College of Nursing
UNIVERSITY OF THE PHILIPPINES MANILA
The Health Sciences Center

Sotejo Hall, Pedro Gil Street, Ermita, Manila 1000 Philippines
Tel Nos. (02) 85231472, (02) 85231477, (02) 85231494 • TeleFax: (02) 85231485
Email: upm-cn@up.edu.ph

N-4: Basic Pathophysiology

2nd Semester, AY 2022-2023

ACADEMIC INTEGRITY

As a student of the University of the Philippines, I pledge to act ethically and uphold the value of honor and excellence.

I understand that suspected misconduct on given assignments/examinations will be reported to the appropriate office and if established, will result in disciplinary action in accordance with University rules, policies, and procedures. I may work with others only to the extent allowed by the Instructor.

COPYRIGHT NOTICE

This material has been reproduced and communicated to you by or on behalf of University of the Philippines pursuant to PART IV: The Law on Copyright of Republic Act (RA) 8293 or the "Intellectual Property Code of the Philippines".

The University does not authorize you to reproduce or communicate this material. The Material may contain works that are subject to copyright protection under RA 8293. Any reproduction and/or communication of the material by you may be subject to copyright infringement and the copyright owners have the right to take legal action against such infringement.

Do not remove this notice.

Sotejo Hall, Pedro Gil Street, Ermita, Manila 1000 Philippines
Tel Nos. (02) 85231472, (02) 85231477, (02) 85231494 • TeleFax: (02) 85231485
Email: upm-cn@up.edu.ph

ACTIVITY: CREATING A PATHOPHYSIOLOGY DIAGRAM

CASE 1: ACUTE CORONARY SYNDROME

History of Present Illness

A 74-yr-old man comes to the Emergency Department (ED) because of a several-month history of increasing exertional chest pain. He states that after walking a few feet he feels left-sided chest pressure that radiates down his left arm. Lately, the pain has been associated with dyspnea and nausea. The pain is relieved by rest within a few minutes. He saw his primary care physician a few days ago. At that time, he was given a prescription for sublingual nitroglycerin as a therapeutic trial and was scheduled for an outpatient stress test in a few weeks. He comes to the ED today because the episodes have been occurring more frequently and with less exertion. He says today that when he takes the sublingual nitroglycerin, it does relieve his symptoms.

Review of Systems

- **General**: No fevers and chills. No weight loss.
- **Skin**: Noncontributory
- **HEENT**: No nasal congestion or throat pain.
- **Pulmonary**: No cough. No hemoptysis. Dyspnea recently but only with the chest pain.
- **Cardiovascular**: No orthopnea, paroxysmal nocturnal dyspnea, lower-extremity edema, light-headedness, or palpitations.
- **Gastrointestinal**: Nausea during the chest pain episodes. No vomiting.
- **Genitourinary**: Noncontributory
- **Musculoskeletal**: She has no muscle aches, joint pain, or stiffness.
- **Neurologic**: No syncope. No progressive weakness or loss of sensation.
- **Psychiatric**: Noncontributory

Past Medical History

- **Medical history**: Hypertension that is well-controlled on drugs, chronic obstructive pulmonary disease (COPD), and osteoarthritis.
- **Surgical history**: Cholecystectomy and appendectomy.
- **Medications**: Vitamin D, Amlodipine 5 mg/day, and fluticasone/salmeterol inhaler. As-needed drugs: albuterol inhaler, tiotropium inhaler, and sublingual nitroglycerin (SLNG).
- **Allergies**: No known drug allergies.

