

SAEMS
Ondansetron HCL
Self-Learning Module

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November, 2008

TRAINING MODULE FOR ONDANSETRON

DATE: November 2008

PURPOSE

This Training Module has been developed to serve as a template for EMS provider training. The intent is to provide consistent and concise information to all providers practicing in the SAEMS Region and under a Base Hospital. One hour of SAEMS continuing education credit may be issued following successful completion of the module by your Base Hospital Manager/Coordinator.

OBJECTIVES: Upon completion of this learning module the participant will be able to:

1. List three benefits of using Ondansetron.
2. Identify three non viral-related reasons for vomiting.
3. List possible causes of vomiting in pediatric population.
4. List four serious conditions causing nausea and vomiting.

INSTRUCTIONS:

1. Read the accompanying information, Standing Order and any additional reference material as necessary.
2. Complete the attached Posttest and return to your base hospital Manager/Coordinator.
3. A SAEMS CE Form will be issued to providers scoring greater than % on the Posttest.
4. Please contact your Base Hospital Manager/Coordinator for questions, suggestions or concerns.

TRAINING MODULE FOR ONDANSETRON HCL

PHARMACOLOGY

Anti-Emetic

Ondansetron HCL (Zofran)

The EMS system is evolving from entities that only existed to initiate emergency treatment of obviously life-threatening traumatic and nontraumatic conditions to those which can perform triage, identify risk factors for signs and symptoms of potentially serious medical conditions, and begin the first stages of emergency department treatment. As the EMS system matures, so does the realization that the first contact gives the opportunity for EMT-P to positively affect the outcome of patient care.

Treatment for symptoms like nausea and vomiting would not have been considered the role of a paramedic even 15 years ago. EMT-P frequently began and ended with an apology for not being able to offer any treatment for the patient retching in the back of the ambulance. Today it is not only possible, but quite simple to provide prompt relief to patients who have nausea and/or vomiting prior to their arrival in the ED.

It is imperative that the EMT-P recognizes that not all vomiting is viral-related; there are often potentially serious medical conditions that generate these symptoms, especially in the geriatric population. It is the EMT-P responsibly who treat these patients to evaluate the patients signs and symptoms a long with the medical history.

Ondansetron (Zofran):

Zofran is a 5-HT₃ antagonist which is a very effective anti-nausea and anti-emetic medication with minimal reported significant side effects. Nausea and vomiting are strongly associated with a specific type of serotonin receptor in the brain (and possibly in other sites as well) called 5-HT₃. Zofran was very expensive; however, now that it has gone off patent, generic versions are available. Side effects of Zofran have generally been infrequent and mild, including diarrhea, headache, fatigue and constipation. The only absolute contraindication to its use is hypersensitivity.

Morphine Induced Nausea and Vomiting:

Nausea and vomiting are undesirable side effects associated with the use of Morphine Sulfate. Nausea or vomiting is apparent in up to 50% of patients taking opioids for relief of chronic pain conditions.

The incidence of nausea and vomiting varies little with the opioid analgesic used. Some opioids have been reported to induce slightly less nausea and vomiting than others due to the functional differences in the various opioid receptors.

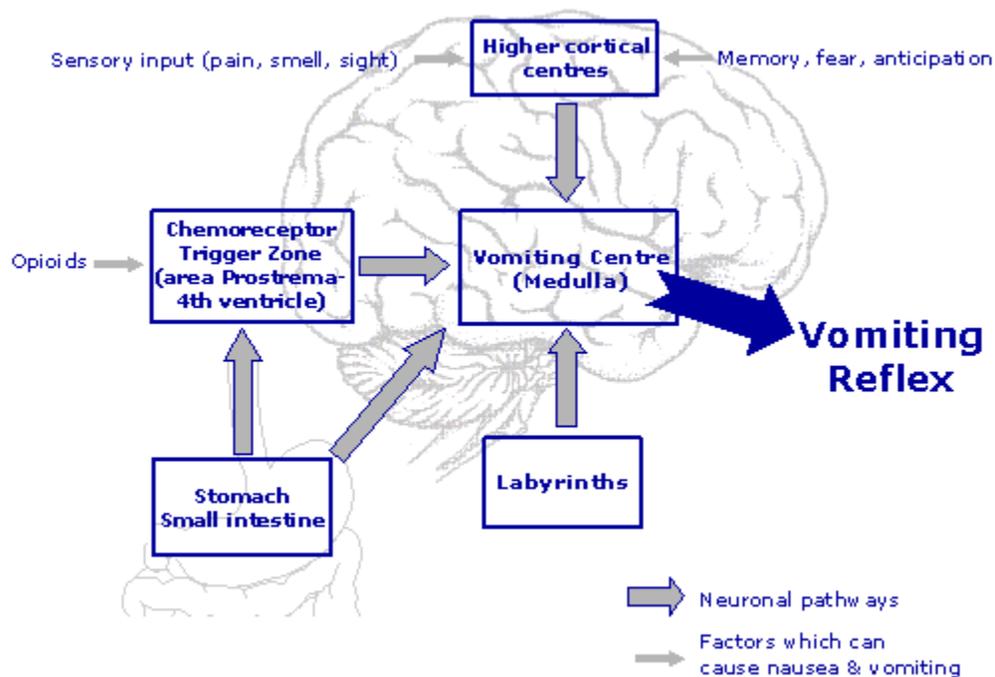
The time course of nausea and vomiting varies with the opioid used, presumably reflecting the pharmacokinetic profiles. The route of administration also plays a part. Intravenous morphine has a lower emetic potential than the same drug administered by the intramuscular route.

