POTASSIUM DIHYDROGEN PHOSPHATE 13.6%
(MONOBASIC POTASSIUM PHOSPHATE) CONCENTRATED INJECTION FOR INFUSION

1 NAME OF THE MEDICINE

Monobasic potassium phosphate

2 QUALITATIVE AND QUANTITATIVE COMPOSITION

Potassium Dihydrogen Phosphate Concentrated Injection contains 136.1 mg/mL monobasic potassium phosphate.

Each mL of solution contains 1.0 millimole (1.0 mEq) of potassium and 1.0 millimole (1.0 mEq) of phosphate. The pH of the solution is 3.5 - 5.0.

For the full list of excipients, see Section 6.1 List of Excipients.

3 PHARMACEUTICAL FORM

Potassium Dihydrogen Phosphate Concentrated Injection is a sterile, clear and colourless, or faintly straw coloured, particle-free solution.

4 CLINICAL PARTICULARS

4.1 THERAPEUTIC INDICATIONS

Potassium Dihydrogen Phosphate Concentrated Injection is indicated for:

- the treatment of severe hypophosphataemia (serum levels < 0.3 mmol/L) and other degrees of hypophosphataemia when oral therapy is not possible.
- lowering the pH of urine.
- the treatment of potassium depletion in patients with hypokalaemia; IV administration is indicated when the patient is unable to take potassium orally or if hypokalaemia is severe.

4.2 DOSE AND METHOD OF ADMINISTRATION

Potassium Dihydrogen Phosphate Concentrated Injection is administered by slow intravenous infusion. The injection must be diluted before use. For the treatment of severe hypophosphataemia, the following doses are suggested.

Adults: Up to 10 mmol phosphate administered over 12 hours. The dose may be repeated at 12 hour intervals until serum phosphate exceeds 0.3 mmol/L.

Children: 0.15 to 0.33 mmol/kg administered over six hours. The dose may be repeated at six hour intervals until serum phosphate exceeds 0.6 mmol/L. The dose should not exceed the maximum recommended adult dose. The rate of infusion should not exceed 0.2 mmol/kg/hour.

For the treatment of hypokalaemia, the following doses are suggested. The dose and rate of injection are dependent upon the individual patient's condition. The usual maximum concentration is 40 mmol/L. In patients whose serum potassium concentration is above 2.5 mmol/L, the rate of infusion should not exceed 10 mmol/hour. The total dose should not exceed 200 mmol/24 hours.

If urgent treatment is required (serum potassium concentration less than 2 mmol/L with ECG changes or paralysis), infuse potassium in a suitable concentration at a rate of 40 mmol/hour, up to a rate of 400 mmol/24-hour period. In critical states, potassium may be infused in saline (unless saline is contra-indicated) rather than in glucose solutions, as the latter may decrease serum potassium concentrations.

Diluent's Compatibility:

Potassium Dihydrogen Phosphate Concentrated Injection has been reported to be compatible with the following IV infusion fluids:

Glucose-Ringers injection combinations, Glucose-lactated Ringers injection combinations, Glucose 5% in lactated Ringers injection, Glucose-saline combinations, Glucose 5% in sodium chloride 0.9%, Glucose 2.5% in water, Glucose 5% in water, Glucose 10% in water, Glucose 20% in water, Ringer's injection, Lactated Ringer's injection, Sodium chloride 0.45%, Sodium chloride 0.9%, Sodium chloride 3%.

4.3 CONTRAINDICATIONS

Potassium Dihydrogen Phosphate Concentrated Injection is contraindicated in:

- patients with severe renal function impairment (less than 30% normal) since there is an increased risk of hyperphosphataemia in these patients. The symptoms of hypophosphataemia include muscle weakness, paraesthesia, convulsions, cardiomyopathy, respiratory failure and haematological abnormalities. Prolonged hypophosphataemia may result in rickets or osteomalacia.
- patients with hyperkalaemia.
- Addison's disease.
- urolithiasis (magnesium ammonium phosphate type, infected) as it may exacerbate the condition.
- renal impairment with oliguria or azotaemia.
- ventricular fibrillation.
- hyperadrenalism associated with adrenogenital syndrome.
- extensive tissue breakdown as in severe burns.
- acute dehydration.
- heat cramps.
- increased sensitivity to potassium administration as in adynamia episodica hereditaria or congenital paramyotonia.

