Hyperemesis Gravidarum

Topic- based Uworld Questions

Block 1, 2, 7, 8

A 32-year-old primigravida at 18 weeks gestation is evaluated in the emergency department for increasing confusion and incoherence. Her husband says that she has become increasingly unsteady while standing and has fallen twice. The patient was previously seen in the emergency department for nausea and vomiting and was treated with intravenous fluids and antiemetics. Although she continues to take oral antiemetics, she has had persistent vomiting and has lost 7 kg (15.4 lb) of her prepregnancy weight. Blood pressure is 110/60 mm Hg and pulse is 98/min. Fetal heart tones are 155/min. Physical examination shows nystagmus but no scleral icterus. Pupils are equal and reactive to light and accommodation. Abdominal examination shows epigastric pain but no rebound or involuntary guarding. The patient has trace pedal edema over her bilateral lower extremities and bilaterally absent ankle reflexes. Laboratory results are as follows:

Complete blood count	
Hematocrit	36%
Mean corpuscular volume	84 fL
Platelets	240,000/mm^3
Leukocytes	10,000/mm^3
Serum chemistry	
Sodium	131 mEq/L
Potassium	3.2 mEq/L
Chloride	90 mEq/L
Bicarbonate	36 mEq/L
Blood urea nitrogen	18 mg/dL
Creatinine	0.8 mg/dL

Complete blood count

Hematocrit	36%
Mean corpuscular volume	84 fL
Platelets	240,000/mm^3
Leukocytes	10,000/mm^3

Serum chemistry

Sodium	131 mEq/L
Potassium	3.2 mEq/L
Chloride	90 mEq/L
Bicarbonate	36 mEq/L
Blood urea nitrogen	18 mg/dL
Creatinine	0.8 mg/dL
Glucose	70 mg/dL
Aspartate aminotransferase (SGOT)	110 U/L
Alanine aminotransferase (SGPT)	114 U/L
Lipase	32 U/L

Which of the following is the most likely diagnosis in this patient?

A. Acute fatty liver of pregnancy

Potassium	3.2 mEq/L
Chloride	90 mEq/L
Bicarbonate	36 mEq/L
Blood urea nitrogen	18 mg/dL
Creatinine	0.8 mg/dL
Glucose	70 mg/dL
Aspartate aminotransferase (SGOT)	110 U/L
Alanine aminotransferase (SGPT)	114 U/L
Lipase	32 U/L

Which of the following is the most likely diagnosis in this patient?

A. Acute fatty liver of pregnancy
B. HELLP syndrome
C. Late neurosyphilis
D. Thiamine deficiency
E. Vitamin B_{12} deficiency

Submit

Potassium	3.2 mEq/L
Chloride	90 mEq/L
Bicarbonate	36 mEq/L
Blood urea nitrogen	18 mg/dL
Creatinine	0.8 mg/dL
Glucose	70 mg/dL
Aspartate aminotransferase (SGOT)	110 U/L
Alanine aminotransferase (SGPT)	114 U/L
Lipase	32 U/L

Which of the following is the most likely diagnosis in this patient?

A. Acute fatty liver of pregnancy (41%)
B. HELLP syndrome (8%)
C. Late neurosyphilis (5%)
✓ D. Thiamine deficiency (37%)
E. Vitamin B_{12} deficiency (7%)

Omitted
Correct answer

37%
Answered correctly

06 secs
Time Spent

04/15/2020
Last Updated

Wernicke encephalopathy	
Associated conditions	• Chronic alcoholism (most common) • Malnutrition (eg, anorexia nervosa) • Hyperemesis gravidarum
Pathophysiology	• Thiamine deficiency
Clinical features	• **Encephalopathy** • **Oculomotor dysfunction** (eg, horizontal nystagmus, bilateral abducens palsy) • Postural & gait **ataxia**
Treatment	• Intravenous thiamine followed by glucose infusion

This patient's presentation of **altered mental status** (eg, encephalopathy), oculomotor dysfunction (eg, **nystagmus**), and **gait ataxia** are suggestive of **Wernicke encephalopathy** (WE), a neurological disease due to a thiamine deficiency. Although most commonly associated with alcoholism, WE can also occur with **hyperemesis gravidarum** (HG), a severe, persistent nausea and vomiting of pregnancy that results in weight loss and dehydration.