Causes of Morphine Induced Nausea and Vomiting:

Morphine is thought to induce nausea and vomiting by a direct action on the chemoreceptor trigger zone (CTZ), an area of the hind brain, which is outside the blood-brain barrier. This is supported by evidence showing that ablation of the CTZ prevents the induction of vomiting by opioids. The mechanism of action of opioids in emesis is, however, complicated. Biphasic dose-response curves have been reported and in certain circumstances, opioids can have anti-emetic actions:

The three known types of opioid receptor (kappa - κ , delta - δ and mu - μ) are all thought to play a role in opioid-induced nausea and vomiting.

The factors involved with opioid-induced nausea and vomiting.



Other causes of Nausea and Vomiting:

Nausea and vomiting can be very distressing for patients when they are already feeling uncomfortable and anxious.

Nausea and vomiting are not diseases, but rather are symptoms of many different conditions, such as infection ("stomach flu"), food poisoning, motion sickness, overeating, blocked intestine, illness, concussion or brain injury, appendicitis, and migraines. Nausea and vomiting can sometimes be symptoms of more serious diseases such as heart attacks, kidney or liver disorders, central nervous system disorders, brain tumors, and some forms of cancer.

Nausea and vomiting can occur in both children and adults.

Nausea and vomiting can be triggered by many factors, including:

- **Gastroenteritis.** This inflammation of the lining of the stomach and intestines is typically caused by a viral infection or bacteria from contaminated food or water. In addition to nausea and vomiting, there may be watery diarrhea and abdominal cramps.
- **Headache or inner ear disturbance.** An intense headache, such as a migraine, can cause nausea and vomiting. An inner ear disturbance, such as motion sickness. A rare cause of headache and nausea with vomiting is a brain tumor.
- **Medical treatment.** Vomiting is often associated with anti-cancer drugs and radiation therapy.
- **Toxins.** High levels of toxins in the blood — including alcohol, nicotine and drugs such as antibiotics — can cause nausea and vomiting.
- **Hormones.** The hormonal changes of early pregnancy can induce nausea and lead to vomiting, as can the surges in hormones that often occur in periods of intense stress. Problems with the thyroid gland — producing either too much thyroid hormone or not enough — also can result in nausea.
- **Diabetes.** Diabetes also can cause nausea, especially if it's poorly controlled.
- **Peptic ulcers.** Peptic ulcers are open sores that develop on the lining of the stomach, upper small intestine or esophagus. The classic symptom is burning pain anywhere from the navel to the breastbone. Many peptic ulcers are caused by the bacterium *Helicobacter pylori* (*H. pylori*).
- **Gastroesophageal reflux disease (GERD).** Stomach acid in the lower esophagus also can trigger nausea and regurgitation of food. It can also be associated with vomiting.
- **Gallstones.** Gallstones are solid deposits of cholesterol or calcium salts that form in the gallbladder or nearby bile ducts.
- **Pancreatitis.** In this condition, digestive enzymes attack the pancreas rather than break down food in the small intestine. Pancreatitis causes mild to severe abdominal pain, often accompanied by nausea, vomiting and fever.
- **Liver disease.** If the liver becomes inflamed (hepatitis), which may be related to a virus or medication, nausea and vomiting occur.
- **Kidney failure.** If the kidneys fail, the body loses the ability to filter toxins and this can lead to nausea and vomiting.

Examples of Serious Conditions Causing Nausea and Vomiting:

- Concussion or other brain injury
- Brain infections (encephalitis or meningitis)
- Intestinal blockage
- Appendicitis

Possible causes of vomiting in infants (0 - 6 months):

- Congenital pyloric stenosis, a constriction in the outlet from the stomach (the infant vomits forcefully after each feeding but otherwise appears to be healthy)
- Food allergies or milk intolerance
- Gastroenteritis (infection of the digestive tract that usually causes vomiting with diarrhea)
- Gastroesophageal reflux
- An inborn error of metabolism
- Hole in the bottle nipple may be wrong size, leading to overfeeding
- Infection, often accompanied by fever or runny nose
- Intestinal obstruction, evidenced by recurring attacks of vomiting and crying or screaming as if in great pain
- Accidentally ingesting a drug or poison

Generic Name: Ondansetron

Class: Antiemetic agent

Mechanism of Action:

