

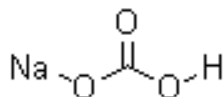
PRODUCT INFORMATION

SODIUM BICARBONATE INTRAVENOUS INFUSION BP 8.4%

(sodium bicarbonate)

NAME OF THE MEDICINE

Sodium bicarbonate



Molecular Formula: NaHCO_3

CAS Number: 144-55-8

DESCRIPTION

Description

A sterile, hypertonic, preservative-free solution containing Sodium Bicarbonate 84 mg/mL and Disodium Edetate in Water for Injections. Each mL of solution contains 1mmol each of sodium and bicarbonate ions.

PHARMACOLOGY

Pharmacodynamics

Sodium bicarbonate is a systemic alkalinising agent which, when given intravenously will increase plasma bicarbonate, buffers excess hydrogen ion concentration, raises blood pH and reverses the clinical manifestations of acidosis.

Pharmacokinetics

Sodium bicarbonate dissociates in water to provide sodium (Na^+) and bicarbonate (HCO_3^-) ions. Sodium is the principal cation of the extracellular fluid. Bicarbonate is a normal constituent of body fluids and the normal plasma level ranges from 24 to 31 mmol/L. Plasma concentration is regulated by the kidney. The bicarbonate anion, at the correct concentration of hydrogen ion (H^+) may be converted to carbonic acid (H_2CO_3), then to its volatile form, carbon dioxide (CO_2) which is excreted by the lung. Normally, a ratio of 1:20 (carbonic acid: bicarbonate) is present in the extracellular fluid.

Excretion

In a healthy adult with normal kidney function, practically all the glomerular filtered bicarbonate ion is reabsorbed and less than 1 % is excreted in the urine.

INDICATIONS

Metabolic acidosis in severe renal disease, uncontrolled diabetes, circulatory insufficiency due to shock or severe dehydration, extracorporeal circulation of blood, cardiac arrest and severe primary lactic acidosis where a rapid increase in plasma total CO₂ content is crucial. Treatment of metabolic acidosis should be concurrent with measures designed to control the cause of the acidosis.

Urinary alkalinisation in the treatment of certain drug intoxications (i.e. barbiturates, salicylates, lithium, methyl alcohol) and in the haemolytic reactions requiring alkalinisation of the urine to diminish nephrotoxicity of blood pigments.

Urinary alkalinisation is also used in methotrexate therapy to prevent nephrotoxicity.

Severe diarrhoea which is often accompanied by a significant loss of bicarbonate.

CONTRAINDICATIONS

- renal failure
- metabolic alkalosis
- respiratory alkalosis
- hypertension
- oedema
- congestive heart failure
- a history of urinary calculi and coexistent potassium depletion or hypocalcaemia
- hypernatraemia, hypoventilation or chloride depletion
- in patients at risk of developing diuretic induced hypochloraemic alkalosis
- eclampsia, aldosteronism.

It is also generally contraindicated in patients with excessive chloride loss from vomiting or continuous gastrointestinal suctioning and in patients at risk of developing diuretic induced hypochloraemic alkalosis.

PRECAUTIONS

- Whenever respiratory acidosis is concomitant with metabolic acidosis, both pulmonary ventilation and perfusion must be adequately supported to get rid of excess carbon dioxide.
- To minimise the risks of pre-existing hypokalaemia and/or hypocalcaemia, these electrolyte disturbances should be corrected prior to initiation of, or concomitantly with, sodium bicarbonate therapy.
- Arterial blood gas analysis, in particular, arterial/venous blood pH and carbon dioxide levels should be performed during the course of sodium bicarbonate treatment to minimise the possibility of overdose and resultant alkalosis.
- Accidental extravasation of hypertonic solutions may cause cellulitis, tissue necrosis, ulceration, vascular irritation and sloughing. The use of scalp veins should be avoided. Prompt elevation of the affected area, warmth and local injection of lignocaine or hyaluronidase are recommended to prevent sloughing.

- Whenever respiratory acidosis is present with metabolic acidosis both pulmonary ventilation and perfusion must be adequately supported in order to eliminate excess CO₂.
- Solutions containing sodium may cause fluid overload when given in excess, resulting in dilution of serum electrolytes or over hydration.
- Sodium bicarbonate should be used with caution in patients with cirrhosis.
- Excessively elevated plasma sodium concentrations may cause dehydration of the brain, resulting in somnolence and confusion, which may progress to convulsions, coma, respiratory failure and ultimately death.
- Bicarbonate should be given with caution to patients with type A lactic acidosis (tissue hypoxia). Administration of bicarbonate may limit the available oxygen, increase lactate production, thus, worsen the acidosis.
- Sodium bicarbonate should not be used in the treatment of diabetic ketoacidosis with pH between 6.90 and 7.10.
- Do not use the injection if it contains precipitate. Do not use unless the solution is clear and the container and seal are intact. Discard any unused portion.

