

PRESCRIBING INFORMATION
INCLUDING PATIENT MEDICATION INFORMATION

^NHYDROmorphone Hydrochloride Injection, USP

(Hydromorphone Hydrochloride Injection, USP)

2 mg/mL Sterile Solution for Injection

Intramuscular, Intravenous, Subcutaneous

Opioid Analgesic

NOT A PRODUCT MONOGRAPH

Fresenius Kabi Canada Ltd.
165 Galaxy Blvd. Suite 100
Toronto, Ontario
M9W 0C8

Date of revision:
August 20, 2019

Submission Control No.: 212894

TABLE OF CONTENTS

PART I: HEALTH PROFESSIONAL INFORMATION	3
SUMMARY PRODUCT INFORMATION	3
INDICATIONS AND CLINICAL USE	3
CONTRAINDICATIONS	3
WARNINGS AND PRECAUTIONS	4
ADVERSE REACTIONS	12
DRUG INTERACTIONS	15
DOSAGE AND ADMINISTRATION	16
OVERDOSAGE	20
ACTION AND CLINICAL PHARMACOLOGY	20
STORAGE AND STABILITY	22
SPECIAL HANDLING INSTRUCTIONS	22
DOSAGE FORMS, COMPOSITION AND PACKAGING	23
PART II: SCIENTIFIC INFORMATION	24
PHARMACEUTICAL INFORMATION	24
REFERENCES	25
PATIENT MEDICATION INFORMATION	27

**^NHYDROmorphone Hydrochloride Injection, USP
(Hydromorphone Hydrochloride Injection, USP)
2 mg/mL Sterile Solution for Injection**

PART I: HEALTH PROFESSIONAL INFORMATION

SUMMARY PRODUCT INFORMATION

Route of Administration	Dosage Form / Strength	Non-medicinal Ingredients
Intramuscular, Intravenous, Subcutaneous	Sterile Solution for Injection / 2 mg/mL	Citric acid, sodium citrate, and water for injection

INDICATIONS AND CLINICAL USE

Adults:

HYDROmorphone Hydrochloride Injection, USP (Hydromorphone Hydrochloride Injection, USP) is indicated for the relief of moderate to severe pain.

Geriatrics (> 65 years of age):

In general, dose selection for an elderly patient should be cautious, usually starting at the low end of the dosing range, and titrated slowly, reflecting the greater frequency of decreased hepatic, renal or cardiac function, concomitant disease or other drug therapy (see WARNINGS AND PRECAUTIONS, Special Populations, Geriatrics).

Pediatrics (< 18 years of age):

The safety and efficacy of HYDROmorphone Hydrochloride Injection, USP has not been studied in the pediatric population. Therefore the use of HYDROmorphone Hydrochloride Injection, USP is not recommended in patients under 18 years of age.

CONTRAINDICATIONS

- Patients who are hypersensitive to the active substances (Hydromorphone) or other opioid analgesics or to any ingredient in the formulation. For a complete listing, see the DOSAGE FORMS, COMPOSITION AND PACKAGING section of the Prescribing Information.
- In patients with known or suspected mechanical gastrointestinal obstruction (e.g., bowel obstruction, strictures) or any diseases/conditions that affect bowel transit (e.g., ileus of any type).
- Patients with suspected surgical abdomen (e.g., acute appendicitis or pancreatitis).
- Patients with mild pain that can be managed with other pain medications.
- Patients with acute or severe bronchial asthma, chronic obstructive airway, or status asthmaticus.

- Patients with acute respiratory depression, elevated carbon dioxide levels in the blood and cor pulmonale.
- Patients with acute alcoholism, delirium tremens, and convulsive disorders.
- Patients with severe CNS depression, increased cerebrospinal or intracranial pressure, and head injury.
- Patients taking concomitant monoamine oxidase (MAO) inhibitors (or within 14 days of such therapy).
- Women who are breast-feeding, pregnant, or during labour and delivery (see Serious Warnings and Precautions, and WARNINGS AND PRECAUTIONS).

WARNINGS AND PRECAUTIONS

SERIOUS WARNINGS AND PRECAUTIONS

Limitations of Use

Because of the risks of addiction, abuse, and misuse with opioids, even at recommended doses, and because of the risks of overdose and death with immediate release opioid formulations, HYDROmorphone Hydrochloride Injection, USP (Hydromorphone Hydrochloride, USP) should only be used in patients for whom alternative treatment options (e.g., non-opioid analgesics) are ineffective, not tolerated, or would be otherwise inadequate to provide appropriate management of pain (see DOSAGE AND ADMINISTRATION).

Addiction, Abuse, and Misuse

HYDROmorphone Hydrochloride Injection, USP poses risks of opioid addiction, abuse, and misuse, which can lead to overdose and death. Each patient's risk should be assessed prior to prescribing HYDROmorphone Hydrochloride Injection, USP, and all patients should be monitored regularly for the development of these behaviours or conditions (see WARNINGS AND PRECAUTIONS). HYDROmorphone Hydrochloride Injection, USP should be stored securely to avoid theft or misuse.

Accidental Exposure

Accidental ingestion of even one dose of HYDROmorphone Hydrochloride Injection, USP, especially by children, can result in a fatal overdose of hydromorphone.

Life-threatening Respiratory Depression: OVERDOSE

Serious, life-threatening, or fatal respiratory depression may occur with use of HYDROmorphone Hydrochloride Injection, USP. Infants exposed in –utero or through breast milk at risk of life-threatening respiratory depression upon delivery or when nursed. Patients should be monitored for respiratory depression, especially during initiation of HYDROmorphone Hydrochloride Injection, USP or following a dose increase. Further, instruct patients of the hazards related to taking opioids including fatal overdose.

Neonatal Opioid Withdrawal Syndrome

Prolonged maternal use of HYDROmorphone Hydrochloride Injection, USP during pregnancy can result in neonatal opioid withdrawal syndrome, which may be life-threatening (see WARNINGS AND PRECAUTIONS).

Interaction with Alcohol

The co-ingestion of alcohol with HYDROmorphone Hydrochloride Injection, USP should be avoided as it may result in dangerous additive effects, causing serious injury or death (see WARNINGS AND PRECAUTIONS and DRUG INTERACTIONS).

Risks From Concomitant Use With Benzodiazepines Or Other CNS Depressants

Concomitant use of opioids with benzodiazepines or other CNS depressants, including alcohol, may result in profound sedation, respiratory depression, coma, and death (see WARNINGS AND PRECAUTIONS, Neurologic and DRUG INTERACTIONS).

- Reserve concomitant prescribing of HYDROmorphone Hydrochloride Injection, USP and benzodiazepines or other CNS depressants for use in patients for whom alternative treatment options are inadequate.
- Limit dosages and durations to the minimum required.
- Follow patients for signs and symptoms of respiratory depression and sedation.

General

HYDROmorphone Hydrochloride Injection, USP should be stored securely to avoid theft or misuse.

HYDROmorphone Hydrochloride Injection, USP should only be prescribed by healthcare professionals who are knowledgeable in the continuous administration of potent opioids, in the management of patients receiving potent opioids for the treatment of pain, and in the detection and management of respiratory depression, including the use of opioid antagonists.

In diseases, such as malignant cancers, where pain control is the primary focus, opioid administration at very high doses is associated with seizures and myoclonus.

If necessary, hydromorphone may be given intravenously but the injection should be given very slowly. Rapid intravenous injection of narcotic analgesic agents, including hydromorphone, increases the possibility of adverse effects, such as hypotension and respiratory depression.

Patients should be cautioned not to consume alcohol while taking HYDROmorphone Hydrochloride Injection, USP as it may increase the chance of experiencing serious adverse events, including death.

Hyperalgesia that will not respond to a further dose increase of hydromorphone may occur at particularly high doses. A hydromorphone dose reduction or change in opioid may be required.

Abuse and Misuse

Like all opioids, HYDROmorphone Hydrochloride Injection, USP is a potential drug of abuse and misuse, which can lead to overdose and death. Therefore, HYDROmorphone Hydrochloride Injection, USP should be prescribed and handled with caution. This risk is increased if HYDROmorphone Hydrochloride Injection, USP is taken with alcohol or other CNS depressants.

Patients should be assessed for their clinical risks for opioid abuse or addiction prior to being prescribed opioids. All patients receiving opioids should be routinely monitored for signs of misuse and abuse.

Opioids, such as HYDROmorphone Hydrochloride Injection, USP, should be used with particular care in patients with a history of alcohol and illicit/prescription drug abuse. However, concerns about abuse, addiction, and diversion should not prevent the proper management of pain.

Cardiovascular

Hydromorphone administration may result in severe hypotension in patients whose ability to maintain adequate blood pressure is compromised by reduced blood volume, or concurrent administration of drugs such as phenothiazines and other tranquilizers, sedatives, hypnotics, tricyclic antidepressants or general anesthetics. These patients should be monitored for signs of hypotension after initiating or titrating the dose of HYDROmorphone Hydrochloride Injection, USP.

The use of HYDROmorphone Hydrochloride Injection, USP in patients with circulatory shock should be avoided as it may cause vasodilation that can further reduce cardiac output and blood pressure.

