Approved Professional Information for Sodium Chloride 0,9 % with Dextrose 5 % Fresenius

SCHEDULING STATUS

S3

1. NAME OF THE MEDICINE

SODIUM CHLORIDE 0,9 % WITH DEXTROSE 5 % FRESENIUS solution for infusion.

2. QUALITATIVE AND QUANTITATIVE COMPOSITION

Each 1 000 ml contains:

Sodium chloride	9,0 g
Dextrose anhydrous	50,0 g
or Dextrose monohydrate	55,0 g

Constituents:

Sodium ions: 154 mmol/l

Chloride ions: 154 mmol/l

Contains sugar: Dextrose (glucose). Each ml contains 50 mg dextrose anhydrous or 55 mg dextrose monohydrate.

For the full list of excipients, see section 6.1.

3. PHARMACEUTICAL FORM

Solution for infusion.

Clear, colourless, or faintly straw-coloured solution.

The osmolarity is 586 mOsm/l

The pH of the solution is 4,0

4. CLINICAL PARTICULARS

4.1 Therapeutic indications

SODIUM CHLORIDE 0,9 % WITH DEXTROSE 5 % FRESENIUS is indicated for use in adults and paediatric patients as a source of electrolytes, calories, and water.

4.2 Posology and method of administration

Posology

Dosage is to be directed by a doctor and is dependent upon age, weight, clinical conditions of the patient and laboratory determinations. Frequent laboratory determinations and clinical evaluations are essential to monitor changes in blood glucose and electrolyte concentrations, and fluid and electrolyte balance during prolonged parenteral therapy.

Fluid administration should be based on calculated maintenance or replacement fluid requirements for each patient.

Method of administration

For intravenous use only.

SODIUM CHLORIDE 0,9 % WITH DEXTROSE 5 % FRESENIUS should be inspected visually for particulate matter and discolouration prior to administration, whenever solution and container permit. Only use when solution is clear and container seals are intact.

When SODIUM CHLORIDE 0,9 % WITH DEXTROSE 5 % FRESENIUS is to be administered peripherally, it should be slowly infused through a small-bore needle, placed well within the lumen of a large vein to minimise venous irritation. Carefully avoid infiltration.

Some additives may be incompatible. Consult with your pharmacist. When introducing additives, use aseptic techniques. Mix thoroughly. Do not store.

4.3 Contraindications

SODIUM CHLORIDE 0,9 % WITH DEXTROSE 5 % FRESENIUS is contraindicated where the administration of sodium or chloride could be clinically detrimental.

SODIUM CHLORIDE 0,9 % WITH DEXTROSE 5 % FRESENIUS is contraindicated in patients with:

- Hypersensitivity to sodium chloride, dextrose anhydrous or dextrose monohydrate, or to any of the excipients (see section 6.1)
- Hypersensitivity to maize and maize products.

4.4 Special warnings and precautions for use

Hypokalaemia

Hypokalaemia may develop during parenteral administration of SODIUM CHLORIDE 0,9 % WITH DEXTROSE 5 % FRESENIUS. Sufficient amounts of potassium should be added to SODIUM CHLORIDE 0,9 % WITH DEXTROSE 5 % FRESENIUS when administered to fasting patients with good renal function, especially those on digoxin therapy. Excessive administration of SODIUM CHLORIDE 0,9 % WITH DEXTROSE 5 % FRESENIUS may result in significant hypokalaemia. Serum potassium levels should be maintained, and potassium supplemented as required.

Close clinical monitoring may be warranted in patients with or at risk for hypokalaemia, for example:

- Persons with metabolic alkalosis.
- Persons with thyrotoxic periodic paralysis. Administration of intravenous glucose has been associated in aggravating hypokalaemia.

- Prolonged low potassium diet.
- Persons with primary hyperaldosteronism.
- Patients treated with medicines that increase the risk of hypokalaemia (e.g., diuretics, beta-2 agonists, or insulin).
- Extraordinary electrolyte losses such as may occur during protracted nasogastric suction, vomiting, or diarrhoea, or gastrointestinal fistula drainage may necessitate additional electrolyte supplementation. Additional essential electrolytes, minerals and vitamins should be supplied as needed.