Patients with HG commonly have **hypochloremic metabolic alkalosis**, hypokalemia, **hypoglycemia**, and **elevated serum aminotransferases**, all of which occur as the result of protracted vomiting. Treatment for this patient should include antiemetics, fluids, and thiamine supplementation. Patients with HG often require glucose infusions due to prolonged hypoglycemia. However, glucose infusion prior to thiamine supplementation can exacerbate WE and should be delayed until the patient has received thiamine. WE in pregnancy is associated with an increased risk of spontaneous abortion; thiamine supplementation may decrease this risk.

(Choice A) Acute fatty liver of pregnancy can present with nausea, vomiting, elevated serum aminotransferases, and hypoglycemia but typically occurs in the third trimester. At 18 weeks gestation, this diagnosis is unlikely.

(Choice B) HELLP syndrome can present with nausea, vomiting, and elevated serum aminotransferases. However, HELLP syndrome also

This patient's presentation of **altered mental status** (eg, encephalopathy), oculomotor dysfunction (eg, **nystagmus**), and **gait ataxia** are suggestive of **Wernicke encephalopathy** (WE), a neurological disease due to a thiamine deficiency. Although most commonly associated with alcoholism, WE can also occur with **hyperemesis gravidarum** (HG), a severe, persistent nausea and vomiting of pregnancy that results in weight loss and dehydration.

Patients with HG commonly have **hypochloremic metabolic alkalosis**, hypokalemia, **hypoglycemia**, and **elevated serum aminotransferases**, all of which occur as the result of protracted vomiting. Treatment for this patient should include antiemetics, fluids, and thiamine supplementation. Patients with HG often require glucose infusions due to prolonged hypoglycemia. However, glucose infusion prior to thiamine supplementation can exacerbate WE and should be delayed until the patient has received thiamine. WE in pregnancy is associated with an increased risk of spontaneous abortion; thiamine supplementation may decrease this risk.

(Choice A) Acute fatty liver of pregnancy can present with nausea, vomiting, elevated serum aminotransferases, and hypoglycemia but typically occurs in the third trimester. At 18 weeks gestation, this diagnosis is unlikely.

(Choice B) HELLP syndrome can present with nausea, vomiting, and elevated serum aminotransferases. However, HELLP syndrome also requires low platelets and evidence of hemolysis for diagnosis, which are not seen in this patient. Physical examination findings include hyperreflexia rather than absent reflexes.

(Choice C) Late neurosyphilis manifests years after an initial syphilitic infection and is characterized by tabes dorsalis (eg, sensory ataxia, lancinating pain) and Argyll Robertson pupils (eg, normal pupillary constriction with accommodation but not light). This patient has a normal pupillary examination and an acute presentation.

(Choice E) Vitamin B12 deficiency presents with dementia and a subacute combined degeneration due to demyelination of spinocerebellar tracts (eg, gait ataxia), lateral corticospinal tracts (eg, spastic paresis), and dorsal columns (eg, loss of position and vibration sense). However, the clinical course of vitamin B12 deficiency is indolent rather than acute. Patients also have a macrocytic anemia (mean corpuscular volume >100 fL).

Educational objective:
Wernicke encephalopathy is a complication of hyperemesis gravidarum that results from thiamine deficiency. Classic presenting symptoms include encephalopathy, oculomotor dysfunction, and gait ataxia.