Rapid intravenous injection of opioid analgesics increases the possibility of hypotension and respiratory depression and should be avoided (see DOSAGE AND ADMINISTRATION).

Dependence/Tolerance

As with other opioids, tolerance and physical dependence may develop upon repeated administration of hydromorphone and there is a potential for development of psychological dependence. HYDROmorphone Hydrochloride Injection, USP should therefore be prescribed and handled with the degree of caution appropriate to the use of a drug with abuse potential.

Physical dependence and tolerance reflect the neuroadaptation of the opioid receptors to chronic exposure to an opioid, and are separate and distinct from abuse and addiction. Tolerance, as well as physical dependence, may develop upon repeated administration of opioids, and are not by themselves evidence of an addictive disorder or abuse.

Patients on prolonged therapy should be withdrawn gradually from the drug if it is no longer required for pain control. Withdrawal symptoms may occur following abrupt discontinuation of therapy or upon administration of an opioid antagonist. Some of the symptoms that may be associated with abrupt withdrawal of an opioid analgesic include body aches, diarrhea, gooseflesh, loss of appetite, nausea, nervousness or restlessness, anxiety, runny nose, sneezing,

tremors or shivering, stomach cramps, tachycardia, trouble with sleeping, unusual increase in sweating, palpitations, unexplained fever, weakness and yawning (see ADVERSE REACTIONS, DOSAGE AND ADMINISTRATION, Adjustment or Reduction of Dosage).

Use in Drug and Alcohol Addiction

HYDROmorphone Hydrochloride Injection, USP is an opioid with no approved use in the management of addictive disorders. Its proper usage in individuals with drug or alcohol dependence, either active or in remission, is for the management of pain requiring opioid analgesia. Patients with a history of addiction to drugs or alcohol may be at higher risk of becoming addicted to HYDROmorphone Hydrochloride Injection, USP; unless used under extreme caution and awareness.

Endocrine

Adrenal Insufficiency: Cases of adrenal insufficiency have been reported with opioid use, more often following greater than one month of use. Presentation of adrenal insufficiency may include non-specific symptoms and signs including nausea, vomiting, anorexia, fatigue, weakness, dizziness, and low blood pressure. If adrenal insufficiency is suspected, confirm the diagnosis with diagnostic testing as soon as possible. If adrenal insufficiency is diagnosed, treat with physiologic replacement doses of corticosteroids. Wean the patient off of the opioid to allow adrenal function to recover and continue corticosteroid treatment until adrenal function recovers. Other opioids may be tried as some cases reported use of a different opioid without recurrence of adrenal insufficiency. The information available does not identify any particular opioids as being more likely to be associated with adrenal insufficiency.

Gastrointestinal Effects

Hydromorphone and other morphine-like opioids have been shown to decrease bowel motility. Hydromorphone may obscure the diagnosis or clinical course in patients with acute abdominal conditions (see CONTRAINDICATIONS).

Neonatal Opioid Withdrawal Syndrome (NOWS)

Prolonged maternal use of opioid during pregnancy can result in withdrawal signs in the neonate. Neonatal opioid withdrawal syndrome, unlike opioid withdrawal syndrome in adults, may be life-threatening.

Neonatal opioid withdrawal syndrome presents as irritability, hyperactivity and abnormal sleep pattern, high pitched cry, tremor, vomiting, diarrhea and failure to gain weight. The onset, duration, and severity of neonatal opioid withdrawal syndrome vary based on the specific opioid used, duration of use, timing and amount of last maternal use, and rate of elimination of the drug by the newborn.

Use of HYDROmorphone Hydrochloride Injection, USP is contraindicated in pregnant women (see CONTRAINDICATIONS).

Neurologic

Interactions with CNS Depressants (including benzodiazepines and alcohol):

Hydromorphone should be used with caution and in a reduced dosage during concomitant administration of other opioid analgesics, general anesthetics, phenothiazines and other tranquilizers, sedatives, hypnotics, tricyclic antidepressants, antipsychotics, antihistamines,

benzodiazepines, centrally-active anti-emetics and other CNS depressants. Respiratory depression, hypotension and profound sedation, coma or death may result.

Observational studies have demonstrated that concomitant use of opioid analgesics and benzodiazepines increases the risk of drug-related mortality compared to use of opioid analgesics alone. Because of similar pharmacological properties, it is reasonable to expect similar risk with the concomitant use of other CNS depressant drugs with opioid analgesics (see DRUG INTERACTIONS). If the decision is made to prescribe a benzodiazepine or other CNS depressant concomitantly with an opioid analgesic, prescribe the lowest effective dosages and minimum durations of concomitant use. In patients already receiving an opioid analgesic, prescribe a lower initial dose of the benzodiazepine or other CNS depressant than indicated in the absence of an opioid, and titrate based on clinical response. If an opioid analgesic is initiated in a patient already taking a benzodiazepine or other CNS depressant, prescribe a lower initial dose of the opioid analgesic, and titrate based on clinical response. Follow patients closely for signs and symptoms of respiratory depression and sedation.

Advise both patients and caregivers about the risks of respiratory depression and sedation when HYDROmorphone Hydrochloride Injection, USP is used with benzodiazepines or other CNS depressants (including alcohol and illicit drugs). Advise patients not to drive or operate heavy machinery until the effects of concomitant use of the benzodiazepine or other CNS depressant have been determined. Screen patients for risk of substance use disorders, including opioid abuse and misuse, and warn them of the risk for overdose and death associated with the use of additional CNS depressants including alcohol and illicit drugs (see DRUG INTERACTIONS).

HYDROmorphone Hydrochloride Injection, USP should not be consumed with alcohol as it may increase the chance of experiencing dangerous side effects, including death (see CONTRAINDICATIONS and ADVERSE REACTIONS, Sedation, and DRUG INTERACTIONS).

Severe pain antagonizes the subjective and respiratory depressant actions of opioid analgesics. Should pain suddenly subside, these effects may rapidly become manifest.

Serotonin Syndrome: HYDROmorphone Hydrochloride Injection, USP could cause a rare but potentially life-threatening condition resulting from concomitant administration of serotonergic drugs (e.g. anti-depressants, migraine medications). Treatment with the serotonergic drug should be discontinued if such events (characterized by clusters of symptoms such as hyperthermia, rigidity, myoclonus, autonomic instability with possible rapid fluctuations of vital signs, mental status changes including confusion, irritability, extreme agitation progressing to delirium and coma) occur and supportive symptomatic treatment should be initiated. HYDROmorphone Hydrochloride Injection, USP should not be used in combination with MAO inhibitors or serotonin-precursors (such as L-tryptophan, oxitriptan) and should be used with caution in combination with other serotonergic drugs (triptans, certain tricyclic antidepressants, lithium, tramadol, St. John's Wort) due to the risk of serotonergic syndrome (see DRUG INTERACTIONS).

Head Injury: The respiratory depressant effects of hydromorphone, and the capacity to elevate cerebrospinal fluid pressure, may be greatly increased in the presence of an already elevated intracranial pressure produced by trauma. Also, hydromorphone may produce confusion, miosis,

vomiting and other side effects which obscure the clinical course of patients with head injury. In such patients, hydromorphone must be used with extreme caution and only if it is judged essential (see CONTRAINDICATIONS).

Peri-Operative Considerations

HYDROmorphone Hydrochloride Injection, USP is not indicated for pre-emptive analgesia (administration pre-operatively for the management of post-operative pain). In the case of planned chordotomy or other pain-relieving operations, patients should not be treated with HYDROmorphone Hydrochloride Injection, USP for at least 24 hours before the operation.

Physicians should individualize treatment, moving from parenteral to oral analgesics as appropriate. Thereafter, if HYDROmorphone Hydrochloride Injection, USP is to be continued after the patient recovers from the post-operative period, a new dosage should be administered in accordance with the changed need for pain relief. The risk of withdrawal in opioid-tolerant patients should be addressed as clinically indicated.

The administration of analgesics in the peri-operative period should be managed by healthcare providers with adequate training and experience (e.g., by an anesthesiologist).

Hydromorphone and other hydromorphone-like opioids have been shown to decrease bowel motility. Ileus is a common post-operative complication, especially after intra-abdominal surgery with opioid analgesia. Caution should be taken to monitor for decreased bowel motility in post-operative patients receiving opioids. Standard supportive therapy should be implemented.

Psychomotor Impairment

Hydromorphone may impair the mental and/or physical abilities needed for certain potentially hazardous activities such as driving a car or operating machinery. Patients should be cautioned accordingly. Patients should also be cautioned about the combined effects of hydromorphone with other CNS depressants, including other opioids, phenothiazine, sedatives, hypnotics and alcohol.

Respiratory

Respiratory Depression:

Serious, life-threatening, or fatal respiratory depression has been reported with the use of opioids, even when used as recommended. Respiratory depression from opioid use, if not immediately recognized and treated, may lead to respiratory arrest and death. Management of respiratory depression may include close observation, supportive measures, and use of opioid antagonists, depending on the patient's clinical status. Hydromorphone should be used with extreme caution in patients with substantially decreased respiratory reserve, pre-existing respiratory depression, hypoxia or hypercapnia (see CONTRAINDICATIONS).