4.4 SPECIAL WARNINGS AND PRECAUTIONS FOR USE

Potassium

The use of potassium salts in patients with chronic renal disease, adrenal insufficiency or any other condition which impairs potassium excretion, requires particularly careful monitoring of the serum potassium concentration and appropriate dosage adjustment.

Hypokalaemia should not be treated by the concomitant administration of potassium salts and potassium-sparing diuretic (e.g. spironolactone or triamterene), since the simultaneous administration of these agents can produce severe hyperkalaemia.

In patients on a low-salt diet particularly, hypokalaemic hypochloraemic alkalosis is a possibility that may require chloride as well as potassium supplementation.

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 ECG and the patient's clinical status.

Potassium should be used with caution in diseases associated with heart block since increased serum potassium may increase the degree of block.

Hyperkalaemia: monobasic potassium phosphates should be avoided in patients with hyperkalaemia. Sodium phosphates may be substituted.

Phosphate

Phosphate should be administered with caution in conditions where high phosphate levels may be encountered, such as hypoparathyroidism, chronic renal disease, rhabdomyolysis, acute dehydration, pancreatitis, severe renal insufficiency and extensive tissue damage (such as severe burns).

Phosphate should be administered with caution in conditions where low calcium levels may be encountered, such as hypoparathyroidism, osteomalacia, chronic renal disease, acute pancreatitis, rhabdomyolysis, rickets, myotonia congenita and heart disease (particularly in digitalised patients, see Section 4.5 Interactions with Other Medicines and Other Forms of Interactions), since these conditions may be exacerbated by the potassium in the injection.

The cause of hypophosphataemia should be identified and treated. Caution should be used where patients may be hypocalcaemic.

Serum electrolyte and especially phosphate levels in the body and renal function should be monitored during treatment.

Warnings

In patients with impaired mechanisms for excreting potassium, administration of potassium salts can produce hyperkalaemia and cardiac arrest. This is an important concern in patients given IV potassium. Potentially fatal hyperkalaemia can develop rapidly and be asymptomatic. In patients being given potassium especially by IV, monitoring of serum electrolytes, the ECG and the patient's clinical status is indicated.

Use in the elderly

No data available.

Paediatric use

No data available.

Effect on laboratory tests

Saturation of bone binding sites by phosphate ions may cause decreased bone uptake of technetium Tc^{99m} labelled contrast agents in bone imaging.

Phosphates should not be administered to patients with severely impaired renal function. Aluminium, calcium, or magnesium salts should not be administered concomitantly with phosphates as they bind phosphate thus impairing its absorption from the gastro-intestinal tract.

4.5 INTERACTIONS WITH OTHER MEDICINES AND OTHER FORMS OF INTERACTIONS

Angiotensin converting enzyme (ACE) inhibitors: Concurrent use with Potassium dihydrogen phosphate Concentrated Injection may result in hyperkalaemia, especially in patients with renal impairment.

Calcium containing medicines: Concurrent use with phosphate and calcium containing medicines may increase the risk of deposition of calcium in soft tissues.

Digitalis glycosides: The administration of Potassium Dihydrogen Phosphate Concentrated Injection in digitalised patients with severe or complete heart block may result in hyperkalaemia.

Potassium sparing diuretics: Concurrent use with Potassium Dihydrogen Phosphate Concentrated Injection may result in hyperkalaemia, especially in patients with renal impairment.

Nonsteroidal anti-inflammatory agents (NSAIDs): Concurrent use with Potassium Dihydrogen Phosphate Concentrated Injection may result in hyperkalaemia, especially in patients with renal impairment.

Phosphate containing medicines: Concurrent use with Potassium Dihydrogen Phosphate Concentrated Injection may result in hyperphosphataemia, especially in patients with impaired renal function.

Potassium containing medicines: Concurrent use with Potassium Dihydrogen Phosphate Concentrated Injection may result in hyperkalaemia, especially in patients with renal impairment.

Salicylates: Concurrent use with Potassium Dihydrogen Phosphate Concentrated Injection may increase the serum concentration of salicylates, since salicylate excretion is decreased in acidified urine. This may result in toxic salicylate concentrations when phosphate is administered to patients already stabilised on salicylates.

4.6 FERTILITY, PREGNANCY AND LACTATION

Effects on fertility

No data available.

Use in pregnancy

Animal reproduction studies have not been conducted with this product. It is not known whether this product can adversely affect the fetus when administered to a pregnant woman. Therefore, Potassium Dihydrogen Phosphate Concentrated Injection is not recommended for use during pregnancy.