A 24-year-old primigravid woman at 10 weeks gestation comes to the emergency department with severe nausea and vomiting. During the past 3 weeks, the patient has had nausea lasting most of the day with occasional emesis, but over the past day her vomiting has become so severe that she has been unable to keep down any fluids. Her medical history includes obesity and appendectomy. Temperature is 36.7 C (98 F), blood pressure is 90/50 mm Hg, pulse is 116/min, and respirations are 16/min. The patient is clutching an emesis basin, into which she frequently spits. On physical examination, mucous membranes are dry and skin turgor is decreased. Heart and breath sounds are normal, and the abdomen is soft and nontender. Transvaginal ultrasound shows a viable, intrauterine twin pregnancy. She is admitted to the hospital for intravenous fluids and antiemetics. Although her emesis subsides, 4 hours later she reports worsening chest discomfort that radiates to her back. Blood pressure is 102/66 mm Hg, and pulse is 112/min. Breath sounds are equal, and a retrosternal crunching sound is heard with each heartbeat. The abdomen is soft but mildly tender in the epigastrium. Which of the following is the most likely diagnosis in this patient?

- A. Acute pancreatitis
- B. Aspiration pneumonitis
- C. Biliary colic
- D. Esophageal perforation
- E. Mallory-Weiss syndrome
- F. Reflux esophagitis

Submit

A 24-year-old primigravid woman at 10 weeks gestation comes to the emergency department with severe nausea and vomiting. During the past 3 weeks, the patient has had nausea lasting most of the day with occasional emesis, but over the past day her vomiting has become so severe that she has been unable to keep down any fluids. Her medical history includes obesity and appendectomy. Temperature is 36.7 C (98 F), blood pressure is 90/50 mm Hg, pulse is 116/min, and respirations are 16/min. The patient is clutching an emesis basin, into which she frequently spits. On physical examination, mucous membranes are dry and skin turgor is decreased. Heart and breath sounds are normal, and the abdomen is soft and nontender. Transvaginal ultrasound shows a viable, intrauterine twin pregnancy. She is admitted to the hospital for intravenous fluids and antiemetics. Although her emesis subsides, 4 hours later she reports worsening chest discomfort that radiates to her back. Blood pressure is 102/66 mm Hg, and pulse is 112/min. Breath sounds are equal, and a retrosternal crunching sound is heard with each heartbeat. The abdomen is soft but mildly tender in the epigastrium. Which of the following is the most likely diagnosis in this patient?

- A. Acute pancreatitis (3%)
- B. Aspiration pneumonitis (1%)
- C. Biliary colic (0%)
- ✓ D. Esophageal perforation (79%)
- E. Mallory-Weiss syndrome (13%)
- F. Reflux esophagitis (1%)

Omitted
Correct answer
D

79%
Answered correctly

02 secs
Time Spent

04/04/2020
Last Updated

Explanation

Esophageal perforation	
Etiology	• Instrumentation (eg, endoscopy), trauma • Effort rupture (Boerhaave syndrome) • Esophagitis (infectious/pills/caustic)
Clinical presentation	• Chest/back &/or epigastric pain, systemic signs (eg, fever) • Crepitus, Hamman sign (crunching sound on auscultation) • Pleural effusion with atypical (eg, green) fluid
Diagnosis	• Chest x-ray or CT scan: widened mediastinum, pneumomediastinum, pneumothorax, pleural effusion • CT scan: esophageal wall thickening, mediastinal fluid collection • **Esophagography with water-soluble contrast:** leak from perforation
Management	• NPO, IV antibiotics & proton pump inhibitors • **Emergency surgical consultation**

This patient with hyperemesis gravidarum and protracted vomiting now has chest pain radiating to the back and a retrosternal crunching sound, concerning for **esophageal perforation (EP)**. Repeated vomiting episodes, particularly when the patient resists the vomiting reflex, can cause effort rupture of the esophagus (Boerhaave syndrome). Efflux of air into the mediastinum (pneumomediastinum) through the **full-thickness** esophageal tear can cause a **crunching sound** heard in the precordium with each heartbeat (Hamman sign) or neck/precordial crepitus (subcutaneous emphysema). Retrosternal **chest pain** radiating to the back is common; other manifestations of EP include odynophagia, dyspnea, and sepsis (eg, fever, tachycardia).

