Summary of Product Characteristics for Pharmaceutical Products

1. Name of the medicinal product:

Dexatas 50% Concentrate for Solution for Infusion

2. Qualitative and quantitative composition

Each 1ml Concentrate for solution for infusion contains 550mg glucose monohydrate (equivalent to 500mg glucose anhydrous.
For the full list of excipients, see section 6.1.

3. Pharmaceutical form

Concentrate for Solution for infusion
Clear colourless solution to faintly yellow coloured solution, free from visible particles.
pH: 3.2 – 6.5

4. Clinical particulars

4.1 Therapeutic indications

Glucose 50% is indicated to restore blood glucose concentrations in the treatment of hypoglycaemia resulting from insulin excess or from other causes.
Glucose 50% may be used to provide temporary relief from the symptoms of cerebral oedema and from hypoglycaemic coma.
Glucose 50% may be used as a source of energy in parenteral nutrition.

4.2 Posology and method of administration

Posology

The concentration and dosage of Glucose 50% intravenous infusion is determined by several factors including the age, weight and clinical condition of the patient. Serum-glucose concentrations may need to be carefully monitored.

Fluid balance, serum glucose, serum sodium and other electrolytes should 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 hypotonic fluids. Glucose containing solutions may become extremely hypotonic after administration due to glucose metabolization in the body (see sections 4.4, 4.5 and 4.8).

Adults, the Elderly and Children:
Hypoglycaemia: 20-50ml of a 50% w/v solution, repeated as necessary according to the patient's response, by slow intravenous injection, e.g. 3ml/minute. After 25g of glucose has been given, it is advisable to interrupt the injection and evaluate the effect. The exact dose required

to relieve hypoglycaemia will vary. After the patient responds, supplemental oral feeding is indicated to avoid relapse, especially after insulin shock therapy.
Acute alcoholism: 50ml of glucose 50% w/v solution should be administered intravenously. Thiamine hydrochloride (100mg) should be added to the infusion. Soluble insulin may need to be given simultaneously. Blood sugar should be measured frequently until stable.

The infusion rate depends on the patient's clinical condition.

Paediatric population
The infusion rate and volume depend on the age, weight clinical and metabolic conditions of the patient, concomitant therapy and should be determined by the consulting physician experienced in paediatric intravenous fluid therapy.

Method of administration:
The solution is for administration by intravenous infusion (peripheral or central vein).

Precautions to be taken before handling or administering the medicinal product

Parenteral drug products should be inspected visually for particulate matter and discoloration prior to administration, whenever solution and container permit. Use only if the solution is clear, without visible particles and the container is undamaged. Administer immediately following the insertion of infusion set.
The solution should be administered with sterile equipment using aseptic technique. The equipment should be primed with the solution in order to prevent air entering the system.

Please see section 4.4 for the risk of air embolism.

4.3 Contraindications

The solution is contraindicated in case of uncompensated diabetes, other known glucose intolerances (such as metabolic stress situations), hyperosmolar coma, hyperglycaemia, hyperlactataemia, patients with anuria, intracranial or intraspinal haemorrhage, or delirium tremens if the patient is already dehydrated.

Hypersensitivity to the active substance. See sections 4.4 and 4.8 for corn allergies.

4.4 Special warnings and precautions for use

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 metabolize glucose, intravenous administration of glucose can cause:

- Hyperosmolality, osmotic diuresis and dehydration
- Hypoosmolality
- Electrolyte disturbances such as
    - hypo- or hyperosmotic hyponatraemia (see below),
    - hypokalaemia,
    - hypophosphatemia,
    - hypomagnesaemia,
    - overhydration/hypervolaemia and, for example, congested states, including pulmonary congestion and oedema.

The above effects do not only result from the administration of electrolyte-free fluid but also from glucose administration.

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) characterized 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.

Particular caution is advised in patients at increased risk of water and electrolyte disturbances that could be aggravated by increased free water load, hyperglycaemia or possibly required insulin administration (see below).

Hyperglycaemia

- Rapid administration of glucose solutions may produce substantial hyperglycaemia and a hyperosmolar syndrome.
- If hyperglycaemia occurs, rate of infusion should be adjusted and/or insulin administered
- If necessary, provide parenteral supplements in potassium.

- Intravenous Glucose 5% should be administered with caution in patients with, for example:
    - impaired glucose tolerance (such as in diabetes mellitus, renal failure, or in the presence of sepsis, trauma, or shock),
    - severe malnutrition (risk of precipitating a refeeding syndrome – see below),
    - thiamine deficiency, e.g., in patients with chronic alcoholism (risk of severe lactic acidosis due to impaired oxidative metabolization of pyruvate),
    - patients with ischemic stroke or severe traumatic brain injury. Avoid infusion within the first 24 hours following head trauma. Monitor blood glucose closely as early hyperglycaemia has been associated with poor outcomes in patients with severe traumatic brain injury.
    - new-borns

Effects on Insulin Secretion

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

Hypersensitivity Reactions

- Hypersensitivity/infusion reactions, including anaphylactic/anaphylactoid reactions, have been reported with Glucose solutions (see section 4.8). Solutions containing glucose should therefore be used with caution, if at all, in patients with known allergy to corn or corn products (see section 4.3).
- The infusion must be stopped immediately if any signs or symptoms of a suspected hypersensitivity reaction develop. Appropriate therapeutic countermeasures must be instituted as clinically indicated.