Sodium retention, fluid overload and oedema

SODIUM CHLORIDE 0,9 % WITH DEXTROSE 5 % FRESENIUS should be used with care in patients with hypervolaemia, renal insufficiency, urinary tract obstruction, or impending or frank cardiac decomposition. The intravenous administration of SODIUM CHLORIDE 0,9 % WITH DEXTROSE 5 % FRESENIUS solution can cause fluid and/ or solute overload resulting in dilution of serum electrolyte concentrations, overhydration, congested states or pulmonary oedema.

SODIUM CHLORIDE 0,9 % WITH DEXTROSE 5 % FRESENIUS should be used with particular caution in:

- Patients with metabolic acidosis.
- Patients at risk of
  - Hypernatraemia
  - Hyperchloraemia
  - Hypervolaemia.
- Patients with conditions that may cause sodium retention, fluid overload and oedema (central and peripheral), such as:
  - Primary hyperaldosteronism.
  - Secondary hyperaldosteronism associated with, for example:

- hypertension
- congestive heart failure
- liver disease (including cirrhosis)
- renal disease (including renal artery stenosis, nephrosclerosis).

  - Pre-eclampsia.

- SODIUM CHLORIDE 0,9 % WITH DEXTROSE 5 % FRESENIUS should be administered with caution to patients receiving medicines that may increase the risk of sodium and fluid retention, such as corticosteroids or corticotropin, or to other salt-retaining patients.
- SODIUM CHLORIDE 0,9 % WITH DEXTROSE 5 % FRESENIUS should be used with great care in patients with congestive heart failure and in clinical states in which there is sodium retention with oedema.

Hyperosmolality, serum electrolytes and water imbalance

Depending on the volume, rate of infusion, the patient's underlying clinical condition and capability to metabolise glucose, administration of SODIUM CHLORIDE 0,9 % WITH DEXTROSE 5 % FRESENIUS can cause:

- Hyperosmolality, osmotic diuresis and dehydration.
- Electrolyte disturbances such as:
  - hyponatraemia (see below)
  - hypokalaemia (see above)
  - hypophosphataemia
  - hypomagnesaemia.
- Acid-base imbalance.
- Overhydration/hypervolaemia and, for example, congested states, including central (e.g., pulmonary congestion) and peripheral oedema.

- An increase in serum glucose concentration is associated with an increase in serum osmolality. Osmotic diuresis associated with hyperglycaemia can result in or contribute to the development of dehydration and in electrolyte losses.

Electrolyte balance

Glucose intravenous infusions are usually isotonic solutions. In the body, however, glucose containing fluids can become extremely physiologically hypotonic due to rapid glucose metabolisation.

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 glucose, intravenous administration of glucose can cause electrolyte disturbances; most importantly hypo- or hyperosmotic hyponatraemia.

Hyponatraemia

Patients with non-osmotic vasopressin release (e.g., in acute illness, pain, post-operative stress, infections, burns, and 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.

Clinical evaluation and periodic laboratory determinations may be necessary to monitor changes in fluid balance, electrolyte concentrations, and acid-base balance during prolonged parenteral therapy or whenever the condition of the patient or the rate of administration warrants such evaluation.

SODIUM CHLORIDE 0,9 % WITH DEXTROSE 5 % FRESENIUS should be used with caution in patients with overt or known subclinical diabetes mellitus, or carbohydrate intolerance for any reason.

Hyperglycaemia

Rapid administration of glucose solutions may produce substantial hyperglycaemia and hyperosmolar syndrome. To avoid hyperglycaemia, the infusion rate should not exceed the patient's ability to utilize glucose. To reduce the risk of hyperglycaemia-associated complications, the infusion rate must be adjusted and/or insulin administered if blood glucose levels exceed levels considered acceptable for the individual patient.

Intravenous glucose should be administered with caution in patients with, for example:

- Impaired glucose tolerance (such as in diabetes mellitus, renal impairment, or in the presence of sepsis, trauma, or shock).
- Severe malnutrition (risk of precipitating a refeeding syndrome, see "*Refeeding syndrome*" below).
- Thiamine deficiency, e.g., in patients with chronic alcoholism (risk of severe lactic acidosis due to impaired oxidative metabolism of pyruvate).
- Water and electrolyte disturbances that could be aggravated by increased glucose and/or free water load.

