MECHANISMS OF HUMAN DISEASE
AND
PHARMACOLOGY & THERAPEUTICS

CASE-BASED SMALL GROUP DISCUSSION

MHD II
Session 5

February 27, 2019

STUDENT COPY
Case 1

Cc: “My back has been killing me since last night”

A 72 year-old woman presents to clinic with complaints of an acute onset of upper back pain. She is accompanied by her best friend. The pain began with her rolling over in bed the night before. The pain is unrelenting, 6-7/10. She could barely get dressed on account of the pain. She has no other concerns.

Her past medical history is significant for thyrotoxicosis between the ages of 20 and 26; it was treated with radioiodine; she has been maintained on levothyroxine 200 mcg daily. She takes no other medications.

She smokes 1 pack of cigarettes per day and has done so for 40 years. She does not drink alcohol.

Menopause occurred at age 49.

Her father died of a myocardial infarction at the age of 54. Her mother died recently and had osteoporosis and dementia. She has one younger sister who has diabetes mellitus.

On physical exam the Caucasian patient is 68 inches tall, weighs 118 pounds, has a blood pressure of 120/80 mm Hg and a regular pulse of 94 per minute. There was dorsal kyphosis and tenderness to palpation at T8. The thyroid was not palpable. Neurologic examination was normal.

Diagnostic Studies

EXAM: DXSPTHOR2 - THORACIC SPINE, 2 VIEWS

THORACIC SPINE AND LUMBAR SPINE:

THERE IS COMPRESSION FRACTURE OF T8 VERTEBRAL BODY AND MINIMAL COMPRESSION OF T10.

NO COMPRESSION DEFORMITY SEEN IN THE LUMBAR VERTEBRAE.


Educational Objectives:

1. What is the most likely etiology of the vertebral compression fracture given the clinical scenario? List some of the major risk factors for the development of this condition in this patient.
Non-steroidal anti-inflammatory agents were recommended for pain. The patient was asked to mobilize as pain allowed and to follow-up with her physician in 1 week.

**Additional diagnostic studies**

**BONE DENSITY/DUAL PHOTON**

The average DXA BMD of the L2-L4 level is 0.943 GM/CM2 WITH A T SCORE OF -3.2. THIS VALUE IS IN THE OSTEOPOROSIS RANGE.

The DXA bone mineral density (BMD) of the left femoral neck is 0.651 GM/CM2 WITH A T SCORE OF -2.4. THIS IS IN THE OSTEOPENIC RANGE.

According to the World Health Organization criteria for osteoporosis:

- INCREASED BMD: T SCORE > +1.0
- NORMAL BMD: T SCORE = +1.0 TO -1.0
- OSTEOPENIA: T SCORE = -1.0 TO -2.5
- OSTEOPOROSIS: T SCORE < -2.5

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IMPRESSION: DECREASED BMD OF THE LUMBAR SPINE CONSISTENT WITH OSTEOPOROSIS AND LEFT FEMORAL NECK CONSISTENT WITH OSTEOPENIA.

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2. What is the role of the DEXA scan? Define “T Score”.

3. The physician orders a vitamin D level (vitamin D-25 hydroxy) based on the results of the DEXA scan. What is the likely rationale?
Calcium 9.1 [8.9-10.3] mg/dl
Phosphorous 3.1 [2.6-4.4] mg/dl

**Vitamin D, 25-Hydroxy** 42 ng/ml
REFERENCE RANGE: 30 - 80 NG/ML
TEST INFORMATION: VITAMIN D, 25-HYDROXY
This assay quantifies the sum of vitamin D3, 25-hydroxy and vitamin D2, 25-hydroxy.
Deficiency: Less than 20 ng/mL
Insufficiency: 20-29 ng/mL
Optimum Level: 30-80 ng/mL
Possible Toxicity: Greater than 80 ng/mL

4. Interpret the above results.

5. Recommend lifestyle changes to treat the patient’s bone disease.

6. Discuss the recommended dietary allowance (RDA) of calcium and vitamin D for this patient. How can she achieve her requirements?

7. Review the Case Images-Musculoskeletal Set 2
Case 2
cc: finger and toe pain x 1 month

A 31-year-old man is evaluated for a 1-month history of a painful, swollen left finger and a swollen right toe. He otherwise feels well.

He has no known chronic medical problems. He has taken no medications regularly until the past month when he has begun to take ibuprofen 400mg two to three times daily for the joint pain.

He is married and monogamous. He works as a golf pro at a country club. He has never smoked cigarettes. He drinks 1-2 beers several times per month. He has never used illicit drugs.

On physical examination, vital signs are: BP 114/68, pulse 72/minute, respirations 12/minute, temp 98.7°F, BMI 26.

The left third distal interphalangeal joint is swollen, with localized tenderness to palpation and pain with active and passive range of motion. The fingernail had pitting as did several others.

The right second toe is remarkable for fusiform swelling and mild diffuse tenderness, with decreased active and passive range of motion. There is onycholysis of several toenails, including the left second toenail.

The remainder of the musculoskeletal exam is normal. Examination of the heart, lungs and abdomen is normal.

Educational Objectives

1. In forming a differential diagnosis, the physician initially considers the following. Cite data (pertinent positives and negatives) from the scenario that supports or refutes each of these diagnoses:

   Osteoarthritis
   Rheumatoid arthritis
   Psoriatic arthritis
   Lyme arthritis
2. The physician re-examines the patient’s skin but does not find characteristic lesions. What other skin sites should be examined?

Case 3

Cc: chest pain x 1 hour

A 27-year old man is brought to the emergency department by paramedics. His friends called 911 when the patient complained of severe chest pain. He does not answer many questions asked by the ED staff. However, he does state that the chest pain had been ongoing for the past hour and that he needs a “smoke now”. He states he is “healthy”. When asked he denies using any illicit drugs.

On physical exam the patient is agitated and not very cooperative. His blood pressure is 173/98 (equal in both arms) and his pulse is 122 bpm. His pupils are equal and dilated. Conjunctiva are anicteric. The nose is inspected and shows perforation of the nasal septum. Lung, heart, and abdominal exams are unremarkable except for tachycardia. He has no “track marks”.

The EKG shows sinus tachycardia and ST segment elevation in leads I and AVL

Initial troponin is 2.78 [0.00- 0.04] ng/ml. Urine drug screen is pending.

Educational Objectives:

1. Based on the given history, acute intoxication with which of the following is suspected?
   - Barbiturate
   - Benzodiazepine
   - Cannabinoid
   - Cocaine
   - Opiate
   - PCP

Discuss your rationale.
2. Based on the mechanism of action of this drug, postulate why chest pain and coronary ischemia/infarction developed.

3. There are recommendations against the use of a particular class of medication in patients with acute coronary syndromes related to the use of this illicit drug. Applying your knowledge regarding the pathophysiology of this illicit drug, name the medication class, and the rationale for not using it.

4. Discuss other potential strategies for controlling this patient’s chest pain and elevated blood pressure

Questions 5 and 6 will be provided during the small group session

Cases 4, 5, 6 are Unknowns – data will be provided during the small group session