DROPERIDOL

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Topic Overview

Droperidol is a butyrophenone, a typical antipsychotic and dopamine receptor antagonist that works in the chemoreceptor trigger zone. The labeled use of droperidol is for the treatment of nausea and vomiting in the surgical and diagnostic setting, although it is often used for various off-label purposes as well. After decades of successful use in the surgical and emergency department settings, droperidol fell out of favor dramatically after the FDA issued a controversial black box warning due to the risk of QT prolongation. However, after much scrutiny of the FDA decision and the available data, droperidol has re-emerged as a potentially safe and effective option, although the practical utility of the drug has been limited by market shortages and periods of unavailability.

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How to Earn Credit: From August 29, 2022, through August 29, 2025, participants must:

1) Read the "learning objectives" and "author and planning team disclosures;"
2) Study the section entitled "educational activity;" and
3) Complete the Post-test and Evaluation form. The Post-test will be graded automatically. Following successful completion of the Post-test with a score of 70% or higher, a statement of participation will be made available immediately. (No partial credit will be given.)

Learning Objectives: Upon completion of this educational activity, participants should be able to:

1. **Identify** the indications, uses, contraindications, and potential side effects of droperidol
2. **Describe** the professional position statement guiding droperidol use in surgical and emergency cases
3. **Compare** droperidol to other treatments for acute agitation, and **Describe** its use in combination with other drugs
4. **Compare** medical research and case reports focused on the role of droperidol in multiple clinical settings

Disclosures

The following individuals were involved in the development of this activity: Kristi Monson, PharmD, BCACP, AE-C, Susan DePasquale, MSN, PMHNP-BC, Angel A. Rodriguez, PharmD. There are no financial relationships relevant to this activity to report or disclose by any of the individuals involved in the development of this activity.

Introduction

Droperidol is a butyrophenone class typical antipsychotic that has a labeled use in the United States for the reduction of nausea and vomiting that accompany diagnostic and surgical procedures. It is used for various off-label indications, such as to sedate acutely agitated or violent patients, to treat acute migraine, and as an adjunct for general anesthesia induction and maintenance. Pharmacists should be aware of the controversial nature of the usage restrictions of this drug, the history of the drug's disappearance and re-emergence from use in the United States, and the risks and benefits associated with its use.

Pharmacological Profile

Droperidol is a typical antipsychotic (1st generation) in the butyrophenone class.[1,2] Droperidol is a dopamine receptor antagonist that works in the chemoreceptor trigger zone; it is also a peripheral alpha-adrenergic antagonist.[1,2] It was approved for use in the United States in 1970 and marketed under the brand name Inapsine®, although it is now available only in generic form.[3] It is available in the United States as a 2.5 mg/mL solution for injection in 2 mL single-dose vials.[4]

Typical antipsychotics are sometimes categorized as high-potency or low-potency or referred to by their chemical structure.[2] The terms high-potency and low**-**potency were developed to compare the dose needed when using a typical antipsychotic to achieve the same therapeutic effect as a 100 mg dose of chlorpromazine. For example, haloperidol is considered high-potency because, in terms of effectiveness, a 1 mg dose is calculated as a dose equivalent to 100 mg of chlorpromazine.[5]

Droperidol is a high-potency, typical antipsychotic. Other examples of high-potency typical antipsychotics include fluphenazine, haloperidol, loxapine, perphenazine, pimozide, thiothixene, and trifluoperazine. Like other high-potency typical antipsychotics, droperidol has a high risk for extrapyramidal symptoms (EPS) but a low risk for anticholinergic and sedative

effects.[2] In contrast, low-potency typical antipsychotics, such as chlorpromazine and thioridazine, usually have a low risk for EPS but a high risk for anticholinergic and sedative effects.[2]

Labeled and Off-label Uses

Droperidol has a single FDA-approved indication: to reduce the incidence of nausea and vomiting that accompany diagnostic and surgical procedures, also known as post-operative nausea/vomiting (PONV).[4] Common off-label indications include:[2]

- Induction of sedation in agitated or violent patients (sometimes known as "chemical restraint")
- Adjunct to general anesthesia induction or maintenance
- Treatment of anxiety prior to anesthesia
- Treatment of acute migraine

