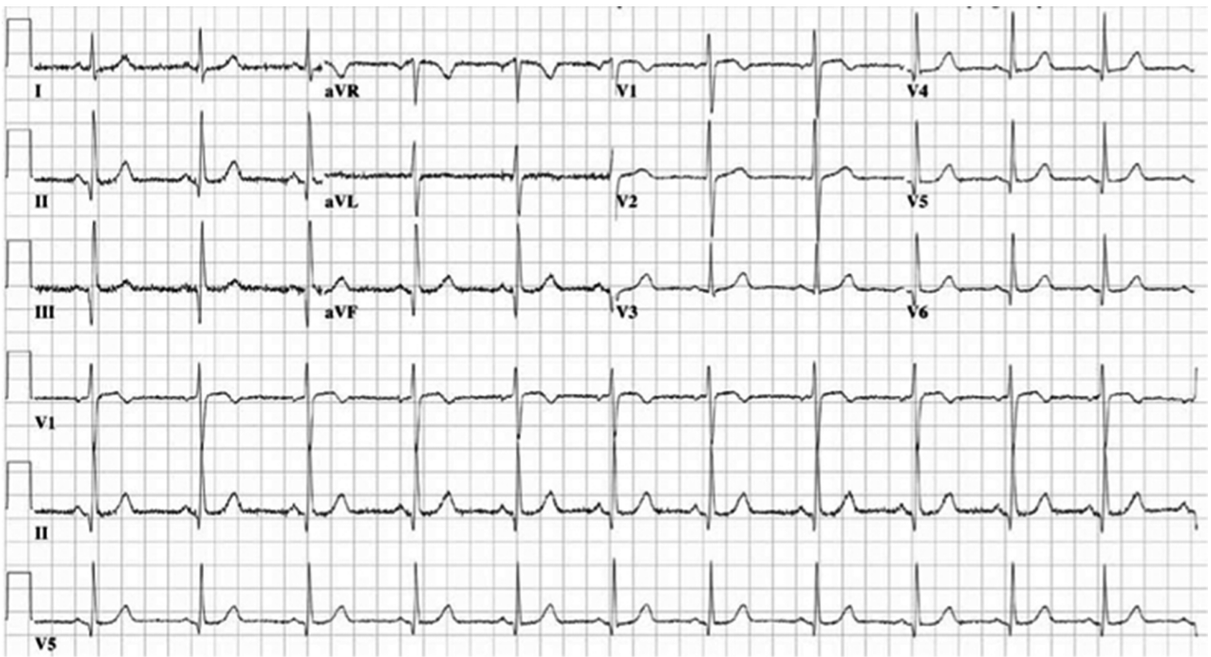

Figure 1.1

J. Action

a. Imaging
   i. Chest x-ray (CXR)
b. Medications
   i. Morphine IV
c. Reassess
   i. Pain improved with morphine

K. Results

Complete blood count (CBC):		**Liver function panel:**	
White blood cells (WBC)	11.1 × 10^3/uL	Aspartate aminotransferase (AST)	31 U/L
Hematocrit (Hct)	40.3%	Alanine aminotransferase (ALT)	29 U/L
Platelets (Plt)	438 × 10^3/uL	Alkaline phosphatase (Alk Phos)	52 U/L
		Total bilirubin (T bili)	0.9 mg/dL
Basic metabolic panel (BMP):		Direct bilirubin (D bili)	0.1 mg/dL
Sodium (Na)	134 mEq/L	Amylase	42 U/L
Potassium (K)	3.9 mEq/L	Lipase	19 U/L
Chloride (Cl)	101 mEq/L	Albumin	4.1 g/dL
Bicarbonate (CO_2)	29 mEq/L		
Blood urea nitrogen (BUN)	20 mEq/dL	**Urinalysis (UA):**	
Creatinine (Cr)	1.2 mg/dL%	Specific Gravity (SG)	1.019
Glucose (Gluc)	113 mg/dL	pH	6
		Protein (Prot)	Neg
Coagulation panel:		Glucose (Gluc)	Neg
Prothrombin time (PT)	11.9 sec	Ketones	Neg
Partial thromboplastin time (PTT)	24.0 sec	Bilirubin (Bili)	Neg
International normalized ratio (INR)	1.1	Blood	Neg
		Leukocyte esterase (LE)	Neg
		Nitrite	Neg
		Color	Yellow

