

# NEW ZEALAND DATA SHEET

## 1. Compound Sodium Lactate (Hartmann's)

## 2. QUALITATIVE AND QUANTITATIVE COMPOSITION

Sterile solution intended for intravenous use containing Sodium Lactate (3.17 g/L), Sodium Chloride (6.0 g/L), Potassium Chloride (400 mg/L) and Calcium Chloride Dihydrate (270 mg/L). Sodium Hydroxide and Hydrochloric acid is added for pH adjustment.

## 3. PHARMACEUTICAL FORM

The total amount of electrolytes per litre are: sodium 131 mmol, potassium 5 mmol, chloride 112 mmol, calcium 2 mmol, bicarbonate (as lactate) 28 mmol. The osmolality is approximately 255 mOsm/kg water. The solutions are isotonic, sterile, non-pyrogenic and do not contain antimicrobial agent or added buffers. The pH range is 5.0 to 7.0. Compound Sodium Lactate (Hartmann's) Solution for Injection is also known as Ringer-Lactate.

## 4. CLINICAL PARTICULARS

### 4.1 Therapeutic Indications

Compound Sodium Lactate (Hartmann's) is used:

- for intravenous fluid and electrolyte replacement
- as a source of bicarbonate in the treatment of mild to moderate metabolic acidosis associated with dehydration or associated with potassium deficiency
- as a vehicle for intravenous drug delivery, if the drugs are compatible with the solutions.

### 4.2 Dose and Method of Administration

To be used as directed by the physician. The dosage of Compound Sodium Lactate (Hartmann's) is dependent upon the age, weight and concomitant conditions of the patient as well as laboratory determinations and response.

Parenteral drug products should be inspected visually for particulate matter and discoloration prior to administration whenever solution and container permit as only sterile and non-pyrogenic equipment must be used for intravenous administration. Do not administer unless the solution is clear and the seal is intact.

As with all parental solutions compatibility with additives with the solution must be assessed before addition, by checking for a possible colour change and/or the appearance of the precipitates, insoluble complexes or crystals.

Before adding a substance or medication, verify that it is soluble and/or stable in water and that the pH range of Compound Sodium Lactate (Hartmann's)

infusion solution is appropriate. Complete information is not available. Those additives known to be incompatible should not be used. Consult with a pharmacist, if available. If in the informed judgment of the physician, it is deemed advisable to introduce additives, use aseptic technique. Mix thoroughly when additives have been introduced.

Contains no antimicrobials. For use in one patient on one occasion only. Discard any unused portion. Care should be taken with intravenous administration technique to avoid administration site reactions and infection.

### **4.3 Contraindications**

- Known hypersensitivity to sodium lactate.
- Congestive heart failure or severe impairment of renal function.
- Clinical states in which the administration of sodium and chloride is detrimental.
- As for other calcium-containing infusion solutions, concomitant administration of ceftriaxone and Compound Sodium Lactate (Hartmann's) is contraindicated in neonates ( $\leq 28$  days of age) even if separate infusion lines are used due to risk of fatal ceftriazone-calcium salt precipitation in the neonates bloodstream. In patients older than 28 days (including children and adults), ceftriaxone must not be administered simultaneously with IV calcium-containing solutions, including Compound Sodium Lactate (Hartmann's) through the same infusion line (e.g. via Y-connector).

### **4.4 Special Warnings and Precautions for Use**

Compound Sodium Lactate (Hartmann's) is not for use in the treatment of lactic acidosis or severe metabolic acidosis. Although the Hartmann's solution has potassium concentrations similar to that of plasma, it is insufficient to produce a useful effect in severe potassium deficiency, Therefore not to be used for treatment of severe deficiency.

The introduction of additives to any solution, regardless of type of container, requires special attention to ensure that no incompatibilities result. While some incompatibilities are readily observed, one must be aware that subtle physical, chemical and pharmacological incompatibilities can occur. The medical literature, the package insert and other available sources of information should be reviewed for thorough understanding of possible incompatibilities.

Concomitant administration with ceftriaxone in newborns ( $\leq 28$  days of age) is not recommended through the same infusion line (see section **4.3 Contraindications**) due to the risk of fatal ceftriaxone calcium salt precipitation.

In patients older than 28 days (including adults), ceftriaxone must not be administered simultaneously with intravenous calcium-containing solutions, through the same infusion line. If the same infusion line is used for sequential

administration, the line must be thoroughly flushed between infusions with a compatible fluid.

Do not administer Compound Sodium Lactate (Hartmann's) infusion solution unless it is clear and the seal is intact.