Administration

Droperidol is approved for administration via intramuscular (IM) injection or slow intravenous injection (slow IV push). Droperidol is sometimes given by intermittent IV infusion. However, because intermittent IV infusion is not an officially approved administration method, the package insert provides no information regarding dilution, compatibility, or stability.[4]

Intermittent IV infusion can be used as an off-label route of administration. It can be mixed in normal saline (NS), 5% dextrose (D5W), or Lactated Ringer's (LR), at a maximum concentration of 1mg/50mL. There is no recommended rate of infusion but should be infused slowly, and the patient should be monitored for side effects during the infusion.[2]

Pharmacokinetics

One of the most clinically attractive qualities of droperidol is its rapid and reliable onset of action (3 to 10 minutes), particularly when dealing with

an acutely agitated patient.[1] Time to maximum effect is approximately 30 minutes, with a duration of effect of 2 to 4 hours (although sometimes lingering as long as 12 hours).[1]

Droperidol readily crosses the blood-brain barrier. Droperidol is hepatically metabolized and primarily renally excreted.[1] The elimination half-life of droperidol is approximately two hours in adults (and slightly shorter in children).[1]

Dosage: Nausea and Vomiting

Per the package insert, the maximum initial dose in adults is 2.5 mg, IV, or IM. Additional doses of 1.25 mg may be used but should be given cautiously.[1]

For children 2 through 12 years of age, the maximum recommended initial dosage is 0.1 mg/kg, with additional doses given if clinically warranted.

In general, dosages used for nausea and/or vomiting are lower than those used for sedation. Kreisler, et al. (2000) published a study in the journal *Anesthesia & Analgesia* that compared 0.625mg of IV droperidol to ondansetron 4mg IV, promethazine 12.5mg IV, and placebo for the prevention of PONV.[6] Droperidol was found to be equivalent to both ondansetron and promethazine for the prevention of PONV.[6]

Dosage: Off-Label Uses

As is typical with off-label indications, dosage recommendations vary. Suggested dosages for sedating agitated or violent patients tend to be higher than the officially recommended nausea/vomiting dosage, often ranging from 2.5 mg up to 10 mg in a single dose, often in combination with a benzodiazepine. For other off-label uses, recommended dosages often mirror the approved labeling with the caveat that dosages should be adjusted for patient factors such as age, weight, and other medications given.[1,2]

Dosing Adjustment

Geriatric

There are no specific dosing recommendations for the use of droperidol for geriatric patients.[1] Adverse reactions of concern for geriatric patients include falls, orthostatic hypotension, and anticholinergic effects. Antipsychotics such as droperidol are potentially inappropriate for patients 65 years or older.[1]

Hepatic and Renal Impairment

There are no specific dosage recommendations for droperidol in patients who have hepatic or renal impairment.[1,4] Droperidol should be used with caution if the patient has hepatic or renal impairment.[1,4]

Lookalike/Soundalike Concerns

Droperidol may potentially be confused with dronabinol.[1] Not only are the drug names similar, but their indications are also similar (since both medications can be used for nausea and/or vomiting). Pharmacists should be aware of the potential for prescribing mix-ups, although actual dispensing errors would be unlikely with these medications since dronabinol is available only in capsule form and at much higher dosages compared to droperidol.

US Boxed Warning

According to the US Boxed Warning ("black box warning") for droperidol issued in 2001, QT prolongation and torsades de pointes have been reported after the use of droperidol, even at or below the recommended dosage. Fatalities have been reported, and this adverse effect has occurred in patients who did not have known risk factors for QT prolongation.[1,2,4] Droperidol should only be used if other treatments have not been effective or if other treatments have caused intolerable adverse effects.

The black box warning is controversial, and it has been suggested that it was inappropriate and not scientifically warranted.[7-9] Cole, *et al.* (2020) stated: "We found the incidence of QTc prolongation and TdP in ED patients receiving droperidol to be extremely rare. Our data suggest the FDA "black box warning" is overstated, and that close ECG monitoring is useful only in high-risk patients."[9] Pharmacists who were practicing in the early 2000s may recall the timing of the black box warning (which resulted in a dramatic decline in droperidol usage) in relation to the approval of newer, more expensive antiemetics was considered by some to be highly suspect. In the years since the warning, droperidol virtually disappeared from use in the United States, initially due to the restrictions placed on its use by facilities in response to the black box warning and subsequently due to product shortages and discontinuations.