Use in lactation

It is not known whether phosphates are excreted into breast milk, therefore Potassium Dihydrogen Phosphate Concentrated Injection is not recommended for use during lactation.

4.7 EFFECTS ON ABILITY TO DRIVE AND USE MACHINES

The effects of this medicine on a person's ability to drive and use machines were not assessed as part of its registration.

4.8 ADVERSE EFFECTS (UNDESIRABLE EFFECTS)

Adverse effects which may occur after parenteral administration also include hypocalcaemic tetany, hypotension, oedema and acute renal failure. Adverse effects occur less frequently after oral administration due to poor absorption from the gastro-intestinal tract, but nausea, vomiting, diarrhoea and abdominal pain have been reported.

Hyperphosphataemia, accompanied by hypocalcaemia or other severe electrolyte disturbances and resulting in tetany and even death, has been reported on a number of occasions following the use of phosphate enemas; infants or children have often been the subjects of these adverse effects. Rectal gangrene has been associated with the use of phosphate enemas in elderly patients and was believed to be due to a direct necrotising effect of the phosphate on the rectum.

Cardiovascular

Uncommon: hypotension.
Rare: myocardial infarction.

Endocrine

Uncommon: fluid retention as indicated by swelling of feet, lower legs or weight gain; hyperkalaemia leading to confusion, tiredness or weakness, irregular or slow heart rate, numbness or tingling around lips, hands or feet, unexplained anxiety, weakness or heaviness of legs, shortness of breath or troubled breathing; hypernatraemia leading to confusion, tiredness or weakness, convulsions, oliguria or decreased frequency of micturition, tachycardia, headache or dizziness, increased thirst; hyperphosphataemia, hypocalcaemia or hypomagnesaemia leading to convulsions, muscle cramps, numbness, tingling, pain or weakness in hands or feet, shortness of breath or troubled breathing, tremor; extraskeletal calcification as nephrocalcinosis has been reported in children with hypophosphataemic rickets treated with phosphate supplements.

Genitourinary

Rare: acute renal failure.

The symptoms and signs of potassium intoxication include paraesthesias of the extremities, flaccid paralysis, listlessness, mental confusion, weakness and heaviness of the legs, fall in blood pressure, cardiac arrhythmias and heart block. Hyperkalaemia may exhibit the following ECG abnormalities: disappearance of the P-wave, widening and slurring of QRS complex, changes of the S-T segment, tall-peaked T-waves. Nausea, vomiting, diarrhoea and abdominal discomfort have been reported.

Treatment of adverse effects involves withdrawal of phosphate, general supportive measures, and correction of serum-electrolyte concentrations, especially calcium.

Reporting suspected adverse effects

Reporting suspected adverse reactions after registration of the medicinal product is important. It allows continued monitoring of the benefit-risk balance of the medicinal product. Healthcare professionals are asked to report any suspected adverse reactions at www.tga.gov.au/reportingproblems.

4.9 OVERDOSE

Phosphate

Excessive administration of phosphate, particularly by the intravenous route, may cause hyperphosphataemia but this rarely occurs unless there is renal failure. Hyperphosphataemia may also occur in the presence of acidosis, acromegaly, haemolysis, hypoparathyroidism, tissue destruction, or vitamin D toxicity. Hyperphosphataemia leads in turn to hypocalcaemia, which may be severe, and to ectopic calcification. Secondary hyperparathyroidism may develop in the presence of renal failure.

Treatment of overdosage involves the following measures: immediate cessation of phosphate therapy; correction of serum electrolyte concentrations, especially calcium; general supportive treatment.

Potassium Symptoms

If excretory mechanisms are impaired or if IV potassium is administered too rapidly, potentially fatal hyperkalaemia can result (see Section 4.3 Contraindications and Section 4.4 Special Warnings and Precautions for Use). However, hyperkalaemia is usually asymptomatic and may be manifested only by an increased serum potassium concentration and characteristic ECG changes (peaking of T-waves, loss of P-wave, depression of S-T segment, and prolongation of the QT interval). Late manifestations include muscle paralysis and cardiovascular collapse from cardiac arrest. Should any of these manifestations occur, discontinue potassium administration immediately.