Other groups of patients in whom SODIUM CHLORIDE 0,9 % WITH DEXTROSE 5 % FRESENIUS should be used with caution include:

- Patients with ischemic stroke. Hyperglycaemia has been implicated in increasing cerebral ischemic brain damage and impairing recovery after acute ischemic strokes.
- Patients with severe traumatic brain injury (in particular during the first 24 hours following the trauma). Early hyperglycaemia has been associated with poor outcomes in patients with severe traumatic brain injury.
- New-borns (See “Paediatric glycaemia-related issues” below).

Prolonged intravenous administration of glucose and associated hyperglycaemia may result in decreased rates of glucose-stimulated insulin secretion.

Hypersensitivity Reactions

- Hypersensitivity/infusion reactions, including anaphylaxis, have been reported (see section 4.8).
- Stop the infusion immediately if signs or symptoms of hypersensitivity/infusion reactions develop. Appropriate therapeutic countermeasures must be instituted as clinically indicated.

Refeeding syndrome

Refeeding severely undernourished patients may result in the refeeding syndrome that is characterised by the shift of potassium, phosphorus, and magnesium intracellularly as the patient becomes anabolic. Thiamine deficiency and fluid retention may also develop. Careful monitoring and slowly increasing nutrient intake while avoiding overfeeding can prevent these complications.

Severe renal impairment

In patients with diminished renal function, administration of SODIUM CHLORIDE 0,9 % WITH DEXTROSE 5 % FRESENIUS may result in sodium retention.

SODIUM CHLORIDE 0,9 % WITH DEXTROSE 5 % FRESENIUS should be administered with caution to patients at risk of (severe) renal impairment. In such patients, administration may result in sodium retention and/or fluid overload.

Blood

Sodium Chloride 0,9 % with Dextrose 5 % Fresenius should not be administered simultaneously with blood through the same administration set because of the possibility of pseudo agglutination or haemolysis.

SODIUM CHLORIDE 0,9 % WITH DEXTROSE 5 % FRESENIUS contains sodium

SODIUM CHLORIDE 0,9 % WITH DEXTROSE 5 % FRESENIUS contains 3,54 mg sodium per ml, equivalent to 0,18 % of the WHO recommended maximum daily intake of 2 g sodium for an adult.

Paediatric population

The dosage selection and constant infusion rate of SODIUM CHLORIDE 0,9 % WITH DEXTROSE 5 % FRESENIUS must be selected with caution in paediatric patients, particularly neonates and low birth weight infants, because of the increased risk of hyperglycaemia/hypoglycaemia. Frequent monitoring of serum glucose concentration is required when dextrose is prescribed to paediatric patients, particularly neonates and low birth weight infants.

In neonates or in very small infants, even small volumes of fluid may affect fluid and electrolyte balance. Care must be exercised in treatment of neonates, especially pre-term neonates, whose renal function may be immature and whose ability to excrete fluid

and solute may be limited. Fluid intake, urine output and serum electrolytes should be monitored closely.

Paediatric glycaemia-related issues

New-borns, especially those born premature and with low birth weight, are at increased risk of developing hypo- or hyperglycaemia. Close monitoring during treatment with intravenous glucose solutions is needed to ensure adequate glycaemic control, in order to avoid potential long term adverse effects.

- Hypoglycaemia in the new-born can cause, e.g., prolonged seizures, coma, and cerebral injury.
- Hyperglycaemia has been associated with cerebral injury, including intraventricular haemorrhage, late onset bacterial and fungal infection, retinopathy of prematurity, necrotizing enterocolitis, increased oxygen requirements, prolonged length of hospital stay, and death.

Paediatric hyponatraemia-related issues

Children (including neonates and older children) are at increased risk of developing hyponatraemia as well as for developing hyponatraemic encephalopathy.

- Hyponatraemia can lead to headache, nausea, seizures, lethargy, coma, cerebral oedema, and death; therefore, acute symptomatic hyponatraemic encephalopathy is considered a medical emergency.
- Plasma electrolyte concentrations should be closely monitored in the paediatric population.
- Rapid correction of hyponatraemia is potentially dangerous (risk of serious neurologic complications). Dosage, rate, and duration of administration should be determined by a doctor experienced in paediatric intravenous fluid therapy.

Geriatric population

When selecting the volume/rate of infusion for a geriatric patient, consider that geriatric patients are generally more likely to have cardiac, renal, hepatic and other diseases or concomitant medicine therapy.