Droperidol should be used cautiously if the patient has risk factors for prolonged QT, which may include age > 65 years, alcohol use, bradycardia, cardiac hypertrophy, congestive heart failure (CHF), hypokalemia, hypomagnesemia, use of other drugs that can prolong the QT interval, and concurrent use of benzodiazepines, diuretics, IV opiates, and volatile anesthetics.[1,2] According to the black box warning, prior to the use of droperidol, a 12-lead ECG should be done, and if the QT interval is > 440 msec (males) or > 450 msec (females), droperidol should not be given.[1,4] If droperidol is given, the patient should be placed on continuous electrocardiogram (ECG) monitoring, the drug administered, and the ECG monitoring continued for 2-3 hours after the dose has been given.[1,2,4]

An important 2015 position statement from the American Academy of Emergency Medicine supporting the use of droperidol without ECG screening and monitoring (in some situations), combined with improved product availability of the drug in 2019 (when the American Regent "reintroduced" the drug in the US market) has led to renewed interest in its use.[7,10]

Contraindications and Adverse Effects

Droperidol is contraindicated if the patient has hypersensitivity to the drug or any components of the product. Droperidol is contraindicated if the patient has known or suspected QT prolongation, including (but not limited to) individuals with congenital long QT syndrome.[1,2,4]

As is typical for older medications, the incidence of adverse effects is not listed in the package insert for droperidol. Nonetheless, side effects listed as "common" include the following:[4]

- Mild to moderate hypotension
- Mild to moderate tachycardia
- Dysphoria
- Postoperative drowsiness
- Restlessness
- Hyperactivity
- Anxiety

Serious adverse reactions include QT prolongation and torsades de pointes, severe hypotension, EPS (such as dystonia, akathisia, oculogyric crisis), and neuroleptic malignant syndrome (NMS).

Pregnancy and Breastfeeding

Droperidol has been evaluated as an adjunctive treatment for hyperemesis gravidarum. It is not recommended as a treatment for treating persistent nausea and vomiting during pregnancy.[1]

Droperidol is categorized as a pregnancy risk category C drug; category C means that animal studies have shown adverse fetal effects, there are no adequate and well-controlled studies of its teratogenic effects in humans, and the benefits of droperidol during pregnancy may outweigh the risks. It is not known if droperidol is excreted in breast milk.[1]

Drug-Drug Interactions

Droperidol interacts with an extremely large number of other medications (far too many to list). However, in general, droperidol drug interactions of the highest concern are due to additive adverse pharmacological effects. In particular, any medication that adds to the anticholinergic, CNS depressing, QT-prolonging, or serotonin-modulating effects of droperidol can lead to a clinically significant interaction.[4,11]

A Closer Look at Two Common Indications

As mentioned previously, droperidol has been used successfully for a number of different indications, many of which are unapproved. Historically, two of the common droperidol uses include preventing/treating postoperative nausea and vomiting (an FDA-approved use) and treating agitation (an off-label use).

Postoperative Nausea and Vomiting

The vomiting center in the brain initiates and coordinates vomiting. It communicates directly with peripheral pathways and receptors, the vestibular system, the cortex, and the chemoreceptor trigger zone. The chemoreceptor trigger zone is activated by dopamine, neurokin-1, and serotonin. Droperidol, by its action as a dopamine receptor antagonist, interrupts the transmission of afferent signals to the vomiting center and prevents emesis.

Without prophylaxis, postoperative vomiting occurs in approximately 30% of all patients and up to 80% of high-risk patients. High-risk patients include females, non-smokers, patients who have had episodes of motion sickness or previous postoperative vomiting, and patients who are expected to need postoperative opioids.[12,13] General anesthesia using volatile anesthetics appears more likely to cause PONV than total intravenous anesthesia.[13]

In addition to being a highly unpleasant experience, PONV can delay discharge from the healthcare facility and increases the risk for postoperative complications like aspiration, dehydration, esophageal rupture, increased intracranial pressure, pneumothorax, and wound dehiscence.[14]

Droperidol, alone or in combination with other drugs, has been used successfully for decades to treat nausea and vomiting.[14-16] However, after the FDA's black box warning about droperidol, and the risks of QT prolongation, torsades de pointes, and sudden death were issued in 2001, the use of droperidol decreased significantly.[9] Other antiemetics like anticholinergics, glucocorticoids, phenothiazines, and serotonin receptor antagonists are preferred as prophylaxis and/or treatment for postoperative nausea and vomiting.[17,18]

Officially, it is recommended that all patients be evaluated for preexisting prolonged QT interval via 12-lead ECG before receiving droperidol and monitored with continuous ECG until at least two to three hours after the dose has been given.[4,9] Droperidol can also be combined with other drugs like dexamethasone, which is a corticosteroid.[19]

Acute Agitation

Droperidol is not approved as a treatment for acute agitation. However, clinical experience and research suggest that it is safe and effective for this purpose.[7,21-26] Indeed, a number of studies have shown comparable or superior safety and efficacy for droperidol compared to other treatments for acute agitation.

