

**Problem
Based
Learning**

2013

Problem Based Learning

Your teacher presents you with a problem in anesthesia, our learning becomes active in the sense that you discover and work with content that you determine to be necessary to solve the problem.

Problem based learning will provide you with opportunities to

- **examine and try out what you know**
- **discover what you need to learn**
- **develop your people skills for achieving higher performance in teams**
- **improve your communications skills**
- **state and defend positions with evidence and sound argument**
- **become more flexible in processing information and meeting obligations**
- **practice skills that you will need after your education**

1-Preoperative Evaluation

A 45-year-old man is undergoing a preoperative evaluation for a laparoscopic cholecystectomy due to acute cholecystitis. He has a history of rheumatoid arthritis for 10 years. After the evaluation, the anesthesiologist determines that the patient is ASA status 3.

- **What are THE GOALS OF PREOPERATIVE ASSESSMENT?**
- **What does ASA status 3 mean?**
- **What is the focus of the anesthesia evaluation of the arthritis, cardiac patients and chronic obstructive lung disease patients?**
- **What is the NPO Status required preoperative?**
- **What is Preoperative Medications you can use ?**

2-Unexplained Apnea under Anesthesia

A 15-year-old boy underwent elective right knee arthroscopy and debridement under general anesthesia with a laryngeal mask airway (LMA and spontaneous breathing). He was otherwise healthy with no allergies to medications. After uneventful induction of anesthesia, the surgeons requested antibiotic prophylaxis with cefazolin 1 gram, which the anesthesiology team administered. Just before the surgical incision was made, 50 mcg of Fentanyl was administered. About 2 minutes later, spontaneous respirations slowed, and the patient became apneic. The surgeon and anesthesiologist assumed the patient's apnea was due to opiate sensitivity and assisted ventilation by hand for 30 minutes. However, despite a rise in the end-tidal CO₂ to 70mm Hg, spontaneous respirations did not return. The anesthesia team examined the drawer and found vials of cefazolin and vecuronium (a long-acting paralytic agent) in adjacent medication slots. The vials were of the same size and shape.

- Discuss etiologies of Apnea during anesthesia .
- Discuss receiving unplanned drug due to a syringe or an ampoule swap.
- Discuss treatment of medication-induced respiratory depression varies by cause.
- Discuss in the case of persistent peripheral muscle blockade, typically due to residual muscle relaxants, the use of peripheral nerve stimulator, reversal with neostigmine is initiated.
- Discuss wrong medication administration in the operating room is due to failure to label syringes and interventions to prevent medical and blood transfusion errors.

3- Postoperative Hypotension

36-year-old mother of two young children, attended as an inpatient for an elective vaginal hysterectomy and repair of prolapse. She had no relevant past history and her preoperative assessment was unremarkable. During surgery, blood loss was greater than usual at 800 ml but no other problems were noted. In the recovery room she was well but noted to be pale and agitated, complaining of abdominal pain. An hour later as she had become unwell, pale and hypotensive with a borderline bradycardia (BP 90/60 mm Hg, pulse 52 bpm)

- **Discuss differential diagnoses such as loss of blood at the operation site , anaphylaxis and myocardial depression.**
- **Discuss clinical indicators of hypovolemia, monitoring and assessment.**
- **Discuss Managements of postoperative hypotension**
- **Discuss when to give blood and how much blood to give.**

4-Difficult airway

A 35-year-old woman presents for laparoscopic lysis of adhesions. Her first laparotomy occurred 10 years prior to this admission. At that time, the process of tracheal intubation consumed 1 hour. She awakened with a very sore throat, but does not know the details of the intubation.

The old records are unavailable.

- **What are the predictors of difficult mask ventilation?**
- **Discuss the risk factors for difficult intubation.?**
- **How is the anticipated difficult intubation approached?**
- **Describe the management options for a patient who, after induction of anesthesia, unexpectedly cannot be intubated with a Macintosh blade. This patient has a good mask airway.**
- **Following induction of anesthesia, ventilation by facemask and intubation are impossible. What maneuvers may help?**
- **How is successful tracheal intubation verified?**
- **Following a difficult intubation, how is postoperative extubation managed?**

5- Hypoxia after anesthesia

A 37 years of age male who arrives in the PACU following surgical removal of his gallbladder. Surgical intervention utilizing the laparoscopic approach is successful. Patient history obtained during the preoperative phase of care showed that he was a 2 pack/day smoker and he denies taking any prescribed medications with no other medical problems. He reports that his pain is 6 on a 10-point scale. He states that he has pain in his shoulder and pressure in his abdomen. Morphine (5 mg) is ordered for the pain, and 4 mg is administered IV. At 1 hour after admission, the patient's oxygen saturations were 89% to 90%, his respiratory rate is 16 breaths per minute, and he is more difficult to arouse.