Sotejo Hall, Pedro Gil Street, Ermita, Manila 1000 Philippines
Tel Nos. (02) 85231472, (02) 85231477, (02) 85231494 • TeleFax: (02) 85231485
Email: upm-cn@up.edu.ph

- **Family history**: No history of early myocardial infarction (MI) or stroke in first-degree relatives.
- **Social history**: Attorney working long, stressful hours. Former cigarette smoker with a 40-pack/-yrear history. He quit 1 year ago. No alcohol or IV drug use. No recent long air flights or travel outside the United States. He is separated from his wife.
-

Physical Examination

- **General appearance**: Well-developed elderly African-American man in minor distress.
- **Vital signs**:
  - Temperature: 36.3° C
  - Pulse: 110 beats/min
  - Right Arm: 142/84 mm Hg
  - Left Arm: 142/80 mm Hg
  - Respirations: 20/min
  - Oxygen saturation: 96% on room air
- **Skin**: Slight pallor. No cyanosis. Cool, dry to the touch.
- **HEENT**: Clear oropharynx. No cervical lymphadenopathy. Normal carotid upstrokes.
- **Pulmonary**: Normal effort. Decreased breath sounds bilaterally with prolonged expiratory phase. No crackles or wheezes noted.
- **Cardiovascular**: No jugular venous distention at 45°. Regular rhythm and rate. Point of maximal impulse (PMI) not displaced. S_1 decreased, S_2 normal. Grade 1-to-2, soft, early systolic murmur heard at the apex. S_4 present. No rubs or gallops. No peripheral edema.
- **Gastrointestinal**: Normal bowel sounds. No epigastric tenderness.
- **Genitourinary**: No costovertebral angle tenderness.
- **Musculoskeletal**: Unremarkable; no erythema, tenderness, or swelling in the legs.
- **Neurologic**: Alert and oriented x 3. No focal motor or sensory deficits.
- **Mental status**: Appropriate mood and behavior.

Laboratory results:

- Cardiac Enzymes (Serum Troponin): Elevated
- ECG: shows ST depression suggestive of myocardial ischemia

Sotejo Hall, Pedro Gil Street, Ermita, Manila 1000 Philippines
Tel Nos. (02) 85231472, (02) 85231477, (02) 85231494 • TeleFax: (02) 85231485
Email: upm-cn@up.edu.ph

CASE 2: END-STAGE RENAL DISEASE

History of Present Illness (HPI)
A 76-year-old man comes to the office because of shortness of breath. He is presently being managed for end-stage renal disease on hemodialysis. Today, the patient states that over the past 6 months he has noted increasing difficulty breathing when he exerts himself. He is relatively sedentary but does climb a flight of stairs to his bedroom at night; he says he used to be able to do this without any problem, but now he reports he needs to stop halfway up the stairs to rest. Occasionally he has mild substernal chest pressure along with the shortness of breath. The chest pressure does not radiate and is not accompanied by nausea or diaphoresis. He has noted increased swelling in his legs. He denies any shortness of breath at rest, orthopnea, or paroxysmal nocturnal dyspnea. He denies any episodes of palpitations, lightheadedness, or syncope. He denies any cough, fever, chills, or night sweats.

Review of Systems
- **General**: Patient generally feels fatigued. No recent weight changes.
- **Skin**: No rashes or skin lesions.
- **HEENT**: No vision changes, ear pain, nasal congestion or discharge, or sore throat.
- **Pulmonary**: See HPI
- **Cardiovascular**: See HPI
- **Gastrointestinal**: Good appetite. No abdominal pain, nausea, vomiting, or change in bowel patterns.
- **Genitourinary**: Has not produced urine for several years since beginning dialysis. Has not missed any dialysis treatments.
- **Musculoskeletal**: No redness or pain in extremities. He has noticed increased swelling of his feet and ankles in recent months.
- **Neurologic**: Noncontributory
- **Psychiatric**: Noncontributory

Past Medical History
- **Medical history**: Hypertension, hyperlipidemia, type 2 diabetes mellitus, end-stage renal disease on hemodialysis.
- **Surgical history**: Left knee replacement at age 65 years.
- **Medications**: Lisinopril, Atorvastatin, Insulin glargine, Calcium carbonate, Erythropoietin
- **Allergies**: No known drug allergies.
- **Family history**: Father had hypertension and stroke. Mother had type 2 diabetes mellitus.
- **Social history**: Patient is married and is a retired teacher. He has never smoked and does not use alcohol or illicit drugs.