Page, *et al.* (2018) used droperidol (149 patients) or midazolam (141 patients) to treat acute behavioral disturbance in the pre-hospital setting.[21] The primary outcomes of the study were the incidence of certain adverse effects, which included airway intervention, oxygen desaturation, respiratory depression, hypotension, excessive sedation, and dystonic reactions. The secondary outcomes were time to sedation, the need for additional sedation, staff, and patient injuries, and prehospital time. Droperidol showed a faster

time to sedation, a lower need for additional sedation, a lower incidence of adverse reactions, and no difference in staff or patient injuries, compared to midazolam.[21]

A randomized clinical trial by Taylor, *et al.* (2017) found that midazolam and droperidol, droperidol alone, and olanzapine were all effective treatments for acute agitation. Midazolam-droperidol in combination was slightly superior to the monotherapies. The clinical trial found no difference in adverse effect profiles between these treatments.[22]

A literature review by Khokar, *et al.* (2016) found that as a treatment for psychosis-induced aggression or agitation, droperidol was equally effective or more effective than haloperidol, midazolam, or olanzapine in terms of time to sedation and the need for other drugs; there was no evidence of serious cardiac adverse effects from droperidol, and the safety profile of droperidol was comparable to the other drugs.[23]

Calver, *et al.* (2015) performed a randomized, controlled trial of droperidol and haloperidol for treating aggressive behavior, giving 110 patients haloperidol and 118 droperidol.[24] There was no significant difference in time to sedation (20 minutes for the haloperidol group, 25 minutes for the droperidol group), and 13% of the haloperidol group subjects needed additional sedation versus 5% of the droperidol group subjects. The authors concluded that haloperidol and droperidol were effective for sedating patients with an acute behavioral disturbance.[24]

Macht, *et al.* (2014) reviewed information from 532 cases of patients 18 given prehospital sedation with either droperidol (218) or haloperidol (314) to control agitation.[25] There was no significant difference between the groups in the post-drug QTc interval and no significant difference in the incidence of adverse effects. Additionally, 10% of patients given droperidol received additional sedation 30 minutes after arriving in the ER versus 13% of the patients given haloperidol.[25]

The American Academy of Emergency Medicine issued a position statement on the use of droperidol in the emergency room, stating that "droperidol is an effective and safe medication in the treatment of nausea, headache, and agitation. Intramuscular doses of up to 10 mg of droperidol seem to be as safe and as effective as other medications used for sedation of the agitated patient."[7]

A Closer Look at Serious Adverse Drug Reactions

Although QT prolongation and torsades de pointes receive the most attention whenever adverse drug reactions of droperidol are discussed, there are a number of other serious drug reactions to note.

QT-Prolongation and Torsades de Pointe

As mentioned previously, cardiac QT prolongation and torsades de pointes have been reported with the use of droperidol, even at or below the recommended dose. Fatalities have been reported, and this adverse effect has occurred in patients who did not have known risk factors for QT prolongation.[1,2] A prolonged QT interval, either drug-induced/acquired or congenital, is a risk factor for the development of torsades de pointes (also called polymorphic ventricular tachycardia), a potentially lethal ventricular arrhythmia. Drug-induced or acquired QT prolongation is defined as a QTc interval that is > 500 msec or a QTc interval increase ≥ 60 msec of the patient's baseline QTc interval.[24]

Drug-induced acquired QT interval prolongation is relatively common, but progression to medication-induced torsades de pointes is rare.[17] Arunachalam, *et al.* (2018) examined data from 14,756 patients who were exposed to a drug known to cause QT prolongation potentially; around 6% of the patients developed QT prolongation, but only 0.3% developed torsades de pointes.[27]