- Discuss hypoxia and possible causes after anesthesia
- Was this patient hypoxemic?
- Discuss hemoglobin oxygen dissociation curve
- Discuss clinical assessments and management of postoperative hypoxia
- Discuss effect of smoking on respiratory system
- Does the patient's history of smoking may be the cause of the respiratory insufficiency?

6-Local Anesthetic Infiltration

A 25-year-old, 75-kg man presents for open appendectomy. The surgery is performed under general anesthesia, without complications. After the specimen is removed, the attending surgeon leaves the operating room to dictate the operative report, leaving the intern and medical student to close the skin. Upon leaving, the surgeon asks them to “inject some local anesthetic into the wounds.” The intern turns to you and asks

which local anesthetic you suggest and how much to inject.

- What are the benefits of local anesthetic infiltration?
- What attributes are you looking for in a local anesthetic in this case?
- Which agent would you choose and what is the maximum dose?
- What are the complications might be expected from overdose?

7-Muscle Relaxants (Neuromuscular Junction Blockers)

A 47-year-old patient is undergoing the clipping of an intracranial aneurysm of the anterior communicating artery. The surgery is being performed under a microscope, so even the smallest movement by the patient could have devastating consequences.

- **How can the patient be protected and the surgery allowed to proceed?**
- **What are the Clinical Pharmacology of the Neuromuscular Blockers?**
- **Maintenance of Blockade: How Much is Enough?**
- **Reversal of the Neuromuscular Blockade and Emergence**

8-APPROACH TO Patient Monitoring

The surgeons have requested a brief general anesthetic for a dressing change to an open infected wound. They suggest that the procedure can be performed in the patient's bed on the hospital floor.

- **Does this patient need special monitoring for this procedure?**
- **What this patient's monitoring must adhere to the standards for basic monitoring published by the American Society of Anesthesiologists.?**
 - 1. Oxygenation**
 - 2. Ventilation**
 - 3. Circulation**
 - 4. Temperature**
 - 5. Urine Output**
 - 6. Invasive Monitoring**
 - 7. Monitoring of Neurological Function**
 - 8. Monitoring of Neuromuscular Function**

9- Fluid Replacement Therapy

A 54-year-old man is undergoing a laparotomy and colon resection for carcinoma. The anesthesiologist is attempting to calculate the fluid replacement.

- What are the components that must be considered when calculating
- the volume of fluid that should be replaced?
- What are the SIGNS OF PREOPERATIVE HYPOVOLEMIA?
- How to calculate the fluid replacement in the intraoperative period all of which take into consideration the preoperative fluid deficits, intraoperative blood loss, and urine output.?
- Which of Fluids: Crystalloid vs Colloids , you can use and when to use ?

10-Anesthesia for healthy patient

A 52-year-old man has had progressive knee pain with swelling, His orthopedic surgeon has tentatively diagnosed a torn meniscus, and recommended an arthroscopy as an outpatient. The patient has had no major illnesses other than the typical childhood diseases. He has had no previous operations or anesthetics, nor a family history of problems with anesthesia. He has no allergies to medications, does not smoke, and consumes alcohol occasionally at social events. His laboratory results and physical examination by an internist were all normal. He has had nothing to eat or drink since he went to bed last night. On examination, the patient weighs 75 Kg and is 182 Cm, in tall. His neck appears to be flexible and mobile. He opens his mouth without difficulty, and with his head extended and tongue protruding, his uvula is completely visible.

- How are a patient's general medical condition, and his risk for difficult airway management classified?
- In which stage of anesthesia is the patient most vulnerable, and why?
- Which components of a pre-anesthetic evaluation are often not included in a patient's typical history and physical examination?

11- Rapid Sequence Induction (RSI):

A 27-year-old woman presents to the emergency department complaining of abdominal pain, nausea, and vomiting. Her pain began in the peri-umbilical region and has now migrated toward the right lower quadrant of the abdomen. A surgery consult is obtained, and based on her history, physical, and findings suggestive of acute appendicitis seen on abdominal CT scan, she is scheduled for emergency appendectomy. The patient is otherwise healthy and takes no regular medications. Her surgical history includes a tonsillectomy at age 10, and a dilatation and curettage (D&C) at age 25. She has not had problems with previous anesthetics.

- What would you include in your preoperative evaluation of this patient?**
- What medications will you use for induction and maintenance of anesthesia?**
- How will you manage postoperative pain in this patient?**
- What considerations are warranted in this healthy, young woman scheduled for an emergency surgical procedure if she have full stomach,”?**