EP is a surgical emergency because spillage of esophageal contents can lead to mediastinitis, septic shock, and death. Diagnosis can be confirmed by **esophagography or CT scan with water-soluble contrast**, with visualization of contrast leaking from the esophagus into surrounding tissues. **Surgical debridement and repair** are the mainstay of treatment, with adjunctive restriction of oral intake and administration of broad-spectrum antibiotics and proton pump inhibitors.

(Choices A and C) Gallbladder hypomotility during pregnancy and obesity increase this patient's risk of gallstones; however, biliary colic causes

This patient with hyperemesis gravidarum and protracted vomiting now has chest pain radiating to the back and a retrosternal crunching sound, concerning for **esophageal perforation (EP)**. Repeated vomiting episodes, particularly when the patient resists the vomiting reflex, can cause effort rupture of the esophagus (Boerhaave syndrome). Efflux of air into the mediastinum (pneumomediastinum) through the **full-thickness** esophageal tear can cause a **crunching sound** heard in the precordium with each heartbeat (Hamman sign) or neck/precordial crepitus (subcutaneous emphysema). Retrosternal **chest pain** radiating to the back is common; other manifestations of EP include odynophagia, dyspnea, and sepsis (eg, fever, tachycardia).

EP is a surgical emergency because spillage of esophageal contents can lead to mediastinitis, septic shock, and death. Diagnosis can be confirmed by **esophagography or CT scan with water-soluble contrast**, with visualization of contrast leaking from the esophagus into surrounding tissues. **Surgical debridement and repair** are the mainstay of treatment, with adjunctive restriction of oral intake and administration of broad-spectrum antibiotics and proton pump inhibitors.

(Choices A and C) Gallbladder hypomotility during pregnancy and obesity increase this patient's risk of gallstones; however, biliary colic causes postprandial epigastric/right upper quadrant pain. Gallstone pancreatitis causes rapid-onset, severe epigastric (rather than chest) pain radiating to the back but is typically accompanied by (rather than preceded by) nausea/vomiting. Neither condition causes pneumomediastinum (Hamman sign). Mild epigastric tenderness can be seen with EP, possibly due to local inflammation.

(Choice B) Aspiration of inflammatory gastric acid can occur with protracted vomiting and incite pneumonitis. This can cause chest pain but would typically present with abrupt-onset respiratory distress, cyanosis, and infiltrates on chest x-ray. Diffuse lung field crackles rather than retrosternal crunching would be expected.

(Choice E) In contrast to Boerhaave syndrome, Mallory-Weiss syndrome represents a partial-thickness (mucosal) esophageal tear. Although it can occur with repeated vomiting, it most commonly presents as hematemesis and would not cause pneumomediastinum (which indicates full-thickness perforation).

(Choice F) Gastroesophageal reflux is common in pregnant women due to decreased lower esophageal sphincter tone and increased intraabdominal pressure from uterine enlargement. Gastric acid reflux can cause esophagitis and chest pain. However, it typically presents more chronically with postprandial heartburn, odynophagia, or dysphagia. Although severe esophagitis is a risk factor for perforation, reflux esophagitis alone does not cause pneumomediastinum.

Educational objective:

surrounding tissues. **Surgical debridement and repair** are the mainstay of treatment, with adjunctive restriction of oral intake and administration of broad-spectrum antibiotics and proton pump inhibitors.