The use of a drug that prolongs the QT interval or a prolonged QT interval alone is seldom enough by itself to cause torsades de pointes. Additional risk factors are almost always present when torsades de pointes occurs; not all medications that prolong the QT interval will cause torsades de pointes, and a drug-induced QT interval prolongation is not consistently predictive for torsades de pointes.[26,28] Factors that prolong the QT interval and increase the risk for torsades de pointes in patients who have drug-induced acquired QT prolongation may include those listed in Table 1 below.[9,26,28]

The US Boxed Warning for droperidol was released by the FDA in 2001 in response to deaths, episodes of torsades de pointes, and cases of QT prolongation that were associated with the use of droperidol involving doses at, above, and below the recommended range.[16,29] The need for and the validity of this Boxed Warning, and the FDA's interpretation of the data from which it was generated, have been disputed since the Warning was first issued, and these criticisms have continued.[16,25,29,30] Researchers and clinicians have concluded that droperidol in low doses and in doses < 10 mg is safe.[16,21-25]

TABLE 1: RISK FACTORS FOR TORSADES DE POINTES[16,21-25]

Advanced age
Baseline prolonged QT interval
Bradycardia
Cardiovascular disease, hepatic disease, renal disease
Electrolyte abnormalities, specifically hypocalcemia, hypokalemia, and hypomagnesemia
Female gender
High doses of a drug that prolongs the QT interval
Overdose of a drug that can prolong the QT interval
The use of drugs that inhibit the metabolism of a drug that causes prolonged QT interval.
The use of multiple drugs that cause prolonged QT interval

The level of risk for serious adverse effects of droperidol use, which from experience appears to be quite minimal, has not been definitively determined. The US Boxed Warning remains part of the prescribing information, and QT

prolongation, torsades de pointes, and sudden death have been associated with the typical antipsychotics. The risk of sudden death (presumed to be due to QT prolongation) caused by the use of any antipsychotic has been reported to be 1.5 to almost 2 times the rate of the risk in non-users.[2,31]

Neuroleptic Malignant Syndrome (NMS)

The typical antipsychotics have been implicated as a cause of NMS, a rare and potentially fatal adverse drug reaction characterized by autonomic instability, hyperthermia, muscle rigidity, and neurological changes.[1,5] Neuroleptic malignant syndrome is a well-known and well-documented adverse effect of all antipsychotics, typical and atypical, and it can occur with normal use and when therapy with an antipsychotic is abruptly discontinued.[32,33] The pathophysiology of NMS is not understood, but is likely, at least in part, to be due to dopamine receptor blockade.[32,33]

Neuroleptic malignant syndrome is rare, reportedly occurring in 0.01 to 0.02% of patients treated with antipsychotic medications.[32] The risk of developing NMS has been reported to be essentially the same for the typical and atypical antipsychotics.[32,34] However, NMS causes death in approximately 10% of patients.[32-34]

Some case reports suggest that patients prescribed antipsychotics in combination with lithium are at greater risk of NMS than patients on monotherapy antipsychotic medications, but these reports do not provide enough evidence for a conclusive position on this point.[35] The occurrence of NMS appears to be independent of the antipsychotic dose being taken.[33] However, studies indicate that there is an association between NMS and an alteration of antipsychotic treatment, especially in cases where the antipsychotic dose is increased.[36]

Neuroleptic malignant syndrome is a diagnosis of exclusion, and its presence cannot be confirmed by clinical tests. The four signs that have traditionally been used as the diagnostic criteria for NMS are altered consciousness (usually confusion), autonomic dysfunction, such as changes in

blood pressure and pulse, hyperthermia, and muscular rigidity.[31,32] Neuroleptic malignant syndrome is a rare, idiosyncratic drug reaction, and because it is a clinical diagnosis of exclusion, the true incidence of NMS is not known.

