

Pack Insert

Front

"For the use of a Registered Medical Practitioner or Hospital or laboratory only"

AXADEX D10

Glucose Intravenous Infusion BP 10% w/v

1. Composition

Each 100 ml contains:

Glucose Anhydrous BP.....10.0% w/v
Water for Injections BP.....q.s.

2. Dosage form

Intravenous Infusion

3. Indications and Usage

Glucose 10% w/v Solution for Infusion is indicated for:
Supply of carbohydrate alone or, as required, during parenteral nutrition.
Prevention and treatment of hypoglycaemia.
Rehydration in case of water loss and dehydration states in patients with high carbohydrate need.
Dilution of compatible medicinal products.

4. Clinical Pharmacology:

Pharmacodynamic properties:

Pharmacotherapeutic group "Carbohydrates", ATC code: B05BA03.
Glucose Intravenous Infusion 10% w/v is a hypertonic solution, with an approximate osmolality of 555 mOsm/l.
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, alone or, as required, in parenteral nutrition. The Glucose 10% w/v solution provides a caloric intake of 400 kcal/l. Furthermore glucose solution for infusion allows hydric supplementation without ionic supplementation.
When medication is added to Glucose Intravenous Infusion 10% w/v, the overall pharmacodynamics of the solution will depend on the nature of the medicinal product used.

Pharmacokinetic properties

Two different pathways are involved in the metabolism of glucose: one anaerobic and one aerobic.
Glucose is metabolised via pyruvic or lactic acid to carbon dioxide and water with release of energy.
When medication is added to Glucose Intravenous Infusion 10% w/v, the overall pharmacokinetics of the solution will depend on the nature of the medicinal product used.

5. Dosage and Administration

Posology

The dosage and rate of administration of Glucose Intravenous Infusion 10% w/v are determined by several factors including the indication for use and the patient's age, weight and clinical condition.

Adults and elderly:

The recommended doses in Table I serve as a guideline for an average adult with a body weight of approximately 70 kg.

Guidance on the Dose for Administration to an Adult (70kg)*			
Indication	Initial daily dose	Rate of administration	Recommended duration of treatment
Supply of Carbohydrate alone or, as required, during parenteral nutrition	From 500 ml to 3000 ml/day (from 7 to 40 ml/kg/day)	The recommended maximum administration rate should not exceed the patient's glucose oxidation, as this may cause hyperglycaemia: 5 mg/kg/min (3 ml/kg/h)	No limit on duration dependent on the clinical condition of the patient
Prevention and treatment of hypoglycaemia			
Rehydration in case of water loss and dehydration states in patients with high carbohydrate need			
Dilution of compatible medicinal products	From 50 to 250 ml per dose	Dependent on the nature of the additive	Dependent on the nature of the additive

*The largest volumes within recommended dose should be administered in 24 hours to avoid haemodilution.

Method of Administration

Administration is usually via a peripheral or central vein.
Glucose Intravenous Infusion 10% w/v is a hypertonic solution.
The osmolality of a final admixed infusion solution must be taken into account when peripheral administration is considered. A gradual increase of flow rate should be considered when starting administration of glucose-containing products.

6. Usage in Specific Population

Paediatric population:

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

Indication	Initial daily dose	Initial Rate of Administration*			
		Preterm and term newborn infants	Infants and toddlers (1-23 months)	Children (2-11 years)	Adolescents (12 to 16-18 years)
Supply of carbohydrate alone, or, as required, during	• (0-10 kg body weight (BW)) 100 ml/kg/day	6-11 ml/kg/h (10-18)	5-11 ml/kg/h (9-18)	4-8 ml/kg/h (7-14)	4 ml/kg/h (7-8.5 mg/kg/min)

parenteral nutrition	• 10-20 kg body weight (mg/kg/min)			
Prevention and treatment of hypoglycaemia	(BW) 1000 ml + add 50 ml for each kg BW >10 kg/day			
Rehydration in case of water loss and dehydration states in patients with high carbohydrate need	• ≥ 20 kg body weight (BW) 1500 ml + add 20 ml for each kg BW >20 kg/day			
Dilution of compatible medicinal products	Initial Dose: 50 to 100ml per dose. Not age dependent. Rate of Administration : Dependant on the nature of the additive. Not age dependent.			

