Approved professional information for Electrolyte No. 2 with Dextrose 10 % Fresenius

SCHEDULING STATUS

S3

1. NAME OF THE MEDICINE

Electrolyte No. 2 with Dextrose 10 % Fresenius solution for infusion

2. QUALITATIVE AND QUANTITATIVE COMPOSITION

Each 1 000 ml contains:

Sodium chloride	1,8 g
Potassium chloride	1,0 g
Sodium lactate	2,8 g
Potassium phosphate dibasic	1,0 g
Magnesium chloride.$6H_2O$	640 mg
Sodium acid phosphate.$2H_2O$	200 mg
Dextrose monohydrate	110 g
Equivalent to/or:	
Dextrose anhydrous	100 g

Content of electrolytes per 1 000 ml:

Sodium ion	62 mmol
Potassium ion	25 mmol
Magnesium ion	3 mmol
Chloride ion	50 mmol
Lactate	25 mmol
H_2PO_4	7 mmol
Milliosmoles (approx.)	727

Kilojoules	1680
pH (approx.)	5

Contains sugar (dextrose).

Excipients with known effect:

Stabiliser: Sodium metabisulphite

Sterile and pyrogen free.

For the full list of excipients, see section 6.1.

3. PHARMACEUTICAL FORM

Solution for infusion.

A clear colourless to light straw-coloured solution.

4. CLINICAL PARTICULARS

4.1 Therapeutic indications

One or more of the electrolyte solutions are indicated in most patients requiring fluid and electrolyte therapy. The solutions are designed to facilitate treatment of the patient in accordance with the basic principles of fluid therapy. It is used for daily water, electrolyte and mineral substitute maintenance.

4.2 Posology and method of administration

For intravenous administration only.

For haemorrhagic shock: one to two litres per 45 to 60 minutes.

If response is transient give 3 to 4 litres plus blood. Central venous pressure monitoring may be necessary.

During surgery: 3 to 10 ml per kg body-mass per hour. Maximum 3 to 4 litres per hour.

After surgery: one or 2 litres.

Dosage is to be determined by a medical practitioner and is dependent upon age, weight, clinical condition of the patient and laboratory determinations. The product should be inspected visually for particulate matter and discolouration prior to administration.

To replace extracellular fluid losses or shifts, and in prolonged labour (see section 4.6), this solution can be used as required.

Method of administration

Fluid balance, serum glucose, serum sodium and other electrolytes may need to be monitored before and during administration, especially in patients with increased non-osmotic vasopressin release (syndrome of inappropriate antidiuretic hormone secretion, SIADH) and in patients co-medicated with vasopressin agonist medicines due to the risk of hyponatraemia.

Monitoring of serum sodium is particularly important for physiologically hypotonic fluids. Electrolyte No. 2 with Dextrose 10 % Fresenius may become extremely hypotonic after administration due to glucose metabolisation in the body (see sections 4.4, 4.5 and 4.8).

4.3 Contraindications

- Known hypersensitivity to any of the ingredients in Electrolyte No. 2 with Dextrose 10 % Fresenius (see section 2 and section 6.1).
- Patients with severe renal disease, adrenal insufficiency or hypoparathyroidism.
- Anuria or oliguria due to renal insufficiency might allow toxic quantities of potassium to accumulate in the blood plasma.
- Severe haemolytic reactions.
- Patients with high levels of serum potassium (hyperkalaemia).
- Early post-operative oliguria, except when gastrointestinal drainage is being done.
- Uncompensated cardiac or pulmonary failure.

- Uncontrolled diabetes, other glucose intolerances, hyperosmolar coma, hyperglycaemia, hyperlactataemia.

4.4 Special warnings and precautions for use

Hypersensitivity reactions

Hypersensitivity/infusion reactions, including anaphylactoid reactions can occur. The infusion must be stopped immediately if any signs or symptoms of a suspected hypersensitivity reaction develop (such as tachycardia, chest pain, dyspnoea and flushing). Appropriate therapeutic counter measures must be instituted as clinically indicated.

Solutions containing dextrose should be used with caution in patients with known allergy to corn or corn products.

Administration in the postoperative period after neuromuscular block should be used with caution since magnesium salts can lead to a recurring effect.

Electrolyte imbalances

The administration of intravenous Electrolyte No. 2 with Dextrose 10 % Fresenius can cause fluid and/or solute overload resulting in dilution of serum electrolyte concentrations, overhydration, congested states or pulmonary oedema. The risk of dilutional states is inversely proportional to the electrolyte concentration.