While serious, life-threatening, or fatal respiratory depression can occur at any time during the use of HYDROmorphone Hydrochloride Injection, USP, the risk is greatest during the initiation of therapy or following a dose increase. Patients should be closely monitored for respiratory depression when initiating therapy with HYDROmorphone Hydrochloride Injection, USP and following dose increases.

Life-threatening respiratory depression is more likely to occur in the elderly, cachectic, or debilitated patients because they may have altered pharmacokinetics or altered clearance compared to younger, healthier patients.

To reduce the risk of respiratory depression, proper dosing and titration of HYDROmorphone Hydrochloride Injection, USP are essential. Overestimating the HYDROmorphone Hydrochloride Injection, USP dose when converting patients from another opioid product can result in a fatal overdose with the first dose. In these patients, the use of non-opioid analgesics should be considered, if feasible (see WARNINGS AND PRECAUTIONS, Special Populations, Special Risk Groups, and DOSAGE AND ADMINISTRATION).

Use in Patients with Chronic Pulmonary Disease: Monitor patients with significant chronic obstructive pulmonary disease or cor pulmonale, and patients having a substantially decreased respiratory reserve, hypoxia, hypercapnia, or preexisting respiratory depression for respiratory depression, particularly when initiating therapy and titrating with HYDROmorphone Hydrochloride Injection, USP, as in these patients, even usual therapeutic doses of HYDROmorphone Hydrochloride Injection, USP may decrease respiratory drive to the point of apnea. In these patients, use of alternative non-opioid analgesics should be considered, if possible. The use of HYDROmorphone Hydrochloride Injection, USP is contraindicated in Patients with acute or severe bronchial asthma, chronic obstructive airway, or status asthmaticus (see CONTRAINDICATIONS).

Patient Counselling Information

A patient information sheet should be provided to patients when HYDROmorphone Hydrochloride Injection, USP is dispensed to them.

Patients receiving HYDROmorphone Hydrochloride Injection, USP should be given the following instructions by the physician:

1. Patients should be informed that accidental ingestion or use by individuals (including children) other than the patient for whom it was originally prescribed, may lead to severe, even fatal consequences. HYDROmorphone Hydrochloride Injection, USP should be kept under lock and out of sight and out of reach of children.
2. Patients should be advised that HYDROmorphone Hydrochloride Injection, USP contains hydromorphone, an opioid pain medicine.
3. Patients should be advised that HYDROmorphone Hydrochloride Injection, USP should only be taken as directed. The dose of HYDROmorphone Hydrochloride Injection, USP should not be adjusted without consulting with a physician.
4. Patients should not combine HYDROmorphone Hydrochloride Injection, USP with alcohol or other central nervous system depressants (sleep aids, tranquilizers) because dangerous additive effects may occur, resulting in serious injury or death.
5. Patients should be advised to consult their physician or pharmacist if other medications are being used or will be used with HYDROmorphone Hydrochloride Injection, USP.
6. Patients should be advised that if they have been receiving treatment with HYDROmorphone Hydrochloride Injection, USP and cessation of therapy is indicated, it may be appropriate to taper HYDROmorphone Hydrochloride Injection, USP dose, rather than abruptly discontinue it, due to the risk of precipitating withdrawal symptoms.
7. Patients should be advised of the most common adverse reactions that may occur while

taking HYDROmorphone Hydrochloride Injection, USP: constipation, dizziness, light-headedness, nausea, sedation, sweating and vomiting. If symptoms worsen, seek immediate medical attention.

8. Patients should be advised that HYDROmorphone Hydrochloride Injection, USP may cause drowsiness, dizziness or light-headedness and may impair mental and/or physical ability required for the performance of potentially hazardous tasks (e.g., driving, operating machinery). Patients started on HYDROmorphone Hydrochloride Injection, USP or patients whose dose has been adjusted should be advised not to drive a car or operate machinery unless they are tolerant to the effects of HYDROmorphone Hydrochloride Injection, USP.
9. Patients should be advised that HYDROmorphone Hydrochloride Injection, USP is a potential drug of abuse. They should protect it from theft or misuse.
10. Patients should be advised that HYDROmorphone Hydrochloride Injection, USP should never be given to anyone other than the individual for whom it was prescribed.
11. Women of childbearing potential who become or are planning to become pregnant should be advised to consult a physician prior to initiating or continuing therapy with HYDROmorphone Hydrochloride Injection, USP. Women who are breast-feeding or pregnant should not use HYDROmorphone Hydrochloride Injection, USP.

Sexual Function / Reproduction

Long-term use of opioids may be associated with decreased sex hormone levels and symptoms such as low libido, erectile dysfunction, or infertility (see ADVERSE REACTIONS, Post-Marketing Experience).

Special Populations

Special Risk Groups: Hydromorphone should be administered with caution to patients with a history of alcohol and drug abuse and in a reduced dosage to debilitated patients, and in patients with severely impaired pulmonary function, Addison's disease, hypothyroidism, myxedema, toxic psychosis, prostatic hypertrophy or urethral stricture.

Opioid analgesics including hydromorphone should also be used with caution in patients about to undergo surgery of the biliary tract, since it may cause spasm of the sphincter of Oddi.

Pregnant Women:

Studies in humans have not been conducted. HYDROmorphone Hydrochloride Injection, USP crosses the placental barrier and is contraindicated in pregnant women.

Prolonged maternal use of opioids during pregnancy can result in withdrawal signs in the neonate. Neonatal Opioid Withdrawal Syndrome (NOWS), unlike opioid withdrawal syndrome in adults, may be life-threatening (see WARNINGS AND PRECAUTIONS, Neonatal Opioid Withdrawal Syndrome (NOWS), ADVERSE REACTIONS, Post-Marketing Experience).

Pregnant women using opioids should not discontinue their medication abruptly as this can cause pregnancy complication such as miscarriage or still-birth. Tapering should be slow and under medical supervision to avoid serious adverse events to the fetus.

Labour, Delivery and Nursing Women:

Since opioids can cross the placental barrier and are excreted in breast milk, HYDROmorphone

Hydrochloride Injection, USP is contraindicated in nursing women and during labour and delivery. Life-threatening respiratory depression can occur in the infant if opioids are administered to the mother. Naloxone, a drug that counters the effects of opioids, should be readily available if HYDROmorphone Hydrochloride Injection, USP is used in this population.

Pediatrics (< 18 years of age): The safety and efficacy of HYDROmorphone Hydrochloride Injection, USP has not been studied in the pediatric population. Therefore the use of HYDROmorphone Hydrochloride Injection, USP is not recommended in patients under 18 years of age.

Geriatrics (> 65 years of age): In general, dose selection for an elderly patient should be cautious, usually starting at the low end of the dosing range and titrated slowly, reflecting the greater frequency of decreased hepatic, renal or cardiac function, concomitant disease or other drug therapy (see DOSAGE AND ADMINISTRATION).

Patients with Hepatic Impairment: Mean exposure to hydromorphone (C_{max} and AUC_{∞}) is increased 4-fold in patients with moderate (Child-Pugh Group B) hepatic impairment compared with subjects with normal hepatic function. The pharmacokinetics of HYDROmorphone in patients with severe hepatic impairment has not been studied. A further increase in C_{max} and AUC of hydromorphone in this group is expected and should be taken into consideration when selecting a starting dose.

Patients with Renal Impairment: Mean exposure to hydromorphone (C_{max} and $AUC_{0-\infty}$) is increased by 2-fold in patients with moderate ($CL_{cr} = 40 - 60$ mL/min) renal impairment and increased by 4-fold in patients with severe ($CL_{cr} < 30$ mL/min) renal impairment compared with normal subjects ($CL_{cr} > 80$ mL/min). In addition, in patients with severe renal impairment, hydromorphone appeared to be more slowly eliminated with a longer terminal elimination half-life (40 hr) compared to patients with normal renal function (15 hr). Patients with renal impairment should be closely monitored during dose titration.

ADVERSE REACTIONS

Adverse Drug Reaction Overview

The adverse effects of HYDROmorphone Hydrochloride Injection, USP (Hydromorphone Hydrochloride, USP) are similar to those of other opioid analgesics and represent an extension of pharmacological effects of the drug class. The major hazards include respiratory depression, central nervous system depression and apnea. To a lesser degree, circulatory depression, respiratory arrest, shock and cardiac arrest have occurred.

The most frequently observed adverse effects are constipation, light-headedness, dizziness, sedation, nausea, vomiting, and hyperhidrosis.

Pain at injection site, local tissue irritation and induration following subcutaneous injection, particularly when repeated in the same area, have occurred.

Sedation: Sedation is a common side effect of opioid analgesics, especially in opioid naïve individuals. Sedation may also occur partly because patients often recuperate from prolonged

fatigue after the relief of persistent pain. Most patients develop tolerance to the sedative effects of opioids within three to five days and, if the sedation is not severe, will not require any treatment except reassurance. If excessive sedation persists beyond a few days, the dose of the opioid should be reduced and alternate causes investigated. Some of these are: concurrent CNS depressant medication, hepatic or renal dysfunction, brain metastases, hypercalcemia and respiratory failure.