Use in Pregnancy

Animal reproduction studies have not been performed with sodium bicarbonate. It is also not known whether sodium bicarbonate can cause foetal harm when administered to pregnant women. Sodium bicarbonate should be used during pregnancy only when clearly needed and the benefits of therapy outweigh the potential risks.

Use in Lactation

It is not known whether sodium bicarbonate is excreted in breast milk. However, problems in humans have not been reported.

Paediatric Use

Rapid injections (10 mL/min) of hypertonic sodium bicarbonate solutions to neonates and children under 2 years of age may produce hypernatraemia, a decrease in cerebrospinal fluid pressure and possible intracranial haemorrhage. Do not administer more than 8 mmol/kg/day.

In emergency situations, such as cardiac arrest, the risk of rapid infusion of the drug must be weighed against the potential for death from acidosis. Also, administration of this drug to children undergoing cardiopulmonary resuscitation may worsen respiratory acidosis.

Use in Renal Impairment

Sodium retention and oedema may occur during sodium bicarbonate therapy, especially when the drug is given in large doses or to patients with renal insufficiency, congestive heart failure or those predisposed to sodium retention and oedema. Sodium and water overload may result in hypernatraemia and hyperosmolality. Severe hyperosmolal states may develop during cardiopulmonary resuscitation when excessive doses of sodium bicarbonate are administered. Serum potassium may decrease during sodium bicarbonate therapy leading to hypokalaemia.

Sodium bicarbonate should be used with extreme caution in patients with in patients with renal insufficiency or other oedematous or sodium retaining conditions; especially those with severe insufficiency such as oliguria or anuria; and in patients receiving

corticosteroids or corticotropin, since each gram of sodium bicarbonate contains 12 mEq of sodium.

Effects on Laboratory Tests

The high urinary alkalinity sometimes produced by sodium bicarbonate may cause a false positive Labistix test for urinary protein.

INTERACTIONS WITH OTHER MEDICINES

- Urinary alkalinisation will increase the renal clearance of tetracyclines, especially doxycycline, but it will increase the half life and duration of action of basic drugs such as quinidine, amphetamines, ephedrine and pseudoephedrine.
- The addition of sodium bicarbonate to solutions containing calcium should be avoided except where compatibility has been shown. Solutions turning hazy as a result of sodium bicarbonate-calcium admixtures should be discarded.
- Use caution when giving parenteral fluids, especially those containing sodium ions, to patients receiving corticosteroids or corticotropin.
- Hypochloraemic alkalosis may occur if sodium bicarbonate is used in conjunction with potassium depleting diuretics such as bumetanide, ethacrynic acid, frusemide and thiazides. Concurrent use in patients taking potassium supplements may reduce serum potassium concentration by promoting an intracellular ion shift.
- Alkalinisation of the urine leads to increased renal clearance of acidic drugs such as salicylates, tetracyclines, (especially doxycycline), barbiturates and tricyclic antidepressants. Conversely, it prolongs the half-life and duration of basic drugs such as quinidine, amphetamines, ephedrine and pseudoephedrine and may result in toxicity.
- Sodium bicarbonate enhances lithium excretion.
- Solutions containing sodium ions should be used with great care, if at all, in patients receiving corticosteroids or corticotropin.
- Hypochloraemic alkalosis may occur if sodium bicarbonate is used in conjunction with potassium depleting diuretics such as bumetanide, ethacrynic acid, frusemide and thiazides. Concurrent use in patients taking potassium supplements may reduce serum potassium concentration by promoting an intracellular ion shift.
- The following drug may have enhanced or prolonged effects due to concomitant administration with sodium bicarbonate: flecainide.
- The following drugs may have decreased effectiveness due to concomitant administration with sodium bicarbonate: aspirin and other salicylates, barbiturates and lithium.
- The following drugs have been reported to be susceptible to inactivation on mixing with sodium bicarbonate solution: adrenaline HCl, benzylpenicillin potassium, carmustine, glycopyrrolate, isoprenaline HCl and suxamethonium chloride.

ADVERSE EFFECTS

- Alkalosis and/or hypokalaemia may result from prolonged use or overcorrection of the bicarbonate deficit, especially in patients with impaired renal function (see **Overdosage**).
- Extravasation of intravenous hypertonic solutions of sodium bicarbonate may cause cellulitis, with tissue necrosis or sloughing at the site of infiltration.