Refeeding syndrome

- Refeeding severely undernourished patients may result in the refeeding syndrome that is characterized 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 intakes while avoiding overfeeding can prevent these complications.

Paediatric population

The infusion rate and volume depend on the age, weight, clinical and metabolic conditions of the patient, concomitant therapy, and should be determined by a consulting physician experienced in paediatric intravenous fluid therapy.

In order to avoid potentially fatal over infusion of intravenous fluids to the neonate, special attention needs to be paid to the method of administration. When using a syringe pump to administer intravenous fluids or medicines to neonates, a bag of fluid should not be left connected to the syringe.

When using an infusion pump all clamps on the intravenous administration set must be closed before removing the administration set from the pump or switching the pump off. This is required regardless of whether the administration set has an anti-free flow device.
The intravenous infusion device and administration equipment must be frequently monitored.

Paediatric glycaemia-related issues
New-borns – especially those born premature and with low birth weight - are at increased risk of developing hypo- or hyperglycaemia and therefore need close monitoring during treatment with intravenous glucose solutions to ensure adequate glycaemic control in order to avoid potential long term adverse effects. Hypoglycaemia in the new born can cause prolonged seizures, coma and cerebral injury. Hyperglycaemia has been associated with intraventricular haemorrhage, late onset bacterial and fungal infection, retinopathy of prematurity, necrotizing enterocolitis, bronchopulmonary dysplasia, prolonged length of hospital stays, and death.

Paediatric hyponatraemia-related issues

- Children (including neonates and older children) are at increased risk of developing hypoosmotic hyponatraemia as well as for developing hyponatraemic encephalopathy.
- Plasma electrolyte concentrations should be closely monitored in the paediatric population.
- Rapid correction of hypoosmotic hyponatraemia is potentially dangerous (risk of serious neurologic complications).
- Dosage, rate, and duration of administration should be determined by a physician experienced in paediatric intravenous fluid therapy.

Geriatric Use

- When selecting the type of infusion solution and 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 drug therapy.

Blood

- Glucose 5% (an aqueous, i.e., electrolyte-free glucose solution) should not be administered simultaneously with, before or after an administration of blood through the same infusion equipment,

because haemolysis and pseudo agglutination can occur. Adding other medication or using an incorrect administration technique might cause the appearance of fever reactions due to the possible introduction of pyrogens. In case of adverse reaction, infusion must be stopped immediately.

Risk of Air Embolism

- Do not use plastic containers in series connections. Such use could result in air embolism due to residual air being drawn from the primary container before the administration of the fluid from the secondary container is completed.
- Pressurizing intravenous solutions contained in flexible plastic containers to increase flow rates can result in air embolism if the residual air in the container is not fully evacuated prior to administration.
- Use of a vented intravenous administration set with the vent in the open position could result in air embolism. Vented intravenous administration sets with the vent in the open position should not be used with flexible plastic containers.

4.5 Interaction with other medicinal products and other forms of interaction

Both the glycaemic effects of Glucose 5% and its effects on water and electrolyte balance should be taken into account when using Glucose 5% in patients treated with other substances that affect glycaemic control, or fluid and/or electrolyte balance.

Concomitant administration of catecholamines and steroids decreases the glucose up-take.

Drugs leading to an increased vasopressin effect
The below listed drugs 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 4.2, 4.4 and 4.8).

- Drugs stimulating vasopressin release, e.g.: Chlorpropamide, clofibrate, carbamazepine, vincristine, selective serotonin reuptake inhibitors, 3.4-methylenedioxy-N-methamphetamine, ifosfamide, antipsychotics, narcotics
- Drugs potentiating vasopressin action, e.g.: Chlorpropamide, 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.

No interaction studies have been performed

4.6 Fertility, pregnancy, and lactation

Pregnancy
Glucose solution can be used during pregnancy. However, caution should be exercised when glucose solution is used intrapartum e.g Glucose 50% 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).

Fertility
There are no adequate data of the effect of Glucose 50% on fertility. However, no effect on fertility is expected.

Lactation
There are no adequate data of using Glucose solution during lactation. However, no effect on lactation is expected. Glucose can be used during lactation.

4.7 Effects on ability to drive and use machines.
There is no information on the effects of intravenous glucose on the ability to operate a vehicle or other heavy machinery.

4.8 Undesirable effects
Tabulated summary of adverse reactions
Adverse events are listed below by system organ class and frequency. The following adverse reactions have been reported in post-marketing experience.