Sotejo Hall, Pedro Gil Street, Ermita, Manila 1000 Philippines
Tel Nos. (02) 85231472, (02) 85231477, (02) 85231494 • TeleFax: (02) 85231485
Email: upm-cn@up.edu.ph

Physical Examination

- **General appearance**: Thin, elderly male in no apparent distress.
- **Vital signs**:
  - Temperature: 37.2° C
  - Pulse: 72 beats/min
  - Blood Pressure: 155/86 mm Hg
  - Respirations: 16/min
- **Skin**: No rashes or cyanosis
- **HEENT**: Nares patent, no discharge; oropharynx clear.
- **Neck**: Jugular venous pressure 5 cm above the clavicle at 45 degrees. Delayed carotid upstrokes.
- **Pulmonary**: Lungs are clear to auscultation bilaterally. No wheezes, rhonchi, or rales. No dullness to percussion.
- **Cardiovascular**: Regular rate and rhythm, normal S_1, diminished S_2, crescendo/decrescendo systolic murmur heard best at the right upper sternal border radiating to the carotids. No rubs or gallops.
- **Gastrointestinal**: Soft, nontender, nondistended. Normal bowel sounds are present in all quadrants. Rectal exam: Nontender, stool heme negative.
- **Genitourinary**: Unremarkable
- **Extremities**: 1+ pitting edema to mid-shin bilaterally, no tenderness or erythema. 1+ dorsalis pedis pulses bilaterally. Dialysis graft present on right forearm with good thrill.
- **Musculoskeletal**: Unremarkable
- **Neurologic**: Unremarkable
- **Mental status**: Unremarkable

Laboratory & Diagnostics:

- Chest x-ray: Normal heart size, mild costophrenic angle blunting, lung parenchyma is clear.
- Transthoracic echocardiography: Normal left ventricular size. Left ventricular ejection fraction 60%. Normal right ventricular size and function. No regional wall motion abnormalities. Moderate concentric left ventricular hypertrophy. Normal diastolic function. Severe calcific aortic stenosis
- ECG showed normal sinus rhythm with left ventricular hypertrophy

CASE 3: IMMUNE THROMBOCYTOPENIA & INTRACRANIAL BLEED

History of Present Illness

A man who appears to be in his 50s is brought to the emergency department. The history is given by emergency medical technicians (EMTs), who state they were called to a store for a 50-yr-old man who possibly had a stroke. At the store, they found him lying on the ground unconscious but breathing normally. After their arrival, the patient awoke but was unable to give coherent responses to questions or commands.

Store employees who saw the patient reported to EMTs that he fell to the ground suddenly from a sitting position, then began drooling, and his arms and legs shook for what seemed to be a long time, but they cannot quantify how long. They state he had not appeared ill before the event.

Review of Systems & Past Medical History

Patient is unable to provide any information at this time

Physical Examination

- **General appearance**: Awake; saliva and blood at corner of his mouth. He appears well-developed, and appearance is consistent with stated age.
- **Vital signs:**
  - Temperature: 36.5° C (97.7° F)
  - Pulse: 80 beats/min and regular
  - BP: 165/90 mm Hg
  - Respirations: 20/min
- **Skin**: Pink, warm, and dry, with a few punctate red spots on right lower leg
- **HEENT**: No evidence of scalp trauma. Tympanic membranes are clear; there is a puncture wound on the bottom of his tongue. HEENT exam is otherwise unremarkable.
- **Pulmonary**: No respiratory distress. Equal breath sounds bilaterally with good air entry/exit; no wheezing.
- **Cardiovascular**: Regular rate and rhythm. Normal S_1 and S_2. No murmurs.
- **Gastrointestinal**: Unremarkable
- **Genitourinary**: Unremarkable except for urine on trousers.
- **Musculoskeletal**: Full range of motion; no deformities, tenderness, or bruises.
- **Neurologic**: Pupils are equal and normally reactive to light with no nystagmus. Face appears symmetric; gag reflex is present and symmetric. The patient can move all limbs equally to command but patient does not comprehend commands for more detailed motor function testing. Deep tendon reflexes are symmetric and 2+ throughout; plantar reflexes are downgoing bilaterally. No meningismus.
- **Mental status**: Awake; eyes open. Oriented only to name; gives confused, incoherent responses to other questions; follows simple commands using all limbs.

