SUMMARY OF PRODUCT CHARACTERISTICS

1 NAME OF THE MEDICINAL PRODUCT

Sodium Chloride 0.45% w/v, Potassium Chloride 0.15% w/v and Glucose 5% Intravenous Infusion.

2 QUALITATIVE AND QUANTITATIVE COMPOSITION

Sodium Chloride BP	0.45% w/v
Glucose Anhydrous BP	5.00% w/v
Potassium Chloride BP	0.15% w/v

For the full list of excipients, see Section 6.1.

3. PHARMACEUTICAL FORM

Sterile, apyrogenic solution for infusion.

4 CLINICAL PARTICULARS

4.1 Therapeutic indications

Sodium Chloride, Potassium Chloride and Glucose Intravenous Infusion is administered in patients post-operatively for electrolyte balance maintenance.

Repeated measurements of plasma potassium are necessary to determine whether further infusions are required and to avoid the development of hyperkalaemia; this is especially liable to occur in renal failure.

4.2 Posology and method of administration

Adults:
The volume and rate of infusion will depend on the condition of the individual patient and the judgement of the physician. The rate of infusion should not exceed 10-20mmols of potassium per hour. The total daily dosage of potassium should not exceed 200mmols.

Paediatric population:
The volume and rate of infusion will depend on the condition of the individual patient and the judgement of the physician. Correspondingly reduced volumes and rates of infusion may be required.

Elderly:
The volume and rate of infusion may need to be reduced in the elderly to avoid circulatory overload, particularly in patients with cardiac or renal insufficiency.

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 drugs due to the risk of hyponatraemia.

Monitoring of serum sodium is particularly important for physiologically hyptonic fluids. Sodium Chloride 0.45% w/v, Potassium Chloride 0.15% w/v and Glucose 5% Intravenous Infusion may become extremely hypotonic after administration due to glucose metabolisation in the body (see sections 4.4, 4.5 and 4.8).

For intravenous infusion

4.3 Contraindications

Addison's disease, adrenal insufficiency, acute or chronic renal disease, oliguria, anuria and patients with hyperkalaemia. The intravenous infusion of dextrose solutions may also be hazardous in patients with impaired hepatic function.

4.4 Special warnings and precautions for use

Caution should be exercised in the volume and rate of infusion since fluid overload and hyperkalaemia may compromise cardiac function. Before administering potassium by the intravenous-route a non-potassium containing hydrating solution should be administered to ensure adequate renal function.

Intravenous infusions containing glucose 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).

Intravenous administration of fluids containing 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, or 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 (cerebral oedema) characterised by headache, nausea, seizures, lethargy, and vomiting. Patients with cerebral oedema are at particular risk of severe, irreversible and life-threatening brain injury.

Children, women of childbearing 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.

4.5 Interaction with other medicinal products and other forms of interaction

Solutions containing potassium should be used with caution in patients receiving drugs that increase serum potassium concentrations (potassium-sparing diuretics, ACE inhibitors, cyclosporin, and drugs that contain potassium such as potassium salts of penicillin).

Corticosteroids are associated with the retention of sodium and water, with oedema and hypertension.

Glucose should not be administered through the same infusion equipment as whole blood as haemolysis and clumping can occur.

Drugs leading to an increased vasopressin effect:
The below listed drugs increase the vasopressin effect, leading to reduced renal electrolyte free water excretion and increased risk of hospital acquired hyponatraemia following inappropriately balanced treatment with IV fluids (see sections 4.2, 4.4 and 4.8):

- Drugs stimulating vasopressin released e.g. Chlorpropamide, clofibrate, carbamazepine, vincristine, selective serotonin uptake inhibitors, 3.4-methylenedioxy-N-methamphetamine, ifosfamide, antipsychotics, narcotics
- Drugs potentiating vasopressin action e.g. NSAIDS, cyclophosphamide
- Vasopressin analogues e.g. Desmopressin, oxytocin, terlipressin

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

4.6 Fertility, pregnancy and lactation

Sodium Chloride, Potassium Chloride and Glucose Intravenous Infusion should be administered 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

Sodium Chloride, Potassium Chloride and Glucose Intravenous Infusion has no or negligible influence on the ability to drive or operate machinery.

4.8 Undesirable effects

Tabulated list of adverse reactions

System Organ Class	Symptoms (LLT terms MedDRA)	Frequency
Metabolism and nutrition disorders	Hospital acquired hyponatraemia* Hyperkalaemia	Not known
Neurological disorders	Hyponatraemic encephalopathy*	
General disorders and administration site conditions	Listlessness Weakness	
Cardiac disorders	Arrhythmias Cardiac arrest.	
Nervous system disorders	Parasthesia Confusion	
Vascular disorders	Hypertension Thrombosis	

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

Reporting of suspected adverse reactions
Reporting suspected adverse reactions after authorisation 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 via the Yellow Card Scheme.
Website: www.mhra.gov.uk/yellowcard

4.9 Overdose

Symptoms of overdosage include hypertension, cardiac arrhythmias, heart block and cardiac arrest. Treatment is to stop infusion immediately and if there is persistent acidosis, administer an intravenous infusion of sodium lactate or sodium bicarbonate. Excessive administration of potassium may lead to the development of hyperkalaemia. Hyperkalaemia may be reversed by the administration of calcium gluconate injection 10% with electrocardiogram monitoring.

