Summary of Product Characteristics for Pharmaceutical Products

1. Name of the medicinal product:

Dexatas 10% - Glucose 10% Solution for Infusion

2. Qualitative and quantitative composition

Each 1ml solution for infusion contains 110.0 mg glucose monohydrate (equivalent to 100mg glucose anhydrous.
For the full list of excipients, see section 6.1.

3. Pharmaceutical form

Solution for infusion
Clear colourless to faintly yellow coloured solution.
pH: 3.5 – 6.5

4. Clinical particulars

4.1 Therapeutic indications

Hypertonic (Glucose > 10%) infusion solutions are indicated:

• As a source of energy incorporated with parenteral nutrition with minimal dilution effect

• For use with an appropriate protein (nitrogen) source in the prevention of nitrogen loss or in the treatment of negative nitrogen balance in patients where:

a) the alimentary tract cannot or should not be used
b) gastrointestinal absorption of protein is impaired
c) metabolic requirements for protein are substantially increased, as with extensive burns.

4.2 Posology and method of administration

The dosage of the glucose infusion solutions is dependent upon the age, weight, concomitant therapy, clinical and metabolic conditions of the patient as well as laboratory determinations. Electrolyte supplementation may be indicated according to the clinical needs of the patient.

When glucose is used as a diluent, the dosage administered will be principally dictated by the nature of the additive and the infusion rate will depend upon the dose regimen of the prescribed medicine. The Glucose infusion solution may be administered intravenously to healthy individuals at a rate of 0.5 g/kg per hour without producing glycosuria; the maximum infusion rate should not exceed 0.8g/kg per hour.

A hypertonic glucose infusion solution, such as the Glucose 10% (556 mOsmol/L), should preferably be administered via intravenous catheter in a large central vein. A gradual increase of flow rate should be considered when starting administration of hypertonic glucose infusions. To reduce the risk of hypoglycaemia after discontinuation, a gradual decrease in flow rate before stopping the infusion should be considered. The usual dose is 20-50mL of 50% glucose injection administered slowly, at a rate of 3mL/minute. If a peripheral vein is used, a large arm vein should be selected and the infusion site should be changed daily.

Parenteral drug products should be inspected visually for particulate matter and discolouration prior to their administration (see Section 4.4 Precautions); only sterile and nonpyrogenic equipment must be used for intravenous administration. Do not administer unless the solution is clear and the seal is intact. Use of an in-line filter is recommended during administration of all parenteral solutions where possible. Additives may be introduced before infusion or during infusion through the injection site. Additives may be incompatible. Consult with a pharmacist, if available. Check additive compatibility with both the solution and container prior to use. Complete information is not available. Those additives known to be incompatible should not be used. Before adding a substance or medication, verify that it is soluble and/or stable in water and that the pH range of the glucose infusion solution is appropriate. The instructions for use of the medication to be added and other relevant literature must be consulted. When introducing additives to the glucose infusion solution, aseptic technique must be used. After addition, check for a possible color change and/or the appearance of precipitates, insoluble complexes or crystals. Thorough and careful aseptic mixing of any additive is mandatory. Solutions containing additives should be used immediately and not stored. The osmolarity of a final admixed infusion solution must be taken into account when peripheral administration is considered. Administration of hyperosmolar solutions may cause venous irritation and phlebitis.
Solutions containing glucose should not be administered through the same lines as those containing whole blood due to the risk of haemolysis and clumping. It does not contain antimicrobials. For use in one patient on one occasion only. Residue should be discarded. Care should be taken with intravenous administration and injection technique to avoid injection site reactions and infections.

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

4.3 Contraindications

The infusion of hypertonic glucose preparations are contraindicated in patients:
• having intracranial or intraspinal haemorrhage
• with delirium tremens or those who are severely dehydrated
• who are anuric and
• with diabetic coma
•with hypersensitivity to the active substance or to any of the excipients listed in section 6.1 Infusion of both isotonic and hypertonic glucose preparations are contraindicated in patients:
• who have had head trauma within 24 hours, with blood glucose concentrations being closely monitored during intracranial hypertension
• with known hypersensitivity to the product

• with known allergy to corn or corn products, because corn starch is used as raw material for glucose production • with clinically significant hyperglycaemia.
• with hypersensitivity to the active substance or to any of the excipients listed in section 6.1
Avoid use after an ischaemic stroke episode as under this condition, the induced lactic acidosis aggravates the recovery of the brain damage tissue.