Use with caution in patients with hypervolaemia, renal insufficiency, urinary tract obstruction, or impending or frank cardiac decompensation.

Solutions containing dextrose should be used with caution in patients with overt or known subclinical diabetes mellitus or carbohydrate intolerance for any reason (see section 4.3).

Discontinue administration if signs of renal insufficiency develop during infusion. Establish renal function using 5 % dextrose in 0,2 % sodium chloride before giving potassium-containing solutions.

This solution does not supply calcium to correct calcium deficiency. Supplementary doses of potassium may be required to correct potassium deficit.

Monitor electrocardiogram (ECG) and serum potassium levels regularly during administration of the infusion (see section 4.2).
If an adverse reaction occurs, discontinue the infusion.

Dextrose intravenous infusions are usually isotonic solutions. In the body, however, glucose containing fluids can become extremely physiologically hypotonic due to rapid glucose metabolisation (see section 4.2).
Depending on the tonicity of the solution, the volume and rate of infusion and depending on a patient's underlying clinical condition and capability to metabolise dextrose, intravenous administration of dextrose can cause electrolyte disturbances most importantly hypo- or hyperosmotic hyponatraemia.
Administration of solutions containing dextrose and lactate in patients with impaired glucose tolerance or diabetes mellitus may worsen hyperglycaemia. Administration of dextrose at a rate exceeding the patient’s utilisation rate may lead to hyperglycaemia, coma, and death.
Hyperglycaemia is associated with an increase in serum osmolality, resulting in osmotic diuresis, dehydration and electrolyte losses. Patients with underlying central nervous system disease and renal impairment who receive dextrose infusions, may be at greater risk of developing hyperosmolar hyperglycaemic state. Monitor blood glucose concentrations and treat hyperglycaemia to maintain concentrations within normal limits while administering Electrolyte No. 2 with Dextrose 10 % Fresenius. Insulin may be administered or adjusted to maintain optimal blood glucose concentrations.

Hyponatraemia:

Patients with non-osmotic vasopressin release (e.g. in acute illness, pain, post-operative stress, infections, burns, and central nervous system (CNS) diseases), patients with heart-, liver- and

kidney diseases and patients exposed to vasopressin agonists (see section 4.5) are at particular risk of acute hyponatraemia upon infusion of hypotonic fluids.

Acute hyponatraemia can lead to acute hyponatraemic encephalopathy (brain oedema) characterised by headache, nausea, seizures, lethargy and vomiting. Patients with brain oedema are at particular risk of severe, irreversible and life-threatening brain injury.

Children, women in the fertile age and patients with reduced cerebral compliance (e.g. meningitis, intracranial bleeding, and cerebral contusion) are at particular risk of the severe and life-threatening brain swelling caused by acute hyponatraemia.

Hypermagnesaemia

Avoid solutions containing magnesium, including Electrolyte No. 2 with Dextrose 10 % Fresenius in patients with or predisposed to hypermagnesaemia, including patients with severe renal impairment and those patients receiving magnesium therapy (e.g., treatment of eclampsia and myasthenia gravis).
Electrolyte No. 2 with Dextrose 10 % Fresenius is not indicated for the treatment of hypomagnesaemia.

Acidosis and alkalosis

Electrolyte No. 2 with Dextrose 10 % Fresenius is not for use for the treatment of lactic acidosis or severe metabolic acidosis in patients with severe liver and/or renal impairment.

Excess administration of Electrolyte No. 2 with Dextrose 10 % Fresenius can result in metabolic alkalosis. Avoid Electrolyte No. 2 with Dextrose 10 % Fresenius in patients with alkalosis or at risk for alkalosis. Electrolyte No. 2 with Dextrose 10 % Fresenius is not indicated for the treatment of hypochloraemic hypokalaemic alkalosis. Avoid use in patients with hypochloraemic hypokalaemic alkalosis.

Patients with renal impairment

In patients with renal impairment, administration of Electrolyte No. 2 with Dextrose 10 % Fresenius may result in sodium and/or potassium or magnesium retention. Avoid Electrolyte No. 2 with Dextrose 10 % Fresenius in patients with severe renal impairment or conditions that may cause sodium, potassium, magnesium, or phosphate retention, fluid overload, or oedema. If use cannot be avoided, monitor patients with severe renal impairment for development of these adverse reactions.

Patients with hepatic impairment

In patients with severe hepatic impairment, lactate metabolism may be impaired and Electrolyte No. 2 with Dextrose 10 % Fresenius may not produce its alkalinisation. Consider when monitoring serum lactate levels.