4.5 Interaction with other medicines and other forms of interaction

Both the glycaemic and effects on water and electrolyte balance should be taken into account when administering SODIUM CHLORIDE 0,9 % WITH DEXTROSE 5 % FRESENIUS to patients treated with other substances that affect glycaemic control, or fluid and/or electrolyte balance.

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 IV fluids (see sections 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, NSAID's, cyclophosphamide.
- Vasopressin analogues, e.g., desmopressin, oxytocin, terlipressin.

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

Caution is advised in patients treated with:

- Lithium. Renal sodium and lithium clearance may be increased during administration and can result in decreased lithium levels.

- Corticosteroids or corticotropin, which are associated with the retention of sodium and water (with oedema and hypertension).
- Diuretics, beta-2 agonists, or insulin, which increase the risk of hypokalaemia.

4.6 Fertility, pregnancy, and lactation

Safety during pregnancy and lactation has not been established.

SODIUM CHLORIDE 0,9 % WITH DEXTROSE 5 % FRESENIUS should be administrated with special caution to pregnant women during labour particularly if administered in combination with oxytocin due to the risk of hyponatraemia (see sections 4.4, 4.5 and 4.8).

4.7 Effects on ability to drive and use machines

There is no information on the effects of SODIUM CHLORIDE 0,9 % WITH DEXTROSE 5 % FRESENIUS on the ability to drive or use machinery.

4.8 Undesirable effects

a) Summary of the safety profile

Adverse reactions which may occur because of SODIUM CHLORIDE 0,9 % WITH DEXTROSE 5 % FRESENIUS or the technique of administration.

Too rapid infusion of SODIUM CHLORIDE 0,9 % WITH DEXTROSE 5 % FRESENIUS may cause local pain and venous irritation. Rate of administration should be adjusted according to tolerance. Use of the largest peripheral vein and a small-bore needle is recommended.

Symptoms may result from an excess or deficit of one or more of the ions present in the solution; therefore, frequent monitoring of electrolyte levels are essential.

b) Tabulated list of adverse reactions

System organ class	**Frequency unknown** (cannot be estimated from the available data)
Immune system disorders	Anaphylactic reaction, * hypersensitivity*
Metabolism and nutrition disorders	Hypervolaemia, * hypernatraemia, hyperglycaemia, hospital acquired, hyponatraemia**
Nervous system disorders	Hyponatraemic encephalopathy**
Vascular disorders	Venous thrombosis or phlebitis extending from the site of injection
Skin and subcutaneous tissue disorders	Rash, pruritis
General disorders and administrative site conditions	Febrile response, pyrexia, chills, infusion site pain, infusion site vesicles, infection at the site of injection, extravasation

* Potential manifestation in patients with allergy to corn, see section 4.4.

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

c) Description of selected adverse reactions

Hypernatraemia may be associated with oedema and exacerbation of congestive heart failure due to the retention of water, resulting in an expanded extracellular fluid volume.

If infused in large amounts, chloride ions may cause a loss of bicarbonate ions, resulting in an acidifying effect.

The doctor should be alert to the possibility of adverse reactions to the medicine additives diluted and administered from the plastic container. Prescribing information for SODIUM CHLORIDE 0,9 % WITH DEXTROSE 5 % FRESENIUS additives to be administered in this manner should be consulted.
If an adverse reaction does occur, discontinue the infusion, evaluate the patient, institute appropriate therapeutic countermeasures, save the remainder of the fluid for examination if deemed necessary.

d) Paediatric population
In neonates or in very small infants, even small volumes of fluid may affect fluid and electrolyte balance (see section 4.4 “**Paediatric population**”).

New-borns, especially those born premature and with low birth weight, are at increased risk of developing hypo- or hyperglycaemia. Close monitoring during treatment with intravenous glucose solutions is needed to ensure adequate glycaemic control, in order to avoid potential long term adverse effects (see section 4.4 “**Paediatric population**, *Paediatric glycaemia-related issues*”).

Children (including neonates and older children) are at increased risk of developing hyponatraemia as well as for developing hyponatraemic encephalopathy (see section 4.4 “**Paediatric population**, *Paediatric hyponatraemia-related issues*”).

e) Other special populations

When selecting the volume/rate of infusion for a geriatric patient, consider that geriatric patients are generally more likely to have cardiac, renal, hepatic, and other diseases or concomitant medicine therapy (see section 4.4 "**Geriatric population)**.

