Potassium Chloride Extended Release Tablets, USP

Rx only

DESCRIPTION The Potassium Chloride Extended Release Tablets, USP 20 mEq product is an immediately dispersing extended release oral dosage form of potassium chloride containing 1500 mg of microencapsulated potassium chloride, USP equivalent to 20 mEq of potassium in a tablet.

The Potassium Chloride Extended Release Tablets, USP 10 mEq product is an immediately dispersing extended release oral dosage form of potassium chloride containing 750 mg of microencapsulated potassium chloride, USP equivalent to 10 mEq of potassium in a tablet.

These formulations are intended to slow the release of potassium so that the likelihood of a high localized concentration of potassium chloride within the gastrointestinal tract is reduced.

Potassium Chloride is an electrolyte replenisher. The chemical name of the active ingredient is potassium chloride, and the structural formula is KCl. Potassium chloride, USP occurs as a white, granular powder or as colorless crystals. It is odorless and has a saline taste. Its solutions are neutral to litmus. It is freely soluble in water and insoluble in alcohol.

Potassium Chloride is a tablet formulation (not enteric coated or wax matrix) containing individually microencapsulated potassium chloride crystals which disperse upon tablet disintegration. In simulated gastric fluid at 37°C and in the absence of out-side agitation, Potassium Chloride Tablets begin disintegrating into microencapsulated crystals within seconds and completely disintegrates within 1 minute. The microencapsulated crystals are formulated to provide an extended release of potassium chloride.

Inactive Ingredients: Crospovidone, Ethylcellulose, Hydroxypropyl Cellulose, Magnesium Stearate, and Microcrystalline Cellulose.

CLINICAL PHARMACOLOGY The potassium ion is the principal intracellular cation

of most body tissues. Potassium ions participate in a number of essential physiological processes including the maintenance of intracellular tonicity; the transmission of nerve impulses; the contraction of cardiac, skeletal, and smooth muscle; and the maintenance of normal renal function.

The intracellular concentration of potassium is approximately 150 to 160 mEq per liter. The normal adult plasma concentration is 3.5 to 5 mEq per liter. An active ion transport system maintains this gradient across the plasma membrane.

Potassium is a normal dietary constituent and under steady-state conditions the amount of potassium absorbed from the gastrointestinal tract is equal to the amount excreted in the urine. The usual dietary intake of potassium is 50 to 100 mEq per day.

Potassium depletion will occur whenever the rate of potassium loss through renal excretion and/or loss from the gastrointestinal tract exceeds the rate of potassium intake. Such depletion usually develops as a consequence of therapy with diuretics, primary or secondary hyperaldosteronism, diabetic ketoacidosis, or inadequate replacement of potassium in patients on prolonged parenteral nutrition. Depletion can develop rapidly with severe diarrhea, especially if associated with vomiting. Potassium depletion due to these causes is usually accompanied by a concomitant loss of chloride and is manifested by hypokalemia and metabolic alkalosis. Potassium depletion may produce weakness, fatigue, disturbances or cardiac rhythm (primarily ectopic beats), prominent U-waves in the electrocardiogram, and in advanced cases, flaccid paralysis and/or impaired ability to concentrate urine.

If potassium depletion associated with metabolic alkalosis cannot be managed by correcting the fundamental cause of the deficiency, eg, where the patient requires long-term diuretic therapy, supplemental potassium in the form of high-potassium food or potassium chloride may be able to restore normal potassium levels.

In rare circumstances (eg, patients with renal tubular acidosis) potassium depletion may be associated with metabolic acidosis and hyperchloremia. In such patients potassium

replacement should be accomplished with potassium salts other than the chloride, such as potassium bicarbonate, potassium citrate, potassium acetate, or potassium gluconate.

INDICATIONS AND USAGE BECAUSE OF REPORTS OF INTESTINAL AND GASTRIC ULCERATION AND BLEEDING WITH CONTROLLED-RELEASE POTASSIUM CHLORIDE PREPARATIONS, THESE DRUGS SHOULD BE RESERVED FOR THOSE PATIENTS WHO CANNOT TOLERATE OR REFUSE TO TAKE LIQUID OR EFFERVESCENT POTASSIUM PREPARATIONS OR FOR PATIENTS IN WHOM THERE IS A PROBLEM OF COMPLIANCE WITH THESE PREPARATIONS.

1. For the treatment of patients with hypokalemia with or without metabolic alkalosis, in digitalis intoxication, and in patients with hypokalemic familial periodic paralysis. If hypokalemia is the result of diuretic therapy, consideration should be given to the use of a lower dose of diuretic, which may be sufficient without leading to hypokalemia.