(Choices A and C) Gallbladder hypomotility during pregnancy and obesity increase this patient's risk of gallstones; however, biliary colic causes postprandial epigastric/right upper quadrant pain. Gallstone pancreatitis causes rapid-onset, severe epigastric (rather than chest) pain radiating to the back but is typically accompanied by (rather than preceded by) nausea/vomiting. Neither condition causes pneumomediastinum (Hamman sign). Mild epigastric tenderness can be seen with EP, possibly due to local inflammation.

(Choice B) Aspiration of inflammatory gastric acid can occur with protracted vomiting and incite pneumonitis. This can cause chest pain but would typically present with abrupt-onset respiratory distress, cyanosis, and infiltrates on chest x-ray. Diffuse lung field crackles rather than retrosternal crunching would be expected.

(Choice E) In contrast to Boerhaave syndrome, Mallory-Weiss syndrome represents a partial-thickness (mucosal) esophageal tear. Although it can occur with repeated vomiting, it most commonly presents as hematemesis and would not cause pneumomediastinum (which indicates full-thickness perforation).

(Choice F) Gastroesophageal reflux is common in pregnant women due to decreased lower esophageal sphincter tone and increased intraabdominal pressure from uterine enlargement. Gastric acid reflux can cause esophagitis and chest pain. However, it typically presents more chronically with postprandial heartburn, odynophagia, or dysphagia. Although severe esophagitis is a risk factor for perforation, reflux esophagitis alone does not cause pneumomediastinum.

Educational objective:
Protracted vomiting can cause esophageal rupture (Boerhaave syndrome). Patients typically have severe chest/back pain and may have pneumomediastinum with crepitus or a precordial crunching sound on auscultation (Hamman sign). Esophageal perforation is a surgical emergency.

References

- Esophageal perforation.
- Pneumomediastinum following esophageal rupture associated with hyperemesis gravidarum.

A 37-year-old woman comes to the emergency department due to persistent nausea and vomiting. The patient has had intermittent nausea for the past week and nausea and vomiting for the past 2 days. Now, she is unable to tolerate solids or liquids. The patient has had no fever, chills, abdominal pain, diarrhea, constipation, or sick contacts. She has well-controlled chronic hypertension and hypothyroidism. The patient has had no surgeries. She is sexually active and uses condoms intermittently. The patient smokes half a pack of cigarettes daily but does not use alcohol or illicit drugs. Temperature is 36.7 C (98 F), blood pressure is 130/88 mm Hg, and pulse is 108/min. Mucous membranes are dry and capillary refill time is delayed. The thyroid is nontender and diffusely enlarged on palpation. Cardiac examination shows sinus tachycardia and no murmurs. The abdomen is nontender and nondistended. A urine pregnancy test is positive. Urinalysis is positive for ketones. Pelvic ultrasound reveals a viable, 8-week intrauterine twin gestation. Which of the following is the most significant risk factor for this patient's current symptoms?

- A. Chronic hypertension
- B. Hypothyroidism
- C. Maternal age
- D. Multiple gestation
- E. Tobacco use

Submit

A 37-year-old woman comes to the emergency department due to persistent nausea and vomiting. The patient has had intermittent nausea for the past week and nausea and vomiting for the past 2 days. Now, she is unable to tolerate solids or liquids. The patient has had no fever, chills, abdominal pain, diarrhea, constipation, or sick contacts. She has well-controlled chronic hypertension and hypothyroidism. The patient has had no surgeries. She is sexually active and uses condoms intermittently. The patient smokes half a pack of cigarettes daily but does not use alcohol or illicit drugs. Temperature is 36.7 C (98 F), blood pressure is 130/88 mm Hg, and pulse is 108/min. Mucous membranes are dry and capillary refill time is delayed. The thyroid is nontender and diffusely enlarged on palpation. Cardiac examination shows sinus tachycardia and no murmurs. The abdomen is nontender and nondistended. A urine pregnancy test is positive. Urinalysis is positive for ketones. Pelvic ultrasound reveals a viable, 8-week intrauterine twin gestation. Which of the following is the most significant risk factor for this patient's current symptoms?