If it is necessary to reduce the dose, it can be carefully increased again after three or four days if it is obvious that the pain is not being well controlled. Dizziness and unsteadiness may be caused by postural hypotension particularly in elderly or debilitated patients and may be alleviated if the patient lies down.

Nausea and Vomiting: Nausea is a common side effect on initiation of therapy with opioid analgesics and is thought to occur by activation of the chemoreceptor trigger zone, stimulation of the vestibular apparatus and through delayed gastric emptying. The prevalence of nausea declines following continued treatment with opioid analgesics. When instituting prolonged therapy with an opioid for chronic pain, the routine prescription of an antiemetic should be considered. In the cancer patient, investigation of nausea should include such causes as constipation, bowel obstruction, uremia, hypercalcemia, hepatomegaly, tumor invasion of celiac plexus and concurrent use of drugs with emetogenic properties. Persistent nausea which does not respond to dosage reduction may be caused by opioid-induced gastric stasis and may be accompanied by other symptoms including anorexia, early satiety, vomiting and abdominal fullness. These symptoms respond to chronic treatment with gastrointestinal prokinetic agents.

Constipation: Practically all patients become constipated while taking opioids on a persistent basis. In some patients, particularly the elderly or bedridden, fecal impaction may result. It is essential to caution the patients in this regard and to institute an appropriate regimen of bowel management at the start of prolonged opioid analgesic therapy. Stool softeners, stimulant laxatives and other appropriate measures should be used as required. As fecal impaction may present as overflow diarrhea, the presence of constipation should be excluded in patients on opioid therapy prior to initiating treatment for diarrhea.

The following adverse effects occur with opioid analgesics and include those reported in hydromorphone clinical trials, as well as post-marketing adverse events related to hydromorphone. The reactions are categorized by body system and frequency according to the following definitions: Very common ($\geq 1/10$); Common ($\geq 1/100$ to $<1/10$); Uncommon ($\geq 1/1,000$ to $<1/100$); Rare ($\geq 1/10,000$ to $<1/1,000$); Very rare ($< 1/10,000$), Not known (cannot be estimated from the available data).

Immune System Disorders:

Not known: anaphylactic reactions, hypersensitivity reactions (including oropharyngeal swelling).

Metabolism and Nutrition Disorders:

Common: decreased appetite

Psychiatric Disorders:

Common: anxiety, confusional state, insomnia, euphoric mood, dysphoria.

Uncommon: Agitation, depression, hallucinations, nightmares, mood altered. *Not known:* drug dependence, nervousness, disorientation.

Nervous System Disorders:

Very common: dizziness, somnolence, sedation.

Common: headache.

Uncommon: myoclonus, paraesthesia, tremor, presyncope.

Rare: lethargy

Not known: convulsions, dyskinesia, hyperalgesia, syncope, increased intracranial pressure, nystagmus.

Eye Disorders:

Uncommon: visual impairment.

Not known: blurred vision, miosis, diplopia.

Cardiac Disorders:

Rare: bradycardia, palpitations, tachycardia.

Vascular Disorders:

Very common: flushing

Uncommon:

hypotension

Not known: flushing, hypertension

Respiratory Thoracic and Mediastinal Disorders:

Uncommon: dyspnea.

Rare: respiratory depression.

Not known: bronchospasm, and laryngospasm.

Gastrointestinal Disorders:

Very common: constipation, nausea

Common: abdominal pain, dry mouth, vomiting.

Uncommon: diarrhea, dysgeusia.

Not known: paralytic ileus.

Hepatobiliary Disorders:

Uncommon: hepatic enzymes increased

Not known: biliary colic

Skin and Subcutaneous Tissue

Disorders: *Common:* pruritus,

hyperhidrosis *Uncommon:* rash

Not known: urticaria

Musculoskeletal and Connective Tissue Disorders

Common: muscle contractions involuntary

Not known: muscle rigidity.

Renal and Urinary Disorders:

Uncommon: urinary retention, urinary hesitancy.

Reproductive System and Breast Disorders:

Uncommon: erectile dysfunction

General Disorders and Administration Site Conditions:

Common: asthenia, injection site reaction, weakness.

Uncommon: drug withdrawal syndrome, fatigue, malaise, peripheral edema.

Not known: drug tolerance, chills, drug withdrawal syndrome neonatal, feeling abnormal

Post-Marketing Experience

The following adverse reactions have been identified during post approval use of hydromorphone. Because these reactions are reported voluntarily from a population of uncertain size, it is not always possible to reliably estimate their frequency or establish a causal relationship to drug exposure.

Serotonin syndrome: Cases of serotonin syndrome, a potentially life-threatening condition, have been reported during concomitant use of opioids with serotonergic drugs.

Adrenal insufficiency: Cases of adrenal insufficiency have been reported with opioid use, more often following greater than one month of use (see **WARNINGS AND PRECAUTIONS - Endocrine**).

Anaphylaxis: Anaphylactic reaction has been reported with ingredients contained in **HYDRomorphone Hydrochloride Injection, USP**.

Androgen deficiency: Chronic use of opioids may influence the hypothalamic-pituitary-gonadal axis, leading to androgen deficiency that may manifest as low libido, impotence, erectile dysfunction, amenorrhea, or infertility. The causal role of opioids in the clinical syndrome of hypogonadism is unknown because the various medical, physical, lifestyle, and psychological stressors that may influence gonadal hormone levels have not been adequately controlled for in studies conducted to date. Patients presenting with symptoms of androgen deficiency should undergo laboratory evaluation.

There have also been post-marketing reports of Neonatal Opioid Withdrawal Syndrome (NOWS) in patients treated with hydromorphone (see **WARNINGS AND PRECAUTIONS, Neonatal Opioid Withdrawal Syndrome (NOWS)**).

DRUG INTERACTIONS**Overview**

Interactions with Central Nervous System (CNS) Depressants (including benzodiazepines and alcohol): Due to additive pharmacologic effect, the concomitant use of benzodiazepines or other CNS depressants (e.g. other opioids, sedatives, hypnotics, antidepressants, anxiolytics, tranquilizers, muscle relaxants, general anesthetics, antipsychotics, phenothiazines, neuroleptics, antihistamines, antiemetics, and alcohol) and beta-blockers, increases the risk of respiratory

depression, profound sedation, coma, and death. Reserve concomitant prescribing of these drugs for use in patients for whom alternative treatment options are inadequate. Limit dosages and durations to the minimum required. Follow patients closely for signs of respiratory depression and sedation (see WARNINGS AND PRECAUTIONS, Neurologic, Interactions with CNS Depressants (including benzodiazepines and alcohol) and Psychomotor Impairment). HYDROmorphone Hydrochloride Injection, USP should not be consumed with alcohol as it may increase the chance of experiencing dangerous side effects.

Drug-Drug Interactions

Administration with Mixed Activity Agonist/Antagonist Opioids: Mixed agonist/antagonist opioid analgesics (i.e., pentazocine, nalbuphine, butorphanol, and buprenorphine) should be administered with caution to a patient who has received or is receiving a course of therapy with a pure opioid agonist analgesic such as hydromorphone. In this situation, mixed agonist/antagonist analgesics may reduce the analgesic effect of hydromorphone and/or may precipitate withdrawal symptoms in these patients.

MAO Inhibitors: MAO Inhibitors intensify the effects of opioid drugs which can cause anxiety, confusion and decreased respiration. HYDROmorphone Hydrochloride Injection, USP is contraindicated in patients receiving MAO inhibitors or who have used them within the previous 14 days (see CONTRAINDICATIONS).

Serotonergic Agents: Coadministration of hydromorphone with a serotonergic agent, such as a Selective Serotonin Re-uptake Inhibitor or a Serotonin Norepinephrine Re-uptake Inhibitor, may increase the risk of serotonin syndrome, a potentially life-threatening condition (see WARNINGS AND PRECAUTIONS, Neurologic).

Drug-Herb Interactions

Interactions with herbal products have not been established.

Drug-Laboratory Interactions

Interactions with laboratory tests have not been established.

Drug-Lifestyle Interactions

The concomitant use of alcohol should be avoided (see WARNINGS AND PRECAUTIONS, General).

DOSAGE AND ADMINISTRATION

For acute pain, it is recommended that HYDROmorphone Hydrochloride Injection, USP be used for a maximum of 7 days at the lowest dose that provides adequate pain relief.

All doses of opioids carry an inherent risk of fatal or non-fatal adverse events. This risk is increased with higher doses. For the management of chronic non-cancer, non-palliative pain, it is recommended that 13.5 mg (90 morphine milligram equivalent) of HYDROmorphone Hydrochloride Injection, USP not be exceeded. Each patient should be assessed for their risk prior to prescribing HYDROmorphone Hydrochloride Injection, USP, as the likelihood of experiencing serious adverse events can depend upon the type of opioid, duration of treatment,

level of pain as well as the patient's own level of tolerance. In addition, the level of pain should be assessed routinely to confirm the most appropriate dose and the need for further use of HYDROmorphone Hydrochloride Injection, USP (see DOSAGE AND ADMINISTRATION - Adjustment or reduction of Dosage).