Sotejo Hall, Pedro Gil Street, Ermita, Manila 1000 Philippines
Tel Nos. (02) 85231472, (02) 85231477, (02) 85231494 • TeleFax: (02) 85231485
Email: upm-cn@up.edu.ph

Shortly after initial examination, the patient becomes extremely lethargic. He responds to deep pain by withdrawing, and he is able to protect his airway. He is noted to have the following: heart rate 30 beats/min, BP 74/52 mm Hg, respirations 10/min, and pulse oximetry 94% on room air. His pupils remain equal and reactive.

Appropriate testing is done and results are shown:

- Normal sinus rhythm at 80 beats/min on cardiac monitor
- Pulse oximetry: 96% on room air
- ECG: Sinus rhythm; no signs of arrhythmia or ischemia
- Bedside glucose: 94 mg/Dl
- Blood:

Test (units)	Result	Results (SI Units)
Hemoglobin	15.2 g/dL	152 g/L
Hematocrit	45.4%	N/A
WBC count	9700/mcL	9.7 x 10^9/L

- Serum chemistry profile: Normal
- ECG: Sinus rhythm; no signs of arrhythmia or ischemia

The patient's family has now arrived at the hospital. They state that:

- Medical history: Osteoarthritis; intermittent, well-controlled asthma; no known hypertension; no recent hospitalizations
- Surgical history: Tonsillectomy during childhood
- Medications: Albuterol inhaler as needed, Fish oil capsules, aspirin as needed
- Allergies: No known drug allergies
- Family history: Noncontributory
- Social history: Social drinker; no other recreational drug use, never smoked cigarettes or used tobacco. No recent travel. Is employed as an attorney, married with children.

Cranial CT scan: Intraparenchymal hemorrhage in the right parietal area

Hepatitis serology panel: Normal
HIV testing: Normal
Liver function tests: Normal
Peripheral blood smear: Thrombocytopenia, otherwise normal
PT/PTT: Normal

Repeat examination for signs of bleeding shows petechiae present on both lower legs and an

Sotejo Hall, Pedro Gil Street, Ermita, Manila 1000 Philippines
Tel Nos. (02) 85231472, (02) 85231477, (02) 85231494 • TeleFax: (02) 85231485
Email: upm-cn@up.edu.ph

area of ecchymosis on the upper back. Stool is negative for occult blood, and the spleen is not palpably enlarged.

CASE 4: DIABETES MELLITUS

History of Present Illness

A 56-year-old woman who is a long-time patient returns to the office for scheduled follow up of her type 2 diabetes and chronically elevated blood glucose. At her last visit 3 months ago, her HbA1C was 7.6%, where it had been for several visits. You recommended beginning treatment with insulin, which she refused because of her fear of needles. You then increased her dose of glimepiride from 4 mg to 8 mg once a day and advised her to more strictly follow her diet and exercise regimen, which she claims to be doing. Since the last visit, her home fingerstick glucose levels have ranged from 119 mg/dL to 263 mg/dL (6.6 to 14.6 mmol/L) and her weight on her home scale is unchanged at about 98 kg. She describes increased thirst and urination but denies blurry vision, nonhealing ulcers, or lethargy.

Per office protocol, a fingerstick glucose test on arrival today shows glucose level of 221mg/dL (12.27 mmol/L) and hemoglobin A1C 8.1%; urine dipstick is normal.