Refeeding syndrome

For patients who are severely malnourished or have undergone a long period of starvation, caution should be exercised initially when administering dextrose. The dose may be gradually increased as glucose metabolism improves. During long-term parenteral treatment, other convenient nutritive supply must be given to the patient.

Dextrose and sodium metabisulphite

Electrolyte No. 2 with Dextrose 10 % Fresenius contains dextrose. Patients with rare glucose-galactose malabsorption, should not be administered Electrolyte No. 2 with Dextrose 10 % Fresenius.

Electrolyte No. 2 with Dextrose 10 % Fresenius contains sodium metabisulphite which may rarely cause severe hypersensitivity reactions and bronchospasm.

4.5 Interaction with other medicines and other forms of interaction

Medicines leading to an increased vasopressin effect:

The below listed medicines increase the vasopressin effect, leading to reduced renal electrolyte free water excretion and increase the risk of hospital acquired hyponatraemia following inappropriately balanced treatment with intravenous fluids (see sections 4.2, 4.4 and 4.8).

- *Medicines stimulating vasopressin release, e.g.:*
  Chlorpropamide, clofibrate, carbamazepine, vincristine, selective serotonin reuptake inhibitors, 3.4-methylenedioxy-*N*-methamphetamine, ifosfamide, antipsychotics, narcotics;
- *Medicines potentiating vasopressin action, e.g.:*
  Chlorpropamide, nonsteroidal anti-inflammatory drugs (NSAIDs), cyclophosphamide;
- *Vasopressin analogues, e.g.:*
  Desmopressin, oxytocin, vasopressin, terlipressin.

Other medicines increasing the risk of hyponatraemia also include diuretics in general and antiepileptics, such as oxcarbazepine.

Interaction with sodium:

Corticoids/steroids and carbenoxolone may cause retention of sodium and water (with oedema and hypertension).

Medicines that increase the risk of hyperkalaemia

Because of its potassium content, avoid use of Electrolyte No. 2 with Dextrose 10 % Fresenius in patients receiving products that can cause hyperkalaemia or increase the risk of hyperkalaemia, such as potassium sparing diuretics (amiloride, spironolactone, triamterene, alone or in association), ACE inhibitors, angiotensin II receptor antagonists, or the immunosuppressants tacrolimus and ciclosporin. If use cannot be avoided, monitor serum potassium concentrations.

Lithium

Renal clearance of lithium may be increased during administration of Electrolyte No. 2 with Dextrose 10 % Fresenius. Monitor serum lithium concentrations during concomitant use.

Medicines with pH dependent renal elimination

Due to its alkalinising effect (formation of bicarbonate), Electrolyte No. 2 with Dextrose 10 % Fresenius may interfere with the elimination of medicines with pH dependent renal elimination.
Renal clearance of acidic medicines, such as salicylates, barbiturates and lithium may be increase because of the alkalinisation of urine by the bicarbonate resulting from acetate and gluconate metabolism.
Renal clearance of alkaline medicines, such as sympathomimetics (e.g. ephedrine, pseudoephedrine) and stimulants (e.g. quinidine, dexamphetamine sulphate, phenfluramine hydrochloride) may be decreased.

Interactions with magnesium

Magnesium salts may potentiate the effect of depolarising neuromuscular blocker, such as suxamethonium, vecuronium or tubocurarine. Therefore, the combination with these substances is not recommended.

4.6 Fertility, pregnancy and lactation

The safety of Electrolyte No. 2 with Dextrose 10 % Fresenius in pregnancy and lactation has not been established.
Electrolyte No. 2 with Dextrose 10 % Fresenius should be administrated with special caution for pregnant women during labour particularly if administered in combination with oxytocin due to the risk of hyponatraemia (see section 4.4, 4.5 and 4.8).

4.7 Effects on ability to drive and use machines

Caution is advised before driving a vehicle or operating machinery until the effects of Electrolyte No. 2 with Dextrose 10 % Fresenius are known.

4.8 Undesirable effects

Immune system disorders

Frequency not known: Hypersensitivity /infusion reaction, including anaphylactoid reaction[**].

Metabolsim and nutrition disorders

Frequency not known: Hospital aquired hyponatraemia[*], hyperkalaemia, hyperglycaemia, hypervolaemia, hyponatraemia.

Nervous system disorders

Frequency not known: Hyponatraemic encephalopathy[*],
seizures.

Vascular disorders

Frequency not known: Reactions which may occur because of the solution or the technique of administration include venous thrombosis or phlebitis extending from the site of injection.