In a dilute condition, osmolarity is approximately equivalent to osmolality. Compound Sodium Lactate (Hartmann's) is isotonic. The addition of potassium chloride (0.18%, 48mOsmol/L) to the Compound Sodium Lactate (Hartmann's) solution does not result in a hypertonic solution (304mOsmol/L). It is important to bear in mind that an administration of substantially hypertonic solution may lead to a wide variety of complications, such as crenation (shrinkage) of red blood cells and general cellular dehydration.

In patients with diminished renal function, administration of Compound Sodium Lactate (Hartmann's) may result in sodium, calcium and/or potassium retention. If a patient receives prolonged therapy, or the rate of administration warrants review, clinical evaluation and laboratory monitoring for changes in fluid balance, electrolyte concentration and acid/base balance should be conducted.

### **Hypersensitivity reactions**

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.

### **Hyponatraemia**

Monitoring of serum sodium is important for hypotonic fluids. High volume infusion must be used under specific monitoring in patients with cardiac or pulmonary failure, and in patients with non-osmotic vasopressin release (including SIADH), due to the risk of hospital-acquired hyponatraemia. Acute hyponatraemia can lead to acute hyponatraemic encephalopathy (brain oedema) characterised by headache, nausea, seizures, lethargy and vomiting. Patients with brain oedema are at particular risk of severe, irreversible and life-threatening brain injury.

### **Fluid/solute overload and electrolyte disturbances**

Depending on the volume and rate of infusion, the intravenous administration of Hartmann's solution can cause fluid and/or solute overloading resulting in dilution of serum electrolyte concentrations, overhydration, congested states (including pulmonary congestion and oedema), clinically relevant electrolyte disturbance and acid-base imbalance. The risk of dilution states is inversely proportional to the electrolyte concentrations of the injections. The risk of solute overload causing congested states with peripheral and pulmonary oedema is directly proportional to the electrolyte concentrations of the injections.

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.

**Use in patients with or at risk of hyperkalaemia**

Hartmann' solution should be administered with particular caution, if at all, to patients with hyperkalaemia or conditions predisposing to hyperkalaemia (e.g. potassium excretion impairment, adrenocortical insufficiency, acute dehydration, severe renal impairment or extensive tissue injury or burns) and patients with cardiac disease, as administration of IV potassium can rapidly result in severe hyperkalaemia without symptoms, which may lead to fatal adverse reactions.

**Use in patients with hypervolaemia, overhydration, or conditions that cause sodium retention and oedema**

Hartmann' solution should be administered with particular caution, if at all, to patients with conditions that may cause sodium retention, fluid overload and oedema. Consideration should be given to withholding Compound Sodium Lactate (Hartmanns) infusion altogether in hypervolaemic or overhydrated patients, including those with severe renal impairment, primary or secondary hyperaldosteronism or preeclampsia, due to the risk of potassium and/or sodium retention, fluid overload and oedema.

Hartmann's solution should be used with caution in patients receiving corticosteroids or corticotropin, (i.e. potential sodium retention).

**Use in patients with or at risk of alkalosis**

Hartmann's solution should be administered with particular caution, if at all, to patients with alkalosis or at risk of alkalosis, because lactate is metabolised to bicarbonate and administration may result in, or worsen, metabolic alkalosis. The effect of the sodium lactate component in Hartmann's solution on patients with metabolic or respiratory alkalosis should be monitored closely.

**Use in patients with or at risk of increased lactate levels or with impaired lactate utilisation**

Hartmann's solution should be administered with extreme caution, if at all, in patients with conditions associated with increased lactate levels or impaired lactate utilisation such as cardiac disease, shock and severe hepatic insufficiency. Hyperlactataemia (i.e., high lactate levels) can develop in patients with severe hepatic insufficiency, since lactate metabolism may be impaired. In addition, Hartmann's solution may not produce alkalinising action in patients with severe hepatic insufficiency, since lactate metabolism may be impaired. Lactate-containing solutions should be administered with particular caution to neonates and infants less than 6 months of age (see also **Paediatric Use** below).

**Use in patients with Type 2 diabetes**

Lactate is a substrate for gluconeogenesis. This should be taken into account when Hartmann's solution is used in patients with Type 2 diabetes.

**Use in patients with or at risk for hypercalcaemia**

Solutions containing calcium salts, including Hartmann's solution should be used with caution in patients with:

- hypercalcaemia, or conditions predisposing to hypercalcaemia such as severe renal impairment and granulomatous diseases associated with increased calcitriol synthesis including sarcoidosis
- Calcium renal calculi or a history of such calculi.