2. For the prevention of hypokalemia in patients who would be at particular risk if hypokalemia were to develop, eg, digitalized patients or patients with significant cardiac arrhythmias.

The use of potassium salts in patients receiving diuretics for uncomplicated essential hypertension is often unnecessary when such patients have a normal dietary pattern and when low doses of the diuretic are used. Serum potassium should be checked periodically, however, and if hypokalemia occurs, dietary supplementation with potassium-containing foods may be adequate to control milder cases. In more severe cases, and if dose adjustment of the diuretic is ineffective or unwarranted, supplementation with potassium salts may be indicated.

CONTRAINDICATIONS Potassium supplements are contraindicated in patients with hyperkalemia since a further increase in serum potassium concentration in such patients can produce cardiac arrest. Hyperkalemia may complicate any of the following conditions: chronic renal failure, systemic acidosis, such as diabetic acidosis, acute dehydration, extensive tissue breakdown as in severe burns, adrenal insufficiency, or the administration of

a potassium-sparing diuretic (eg, spironolactone, triamterene, amiloride) (see **OVERDOSAGE**).

Controlled-release formulations of potassium chloride have produced esophageal ulceration in certain cardiac patients with esophageal compression due to enlarged left atrium. Potassium supplementation, when indicated in such patients, should be given as a liquid preparation or as an aqueous (water) suspension of Potassium Chloride (see **PRECAUTIONS: Information for Patients**, and **DOSAGE AND ADMINISTRATION** sections).

All solid oral dosage forms of potassium chloride are contraindicated in any patient in whom there is structural, pathological (eg, diabetic gastroparesis), or pharmacologic (use of anticholinergic agents or other agents with anticholinergic properties at sufficient doses to exert anticholinergic effects) cause for arrest or delay in tablet passage through the gastrointestinal tract.

WARNINGS **Hyperkalemia** (see **OVERDOSAGE**): In patients with impaired mechanisms for excreting potassium, the administration of potassium salts can produce hyperkalemia and cardiac arrest. This occurs most commonly in patients given potassium by the intravenous route but may also occur in patients given potassium orally. Potentially fatal hyperkalemia can develop rapidly and be asymptomatic. The use of potassium salts in patients with chronic renal disease, or any other condition which impairs potassium excretion, requires particularly careful monitoring of the serum potassium concentration and appropriate dosage adjustment.

Interaction with Potassium-Sparing Diuretics: Hypokalemia should not be treated by the concomitant administration of potassium salts and a potassium-sparing diuretic (eg, spironolactone, triamterene, or amiloride) since the simultaneous administration of these agents can produce severe hyperkalemia.

Interaction with Angiotensin-Converting Enzyme Inhibitors: Angiotensin-converting enzyme (ACE) inhibitors (eg, captopril, enalapril) will produce some potassium retention by inhibiting aldosterone production. Potassium supplements should be given to patients receiving ACE inhibitors only with close monitoring.

Gastrointestinal Lesions: Solid oral dosage forms of potassium chloride can produce ulcerative and/or stenotic lesions of the gastrointestinal tract. Based on spontaneous adverse reaction reports, enteric-coated preparations of potassium chloride are associated with an increased frequency of small bowel lesions (40-50 per 100,000 patient years) compared to sustained release wax matrix formulations (less than one per 100,000 patient years). Because of the lack of extensive marketing experience with microencapsulated products, a comparison between such products and wax matrix or enteric-coated products is not available. Potassium Chloride is a tablet formulated to provide a controlled rate of release of microencapsulated potassium chloride and thus to minimize the possibility of a high local concentration of potassium near the gastrointestinal wall.

Prospective trials have been conducted in normal human volunteers in which the upper gastrointestinal tract was evaluated by endoscopic inspection before and after 1 week of solid oral potassium chloride therapy. The ability of this model to predict events occurring in usual clinical practice is unknown. Trials which approximated usual clinical practice did not reveal any clear differences between the wax matrix and microencapsulated dosage forms. In contrast, there was a higher incidence of gastric and duodenal lesions in subjects receiving a high dose of a wax matrix controlled-release formulation under conditions which did not resemble usual or recommended clinical practice (ie, 96 mEq per day in divided doses of potassium chloride administered to fasted patients, in the presence of an anticholinergic drug to delay gastric emptying). The upper gastrointestinal lesions observed by endoscopy were asymptomatic and were not accompanied by evidence of bleeding (Hemoccult testing). The relevance of these findings to the usual conditions (ie, non-fasting, no anticholinergic agent, smaller doses) under which controlled-release potassium chloride products are used is uncertain; epidemiologic studies have not identified an elevated risk, compared to micro-

encapsulated products, for upper gastrointestinal lesions in patients receiving wax matrix formulations. Potassium Chloride Extended Release Tablets should be discontinued immediately and the possibility of ulceration, obstruction, or perforation should be considered if severe vomiting, abdominal pain, distention, or gastrointestinal bleeding occurs.