HYDROmorphone Hydrochloride Injection, USP should only be used in patients for whom alternative treatment options are ineffective or not tolerated (e.g., non-opioid analgesics).

Rapid intravenous injection of opioid analgesics increases the possibility of hypotension and respiratory depression.

Dosing Considerations

HYDROmorphone Hydrochloride Injection, USP is not indicated for rectal administration.

Sterile Solution for Injection: HYDROmorphone Hydrochloride Injection, USP sterile solution for injection is to be visually inspected prior to use. Only clear solutions practically free from particles should be used. The injection should be given immediately after opening the ampoule. Once opened, any unused portion should be discarded.

Recommended Dose and Dosage Adjustment

Adults: Individual dosing requirements vary considerably based on each patient's age, weight, severity and cause of pain, and medical and analgesic history.

Patients Not Receiving Opioids at the Time of Initiation of Hydromorphone Treatment:

The usual adult parenteral dose for pain relief is 2 mg by subcutaneous or intramuscular route every 4 to 6 hours as necessary. If necessary, hydromorphone may be given intravenously, but the injection should be given very slowly. Rapid intravenous injection of opioid analgesics increases the possibility of hypotension and respiratory depression. Severe pain can be controlled with 3 to 4 mg every 4 to 6 hours as necessary.

HYDROmorphone Hydrochloride Injection, USP injection has been reported to be physically or chemically incompatible with solutions containing sodium bicarbonate and thiopental sodium.

Patients Currently Receiving Opioids: For patients who are receiving an alternate opioid, the "oral hydromorphone equivalent" of the analgesic presently being used, should be determined. Having determined the total daily dosage of the present analgesic, **Table 1** can be used to calculate the approximate daily oral hydromorphone dosage that should provide equivalent analgesia. Further dose reductions should be considered due to incomplete cross-tolerance between opioids.

Opioid Rotation: Conversion ratios for opioids are subject to variations in kinetics governed by genetics and other factors. When switching from one opioid to another, consider reducing the calculated **dose by 25-50%** to minimize the risk of overdose. Subsequently, up-titrate the dose, as required, to reach the appropriate maintenance dose.

Table 1: Opioid Analgesics - Approximate Analgesic Equivalences¹

Drug	Equivalent Dose (mg) ² (compared to morphine 10 mg IM)		Duration of Action (hours)
	Parenteral	Oral	
Strong Opioid Agonists:			
Morphine	10	60 ³	3 - 4
Oxycodone	15	30 ⁴	2 - 4
Hydromorphone	1.5	7.5 ⁵	2 - 4
Anileridine	25	75	2 - 3
Levorphanol	2	4	4 - 8
Meperidine ⁶	75	300	1 - 3
Oxymorphone	1.5	5 (rectal)	3 - 4
Methadone ⁷	-	-	-
Heroin	5 - 8	10 - 15	3 - 4
Weak Opioid Agonists:			
Codeine	120	200	3 - 4
Propoxyphene	50	100	2 - 4
Mixed Agonist-Antagonist⁸			
Pentazocine ⁶	60	180	3 - 4
Nalbuphine	10	-	3 - 6
Butorphanol	2	-	3 - 4

Footnotes:

¹References:

Expert Advisory Committee on the Management of Severe Chronic Pain in Cancer Patients, Health and Welfare Canada.

Cancer pain: A monograph on the management of cancer pain. Ministry of Supplies and Services Canada, 1987. Cat. No. H42-2/5-1984E.

Foley KM. The treatment of cancer pain. N Engl J Med 1985;313(2):84-95.

Aronoff GM, Evans WO. Pharmacological management of chronic pain: A review. In: Aronoff GM, editor. Evaluation and treatment of chronic pain. 2nd ed. Baltimore (MD): Williams and Wilkins; 1992. p. 359-68.

Cherny NI, Portenoy RK. Practical issues in the management of cancer pain. In: Wall PD, Melzack R, editors. Textbook of pain. 3rd ed. New York: Churchill Livingstone; 1994. p. 1437-67.

- 2 **Most of this data was derived from single-dose, acute pain studies and should be considered an approximation for selection of doses when treating chronic pain. As analgesic conversion factors are approximate and patient response may vary, dosing should be individualized according to relief of pain and side effects. Because of incomplete cross-tolerance, dose reductions of 25% to 50% of the equianalgesic dose may be appropriate in some patients when converting from one opioid to another, particularly at high doses.† Upward titration may be required to reach appropriate maintenance doses.**

†Levy MH. Pharmacologic treatment of cancer pain. N Engl J Med 1996;335:1124-1132.

- 3 **For acute pain, the oral or rectal dose of morphine is six times the injectable dose. However, for chronic dosing, clinical experience indicates that this ratio is 2-3:1 (i.e., 20-30 mg of oral or rectal morphine is equivalent to 10 mg of parenteral morphine).**

4 Based on single entity oral oxycodone in acute pain.

5 Clinical experience indicates that during chronic dosing the oral morphine / oral hydromorphone dose ratio is 5 - 7.5:1.

6 Extremely variable equianalgesic dose. Patients should undergo individualized titration starting at an equivalent to 1/10 of the morphine dose.

7 Not recommended for the management of chronic pain.

8 Mixed agonist-antagonists can precipitate withdrawal in patients on pure opioid agonists.

Dose Titration: Dose titration is the key to success with opioid analgesic therapy. Proper optimization of doses scaled to the relief of the individual's pain should aim at the regular administration of the lowest dose which will achieve the overall treatment goal of satisfactory

pain relief with acceptable side effects.

Dosage adjustments should be based on the patient's clinical response.

Adjustment or Reduction of Dosage: Physical dependence with or without psychological dependence tends to occur with chronic administration of opioids, including **HYDROmorphone Hydrochloride Injection, USP**. Withdrawal (abstinence) symptoms may occur following abrupt discontinuation of therapy. These symptoms may include body aches, diarrhea, gooseflesh, loss of appetite, nausea, nervousness or restlessness, runny nose, sneezing, tremors or shivering, stomach cramps, tachycardia, trouble with sleeping, unusual increase in sweating, palpitations, unexplained fever, weakness and yawning.

Following successful relief of moderate to severe pain, periodic attempts to reduce the opioid dose should be made. Smaller doses or complete discontinuation may become feasible due to a change in the patient's condition or mental state. Patients on prolonged therapy should be withdrawn gradually from the drug if it is no longer required for pain control. In patients who are appropriately treated with opioid analgesics and who undergo gradual withdrawal for the drug, these symptoms are usually mild (see **WARNINGS AND PRECAUTIONS**). Tapering should be individualized and carried out under medical supervision.

Patient should be informed that reducing and/or discontinuing opioids decreases their tolerance to these drugs. If treatment needs to be re-initiated, the patient must start at the lowest dose and titrate up to avoid overdose.

Opioid analgesics may only be partially effective in relieving dysesthetic pain, postherpetic neuralgia, stabbing pains, activity-related pain and some forms of headache. That is not to say that patients with advanced cancer suffering from some of these forms of pain should not be given an adequate trial of opioid analgesics, but it may be necessary to refer such patients at an early time to other forms of pain therapy.

Patients with Hepatic Impairment: One-fourth to one-half the usual HYDROmorphone Hydrochloride Injection, USP injection starting dose depending on the extent of impairment.

Patients with Renal Impairment: One-fourth to one-half the usual HYDROmorphone Hydrochloride Injection, USP injection starting dose depending on the degree of impairment.

Geriatrics: Respiratory depression has occurred in the elderly following administration of large initial doses of opioids to patients who were not opioid-tolerant or when opioids were co-administered with other agents that can depress respiration. HYDROmorphone Hydrochloride Injection, USP should be initiated at a low end of the dosing range and slowly titrated (see **WARNINGS AND PRECAUTIONS**).

Use with Non-Opioid Medications: If a non-opioid analgesic is being provided, it may be continued. If the non-opioid is discontinued, consideration should be given to increasing the opioid dose to compensate for the non-opioid analgesic. HYDROmorphone Hydrochloride Injection, USP can be safely used concomitantly with usual doses of other non-opioid analgesics.

OVERDOSAGE

For management of a suspected drug overdose, contact your Regional Poison Control Centre.

Symptoms

Serious overdose with HYDROmorphone Hydrochloride Injection, USP (Hydromorphone hydrochloride, USP) is characterized by respiratory depression (a decrease in respiratory rate and/or tidal volume, Cheyne-Stokes respiration, cyanosis), dizziness, confusion, extreme somnolence progressing to stupor or coma, coma, pneumonia aspiration, skeletal muscle flaccidity, cold and clammy skin, constricted pupils and sometimes bradycardia and hypotension. In severe overdose, particularly following intravenous injection, apnea, circulatory collapse, cardiac arrest and death may occur.