Figure 1.2

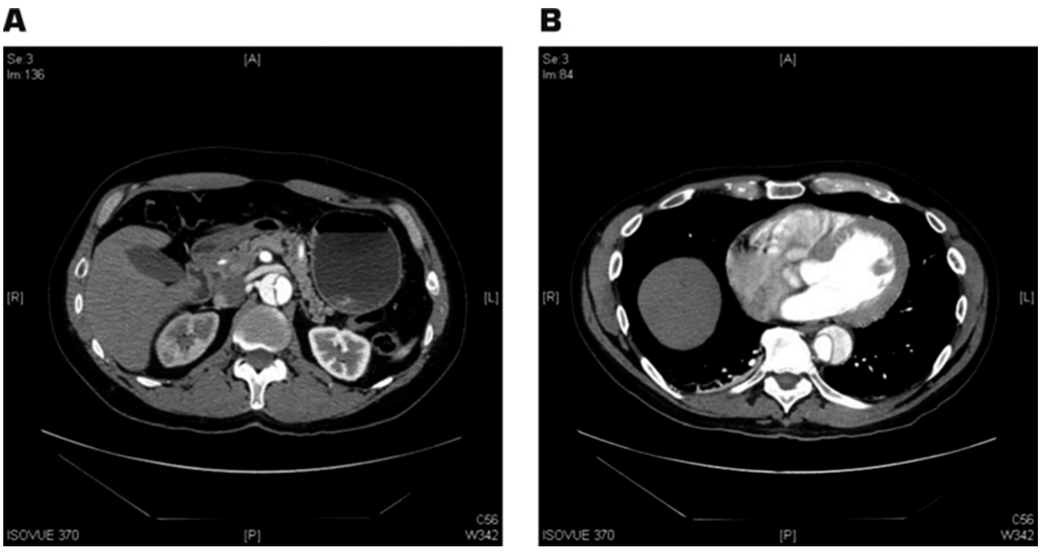

Figure 1.3
A and B

a. Lactate: 1.5
b. CXR (Figure 1.2)

L. Reassess

a. Patient describes worsening of pain, now with nausea and some chest discomfort as well

M. Action

a. Imaging
   i. Computed tomography (CT) scan of chest and abdomen (must describe differential diagnosis to radiologist protocoling study)

N. Nurse

a. CT scan (Figure 1.3) demonstrates dissection of the descending thoracic aorta extending to the abdominal aorta and the left iliac artery. There is no involvement of the aortic arch.

O. Action

a. Consultation
   i. Vascular surgery
   ii. Intensive care unit
   iii. Notify primary care doctor
b. Meds
   i. Esmolol, Labetalol, or other β-antagonist IV
   ii. Morphine IV
   iii. Sodium nitroprusside IV

P. Reassess

a. (β-antagonists given) Monitor: BP: 110/55 HR: 55 RR: 18 Sat: 100% on 2L NC; pain improved
b. (β-antagonists not given) Monitor: BP: 170/100 HR: 100 RR: 18 Sat: 100% on 2L NC; pain continues

Q. Diagnosis

a. Type B aortic dissection

R. Critical actions

- EKG
- CXR
- Analgesia
- Thorough neurologic and vascular examinations
- CT scan to assess for dissection
- Verbalize differential diagnosis (dissection, aneurysm, renal colic) with consultant (radiologist, ICU staff, etc)
- Blood pressure control
- ICU consultation and admission

S. Examiner instructions

a. This is a case of aortic dissection. The aorta is the largest artery in the body and carries blood from the heart to the chest and abdomen. Its wall is composed of several layers that can tear, causing blood to dissect in between the layers. High blood pressure, smoking, and chronic medical conditions can increase the risk of this disorder. The patient's back pain and shortness of breath were due to tearing of the layers of the aorta, and therefore will not be improved with moving to a different position. The aorta should be suspected because of the severity and radiation of pain, and taking into account the patient's risk factors (smoking) and abnormal vital signs (high blood pressure). If the patient is not placed on a cardiac monitor, they should complain of feeling "woozy." The patient's pain will continue to worsen in the ED until he is treated with a β-antagonist (such as Labetalol, Esmolol, Propranolol) and a pain medication such as morphine. If the patient does not undergo imaging or is discharged, he should lose consciousness. A CT scan should be readily available if requested, but ultrasound and MRI will "take a few hours."