- Hyperirritability or tetany may occur caused by rapid shifts of free ionised calcium or due to serum protein alterations arising from the pH changes. Metabolic alkalosis may be accompanied by compensatory hyperventilation, paradoxical acidosis of the cerebrospinal fluid, severe hypokalaemia, hyperirritability or tetany.
- Hyponatraemia has been reported with sodium bicarbonate use, especially in patients with renal disease.
- Hyperosmolality has also been associated with sodium bicarbonate use.
- Accidental extravasation of intravenous hypertonic solutions of sodium bicarbonate has been reported to cause chemical cellulitis, with tissue necrosis, tissue calcification, ulceration or sloughing at the site of infiltration. Hyperirritability or tetany may occur, caused by rapid shifts of free ionised calcium or due to serum protein alterations arising from the pH changes.
- Cerebral oedema has occurred with sodium bicarbonate use and a possibility of intracranial haemorrhage exists.
- Hypercapnia has occurred in patients receiving sodium bicarbonate and with fixed ventilation.

DOSAGE AND ADMINISTRATION

Sodium Bicarbonate Intravenous Infusion is administered intravenously preferably into a large vein.

In cardiac arrest:

Administration is determined based on the results of arterial blood pH, PaCO₂ and calculation of base deficit. For adults, an initial dose of 1mmol/kg followed by 0.5 mmol/kg every 10 minutes of arrest, depending on arterial blood gases. In cardiac arrest, the risks from acidosis exceed those of hyponatraemia.

In mild conditions of metabolic acidosis

Sodium Bicarbonate Intravenous Infusion may be admixed with other intravenous fluids if compatibility is proven.

The amount of bicarbonate to be given to older children and adults over a 4 to 8 hour period is approximately 2 to 5 mmol/kg, depending upon the severity of the acidosis as judged by the lowering of total CO₂ content, blood pH and clinical condition of the patient. Initially, an infusion of 2 to 5mmol/kg over 4 to 8 hours will produce improvement in the acid-base status of the blood.

Therapy should be planned in a step by step method as the degree of response from a given dose is not precisely predictable.

In general it is unwise to try and fully correct a low total CO₂ content during the first 24 hours of therapy. This may be accompanied by unrecognised alkalosis due to a delay in the readjustment of normal ventilation.

Children and Adolescents

Children: The usual dose is 1 mmol/kg (1 mL/kg) given by slow intravenous injection.

For infants up to 2 years of age: A 4.2% solution is recommended at a rate not exceeding 8mmol/kg/day. This will minimise the risk of the possibility of hypernatraemia, decreasing cerebrospinal fluid pressure and intracranial haemorrhage. Diluents may be sterile, physiological solution, glucose 5%, or other standard electrolyte solutions but each should be tested for compatibility.

OVERDOSAGE

Symptoms

Alkalosis is a direct result of overdosage. Excessive administration of bicarbonate may lead to hypokalaemia and metabolic alkalosis, especially in patients with impaired renal function. Symptoms include mood changes (hyperirritability), tiredness, shortness of breath, muscle weakness and irregular heartbeat. Muscle hypertonicity, twitching and tetany may develop, especially in hypocalcaemic patients.

Treatment

Administration of sodium bicarbonate should be immediately discontinued. In order to control the symptoms of alkalosis, the patient should rebreath expired air, and the patient treated with intravenous sodium chloride 0.9% and potassium chloride if hypokalaemia is present.

Any accompanying hyperirritability or tetany can be controlled with calcium gluconate. Ammonium chloride may be indicated in severe cases (except in patients with pre-existing hepatic disease).

Treatment of hypernatraemia usually requires water replacement. In some cases, restricted sodium intake and oral water may be sufficient. If more severe, glucose 5% may be administered by slow intravenous infusion. If total body sodium is too high, loop diuretics combined with an infusion of 5% glucose and potassium supplementation may be necessary.

For information on the management of overdose, contact the Poison Information Centre on 131126 (Australia).

PRESENTATION AND STORAGE CONDITIONS

Presentation

Sodium Bicarbonate Intravenous Infusion BP 8.4% 100 mL glass vial.

Storage

Store below 30°C. Single use only. Discard any unused portion.

The expiry date (month/year) is stated on the package after EXP.

NAME AND ADDRESS OF THE SPONSOR

Manufacturer

Pfizer (Perth) Pty Limited
ABN 32 051 824 956
15 Brodie Hall Drive,
Bentley WA 6102 Australia

Sponsor

Pfizer Australia Pty Ltd
A.B.N. 5000 8422 348
38-42 Wharf Road
WEST RYDE NSW 2114

POISON SCHEDULE OF THE MEDICINE

Australia – Unscheduled.

DATE OF TGA APPROVAL

10 July 2000.

DATE OF MOST RECENT AMENDMENT

28 November 2012