### **Use in the elderly**

Clinical studies of Compound Sodium Lactate (Hartmann's) did not include sufficient numbers of subjects aged 65 and over to determine whether they respond differently from younger subjects. Other reported clinical experience has not identified differences in responses between the elderly and younger patients. In general, dose selection for an elderly patient should be cautious, usually starting at the low end of the dosing range, reflecting the greater frequency of decreased hepatic, renal or cardiac function, and of concomitant disease or drug therapy.

### **Paediatric Population**

Safety and effectiveness of Compound Sodium Lactate (Hartmann's) in paediatric patients have not been established by adequate and well controlled trials; however, the use of electrolyte solutions in the paediatric population is referenced in the medical literature. Lactate-containing solutions should be administered with particular caution to neonates and infants <6 months of age. The precautions and adverse reactions identified for infants, children and adults should be observed in the paediatric population.

### **Effects on laboratory tests**

The effect of this medicine on laboratory tests has not been established.

## **4.5 Interactions with other Medicines and other forms of Interaction**

Compound Sodium Lactate (Hartmann's) should not be administered simultaneously with blood preparations (e.g. citrate anticoagulated/preserved blood) through the same administration set, because of a possibility or the likelihood of coagulation.

Concomitant administration with ceftriaxone is not recommended through the same infusion line (see sections **4.3 Contraindications** and **4.4 Special Warnings and Precautions for Use**) due to the risk of fatal ceftriaxone-calcium salt precipitation.

Caution is advised when administering Hartmann's solution to patients treated with drugs leading to an increased vasopressin effect. The below listed drugs increase the vasopressin effect, leading to reduced renal electrolyte free water excretion and may increase the risk of hyponatraemia following treatment with intravenous fluids (see sections 4.4 and 4.8).

- Drugs stimulating vasopressin release such as chlorpropamide, clofibrate, carbamazepine, vincristine, selective serotonin reuptake inhibitors (SSRIs), 3,4-methylenedioxy-N-methamphetamine, ifosfamide, antipsychotics, opioids.
- Drugs potentiating vasopressin action such as chlorpropamide, non-steroidal anti-inflammatories (NSAIDs), cyclophosphamide.

- Vasopressin analogues such as desmopressin, oxytocin, vasopressin, terlipressin.

Caution is advised when administering Hartmann's solution to patients treated with drugs that may increase the risk of hyponatraemia, such as diuretics and antiepileptics (e.g., oxcarbazepine).

Administration of calcium may increase the effects of digitalis and lead to serious or fatal cardiac arrhythmias. Therefore, larger volumes or faster infusion rates should be used with caution in patients treated with digitalis glycosides.

Caution is advised when administering Compound Sodium Lactate (Hartmann's) infusion solution to patients treated with thiazide diuretics or vitamin D as these can increase the risk of hypercalcaemia.

Caution is advised when administering Compound Sodium Lactate (Hartmann's) infusion solution to patients treated with medicines that may increase the risk of sodium and fluid retention such as carbenoxolone and corticosteroids (see section **4.4 Special Warnings and Precautions for Use**).

Caution is advised when administering Compound Sodium Lactate (Hartmann's) infusion solution to patient treated with drugs for which renal elimination is pH dependent. Due to the alkalinising action of lactate (formation of bicarbonate), Compound Sodium Lactate (Hartmann's) infusion solution may interfere with the elimination of such drugs:

- Renal clearance of acidic medicines such as salicylates, barbiturates and lithium may be increased.

The renal clearance of alkaline medicines such as sympathomimetics (e.g. pseudoephedrine), dexamphetamine sulphate and fenfluramine hydrochloride may be decreased.

Compound Sodium Lactate (Hartmann's) infusion solution contains approximately 5 mmol/L potassium and caution is advised when administering Compound Sodium Lactate (Hartmann's) to patients treated with drugs that can cause hyperkalaemia or increase the risk of hyperkalaemia, such as potassium sparing diuretics (amiloride, spironolactone, triamterene), angiotensin converting enzyme (ACE) inhibitors, angiotensin II receptor antagonists (ARAs) or the immunosuppressants tacrolimus and cyclosporin, or potassium supplement preparations. Simultaneous administration of these drugs can result in severe and potentially fatal hyperkalaemia, particularly in patients with severe renal insufficiency (see section 6.2).

#### **4.6 Fertility, Pregnancy and Lactation**

##### Fertility:

Data not available.

#### Pregnancy (Category C):

There is no adequate data from the use of Compound Sodium Lactate (Hartmann's). The potential risks and benefits for each specific patient should be carefully considered before using Compound Sodium Lactate (Hartmann's) solution in pregnant women.