Selectively blocks serotonin 5-HT₃ receptors located in the CNS at the chemoreceptor trigger zone and in the peripheral nervous system on nerve-terminals of the vagus nerve

Indications for use:

Nausea and vomiting

Contraindications:

Hypersensitivity
Use with caution in patients with hepatic impairment

Adverse Reactions:

<u>CNS:</u>	Headache, malaise, fatigue, dizziness, fever, sedation, extrapyramidal syndrome
<u>Cardiovascular:</u>	Chest pain, arrhythmias
<u>Respiratory:</u>	Hypoxia
<u>GI & Hepatic:</u>	Diarrhea, constipation, abdominal pain, xerostomia, decreased appetite
<u>Skin:</u>	Rash

Notes on Administration

Incompatibilities/Drug Interactions:

Inducers or inhibitors of P450 drug metabolizing enzymes may alter the clearance of Ondansetron. No dosage adjustment is recommended.

Adult Dosage:

4 – 8 mg IV slow push over 2 – 5 minutes
8 mg PO ODT or tablet

Pediatric Dosage: (1 month to 12 years old)

Greater than 40 kg- 4 mg IV slow push over 2 – 5 minutes
Less than 40 kg- 0.1 mg/kg IV slow push over 2 – 5 minutes

GD-093-PHS-EMS: Drug Profile for Ondansetron

4-12 years old 4 mg PO ODT or ODT

Route of Administration:

IV, IM, PO

Onset of Action:

Unknown but probably 10 to 30 minutes

Peak effects:

Unknown

Duration of Action:

Half life is approximately 4 hours. Exact duration unknown but appears to be prolonged compared to half-life

Dosage Forms/Packaging:

4 mg/2 mL vial
4 or 8 mg ODT or tablet

Arizona Drug Box Standard Minimum Supply:

Optional- 4 mg

Special Notes:

Instructions for Use/Handling ZOFTRAN ODT Orally Disintegrating Tablets: Do not attempt to push ZOFTRAN ODT Tablets through the foil backing. With dry hands, PEEL BACK the foil backing of 1 blister and GENTLY remove the tablet. IMMEDIATELY place the ZOFTRAN ODT Tablet on top of the tongue where it will dissolve in seconds, then swallow with saliva. Administration with liquid is not necessary.

Bottles: Store between 2° and 30°C (36° and 86°F). Protect from light.

Dispense in tight, light-resistant container as defined in the USP.

Unit Dose Packs: Store between 2° and 30°C (36° and 86°F). Protect from light. Store blisters in cartons.

Ondansetron HCL Drug Profile Test

NAME: _____ **UNIT:** _____ **DATE:** _____

1. Brand name of ondansetron is:
 - a. Reglan
 - b. Omeprazole
 - c. Tigan
 - d. Zofran
2. Indications for ondansetron are/is (circle all that apply):
 - a. Anxiousness
 - b. Nausea
 - c. Emesis
 - d. Pain
3. Ondansetron works on which receptors:
 - a. Dopamine
 - b. Histamine
 - c. Serotonin
 - d. Opiate
4. The adult dosage for ondansetron is:
 - a. 0.5mg IVP slow
 - b. 1-2mg IVP slow
 - c. 0.1mg/kg
 - d. 4mg IVP slow
5. Most common side effect of ondansetron is:
 - a. Diarrhea
 - b. Hypotension
 - c. Tachycardia
 - d. Seizures

6. Ondansetron can be used for adult and pediatric patients:
- True
 - False
7. Digestive enzymes attack the pancreas when you have a peptic ulcer.
- True
 - False
8. Morphine is thought to induce nausea vomiting by a direct action:
- Blocking dopamine-2 receptors in the brain
 - Acting as an anti-psychotic medication
 - On the chemoreceptor trigger zone
 - Blocking dopamine receptors in the brain
9. You should use caution when giving patients in liver failure ondansetron
- True
 - False
10. CNS adverse effect (s) can include:
- Headache
 - Extrapyramidal symptoms
 - Seizures
 - All the above
11. Classification of ondansetron is:
- Non-narcotic pain reliever
 - Anti-histamine
 - Anti-emetic
 - Anti-arrhythmic

12. Onset of ondasetron is:

- a. Rapid (within minutes)
- b. One hour
- c. 45 minutes

13. Dosage form/packaging of ondansetron is:

- a. 2mg/1ml
- b. 4mg/2ml
- c. 4mg/1ml
- d. 1mg/1ml

SAEMS EVALUATION FORM

EVALUATION

Please answer the following questions by marking the appropriate response:

	Lowest Worst Least				Highest Best Most
1. To what extent did this module meet your needs?	1	2	3	4	5
2. There was a balance between theoretical and practical information.	1	2	3	4	5
3. The time required was appropriate to content.	1	2	3	4	5
4. The module increased my knowledge and understanding of the topic.	1	2	3	4	5
5. References or audiovisuals were adequate.	1	2	3	4	5
6. Overall, this program was worthwhile.	1	2	3	4	5
7. Additional comments:					