Treatment

In the treatment of overdose, primary attention should be given to the re-establishment of adequate respiratory exchange through provision of a patent airway and institution of assisted or controlled ventilation. It should be borne in mind that for individuals who are physically dependent on opioids and are receiving large doses of these drugs, the administration of the usual dose of opioid antagonist will precipitate an acute withdrawal syndrome. The severity will depend on the degree of physical dependence and the dose of the antagonist administered. Use of an opioid antagonist in such persons should be avoided. If necessary to treat serious respiratory depression in the physically dependent patient, the antagonist should be administered with extreme care and by titration, commencing with 10 to 20% of the usual recommended initial dose.

Respiratory depression which may result from overdose, or unusual sensitivity to hydromorphone in a non-opioid-tolerant patient, can be managed with the opioid antagonist naloxone. A dose of naloxone (usually 0.4 to 2.0 mg) should be administered intravenously, if possible, simultaneously with respiratory resuscitation. The dose can be repeated in 3 minutes. Naloxone should not be administered in the absence of clinically significant respiratory or cardiovascular depression. Naloxone should be administered cautiously to persons who are known or suspected to be physically dependent on hydromorphone. In such cases, an abrupt or complete reversal of opioid effects may precipitate an acute abstinence syndrome. Since the duration of action of hydromorphone may exceed that of the antagonist, the patient should be kept under continued surveillance; repeated doses of the antagonist may be required to maintain adequate respiration. Other supportive measures should be applied when indicated.

Supportive measures, including oxygen and vasopressors, should be employed in the management of circulatory shock and pulmonary edema accompanying overdose, as indicated. Cardiac arrest or arrhythmias may require cardiac massage or defibrillation.

ACTION AND CLINICAL PHARMACOLOGY

Mechanism of Action

HYDROmorphone Hydrochloride Injection, USP (Hydromorphone hydrochloride, USP) has

analgesic and antitussive activity. Small doses of hydromorphone produce effective and prompt relief of pain, usually with minimal nausea and vomiting.

Opioid analgesics have multiple actions but exert their primary effects on the central nervous system and organs containing smooth muscle. The principal actions of therapeutic value are analgesia and sedation. Opioid analgesics also suppress the cough reflex and cause respiratory depression, mood changes, mental clouding, euphoric mood, dysphoria, nausea, vomiting, increased cerebrospinal fluid pressure, pinpoint constriction of the pupils, increased biliary tract pressure, increased parasympathetic activity and transient hyperglycemia.

The precise mode of analgesic action of opioid analgesics is unknown. However, specific CNS opiate receptors have been identified. Opioids are believed to express their pharmacological effects by combining with these receptors.

Pharmacodynamics

When given parenterally, hydromorphone's analgesic action is generally apparent within five minutes. The onset of action of oral hydromorphone hydrochloride is somewhat slower, with measurable analgesia occurring within 30 minutes. When sleep follows the administration of hydromorphone, it is usually due to relief of pain, not to hypnosis.

Estimates of the relative analgesic potency of parenterally administered hydromorphone to morphine in acute pain studies in man range from approximately 7:1 to 11:1. In addition, hydromorphone is better absorbed orally than is morphine, the former approximately 20 to 25% as active orally as intramuscularly hydromorphone has greater antitussive potency than codeine on a weight basis; however, its dependence liability is also greater than that of codeine.

Cardiovascular System:

Hydromorphone may produce release of histamine with or without associated peripheral vasodilation. Manifestations of histamine release and/or peripheral vasodilatation may include pruritus, flushing, red eyes, hyperhidrosis and/or orthostatic hypotension.

Central Nervous System:

Hydromorphone produces respiratory depression by direct action on brain stem respiratory centres. The respiratory depression involves both a reduction in the responsiveness of the brain stem centres to increases in CO₂ tension and to electrical stimulation.

Hydromorphone depresses the cough reflex by direct effect on the cough centre in the medulla. Antitussive effects may occur with doses lower than those usually required for analgesia.

Hydromorphone causes miosis, even in total darkness. Pinpoint pupils are a sign of opioid overdose but are not pathognomonic (e.g., pontine lesions of hemorrhagic or ischemic origin may produce similar findings). Marked mydriasis rather than miosis may be seen with hypoxia in the setting of hydromorphone overdose.

Endocrine System:

Opioids may influence the hypothalamic-pituitary-adrenal or -gonadal axes. Some changes that can be seen include an increase in serum prolactin, and decreases in plasma cortisol and testosterone. Clinical signs and symptoms may be manifest from these hormonal changes.

Gastrointestinal Tract and Other Smooth Muscle:

Hydromorphone causes a reduction in motility associated with an increase in smooth muscle tone in the antrum of the stomach and duodenum. Digestion of food in the small intestine is delayed and propulsive contractions are decreased. Propulsive peristaltic waves in the colon are decreased, while tone may be increased to the point of spasm resulting in constipation. Other opioid-induced effects may include a reduction in gastric, biliary and pancreatic secretions, spasm of the sphincter of Oddi, and transient elevations in serum amylase.

Hepatobiliary System:

Opioids may induce biliary spasm.

Immune System:

In vitro and animal studies indicate that opioids have a variety of effects on immune functions, depending on the context in which they are used. The clinical significance of these findings is unknown.

Pharmacokinetics

Absorption: When hydromorphone is taken orally, it is absorbed from the gastrointestinal tract.

Distribution: Following intravenous administration of hydromorphone to normal volunteers, the mean $t_{1/2}$ of elimination was 2.65 +/- 0.88 hours. The mean volume of distribution was 91.5 liters, suggesting extensive tissue uptake. Hydromorphone is rapidly removed from the bloodstream and distributed to skeletal muscle, kidneys, liver, intestinal tract, lungs, spleen and brain. It also crosses the placental membranes.

Metabolism: In normal human volunteers hydromorphone is metabolized primarily in the liver.

Elimination: Hydromorphone is excreted in the urine, predominantly as the glucuronidated conjugate, with small amounts of parent drug and minor amounts of 6-hydroxy reduction metabolites.

Special Population and Conditions

Pediatrics:

Individuals under 18 years of age should not take HYDROmorphone Hydrochloride Injection, USP.

STORAGE AND STABILITY

Sterile Solution for Injection: Store HYDROmorphone Hydrochloride Injection, USP sterile solution for injection at 15°C to 30°C. Protect from light. Discard unused portion.

SPECIAL HANDLING INSTRUCTIONS

Not applicable.

DOSAGE FORMS, COMPOSITION AND PACKAGING

Dosage Forms and Composition

Sterile solution for injection: Each mL of sterile solution contains: 2 mg hydromorphone hydrochloride. Non-medicinal ingredients: citric acid 2 mg, sodium citrate 2 mg, and water for injection.

Packaging

Sterile solution for injection: HYDROmorphone Hydrochloride Injection, USP sterile solution for injection, containing 2 mg hydromorphone hydrochloride per mL is available in 2 mL single use vials (1 mL fill) in boxes of 25.

PART II: SCIENTIFIC INFORMATION

PHARMACEUTICAL INFORMATION

Drug Substance

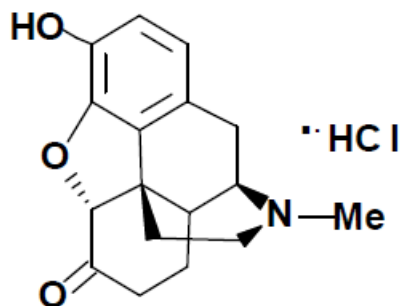
Proper Name: Hydromorphone hydrochloride

Chemical Name: (1) Morphinan-6-one,4,5-epoxy-3-hydroxy-17-methyl-, hydrochloride,(5 α)-
(2) 4, 5 α -Epoxy-3-hydroxy-17-methylmorphinan-6-one hydrochloride

Molecular Formula: C₁₇H₁₉NO₃·HCl

Molecular Mass: 321.80 g/mol

Structural Formula:



Physicochemical Properties

Appearance: White to off-white odorless powder.

Solubility: Soluble in 3 parts water and sparingly soluble in alcohol.

Melting Point: Decomposes at 305°C to 315°C.

pKa: 8.095 ± 0.013 (basic)
9.190 ± 0.013 (acidic)