Treatment

If hyperkalaemia develops, the following measures should be considered: elimination of foods and medications containing potassium and of potassium-sparing diuretics; IV administration of 300 to 500 mL/hour of 10% glucose solution containing 10 to 20 units of insulin/1000 mL; correction of acidosis, if present, with IV sodium bicarbonate; use of exchange resins, haemodialysis, or peritoneal dialysis; in presence of life-threatening cardiac arrhythmias, IV administration of 10 to 50 mL calcium gluconate 10% over 5 minutes. Continuous ECG monitoring is mandatory.

In treating hyperkalaemia in digitalised patients, too rapid a lowering of the serum potassium concentration can produce digitalis toxicity.

For information on the management of overdose, contact the Poisons Information Centre on 131126 (Australia).

5 PHARMACOLOGICAL PROPERTIES

5.1 PHARMACODYNAMIC PROPERTIES

Mechanism of action

Potassium

Potassium ion is the principal intracellular ion of most body tissues. Potassium ions are involved 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.

Phosphate

Phosphate is found mainly as calcium phosphate in the skeleton and soft tissues of the body.

Phosphate is the principle anion of intracellular fluid. Apart from its essential role in bone structure, and as intracellular buffers, phosphate is also important in many metabolic and enzymatic pathways.

Clinical trials

No data available.

5.2 PHARMACOKINETIC PROPERTIES

Absorption

Approximately two thirds of the ingested phosphate is absorbed from the gastrointestinal tract.

Distribution

Phosphate is the principle anion of intracellular fluid. Phosphate is found mainly as calcium phosphate in the skeleton and soft tissues of the body.

Metabolism

No data available.

Excretion

Excretion of potassium occurs via the kidneys and normally any amounts given in excess of intracellular requirements are rapidly eliminated.

Excess phosphate is primarily excreted in the urine with the remainder being excreted in the faeces. Parathyroid hormone decreases the tubular reabsorption of phosphate, thereby increasing urinary excretion. Calcium concentrations in the body are inversely proportional to the amount of phosphate, via the control of calcitriol.

5.3 PRECLINICAL SAFETY DATA

Genotoxicity

No data available.

Carcinogenicity

No data available.

6 PHARMACEUTICAL PARTICULARS

6.1 LIST OF EXCIPIENTS

Potassium Dihydrogen Phosphate Concentrated Injection contains water for injections.

6.2 INCOMPATIBILITIES

Phosphates are incompatible with calcium, or magnesium containing solutions. Admixture will lead to precipitates being formed in the solution. Other solutions containing other cations such as iron and aluminium may also precipitate.

6.3 SHELF LIFE

In Australia, information on the shelf life can be found on the public summary of the Australian Register of Therapeutic Goods (ARTG)[1]. The expiry date can be found on the packaging.

6.4 SPECIAL PRECAUTIONS FOR STORAGE

Store below 25°C.

6.5 NATURE AND CONTENTS OF CONTAINER

Potassium Dihydrogen Phosphate Concentrated Injection is presented as a 10 mL glass vial clear Type 1 glass vial with a grey chlorobutyl rubber stopper with an aluminium cap sealed with a red flip-off seal in cartons of 10 vials.

Phebra Product Code - INJ089.

6.6 SPECIAL PRECAUTIONS FOR DISPOSAL

In Australia, any unused medicine or waste material should be disposed of in accordance with local requirements.

6.7 PHYSICOCHEMICAL PROPERTIES

Monobasic potassium phosphate is a white or almost white, odourless, crystalline powder or colourless crystals. It is freely soluble in water and practically insoluble in alcohol.

Chemical structure

The molecular weight of the compound is 136.1. The molecular formula is KH_2PO_4.

CAS number

7778-77-0

7 MEDICINE SCHEDULE (POISONS STANDARD)

UNSCHEDULED.

8 SPONSOR

Phebra[2] Pty Ltd, 19 Orion Road, Lane Cove West NSW 2066, Australia

Telephone: 1800 720 020

9 DATE OF FIRST APPROVAL

14 Oct 1991

10 DATE OF REVISION

15 Apr 2021

[1] AUST R 23183

[2] Phebra and the Phi symbol are trademarks of Phebra Pty Ltd, 19 Orion Road, Lane Cove West, NSW 2066, Australia.

SUMMARY TABLE OF CHANGES

Section Changed	Summary of new information
All	PI reformatted to align with new format
2	Editorial update – pH range
3	Editorial update on product description
4.4, 4.9	Editorial update – typo correction
5.2	Editorial update – typo correction
6.5	Editorial update – typo correction
6.7	Editorial update – removal of irrelevant information