Reporting of suspected adverse reactions

Health care providers are asked to report any suspected adverse drug reactions to the Holder of the Certificate of Registration at the following email address: safety.fksa@fresenius-kabi.com and to the relevant medicine's regulatory authority in the country where the product is marketed.

Reporting suspected adverse reactions after authorisation of SODIUM CHLORIDE 0,9 % WITH DEXTROSE 5 % FRESENIUS is important. It allows continued monitoring of the benefit/risk balance of SODIUM CHLORIDE 0,9 % WITH DEXTROSE 5 % FRESENIUS. Health care providers are asked to report any suspected adverse reactions 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

In the event of a fluid or solute overload during parenteral therapy, re-evaluate the patient's condition and institute appropriate corrective treatment.

5. PHARMACOLOGICAL PROPERTIES

5.1 Pharmacodynamic properties

Category and class: A 24 Mineral substitutes, electrolytes.

Pharmacotherapeutic group: Electrolytes with carbohydrates.

ATC code: B05BB02

Mechanism of action:

Sodium chloride 0,9 % with dextrose 5 % provide electrolytes and calories and is a source of water.

SODIUM CHLORIDE 0,9 % WITH DEXTROSE 5 % FRESENIUS is an isotonic and hyperosmolar solution of sodium chloride and glucose.

The pharmacodynamic properties of this solution are those of its components (glucose, sodium, and chloride).

5.2 Pharmacokinetic properties

The pharmacokinetic properties of this solution are those of its components (glucose, sodium, and chloride).

6. PHARMACEUTICAL PARTICULARS

6.1 List of excipients

Water for injection.

6.2 Incompatibilities

Incompatibilities may arise from mixing SODIUM CHLORIDE 0,9 % WITH DEXTROSE 5 % FRESENIUS with prescribed additives. The final infusate should be inspected for cloudiness or precipitation immediately after mixing, prior to administration, and periodically during administration.

Dextrose solutions are incompatible with a number of medicines such as cyanocobalamin, kanamycin, sulphate, novobiocin sodium and warfarin sodium. Erythromycin gluceptate is unstable in dextrose solutions at a pH less than 5.05.

Because of the presence of glucose, SODIUM CHLORIDE 0,9 % WITH DEXTROSE 5 % FRESENIUS should not be administered simultaneously with blood through the same administration set because of the possibility of pseudo agglutination or haemolysis (see section 4.4).

In the absence of compatibility studies, this solution must not be mixed with other medicines.

6.3 Shelf life

Unopened bags: 24 months.

In-use shelf life: To be used immediately after the bag is opened.

6.4 Special precautions for storage

Store at or below 25 °C.

For storage of the opened product, see section 6.3.

6.5 Nature and contents of container

SODIUM CHLORIDE 0.9 % WITH DEXTROSE 5 % FRESENIUS, Solution for Infusion is filled into 200 ml, 500 ml or 1 000 ml *free*flex ® or PVC bags.

Each bag is labelled and over pouched. The *free*flex ® bags are overwrapped with a multilayer foil and the PVC bags are over pouched with a nylon/polypropylene film or an HDPE over pouch film. The overwrapped *free*flex ® or PVC bags are packed into corrugated cardboard shipper boxes.

Pack sizes per corrugated cardboard shipper box.:

- 30 or 40 x 200 ml filled in 250 ml *free*flex ® or 200 ml PVC bags.
- 30 x 500 ml *free*flex ® bags.
- 12 x 1 000 ml *free*flex ® or PVC bags.

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

6.6 Special precautions for disposal and other handling

For method of administration and precautions to be taken before handling or administering the product, please see also section 4.2.

SODIUM CHLORIDE 0,9 % WITH DEXTROSE 5 % FRESENIUS is intended for intravenous administration using sterile equipment. It is recommended that intravenous administration apparatus be replaced at least once every 24 hours.

If administration is controlled by the pumping device, care must be taken to discontinue pumping action before the container runs dry or air embolism may result.

Discard after single use.

Discard any unused portion.

7. HOLDER OF CERTIFICATE OF REGISTRATION

Fresenius Kabi Manufacturing SA (Pty) Ltd

6 Gibaud Road

Korsten 6020

Gqeberha

South Africa

8. REGISTRATION NUMBER

D/24/155

9. DATE OF FIRST AUTHORISATION

01 March 1972

10. DATE OF REVISION OF THE TEXT

04 August 2022