Metabolic Acidosis: Hypokalemia in patients with metabolic acidosis should be treated with an alkalinizing potassium salt such as potassium bicarbonate, potassium citrate, potassium acetate, or potassium gluconate.

PRECAUTIONS **General:** The diagnosis of potassium depletion is ordinarily made by demonstrating hypokalemia in a patient with a clinical history suggesting some cause for potassium depletion. In interpreting the serum potassium level, the physician should bear in mind that acute alkalosis per se can produce hypokalemia in the absence of a deficit in total body potassium while acute acidosis per se can increase the serum potassium concentration into the normal range even in the presence of a reduced total body potassium. The treatment of potassium depletion, particularly in the presence of cardiac disease, renal disease, or acidosis requires careful attention to acid-base balance and appropriate monitoring of serum electrolytes, the electrocardiogram, and the clinical status of the patient.

Information for Patients: Physicians should consider reminding the patient of the following:

To take each dose with meals and with a full glass of water or other liquid.

To take each dose without crushing, chewing, or sucking the tablets. If those patients are having difficulty swallowing whole tablets, they may try one of the following alternate methods of administration:

a. Break the tablet in half, and take each half separately with a glass of water.

b. Prepare an aqueous (water) suspension as follows:

1. Place the whole tablet(s) in approximately 1 /2 glass of water (4 fluid ounces).

2. Allow approximately 2 minutes for the tablet(s) to disintegrate.

3. Stir for about half a minute after the tablet(s) has disintegrated.

4. Swirl the suspension and consume the entire contents of the glass immediately by drinking or by the use of a straw.

5. Add another 1 fluid ounce of water, swirl, and consume immediately.

6. Then, add an additional 1 fluid ounce of water, swirl, and consume immediately.

Aqueous suspension of Potassium Chloride that is not taken immediately should be discarded. The use of other liquids for suspending Potassium Chloride Tablets is not recommended.

To take this medicine following the frequency and amount prescribed by the physician. This is especially important if the patient is also taking diuretics and/or digitalis preparations.

To check with the physician at once if tarry stools or other evidence of gastrointestinal bleeding is noticed.

Laboratory Tests: When blood is drawn for analysis of plasma potassium it is important to recognize that artifactual elevations can occur after improper venipuncture technique or as a result of *in vitro* hemolysis of the sample.

Drug Interactions: Potassium-sparing diuretics, angiotensin-converting enzyme inhibitors (see **WARNINGS**).

Carcinogenesis, Mutagenesis, Impairment of Fertility: Carcinogenicity, mutagenicity, and fertility studies in animals have not been performed. Potassium is a normal dietary constituent.

Pregnancy Category C: Animal reproduction studies have not been conducted with Potassium Chloride. It is unlikely that potassium supplementation that does not lead to hyperkalemia would have an adverse effect on the fetus or would affect reproductive capacity.

Nursing Mothers: The normal potassium ion content of human milk is about 13 mEq per liter. Since oral potassium becomes part of the body potassium pool, so long as body

potassium is not excessive, the contribution of potassium chloride supplementation should have little or no effect on the level in human milk.

Pediatric Use: Safety and effectiveness in pediatric patients have not been established.

Geriatric Use: Clinical studies of Potassium Chloride did not include sufficient numbers of subjects aged 65 and over to determine whether they respond differently from younger subjects. Other reported clinical experience has not identified differences in responses between the elderly and younger patients. In general, dose selection for an elderly patient should be cautious, usually starting at the low end of the dosing range, reflecting the greater frequency of decreased hepatic, renal or cardiac function, and of concomitant disease or other drug therapy.

This drug is known to be substantially excreted by the kidney, and the risk of toxic reactions to this drug may be greater in patients with impaired renal function. Because elderly patients are more likely to have decreased renal function, care should be taken in dose selection; and it may be useful to monitor renal function.

ADVERSE REACTIONS One of the most severe adverse effects is hyperkalemia (see **CONTRAINDICATIONS**, **WARNINGS**, and **OVERDOSAGE**). There have also been reports of upper and lower gastrointestinal conditions including obstruction, bleeding, ulceration, and perforation (see **CONTRAINDICATIONS** and **WARNINGS**). The most common adverse reactions to oral potassium salts are nausea, vomiting, flatulence, abdominal pain/discomfort, and diarrhea. These symptoms are due to irritation of the gastrointestinal tract and are best managed by diluting the preparation further, taking the dose with meals or reducing the amount taken at one time.