REFERENCES

1. Brown CR Jr., Forrest WH, Hayden J, James KE. Respiratory effects of hydromorphone in man. *Clin Pharmacol Ther* 1973;14(3):331-7.
2. Bruera E, Brenneis C, Michaud M, Bacovsky R, Chadwick S, Emeno A, MacDonald N. Use of the subcutaneous route for the administration of narcotics in patients with cancer pain. *Cancer* 1988;62(2):407-11.
3. Cone EJ, Phelps BA, Gorodetzky CW. Urinary excretion of hydromorphone and metabolites in humans, rats, dogs, guinea pigs and rabbits. *J Pharm Sci* 1977;66(12):1709-13.
4. Cone EJ, Darwin WD. Simultaneous determination of hydromorphone, hydrocodone and their 6 and 6 β hydroxy metabolites in urine using selected ion recording with methane chemical ionization. *Biomed Mass Spectrom* 1978;5(4):291-5.
5. Dickson PH, Lind A, Studts P, Nipper HC, Makoid M, Makoid M, et al. The routine analysis of breast milk for drugs of abuse in a clinical toxicology laboratory. *J Forensic Sci* 1994;39(1):207-14.
6. Expert Advisory Committee on the Management of Severe Chronic Pain in Cancer Patients, Health and Welfare Canada. Cancer pain: a monograph on the management of cancer pain. Ministry of Supplies and Services Canada, 1987. Cat. No. H42-2/5-1984E.
7. Goldberg RI and Shuman FI. Oral hydromorphone in trauma. *Curr Ther Res Clin Exp* 1965;7(5):284-8.
8. Hagen N, Thirlwell MP, Dhaliwal HS, Babul N, Harsanyi Z, Darke AC. Steady-state pharmacokinetics of hydromorphone and hydromorphone-3-glucuronide in cancer patients after immediate and controlled-release hydromorphone. *J Clin Pharmacol* 1995;35:37-44.
9. Hanks GW, Justins DM. Cancer pain: management. *Lancet* 1992;339(8800):1031-6.
10. Hays H, Hagen N, Thirlwell M, Dhaliwal H, Babul N, Harsanyi Z, Darke AC. Comparative clinical efficacy and safety of immediate release and controlled release hydromorphone for chronic severe cancer pain. *Cancer* 1994;74(6):1808-16.
11. Hill HF, Coda BA, Tanaka A, Schaffer R. Multiple-dose evaluation of intravenous hydromorphone pharmacokinetics in normal human subjects. *Anesth Analg* 1991;72(3):330-6.
12. Houde RW. Clinical analgesic studies of hydromorphone. In: Foley KM, Inturrisi CE, editors. *Advances in pain research and therapy*. Vol. 8. Opioid analgesics in the management of clinical pain. New York: Raven Press; 1986. p. 129-41.
13. Keeri-Szanto M. Anaesthesia time/dose curves IX: the use of hydromorphone in surgical anaesthesia and postoperative pain relief in comparison to morphine. *Can Anaesth Soc J* 1976;23(6):587-95.
14. Mahler DL, Forrest WH Jr. Relative analgesic potencies of morphine and hydromorphone in postoperative pain. *Anesthesiology* 1975;42(5):602-7.

15. Moulin DE, Johnson NG, Murray-Parsons N, Geoghegan MF, Goodwin VA, Chester MA. Subcutaneous narcotic infusions for cancer pain: treatment outcome and guidelines for use. *CMAJ* 1992;146(6):891-7.
16. Portenoy RK, Coyle N. Controversies in the long-term management of analgesic therapy in patients with advanced cancer. *J Pain Symptom Manage* 1990;5(5):307-19.
17. Portenoy RK. Chronic opioid therapy in non-malignant pain. *J Pain Symptom Manage* 1990;5 (Suppl 1):S46-S62.
18. Principles of analgesic use in the treatment of acute pain and cancer pain. 6th ed. Glenview (IL): American Pain Society;2008.
19. Reidenberg MM, Goodman H, Erle H, Gray G, Lorenzo B, Leipzig RM, Meyer BR, Drayer DE. Hydromorphone levels and pain control in patients with severe chronic pain. *Clin Pharmacol Ther* 1988;49(4):376-82.
20. Steinberg SK, Kornijenko M. The role of hydromorphone in the treatment of cancer pain. *Can Pharm J* 1988;121(3):182-6.
21. Vallner JJ, Stewart JT, Kotzan JA, Kirsten EB, Honigberg IL. Pharmacokinetics and bioavailability of hydromorphone following intravenous and oral administration to human subjects. *J Clin Pharmacol* 1981;21(4):152-6.
22. Sandoz Canada Inc., Prescribing Information: ^NHYDROmorphone Hydrochloride Injection USP. Control No.: 216086. Date of Revision: June 11, 2018.

READ THIS FOR SAFE AND EFFECTIVE USE OF YOUR MEDICINE

PATIENT MEDICATION INFORMATION

^NHYDROMorphone Hydrochloride Injection, USP (Hydromorphone Hydrochloride Injection, USP) 2 mg/mL Sterile Solution for Injection

Read this carefully before you start taking HYDROMorphone Hydrochloride Injection, USP and each time you get a refill. This leaflet is a summary and will not tell you everything about this drug. Talk to your healthcare professional about your medical condition and treatment and ask if there is any new information about HYDROMorphone Hydrochloride Injection, USP.

Serious Warnings and Precautions

- **Even if you take HYDROMorphone Hydrochloride Injection, USP as prescribed you are at a risk for opioid addiction, abuse and misuse. This can lead to overdose and death.**
- **You may get life-threatening breathing problems while taking HYDROMorphone Hydrochloride Injection, USP. This is less likely to happen if you take it as prescribed by your doctor. Babies are at risk of life-threatening breathing problems if their mothers take opioids while pregnant or nursing.**
- **You should never give anyone your HYDROMorphone Hydrochloride Injection, USP. They could die from taking it. If a person has not been prescribed HYDROMorphone Hydrochloride Injection, USP, taking even one dose can cause a fatal overdose. This is especially true for children.**
- **If you took HYDROMorphone Hydrochloride Injection, USP while you were pregnant, whether for short or long periods of time or in small or large doses, your baby can suffer life-threatening withdrawal symptoms after birth. This can occur in the days after birth and for up to 4 weeks after delivery. If your baby has any of the following symptoms:**
 - **has changes in their breathing (such as weak, difficult or fast breathing)**
 - **is unusually difficult to comfort**
 - **has tremors (shakiness)**
 - **has increased stools, sneezing, yawning, vomiting, or fever****Seek immediate medical help for your baby.**
- **Taking HYDROMorphone Hydrochloride Injection, USP with other opioid medicines, benzodiazepines, alcohol, or other central nervous system depressants (including street drugs) can cause severe drowsiness, decreased awareness, breathing problems, coma, and death.**

What is HYDROMorphone Hydrochloride Injection, USP used for?

HYDROmorphone Hydrochloride Injection, USP is a pain medication used to control pain.

How does HYDROmorphone Hydrochloride Injection, USP work?

HYDROmorphone Hydrochloride Injection, USP contains hydromorphone which is a pain medication belonging to the class of drugs known as opioids which includes codeine, fentanyl, morphine and oxycodone. It relieves pain by acting on specific nerve cells of the spinal cord and brain.

HYDROmorphone Hydrochloride Injection, USP is used to treat severe pain in patients who need an opioid administered by injection. This is given under the skin, into the muscle or vein in doses or concentrations that are higher than those usually needed.

What are the ingredients in HYDROmorphone Hydrochloride Injection, USP?

Medicinal ingredient: hydromorphone hydrochloride

Non-medicinal ingredients: citric acid, sodium citrate, and water for injection.

HYDROmorphone Hydrochloride Injection, USP comes in the following dosage forms:

Sterile solution for injection: 2 mg/mL.

Do not use HYDROmorphone Hydrochloride Injection, USP if:

- your doctor did not prescribe it for you
- you are allergic to hydromorphone, or any of the other ingredients in HYDROmorphone Hydrochloride Injection, USP (see What are the ingredients in HYDROmorphone Hydrochloride Injection, USP?)
- you can control your pain by the occasional use of other pain medications. This includes those available without a prescription
- you have severe asthma, trouble breathing, or other breathing problems
- you have any heart problems
- you have bowel blockage or narrowing of the stomach or intestines
- you have severe pain in your abdomen
- you have a head injury
- you are at risk for seizures
- you have a brain tumor
- you suffer from alcoholism
- you are taking or have taken within the past 2 weeks a Monoamine Oxidase inhibitor (MAOI) (such as phenelzine sulfate, tranylcypromine sulfate, moclobemide or selegiline)
- you are going to have, or recently had, a planned surgery
- you are pregnant or planning to become pregnant or you are in labour
- you are breastfeeding

To help avoid side effects and ensure proper use, talk to your healthcare professional before you take HYDROmorphone Hydrochloride Injection, USP. Talk about any health conditions or problems you may have, including if you:

- have a history of illicit or prescription drug or alcohol abuse
- have severe kidney disease, liver or lung disease
- have heart disease
- have low blood pressure
- have past or current depression
- suffer from chronic or severe constipation
- have problems with your adrenal or prostate gland
- have, or had in the past hallucinations or other severe mental problems
- suffer from migraines
- are planning to become pregnant

Other warnings you should know about:

Opioid dependence and addiction: There are important differences between physical dependence and addiction. It is important that you talk to your doctor if you have questions or concerns about abuse, addiction or physical dependence.

Pregnancy, nursing, labour and delivery:

Do not use HYDROmorphine Hydrochloride Injection, USP while pregnant, nursing, during labour or delivery. Opioids can be transferred to your baby through breast milk, or while still in the womb. HYDROmorphine Hydrochloride Injection, USP can then cause life-threatening breathing problems in your unborn baby or nursing infant.

If you are pregnant and are taking HYDROmorphine Hydrochloride Injection, USP, it is important that you don't stop taking your medication all of a sudden. If you do, it can cause a miscarriage or a still-birth. Your doctor will monitor and guide you on how to slowly stop taking HYDROmorphine Hydrochloride Injection, USP. This may help avoid serious harm to your unborn baby.

Driving and using machines: Before you do tasks which may require special attention, you should wait until you know how you react to HYDROmorphine Hydrochloride Injection, USP.