7. Contraindication

The solution is contra-indicated in patients presenting with:
Uncompensated diabetes and diabetes insipidus,
Hyperosmolar coma
Haemodilution and extracellular hyperhydration or hypervolaemia.
Hyperglycaemia and hyperlactataemia,
Severe renal insufficiency (with oliguria / anuria).
Uncompensated cardiac failure.
General oedema (including pulmonary and brain oedema) and ascitic cirrhosis,
Other known glucose intolerances (such as metabolic stress situations).
Hypersensitivity to the active substance
The contra-indications related to any medicinal product that is added to the glucose solution should be considered.

8. Warnings and Precautions

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

Dilution and other effects on serum electrolytes

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
 - Hypokalaemia,
 - Hypophosphatemia,
 - Hypomagnesaemia,
 - Overhydration/hypervolemia 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 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.

In case of prolonged administration or high glucose dose, care should be taken to avoid hypokalaemia by monitoring plasma potassium levels and administering a potassium supplement as appropriate.

Special clinical monitoring is required at the beginning of any intravenous infusion.

Hyperglycaemia

Rapid administration of glucose solutions may produce substantial hyperglycaemia and a hyperosmolar syndrome.

To reduce the risk of hyperglycaemia-associated complications, the infusion rate must be adjusted and/or insulin administered

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

- impaired glucose tolerance (such as in patients with renal failure or diabetes mellitus or in the presence of sepsis, trauma, or shock)
- severe malnutrition (risk of precipitating a refeeding syndrome),
- thiamine deficiency, e.g., in patients with chronic alcoholism (risk of severe lactic acidosis due to impaired oxidative metabolism 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.

- newborns

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

240mm

160mm

reactions, have been reported with Glucose solution. Solutions containing glucose should therefore be used with caution, if at all, in patients with known allergy to corn or corn products.

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 depends 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

Newborns – 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 newborn 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 stay, and death.

Paediatric hyponatraemia-related issues

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

Plasma electrolyte concentrations should be closely monitored in the paediatric population.

Rapid correction of hyposmotic 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.

Blood

Glucose solution (an aqueous, i.e., electrolyte-free glucose solution) should not be administered through the same equipment as whole blood, as haemolysis and pseudoagglutination can occur.

Risk of Air Embolism

Do not connect flexible plastic containers in series in order to avoid air embolism due to possible residual air contained in the primary container.

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.

9. Adverse Reaction

The administration of Glucose 10% w/v Solution for Infusion can lead to the development of:

Hyperglycaemia,
Fluid-balance disturbances (hypervolaemia),

Electrolyte disturbances (hypokalaemia, hypomagnesaemia, and hypophosphataemia).

Tabulated list of adverse reactions

System Organ Class	Adverse reaction (MedDRA term)	Frequency
Immune system disorders	Anaphylactic reaction Hypersensitivity	Not known
Metabolism and nutrition disorders	Electrolyte disturbances Hyperglycaemia Hemodilution Hypervolaemia Hospital Acquired Hyponatraemia	
Skin and subcutaneous tissue disorders	Sweating Rash	
Nervous system disorders	Hyponatraemic encephalopathy	
General disorders and administration site conditions	Chills, Shivering Pyrexia, Febrile reaction, Fever Infection at site of injection Thrombophlebitis Infusion site reactions including, • Infusion site phlebitis • Infusion site erythema	
Investigations	Glycosuria	

10. Drug Interaction

Both the glycaemic effects of Glucose solution and its effects on water and electrolyte balance should be taken into account when using Glucose solution 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 i.v. fluids.

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.

11. 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 solution should be administered with special caution for pregnant women during labour particularly if administered in combination with oxytocin due to the risk of hyponatraemia.

Fertility

There are no adequate data of the effect of Glucose 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 solution can be used during lactation.

12. Overdosage

Prolonged administration or rapid infusion of large volumes of Glucose Intravenous Infusion 10% w/v may cause hyperosmolarity and hyponatraemia, dehydration, hyperglycaemia, hyperglycosuria, osmotic diuresis (due to hyperglycaemia) and water intoxication and edema. Severe hyperglycaemia and hyponatraemia may be fatal.

In case of suspected overdose, treatment with Glucose 10% must be stopped immediately. Management of overdose is symptomatic and supportive, with appropriate monitoring.

13. Description: Clear colourless solution

14. Storage: Store below 30°C. Protect from light. Do not refrigerate or freeze.

15. Presentation: 1×250 ml filled in 300ml LDPE bottle with pre-printed label, with helmet cap/Euro head cap packed in a unit carton along with pack insert.

Manufactured in India By:

AXA PARENTALS LIMITED
Plot No. 936,937,939, Vill. Kishanpur, Jamalpur,
Roorkee-247667, Distt. Haridwar (Uttarakhand) India.

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