General disorders and administration site conditions

Frequency not known: The sodium content may cause oedema in salt-retaining patients.
Reactions which may occur because of the solution or the technique of administration include febrile response, burning sensation, injection site pain or irritation, infection at the site of injection, extravasation and
hypervolaemia.

*Hospital acquired hyponatraemia may cause irreversible brain injury and death due to development of acute hyponatraemic encephalopathy (see sections 4.2 and 4.4).

**Potential manifestation in patients with allergy to corn.

Reporting of suspected adverse reactions:

Reporting suspected adverse reactions after authorisation of Electrolyte No. 2 with Dextrose 10 % Fresenius is important. It allows continued monitoring of the benefit/risk balance of Electrolyte No. 2 with Dextrose 10 % Fresenius. Health care providers are asked to report any suspected adverse reactions to SAHPRA via the "**6.04 Adverse Drug Reactions Reporting Form**", found online under SAHPRA's publications: https://www.sahpra.org.za/Publications/Index/8

4.9 Overdose

Too fast infusion with Electrolyte No. 2 with Dextrose 10 % Fresenius may lead to water and sodium overload with a risk of oedema, particularly when there is a defective renal sodium excretion. In this case renal dialysis may be necessary.

Excessive administration or rapid infusion or prolonged administration of dextrose may lead to hyperglycaemia.

Excessive administration of potassium may lead to the development of hyperkalaemia, especially in patients with renal impairment. Symptoms include paraesthesia of the extremities, muscle weakness, paralysis, cardiac dysrhythmias, heart block, cardiac arrest, and mental confusion.
Treatment of hyperkalaemia involves the administration of calcium, insulin (with glucose), sodium bicarbonate, exchange resins or dialysis.

Excessive administration of magnesium may lead to hypermagnesaemia, important signs of which are loss of deep tendon reflexes and respiratory depression, both due to neuromuscular

blockade. Other symptoms of hypermagnesaemia may include nausea, vomiting, flushing of the skin, thirst, hypotension due to peripheral vasodilatation, drowsiness, confusion, muscle weakness, bradycardia, coma, and cardiac arrest.

Excessive administration of chloride salts may cause a loss of bicarbonate with an acidifying effect.

Excessive administration of compounds which are metabolised to form the bicarbonate anion may lead to hypokalaemia and metabolic alkalosis, especially in patients with impaired renal function. Symptoms may include mood changes, tiredness, shortness of breath, muscle weakness, and irregular heartbeat.
Muscle hypertonicity, twitching, and tetany may develop especially in hypocalcaemic patients.
Treatment of metabolic alkalosis associated with bicarbonate overdose consists mainly of appropriate correction of fluid and electrolyte balance.

Acute treatment

The infusion should be interrupted immediately. Administration of diuretics and continuous monitoring of serum electrolytes, correction of electrolyte balance and acid-base balance.
When assessing an overdose, any additives in the solution must also be considered.
The effects of an overdose may require immediate medical attention and treatment.

5. PHARMACOLOGICAL PROPERTIES

Category and class: A 24 Mineral substitutes, electrolytes

Pharmacotherapeutic group: Electrolytes with carbohydrates

ATC code: B05BB02

An electrolyte solution for intravenous use. The carbohydrate, dextrose, also provides calories.

6. PHARMACEUTICAL PARTICULARS

6.1 List of excipients

Glacial acetic acid (for pH-adjustment),

sodium metabisulphite (E223),

water for injections.

6.2 Incompatibilities

Additives may be incompatible. Those additives known to be incompatible should not be used (see section 4.2).

Dextrose as contained in Electrolyte No. 2 with Dextrose 10 % Fresenius should not be administered concomitantly with blood in the same infusion set, due to the risk of clotting of red blood cells (see section 4.4 and 4.5).

6.3 Shelf life

24 months.

Store at or below 25 °C.

6.4 Special precautions for storage

No special requirements.

6.5 Nature and contents of container

1 000 ml PVC or **free***flex*® bag. Pack size: 1 or 12.

Not all container closure systems and pack sizes may be marketed.

6.6 Special precautions for disposal and other handling

Do not use unless solutions is clear.

Check for minute leaks by squeezing bag.

Destroy any unused portion.

7. HOLDER OF CERTIFICATE OF REGISTRATION

Fresenius Kabi Manufacturing SA (Pty) Ltd

6 Gibaud Road

Korsten

Port Elizabeth 6020

South Africa

8. REGISTRATION NUMBER

J/24/276

9. DATE OF FIRST AUTHORISATION/RENEWAL OF THE AUTHORISATION

20 April 1977

10. DATE OF REVISION OF THE TEXT

19 April 2021