- A. Chronic hypertension (2%)
- B. Hypothyroidism (5%)
- C. Maternal age (5%)
- ✓ D. Multiple gestation (81%)
- E. Tobacco use (5%)

Omitted
Correct answer
D

81%
Answered correctly

02 secs
Time Spent

02/03/2020
Last Updated

Explanation

Hyperemesis gravidarum

Hyperemesis gravidarum	
Risk factors	• Hydatidiform mole • Multifetal gestation • History of hyperemesis gravidarum
Clinical features	• Severe, persistent vomiting • >5% loss of prepregnancy weight • Dehydration • Orthostatic hypotension
Laboratory abnormalities	• Ketonuria • Hypochloremic metabolic alkalosis • Hypokalemia • Hemoconcentration
Treatment	• Admission to hospital • Antiemetics & intravenous fluids

This patient has **hyperemesis gravidarum**, a severe form of persistent **nausea and vomiting in pregnancy** that is often characterized by dehydration (eg, dry mucous membranes, delayed capillary refill, tachycardia) and hypoglycemia (as evidenced by ketonuria). Additional clinical features may include orthostatic hypotension, electrolyte abnormalities, and a >5% loss of prepregnancy weight. Hyperemesis gravidarum typically occurs during the first trimester and early portions of the second trimester.

A common **risk factor** for hyperemesis gravidarum is a **twin (multiple) gestation**; other risk factors include hyperemesis gravidarum in a prior pregnancy, a hydatidiform mole, and a history of migraines or motion sickness. Twin gestations are thought to be at an increased risk for hyperemesis gravidarum due to **elevated hCG and progesterone concentrations** from a larger placental volume. hCG levels (which peak at the same time as hyperemesis gravidarum symptoms) may be a cause for increased nausea. Elevated progesterone levels, which relax smooth

A common **risk factor** for hyperemesis gravidarum is a **twin (multiple) gestation**; other risk factors include hyperemesis gravidarum in a prior pregnancy, a hydatidiform mole, and a history of migraines or motion sickness. Twin gestations are thought to be at an increased risk for hyperemesis gravidarum due to **elevated hCG and progesterone concentrations** from a larger placental volume. hCG levels (which peak at the same time as hyperemesis gravidarum symptoms) may be a cause for increased nausea. Elevated progesterone levels, which relax smooth muscle tone at the lower esophageal sphincter (ie, gastroesophageal reflux) and in the stomach (ie, delayed gastric emptying), can cause increased or persistent vomiting.

Nausea and vomiting in pregnancy typically resolve spontaneously by the second trimester and can be managed with antiemetics and dietary changes (eg, small meals). Patients with hyperemesis gravidarum typically require treatment for their electrolyte abnormalities and hypovolemia and are placed on multiple scheduled antiemetics.

(Choice A) Chronic hypertension is a risk factor for preeclampsia, fetal growth restriction, and abruptio placentae. It is not a risk factor for hyperemesis gravidarum.

(Choice B) Hyperemesis gravidarum may cause a transient hyperthyroidism because elevated hCG levels share a similar subunit to TSH and, therefore, can have some thyroid-stimulating activity. Maternal hypothyroidism does not increase the risk of hyperemesis gravidarum.

(Choice C) Hyperemesis gravidarum is more common in young women during their first pregnancy, not those of advanced (>35) maternal age.

(Choice E) Tobacco use protects against hyperemesis gravidarum, likely because it increases the metabolism of estrogen and thereby decreases serum estrogen levels.

Educational objective:
Hyperemesis gravidarum is a severe form of nausea and vomiting in pregnancy that typically occurs during the first trimester. A common risk factor is a twin gestation due to elevated hCG and progesterone levels.

References

- Hyperemesis gravidarum: a review of recent literature.
- Hyperemesis gravidarum: a current review.