HYDROmorphine Hydrochloride Injection, USP can cause:

- drowsiness
- dizziness or
- light headedness

This can usually occur after you take your first dose and when your dose is increased.

Disorder of the adrenal gland: You may develop a disorder of the adrenal gland called adrenal insufficiency. This means that your adrenal gland is not making enough of certain hormones. You may experience symptoms such as:

- nausea, vomiting
- feeling tired, weak or dizzy
- decreased appetite

You may be more likely to have problems with your adrenal gland if you have been taking opioids for longer than one month. Your doctor may do tests, give you another medication, and slowly take you off HYDROmorphine Hydrochloride Injection, USP.

Serotonin Syndrome: HYDROmorphine Hydrochloride Injection, USP can cause Serotonin

Syndrome, a rare but potentially life-threatening condition. It can cause serious changes in how your brain, muscles and digestive system work. You may develop Serotonin Syndrome if you take HYDROmorphone Hydrochloride Injection, USP with certain anti-depressants or migraine medications.

Serotonin Syndrome symptoms include:

- fever, sweating, shivering, diarrhea, nausea, vomiting;
- muscle shakes, jerks, twitches or stiffness, overactive reflexes, loss of coordination;
- fast heartbeat, changes in blood pressure;
- confusion, agitation, restlessness, hallucinations, mood changes, unconsciousness, and coma.

Sexual Function/Reproduction: Long term use of opioids may lead to a decrease in sex hormone levels. It may also lead to low libido (desire to have sex), erectile dysfunction or being infertile.

Tell your healthcare professional about all the medicines you take, including any drugs, vitamins, minerals, natural supplements or alternative medicines.

The following may interact with HYDROmorphone Hydrochloride Injection, USP:

- Alcohol. This includes prescription and non-prescription medications that contain alcohol. **Do not** drink alcohol while you are taking HYDROmorphone Hydrochloride Injection, USP. It can lead to:
 - drowsiness
 - unusually slow or weak breathing
 - serious side effects or
 - a fatal overdose
- other sedative drugs which may enhance the drowsiness caused by HYDROmorphone Hydrochloride Injection, USP
- other opioid analgesics (drugs used to treat pain)
- general anesthetics (drugs used during surgery)
- benzodiazepines (drugs used to help you sleep or that help reduce anxiety)
- antidepressants (for depression and mood disorders). **Do not** take HYDROmorphone Hydrochloride Injection, USP with MAO inhibitors (MAOI) or if you have taken MAOI's in the last 14 days.
- drugs used to treat serious mental or emotional disorders (such as schizophrenia)
- antihistamines (drugs used to treat allergies)
- anti-emetics (drugs used for the prevention of vomiting)
- drugs used to treat muscle spasms and back pain
- some heart medications (such as beta blockers)
- drugs used to treat migraines (e.g. triptans)
- St. John's Wort

How to take HYDROmorphone Hydrochloride Injection, USP:

Take HYDROmorphone Hydrochloride Injection, USP:

- usually every 4 to 6 hours, or as directed by your doctor.

HYDROmorphone Hydrochloride Injection, USP should be visually inspected prior to use. Only clear solutions free from particles should be used. The injection should be given immediately after opening the ampoule. Once opened, any unused portion should be discarded.

Usual Adult Starting Dose:

Your dose is tailored/personalized just for you. Be sure to follow your doctor's dosing instructions exactly. Do not increase or decrease your dose without consulting your doctor.

Your doctor will prescribe the lowest dose that works to control your pain. It is recommended that you only take HYDROmorphone Hydrochloride Injection, USP for up to 7 days. If you need to take HYDROmorphone Hydrochloride Injection, USP for longer, your doctor will determine the best dose for you to lower the risk of side effects and overdose. Taking higher doses can lead to more side effects and a greater chance of overdose.

Review your pain regularly with your doctor to determine if you still need HYDROmorphone Hydrochloride Injection, USP. Be sure to use HYDROmorphone Hydrochloride Injection, USP only for the condition for which it was prescribed.

If your pain increases or you develop any side effect as a result of taking HYDROmorphone Hydrochloride Injection, USP, tell your doctor immediately.

Stopping your Medication

You should not stop taking HYDROmorphone Hydrochloride Injection, USP all at once if you have been taking it for more than a few days. Your doctor will monitor and guide you on how to slowly stop taking HYDROmorphone Hydrochloride Injection, USP. You should do it slowly to avoid uncomfortable symptoms such as having:

- body aches
- diarrhea
- goosebumps
- loss of appetite
- nausea
- feeling nervous or restless
- runny nose
- sneezing
- tremors or shivering
- stomach cramps
- rapid heart rate (tachycardia)
- having trouble sleeping
- an unusual increase in sweating
- heart palpitations
- an unexplained fever
- weakness
- yawning

By reducing or stopping your opioid treatment, your body will become less used to opioids. If you start treatment again, you will need to start at the lowest dose. You may overdose if you restart at the last dose you took before you slowly stopped taking HYDROmorphone Hydrochloride Injection, USP.

Overdose:

If you think you have taken too much HYDROmorphone Hydrochloride Injection, USP, contact your healthcare professional, hospital emergency department or regional Poison Control Centre immediately, even if there are no symptoms.

Signs of overdose may include:

- unusually slow or weak breathing
- dizziness
- confusion
- extreme drowsiness

What are possible side effects from using HYDROmorphone Hydrochloride Injection, USP?

These are not all the possible side effects you may feel when taking HYDROmorphone Hydrochloride Injection, USP. If you experience any side effects not listed here, contact your healthcare professional.

Side effects may include:

- Drowsiness
- Insomnia
- Dizziness
- Fainting
- Nausea, vomiting, or a poor appetite
- Dry mouth
- Headache
- Problems with vision
- Weakness, uncoordinated muscle movement
- Lack of muscle strength
- Itching
- Light headedness
- Sweating
- Constipation
- Confusion
- Anxiety
- Abdominal pain
- Injection site reaction
- Low sex drive, impotence (erectile dysfunction), infertility

Talk with your doctor or pharmacist about ways to prevent constipation when you start using HYDROmorphone Hydrochloride Injection, USP.

Serious side effects and what to do about them				
Symptom / effect		Talk to your healthcare professional		Stop taking drug and get immediate medical help
		Only if severe	In all cases	
RARE	Overdose: hallucinations, confusion, inability to walk normally, slow or weak breathing, extreme sleepiness, sedation, or dizziness, floppy muscles/low muscle tone, cold and clammy skin.			√
	Respiratory Depression: slow, shallow or weak breathing.			√
	Allergic Reaction: rash, hives, swelling of the face, lips, tongue or throat, difficulty swallowing or breathing			√
	Bowel Blockage (impaction): abdominal pain, severe constipation, nausea			√
	Withdrawal: nausea, vomiting, diarrhea, anxiety, shivering, cold and clammy skin, body aches, loss of appetite, sweating.		√	
	Fast, Slow or Irregular Heartbeat: heart palpitations.		√	
	Low Blood Pressure: dizziness, fainting, light-headedness.	√		
	Serotonin Syndrome: agitation or restlessness, loss of muscle control or muscle twitching, tremor, diarrhea			√

If you have a troublesome symptom or side effect that is not listed here or becomes bad enough to interfere with your daily activities, talk to your healthcare professional.

Reporting Side Effects

You can report any suspected side effects associated with the use of health products to Health Canada by:

- Visiting the Web page on [Adverse Reaction Reporting \(https://www.canada.ca/en/health-canada/services/drugs-health-products/medeffect-canada/adverse-reaction-reporting.html\)](https://www.canada.ca/en/health-canada/services/drugs-health-products/medeffect-canada/adverse-reaction-reporting.html) for information on how to report online, by mail or by fax; or
- Calling toll-free at 1-866-234-2345.

NOTE: Contact your health professional if you need information about how to manage your side effects. The Canada Vigilance Program does not provide medical advice.

Storage:

- **Keep unused or expired HYDROmorphone Hydrochloride Injection, USP in a secure place to prevent theft, misuse or accidental exposure.**
- Store at 15° to 30°C. Protect from light.
- **Keep HYDROmorphone Hydrochloride Injection, USP under lock, out of sight and reach of children and pets.**
- **Never take medicine in front of small children as they will want to copy you. Accidental ingestion by a child is dangerous and may result in death. If a child accidentally takes HYDROmorphone Hydrochloride Injection, USP, get emergency help right away.**

If you want more information about HYDROmorphone Hydrochloride Injection, USP:

- Talk to your healthcare professional
- Find the full prescribing information that is prepared for healthcare professionals and includes this Patient Medication Information by visiting the Health Canada website (<https://health-products.canada.ca/dpd-bdpp/index-eng.jsp>); the manufacturer's website (<http://www.fresenius-kabi.ca>), or by calling 1-877-821-7724 (toll-free-telephone).

This information is current up to the time of the date of preparation shown below, but more current information may be available from Fresenius Kabi.

Date of Preparation: August 20, 2019.



Fresenius Kabi Canada Ltd.

165 Galaxy Blvd, Suite 100

Toronto, ON M9W 0C8

Questions or concerns? 1-877-821-7724