5 PHARMACOLOGICAL PROPERTIES

5.1 Pharmacodynamic properties

Pharmacotherapeutic group: Electrolytes with Carbohydrates, ATC code: B05BB02.

The pharmacodynamic properties of this solution are those of its components (glucose, sodium, potassium, and chloride) in maintaining fluid, electrolyte and energy balance.
Potassium is essential for numerous metabolic and physiological processes including nerve conduction, muscle contraction, and acid-base regulation. A normal concentration of potassium in plasma is about 3.5 to 5.0 mmoles per litre. Potassium is predominantly an intracellular action.

The passage of potassium into the cells and retention against the concentration gradient requires active transport via the Na^+/K^+ ATPase enzyme.

Ions, such as sodium, circulate through the cell membrane, using various mechanisms of transport, among which is the sodium pump (Na-K-ATPase). Sodium plays an important role in neurotransmission and cardiac electrophysiology, and also in its renal metabolism.

Chloride is mainly an extracellular anion. Intracellular chloride is in high concentration in red blood cells and gastric mucosa. Reabsorption of chloride follows reabsorption of sodium.
Glucose is the principal source of energy in cellular metabolism.

5.2 Pharmacokinetic properties

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

Intravenous administration of the solution provides an immediate supply of electrolytes and glucose to blood.

Factors influencing potassium transfer between intracellular and extracellular fluid such as acid base disturbances can distort the relationship between plasma concentrations and total body stores. Potassium is excreted mainly by the kidneys; it is secreted in the distal tubules in exchange of sodium or hydrogen ions. The capacity of the kidneys to conserve potassium is poor and some urinary excretion of potassium continues even when there is severe depletion. Some potassium is excreted in the faeces and small amounts may also be excreted in sweat.

After injection of radiosodium (^{24}Na), the half-life is 11 to 13 days for 99% of the injected Na and one year for the remaining 1%. The distribution varies according to tissues: it is fast in muscles, liver, kidney, cartilage and skin; it is slow in erythrocytes and neurones; it is very slow in the bone. Sodium is predominantly excreted by the kidney, but (as described earlier) there is extensive renal reabsorption. Small amounts of sodium are lost in the faeces and sweat.

The two main metabolic pathways of glucose are gluconeogenesis (energy storage) and glycogenolysis (energy release). Glucose metabolism is regulated by insulin. Glucose is metabolised via pyruvic or lactic acid to carbon dioxide and water with the release of energy. All body cells are capable of oxidising glucose and it forms the principal source of energy in cellular metabolism.

5.3 Preclinical safety data

The preclinical safety assessment of Potassium Chloride 0.15%, Sodium Chloride 0.45% and Glucose 5% solution for infusion in animals is not relevant as electrolytes and glucose are physiological constituents of the body and are covered by appropriate pharmacopoeial references.

6 PHARMACEUTICAL PARTICULARS

6.1 List of excipients

Water for Injections BP

6.2 Incompatibilities

Incompatibilities have been demonstrated in potassium-containing intravenous infusions with for example amikacin, amphotericin, benzyl-penicillin and dobutamine.

Before adding a drug, verify it is soluble and stable in water at the pH of Potassium Chloride 0.15%, Sodium Chloride 0.18% and Glucose 4%. Glucose should not be administered through the same infusion equipment as whole blood as haemolysis and clumping can occur.

Those additives known to be incompatible should not be used.

6.3 Shelf life

2 years from the date of manufacture.

6.4 Special precautions for storage

Store below 25^{o}C.

6.5 Nature and contents of container

The container is a flexible bag made of medical grade PVC.

Closures:

(a) radiofrequency weld
(b) polycarbonate plug
(c) PVC plug

Pack Sizes: 500ml and 1000ml

Not all pack sizes may be marketed.

6.6 Special precautions for disposal

Discard after single use. Do not reconnect partially used bags. Discard any unused portion. Any unused medicinal product or waste material should be disposed of in accordance with local requirements.

7 MARKETING AUTHORISATION HOLDER

Terumo BCT Ltd.
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Millbrook
Larne
Northern Ireland
BT40 2SH
United Kingdom

8. MARKETING AUTHORISATION NUMBER

PL 21538/0014

9 DATE OF FIRST AUTHORISATION/RENEWAL OF THE AUTHORISATION

18/03/2009

10 DATE OF REVISION OF THE TEXT

08/02/2018