Term	Frequency of occurrence
Very common	(≥1/10)
Common	(≥1/100 to <1/10)
Uncommon	(≥1/1 000 to <1/100)
Rare	(≥1/10 000 to <1/1 000)
Very rare	(<1/10 000)
Not known	(Cannot be estimated from the available data)

System Organ Class	Frequency*	Undesirable effects
Immune system disorders	Not Known	Anaphylactic reaction*
		Hypersensitivity reactions*
Metabolism and nutrition disorders	Not Known	Electrolyte imbalance Hypokalaemia Hypomagnesaemia Hypophosphatemia Hyperglycaemia Dehydration Hypervolaemia Hospital acquired hyponatraemia**
Nervous system disorders	Not Known	Hyponatraemic encephalopathy**
Skin and subcutaneous tissue disorders	Not Known	Rash
Vascular disorders	Not Known	Venous thrombosis Phlebitis

Renal and urinary disorders	Not Known	Polyuria
General disorders and administration site conditions	Not Known	Chills Pyrexia Infection at site of injection Thrombophlebitis Infusion site reactions including, erythema Extravasation Local reaction Pain localised
*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)		

Healthcare professionals are asked to report any suspected adverse reactions via the PPB website https://pv.pharmacyboardkenya.org.

4.9 Overdose

Prolonged administration or rapid infusion of large volumes of Glucose 50% may cause hyperosmolarity and hyponatraemia, dehydration, hyperglycaemia, hyperglycosuria, osmotic diuresis (due to the hyperglycaemia) and water intoxication and oedema. Severe hyperglycaemia and hyponatraemia may be fatal (see sections 4.4 and 4.8).

In case of suspected overdose, treatment with Glucose 50% must be stopped immediately. Management of overdose is symptomatic and supportive, with appropriate monitoring. '

5. Pharmacological properties

5.1 Pharmacodynamic properties

Pharmacotherapeutic group: "Other IV Solution Additives"
ATC code: B05BA03

The pharmacodynamic properties of this solution are those of glucose, which forms the principal source of energy in cellular metabolism. Glucose is given as a source of carbohydrate in parenteral nutrition. Furthermore, this glucose solution for infusion allows hydric supplementation without ionic supplementation.
Glucose, the natural sugar occurring in the blood, is the principle source of energy for the body. It is readily converted to fat and is also stored in the liver and muscles as glycogen. When a rapid rise in blood sugar is demanded by the body, glycogen is quickly liberated as d-glucose. When the supply of glucose is insufficient, the body mobilises fat stores which are converted to acetate with production of energy by the same oxidative pathways employed in the combustion of glucose. It may decrease body protein and nitrogen losses. Glucose is also the probable source of glucuronic acid with which many foreign substances and their metabolites combine to form excretion products. It probably provides the

basic substances required for the formation of hyalluronates and chondroitin sulfate, the supporting structures of the organism. It can be converted to a pentose essential for the formation of nucleic acids by the cells.

5.2 Pharmacokinetic properties

Glucose is metabolized via pyruvic or lactic acid to carbon dioxide and water with the release of energy.

5.3 Preclinical safety data

The safety of glucose in animals is not relevant in view of its presence as a normal component in animal and human plasma.

6. Pharmaceutical particulars

6.1 List of excipients

Water for Injections
Hydrochloric Acid
Sodium Hydroxide

6.2 Incompatibilities

As with all parenteral solutions compatibility of the additives with the solution must be assessed before addition.

It is the responsibility of the physician to judge the incompatibility of an additive medication with the Glucose 5% solution by checking for eventual colour change and/or eventual precipitate, insoluble complexes or crystals apparition. The Instructions for Use of the medication to be added must be consulted.

Before adding a drug, verify it is soluble and stable in water at the pH of Glucose 5%.
When a compatible medication is added to the Glucose 5%, the solution must be administered immediately.
Those additives known to be incompatible should not be used.

6.3 Shelf life

2 years

Discard any unused solution immediately after first use.

It is recommended that the product is used immediately after removal from the over pouch.
From a microbiological point of view, any admixture should be used immediately. If not used immediately, in-use storage times and conditions prior to use are the responsibility of the user and would normally not be longer than 24 hours at 2°C to 8°C. Preparation of the admixture should take place under controlled and validated aseptic conditions.

6.4 Special precautions for storage:
Do not store above 30˚C.

6.5 Nature and contents of container
Glucose 50% w/v is supplied in a 50ml polyolefin bags packed in a metallised trilaminate over pouch

6.6 Special precautions for disposal and other handling:
Discard after single use.
Discard any unused portion.
Do not store solutions containing additives.
Do not reconnect partially used bags.
Do not remove unit from overwrap until ready for use. The inner bag maintains the sterility of the product.

7. Marketing authorization holder and manufacturing site addresses

Marketing authorization holder:
Tasa Pharma Limited
Address: Unit C1-C3 Kay complex, Mombasa Road, P.O. Box 3959-00506 Nairobi. KENYA

Manufacturing site address:
Tasa Pharma Limited
Address: Unit C1-C3 Kay complex, Mombasa Road, P.O. Box 3959-00506 Nairobi. KENYA

8. Marketing authorization number
CTD9932

9. Date of first registration
13/12/2022

10. Date of revision of the text:
18/09/2023

11. Dosimetry:
Not Applicable

12. Instructions for Preparation of Radiopharmaceuticals:
Not Applicable