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 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 (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 and its effects on water and electrolyte balance should be taken into account when using Glucose 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

When a medicinal product is added, the nature of the drug and its use during pregnancy and lactation have to be considered separately.

Intrapartum maternal intravenous glucose infusion may result in foetal insulin production, with an associated risk of foetal hyperglycaemia and metabolic acidosis as well as rebound hypoglycaemia in the neonate.

Pregnancy

Glucose solution can be used during pregnancy. However, caution should be exercised when glucose solution is used intrapartum.
Glucose 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 10% 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 10% 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 10% must be stopped immediately. Management of overdose is symptomatic and supportive, with appropriate monitoring. '
Fluid overload and biochemical imbalance resulting from overdosage with glucose should be treated with appropriate corrective therapy. If diuresis is adequate, administration of a slightly hypotonic electrolyte

solution in a quantity calculated to replace the net quantity of fluid and specific electrolytes (particularly potassium) lost to osmodiuresis, whilst continuously monitoring serum electrolytes, fluid balance and acid-base status is recommended.

A suitable basic solution for replacing fluids and major electrolytes could be made up according to the following formulation per 1000mL: Na+: approx. 120mmol, K+: approx. 30mmol, Cl-: approx. 150mmol. Other electrolytes should also be replaced to make up for losses incurred.

In addition to replacement of net losses of fluids and electrolytes to diuresis, any acid-base imbalance should be corrected whilst continuing to monitor laboratory values.

In patients with oliguria or those with anuria, peritoneal dialysis or extracorporeal haemodialysis using carbohydrate-free solutions can be considered as a last resort.

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. The Glucose solution provides a caloric intake of 200 kcal/l. Furthermore, this glucose solution for infusion allows hydric supplementation without ionic supplementation.

Glucose 10% is a hypertonic solution.

The pharmacodynamics of the additive will depend on the nature of the drug used.

5.2 Pharmacokinetic properties

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

The pharmacokinetics of the additive will depend on the nature of the drug used.

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.
The safety of the additive should be considered separately.

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 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 10%.
When a compatible medication is added to the Glucose 10%, the solution must be administered immediately.
Those additives known to be incompatible should not be used.

6.3 Shelf life

24 months

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 10% w/v is a clear to slightly yellow solution.
Glucose 10% w/v is supplied in a 50ml, 100ml, 250ml, 500ml,1000ml and 2000ml 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.

When introducing additives to Glucose solution aseptic technique must be used.
Mix the solution thoroughly when additives have been introduced.

1. Opening

a. Remove the bag from the over pouch just before use.
b. Check for minute leaks by squeezing inner bag firmly. If leaks are found, discard solution, as sterility may be impaired.
c. Check the solution for limpidity and absence of foreign matters. If solution is not clear or contains foreign matters, discard the solution.

2. Preparation for administration

Use sterile material for preparation and administration.
a. Suspend container from eyelet support.
b. Remove plastic protector from outlet port at bottom of container:
- grip the small wing on the neck of the port with one hand,
- grip the large wing on the cap with the other hand and twist,
- the cap will pop off.

c. Use an aseptic method to set up the infusion
d. Attach administration set. Refer to complete directions accompanying set for connection, priming of the set and administration of the solution.

3. Techniques for injection of additive medications

Warning: Additives may be incompatible.

To add medication before administration

a. Disinfect medication site.
b. Using syringe with 19-gauge (1.10 mm) to 22-gauge (0.70 mm) needle, puncture resealable medication port and inject.
c. Mix solution and medication thoroughly. For high-density medication such as potassium chloride, tap the ports gently while ports are upright and mix.

Caution: Do not store bags containing added medications.

To add medication during administration

a. Close clamp on the set.
b. Disinfect medication site.
c. Using syringe with 19-gauge (1.10 mm) to 22-gauge (0.70 mm) needle, puncture resealable medication port and inject.
d. Remove container from IV pole and/or turn to an upright position.
e. Evacuate both ports by tapping gently while the container is in an upright position.
f. Mix solution and medication thoroughly.

g. Return container to in use position, re-open the clamp and continue administration.

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
CTD9933

9. Date of first registration
13/12/2022

10. Date of revision of the text:
19/09/2023

11. Dosimetry:
Not Applicable

12. Instructions for Preparation of Radiopharmaceuticals:
Not Applicable