T. Pearls

a. Dissections are often classified according to their anatomic involvement: Type A involves the ascending aorta; type B does not.

b. Up to 12% of patients with aortic dissection have a normal CXR; the test should not be used to exclude the diagnosis.
c. Magnetic resonance imaging (MRI) has the best sensitivity and specificity for the diagnosis of aortic dissection; however, this test is often not feasible as it requires a stable patient and more time than other modalities, such as transesophageal echo (TEE) or CT scan. Among these options, CT scan is most commonly employed as the test of choice in the ED.
d. When considering aortic dissection in a patient with chest pain or difficulty breathing, other diagnoses in the differential include myocardial ischemia, congestive heart failure, pericarditis, and pulmonary embolus (PE). The diagnosis should also be considered for atypical back pain where renal colic or musculoskeletal causes are being considered, especially in patients with risk factors, such as advanced age, smoking, or hypertension.
e. Goals of emergency department therapy for dissection include blood pressure reduction and decreasing shear forces acting on the dissection site. Thus, β-blockers such as Esmolol, Metoprolol, and Propranolol are considered first-line agents. Vasodilators such as sodium nitroprusside may be administered after these agents are used. Analgesia is important for patient comfort; it reduces sympathomimetic drive contributing to blood pressure and shear forces.
f. Surgical management reduces in-hospital mortality for type A dissections and is the standard of care. Initial treatment of type B acute aortic dissections is generally medical (blood pressure control and observation). Patients with persistent pain, uncontrolled hypertension, occlusion of a major arterial trunk, aortic leak or rupture, or development of a localized aneurysm may require surgical intervention.

U. References

a. Tintinalli's: Chapter 62. Aortic Dissection and Related Aortic Syndromes
b. Rosen: Chapter 85. Aortic Dissection

SAMPLE CASE SCRIPT

Here is one example of how the sample case could play out between an examiner and a candidate. Each case will run a very different course depending on the examiner and the choices the candidate makes. This example is intended to highlight a few common circumstances that will come up during the cases. This is **NOT** an example of a "perfectly run" case.

EXAMINER:

You are working an overnight shift at General Hospital, and the next patient is a 55-year-old man with back pain. *(If you are making up the case, you get to name the hospital! Most cases should take place in an emergency department associated with a large hospital, but you can alter the scenarios as you like. During the boards, "ABEM General" is the default location.)*

CANDIDATE:

What do I see when I walk into the room?

EXAMINER:

(From What does the patient look like?) The patient is lying on a stretcher, appears stated age; he is in mild distress as he attempts to find a position of comfort.

CANDIDATE:
May I have the vital signs?

EXAMINER:
(From Vital signs) Blood pressure: 165/90, heart rate: 90, respiratory rate: 16, temperature: 36.8°C orally, oxygen saturation: 98% on room air.

CANDIDATE:
I'd like to perform a primary survey. Is the patient able to speak?

EXAMINER:
(From the Primary survey) Yes, he is speaking in full sentences.

CANDIDATE:
How is his breathing? What does his skin look like?

EXAMINER:
(From the Primary survey) He is in no respiratory distress; there is no cyanosis. His skin is warm and moist, and he has normal capillary refill.

CANDIDATE:
The patient seems stable enough to obtain a further history. Sir, what brings you to the emergency department today?

EXAMINER:
(From the HPI) Well, Doc, my back's been hurting me for a few hours now. I got this sharp pain in my lower back while I was walking to work. It came out of nowhere. It seemed to go down my left leg and up to my chest. *(If you are just starting out, you can just read the HPI as written. Once you become comfortable with the cases, it will be more interesting and true to the oral board format to act out the case a bit and speak as the patient in the first person.)*

CANDIDATE:
Was there a particular position that makes the pain worse or better?

EXAMINER:
No, and I can't seem to get into a comfortable position now, either. I've never had anything like this before.

CANDIDATE:
Were you exerting yourself at all? Have you been working out recently, or have you had any injury to the area?

EXAMINER:
No, nothing I can think of.