#### Breast feeding:

There is no adequate data from the use of Compound Sodium Lactate (Hartmann's) in lactating women. The potential risks and benefits for each specific patient should be carefully considered before using Compound Sodium Lactate (Hartmann's) solution in lactating women.

### **4.7 Effects on Ability to Drive and Use Machines**

Data not available.

### **4.8 Undesirable Effects**

Allergic reactions or anaphylactic/anaphylactoid symptoms such as localised or generalised urticaria, skin rash and erythema and itching/pruritus; skin swelling, periorbital facial and/or laryngeal oedema (Quincke's oedema); chest tightness, chest pain, with tachycardia or bradycardia; nasal congestion, coughing, sneezing, bronchospasm and/or difficulty breathing have been reported during administration of Hartmann's Solution.

Adverse reactions may occur due to the solution or the technique of administration including fever response, or infection at the site of injection. Prolonged intravenous infusion of this type of product may cause venous thrombosis or phlebitis extending from the site of injection, extravasation, and hypervolaemia.

If an adverse reaction does occur, discontinue the infusion and evaluate the patient, institute appropriate therapeutic countermeasures, and save the remainder of the fluid for examination if deemed necessary.

### **Post-marketing Adverse Reactions**

The following adverse reactions have been reported in the post-marketing experience:

**IMMUNE SYSTEM DISORDERS:** Hypersensitivity/infusion reactions, including Anaphylactic/Anaphylactoid reactions and the following manifestations:

Angioedema, chest pain, chest discomfort, decreased heart rate, tachycardia, blood pressure decreased, respiratory distress, bronchospasm, dyspnoea, cough, urticaria, rash, pruritus, erythema, flushing, throat irritation, paraesthesia's, hypoesthesia oral, dysgeusia, nausea, anxiety, pyrexia, headache.

**METABOLISM AND NUTRITION DISORDERS:** Hyperkalaemia

GENERAL DISORDERS AND ADMINISTRATION SITE CONDITIONS:  
Infusion site reactions, including phlebitis, infusion site inflammation, infusion site swelling, infusion site rash, infusion site pruritus, infusion site erythema, infusion site pain, infusion site burning.

### **Class Reactions**

Other adverse reactions reported with similar products are:

- hyponatraemia
- hyponatraemic encephalopathy
- Infusion site anaesthesia (numbness) (reported with Lactated Ringer's and 5% Dextrose Injection).

During administration of parenteral nutrition fat emulsions, two types of adverse reactions can occur.

### **Immediate reactions**

At the beginning of the infusion, any of the following abnormal signs evoking a hypersensitivity reaction should be cause for immediate discontinuation of the infusion: sweating, shivering, cephalgia, dyspnoea.

### **Delayed reactions**

During long-term parenteral nutrition of fat emulsions, the following adverse reactions have been observed:

Hepato-biliary disorders:

- increase of alkaline phosphatase, bilirubin and transaminases (ALT & AST)
- hepatomegaly
- icterus

Blood and lymphatic system disorders:

- thrombocytopenia

### Reporting of suspected adverse reactions

Reporting suspected adverse reactions after authorisation of the medicine is important. It allows continued monitoring of the benefit/risk balance of the medicine. Healthcare professionals are asked to report any suspected adverse reactions <https://nzphvc.otago.ac.nz/reporting/>

## **4.9 Overdose**

There is no overdose experience with Compound Sodium Lactate (Hartmann's) infusion solution. No specific antidotes to this preparation are known. Should overdose occur, treat the symptoms and institute appropriate supportive measures as required.

An excessive volume or too high a rate of administration may lead to fluid and sodium overload with a risk of oedema (peripheral and/or pulmonary), particularly when renal sodium excretion is impaired. Excessive administration of lactate may lead to metabolic alkalosis, which may be accompanied by hypokalaemia. Excessive administration of potassium may lead to the

development of hyperkalaemia, especially in patients with severe renal impairment. Excessive administration of calcium salts may lead to hypercalcaemia.

When assessing an overdose, any additives in the solution must also be considered.

For advice on the management of overdose please contact the National Poisons Centre on 0800 POISON (0800 764 766).

## **5. PHARMACOLOGICAL PROPERTIES**

### **5.1 Pharmacodynamic Properties**

A multiple electrolyte intravenous solution is intended for restoring the electrolyte balance and water for hydration. A combination of multiple electrolytes and sodium lactate, an alkalinising agent, will provide electrolyte balance and normalise the pH of the acid-base balance of the physiological system.