The incidence and risk of NMS caused by droperidol are not known. A case report published in 2013 reviewed droperidol-induced NMS as a possible diagnosis.[37] If the patient has NMS, the offending drug should be immediately discontinued.[33]

Treatment of NMS is primarily supportive, but the dopaminergic drugs amantadine and bromocriptine and the muscle relaxer dantrolene can be effective.[33] Restarting treatment with an antipsychotic after NMS has resolved is complicated and risky.[33,34] Oruch, *et al.* (2017) report that a "majority of psychiatric centers recommend a drug from the atypical group (second-generation or nonconventional) of a low-potency type" when restarting antipsychotic treatment.[33] Grover, *et al.* (2022) state that a patient should not restart therapy with an antipsychotic for at least two weeks after an episode of NMS has resolved.[34] Horseman, *et al.* (2022) agree with a 2-week cessation for oral antipsychotics.[38] For depot formulations, they state that clinicians should wait at least six weeks before restating depot formulation antipsychotics.[38]

Patients who are on a long-term antipsychotic treatment may want to restart the treatment after NMS. When restarting antipsychotics, clinicians can reduce the risk of NMS recurring by avoiding the offending compound or the use of parenteral antipsychotics.[38] They should also start with a low dose and increase the dose slowly. Patients must be kept well hydrated, and they should be monitored for signs of NMS.[34,38] Clinicians should also avoid combining antipsychotics with lithium after a patient had NMS.[38] Patients should be educated on the symptoms of NMS to help them identify the condition should it recur.[38]

Orthostatic Hypotension

Typical antipsychotics can cause orthostatic hypotension due to their activity as peripheral alpha-adrenergic receptor antagonists. This is a class effect, although the intensity of this effect varies throughout the class. Droperidol is a strong peripheral alpha-adrenergic antagonist with a notable propensity to cause orthostatic hypertension.[1] Elderly patients are more likely to have orthostatic hypotension, probably due to decreased baroreceptor sensitivity.[39]

Extrapyramidal Symptoms

Drug-induced extrapyramidal symptoms are movement disorders that are thought to be primarily caused by dopamine receptor antagonism and an imbalance between dopaminergic and cholinergic activity in the nigrostriatal tract, an area of the brain that controls motor movements.[3,4] Extrapyramidal symptoms are a well-known adverse effect of the typical antipsychotic, including droperidol.[40]

A variety of extrapyramidal symptoms (including but not limited to akathisia, dystonia, and oculogyric crisis) have been reported with droperidol, even when used at low doses.[1,4]

Summary

Droperidol is a butyrophenone typical antipsychotic with a variety of uses, notably for postoperative nausea and vomiting and for acute agitation. While fast-acting and reliable, the drug is associated with a number of potentially serious side effects, such as QT prolongation, torsades de pointes, and neuroleptic malignant syndrome. Despite a black box warning issued by the FDA in 2001 that resulted in restricted availability of the drug in many health systems, the drug seems to have regained popularity as a "tried and true" option in many settings, especially after the release of an important position statement from the American Academy of Emergency Medicine supporting its use.

Course Test

1. **Droperidol is a _____, typical antipsychotic.**

    a. high-potency
    b. second generation
    c. phenothiazine class
    d. low-potency

2. **Mothers who breastfeed should know that droperidol**

    a. is excreted in breast milk.
    b. is contraindicated for mothers who are breastfeeding.
    c. may or may not be excreted in breast milk.
    d. has known adverse effects on nursing infants.

3. **FDA-approved options for droperidol administration include**

    a. IM and slow IV push.
    b. continuous IV infusion and SQ.
    c. oral and continuous IV infusion.
    d. IM and continuous IV infusion.

4. **Established off-label uses for droperidol include all the following except**

    a. schizophrenia treatment.
    b. acute migraine treatment.
    c. acute agitation treatment.
    d. pre-anesthesia anxiety treatment.

5. **True or False: Droperidol readily crosses the blood-brain barrier.**

    a. True
    b. False

6. **Droperidol is contraindicated if a patient**

    a. is concurrently receiving a benzodiazepine.
    b. has congenital long QT syndrome.
    c. is over 65 years old.
    d. All of the above

7. Droperidol is used off-label for the treatment of

a. postoperative nausea and vomiting.
b. depression.
c. acute agitation.
d. undifferentiated dementia.

8. Droperidol is particularly useful when a clinician is dealing with an acutely agitated patient because

a. it does not interact with other medications.
b. it does not easily cross the blood-brain barrier.
c. of its rapid and reliable onset of action.
d. of its low-potency characteristics.

9. Droperidol, by its action as a dopamine receptor antagonist, interrupts the transmission of _____ signals to the vomiting center and prevents emesis.

a. efferent
b. tardive
c. involuntary
d. afferent

10. Potentially severe side effects of droperidol include all the following except

a. oculogyric crisis.
b. QT prolongation.
c. neuroleptic malignant syndrome.
d. hypertensive crisis.

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