Review of Systems

- **General**: Increased thirst and is drinking more water. Appetite is normal and her weight at home has been unchanged for several months. She denies lethargy, fever, chills, or night sweats.
- **Skin**: No rash, pruritus, or lesions
- **HEENT**: No change in vision, sore throat, dysphagia
- **Pulmonary**: No cough, shortness of breath, wheezing
- **Cardiovascular**: No chest pain, pressure, or discomfort; no orthopnea, dyspnea on exertion, or paroxysmal nocturnal dyspnea.
- **Gastrointestinal**: No abdominal pain, nausea, vomiting, diarrhea
- **Genitourinary**: Increased urinary frequency without urgency, dysuria, or blood in urine. No vaginal discharge or itching.
- **Musculoskeletal**: No joint or muscle pain, no sores or lesions on feet.
- **Neurologic**: Has numbness and tingling in both feet that comes and goes throughout the day. No headache, tremor, change in gait.
- **Psychiatric**: No mood swings, depression, or anxiety.

Sotejo Hall, Pedro Gil Street, Ermita, Manila 1000 Philippines
Tel Nos. (02) 85231472, (02) 85231477, (02) 85231494 • TeleFax: (02) 85231485
Email: upm-cn@up.edu.ph

Past Medical History

- **Medical history**: Hypertension, type 2 diabetes mellitus, hyperlipidemia, and obesity

- **Surgical history**: Cholecystectomy 5 years prior
- **Medications**: Metformin, Atorvastatin, Glimepiride, Lisinopril
- **Allergies**: Penicillin, which causes rash
- **Family history**: Father died from myocardial infarction at age 89 years, mother age 88 years has type 2 diabetes mellitus, hypertension, and hyperlipidemia.
- **Social history**: Patient works as a social worker, has never smoked cigarettes, denies any illicit drug use, drinks 1 to 2 glasses of wine with dinner every night. She rides a stationary bike about 1 to 2 days per week for 20 minutes, which she has been able to do without difficulty. She is up to date with all immunizations. Her diet consists mainly of pizza, chicken, vegetables, fruit, pasta, and diet sodas. She is married and has a 12-year-old son. She is intermittently sexually active with her husband 1 to 2 times per month. They do not use contraception as she is no longer menstruating.

Physical Examination

- **General appearance**: Well-appearing female in no apparent distress, height 1.65 m, weight 95.3 kg (BMI 34.9)
- **Vital signs**:
  - Temperature: 37° C
  - Pulse: 82 min
  - BP: 159/88 mmHg
  - Respirations: 12/min
- **Skin**: There is velvety smooth hyperpigmentation in neck folds and under arms; no other lesions or rash.
- **HEENT**: Moist mucous membranes, no exudates, no cervical lymphadenopathy.
- **Pulmonary**: Clear to auscultation bilaterally, no wheezes, rales, or rhonchi.
- **Cardiovascular**: Regular rate and rhythm; no murmurs, gallops, or rubs. Jugular venous distention normal.
- **Gastrointestinal**: Obese abdomen, soft, non-distended, normal bowel sounds, no rebound or guarding.
- **Genitourinary**: No signs of yeast infection or other lesions. No tenderness to flank percussion.

- **Musculoskeletal**: No peripheral edema, swelling or tenderness. Joints full range of motion and nontender.

- **Neurologic**: Decreased sensation to light touch in feet bilaterally. Cranial nerves II to VIII grossly intact, normal gait, strength 5/5 throughout.
- **Mental status**: Alert and oriented x3

Laboratory Results:
Serum

- HbA1C: 8.1%
- Glucose: 221 mg/dL (12.27 mmol/L)
- Sodium: 138 mEq/L (138 mmol/L)
- Potassium: 4.1 mEq/L (4.1 mmol/L)
- Creatinine: 0.7 mg/dL (62 μmol/L)
- BUN: 23 mg/dL (8.2 mmol/L)
- Lipid Panel: Results pending

Source: MSD Manual Professional Version. Retrieved from https://www.msdmanuals.com/professional/pages-with-widgets/case-studies?mode=list