OVERDOSAGE The administration of oral potassium salts to persons with normal excretory mechanisms for potassium rarely causes serious hyperkalemia. However, if excretory mechanisms are impaired or if potassium is administered too rapidly intravenously, potentially fatal hyperkalemia can result (see **CONTRAINDICATIONS** and **WARNINGS**). It is important to recognize that hyperkalemia is usually asymptomatic and may be

manifested only by an increased serum potassium concentration (6.5-8.0 mEq/L) and characteristic electrocardiographic changes (peaking of T-waves, loss of P-waves, depression of S-T segment, and prolongation of the QT-interval). Late manifestations include muscle paralysis and cardiovascular collapse from cardiac arrest (9-12 mEq/L).

Treatment measures for hyperkalemia include the following:

Patients should be closely monitored for arrythmias and electrolyte changes.

1. Elimination of foods and medications containing potassium and of any agents with potassium-sparing properties such as potassium-sparing diuretics, ARBS, ACE inhibitors, NSAIDS, certain nutritional supplements and many others.

2. Intravenous calcium gluconate if the patient is at no risk or low risk of developing digitalis toxicity.

3. Intravenous administration of 300 to 500 mL/hr of 10% dextrose solution containing 10-20 units of crystalline insulin per 1,000 mL.

4. Correction of acidosis, if present, with intravenous sodium bicarbonate.

5. Use of exchange resins, hemodialysis, or peritoneal dialysis.

In treating hyperkalemia, it should be recalled that in patients who have been stabilized on digitalis, too rapid a lowering of the serum potassium concentration can produce digitalis toxicity.

The extended release feature means that absorption and toxic effects may be delayed for hours. Consider standard measures to remove any unabsorbed drug.

DOSAGE AND ADMINISTRATION The usual dietary intake of potassium by the average adult is 50 to 100 mEq per day. Potassium depletion sufficient to cause hypokalemia usually requires the loss of 200 or more mEq of potassium from the total body store.

Dosage must be adjusted to the individual needs of each patient. The dose for the prevention of hypokalemia is typically in the range of 20 mEq per day. Doses of 40-100 mEq per day or more are used for the treatment of potassium depletion. Dosage should be divided

if more than 20 mEq per day is given such that no more than 20 mEq is given in a single dose.

Each Potassium Chloride Extended Release Tablet, USP 20 mEq provides 20 mEq of potassium chloride.

Each Potassium Chloride Extended Release Tablet, USP 10 mEq 10 tablet provides 10 mEq of potassium chloride.

Potassium Chloride Tablets should be taken with meals and with a glass of water or other liquid. This product should not be taken on an empty stomach because of its potential for gastric irritation (see **WARNINGS**).

Patients having difficulty swallowing whole tablets may try one of the following alternate methods of administration:

a. Break the tablet in half, and take each half separately with a glass of water.

b. Prepare an aqueous (water) suspension as follows:

1. Place the whole tablet(s) in approximately 1 /2 glass of water (4 fluid ounces).
2. Allow approximately 2 minutes for the tablet(s) to disintegrate.
3. Stir for about half a minute after the tablet(s) has disintegrated.
4. Swirl the suspension and consume the entire contents of the glass immediately by drinking or by the use of a straw.
5. Add another 1 fluid ounce of water, swirl, and consume immediately.
6. Then, add an additional 1 fluid ounce of water, swirl, and consume immediately.

Aqueous suspension of Potassium Chloride that is not taken immediately should be discarded. The use of other liquids for suspending Potassium Chloride Tablets is not recommended.

HOW SUPPLIED Potassium Chloride Extended Release Tablets, USP 20mEq are available in bottles of 100 (NDC 0085-0787-01); bottles of 500 (NDC 0085-0787-06); bottles of 1000 (NDC 0085-0787-10); and boxes of 100 for unit dose dispensing (NDC 0085- 0787-81).

Potassium Chloride Extended Release Tablets, USP 20 mEq are white to off-white capsule-shaped tablets imprinted "W-1714" and scored on the other side.

Potassium Chloride Extended Release Tablets, USP 10mEq are available in bottles of 100 (NDC 0085-0263-01) and boxes of 100 for unit dose dispensing (NDC 0085-0263-81). Potassium Chloride Extended Release Tablets, USP 10mEq are white to off-white capsule-shaped tablets imprinted "W-1715" on one side and plain on the other side.

Storage Conditions: Keep tightly closed. Store at 25°C (77°F); excursions permitted to 15°-30°C (59°-86°F) [see USP Controlled Room Temperature]

Rx only.

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