Sodium is the major cation of extracellular fluid and functions principally in the control of water distribution, fluid and electrolyte balance and osmotic pressure of body fluids. Chloride, the major extracellular anion, closely follows the physiologic disposition of the sodium cation in maintenance of the acid-base balance, isotonicity and electrodynamic characteristic of the cells.

In contrast to the sodium ion, potassium is a major cation of the intracellular fluid (160 mEq/L of intracellular water) and functions principally in the control of body fluid composition and electrolyte balance. Potassium participates in carbohydrate utilisation, protein synthesis and is critical in the regulation of nerve conduction and muscle contraction, particularly in the heart.

Calcium is essential for maintenance of the functional integrity of the nervous, muscular, and skeletal systems and cell membrane and capillary permeability. Calcium is the major component of the body skeleton. The calcium content in bone is continuously undergoing a process of resorption and formation. The normal concentration of calcium in plasma is between 2.2 and 2.6 mmol/L.

Sodium lactate is an alkalinising agent. Lactate is slowly metabolised to bicarbonate and water. This reaction depends on the cellular oxidative activity. Under normal physiological conditions conversion of sodium lactate to bicarbonate requires about one to two hours. The bicarbonate metabolite then has similar actions to those of sodium bicarbonate preparations. That is, bicarbonate metabolites react with acid to produce carbon dioxide and water.

### **5.2 Pharmacokinetic Properties**

As Compound Sodium Lactate (Hartmann's) is directly administered to the systemic circulation, the bioavailability (absorption) of the active components is complete (100%). Excess of calcium is predominantly excreted by the renal system, as in the case of potassium and sodium excretion.

### 5.3 Preclinical Safety Data

#### Carcinogenesis, mutagenesis, impairment of fertility:

The active ingredients, potassium chloride, sodium chloride, calcium chloride and sodium lactate, are neither carcinogenic nor mutagenic at physiological concentrations.

## 6. PHARMACEUTICAL PARTICULARS

### 6.1 List of excipients

Water for Injection. Sodium Hydroxide and Hydrochloric acid is added for pH adjustment.

### 6.2 Incompatibilities

Additives may be incompatible. Complete information is not available. Those additives known to be incompatible should not be used. Consult with Pharmacist, if available. If, in the informed judgment of the doctor, it is deemed advisable to introduce additives, use aseptic technique. Mix thoroughly when additives have been introduced. Do not store solutions containing additives.

### 6.3 Shelf life

3 years.

### 6.4 Special Precautions for Storage

Store at or below 25°C.

### 6.5 Nature and contents of container

Compound Sodium Lactate (Hartmann's) Solution for Injection in **freeflex**<sup>®</sup> bags;

<b><u>Bag, 20 x 250mL</u></b>	<b><u>5 L</u></b>
<b><u>Bag, 30 x 250mL</u></b>	<b><u>7.5 L</u></b>
<b><u>Bag, 35 x 250mL</u></b>	<b><u>8.75 L</u></b>
<b><u>Bag, 40 x 250mL</u></b>	<b><u>10 L</u></b>
<b><u>Bag, 10 x 1000mL</u></b>	<b><u>10 L</u></b>
<b><u>Bag, 20 x 500mL</u></b>	<b><u>10 L</u></b>

### 6.6 Special Precautions for Disposal

Any unused medicine or waste material should be disposed of in accordance with local requirements.

## 7. MEDICINE SCHEDULE

General Sales Medicine.

## 8. SPONSOR

Fresenius Kabi New Zealand Limited,  
c/o GNZCC,  
HSBC Tower, Level 14, 188 Quay Street, Auckland 1010,  
New Zealand.  
Freecall: 0800 144 892

## 9. DATE OF FIRST APPROVAL

10<sup>th</sup> May 2006

## 10. DATE OF REVISION OF THE TEXT

4<sup>th</sup> November 2024

## SUMMARY TABLE OF CHANGES

Section Changed	Summary of new information
4.3	Contraindication with ceftriaxone updated.
4.4	Information arranged with editorial changes to be in alignment with source document. Correction of typo error (304 mOsmol/L) Added safety information relating to risk of hyponatremia, Fluid/solute overload and electrolyte disturbances. Added caution statement in patients receiving corticosteroids or corticotropin. Added effects on laboratory test paragraph.
4.5	Addition of new interaction with medicines increasing the vasopressin effect and caution with drugs increasing the risk of hyponatraemia. Information updated for pH dependent renal elimination and risk of hyperkalaemia.
4.8	Addition of "Hyponatremia" and "Hyponatremic Encephalopathy".