This information was up to date at the time of release to the Heads of Midwifery.
The editorial board does not accept liability for any errors or omissions following its subsequent publication.
Updating arrangements for the formulary should be decided upon and implemented at a local level.

Sodium Lactate Intravenous Infusion, Compound (Hartmann's Solution for Injection; Ringer-Lactate Solution for Injection)

Legal status (GSL, P or POM on exemption list, or PGD)	▪ POM - midwife may administer as medicine is on midwives exemptions list
Patient group	Women requiring resuscitation with intravenous fluids including hypotension, haemorrhage.
Clinical indication	Diluent for oxytocin infusion. Sudden drop in systolic blood pressure. Replacement of fluid to maintain circulatory volume until blood is available as per local guidelines for postpartum haemorrhage.
Pharmacology (Onset and duration of action where appropriate)	Compound sodium lactate is an isotonic solution which replaces water, sodium, potassium and calcium ions. It is used in maternal resuscitation post haemorrhage to initially replace fluid loss to increase the circulating blood volume. It replaces both water and sodium ions in the body, however as little as 10% will stay in the intravascular space. In the management of haemorrhage it may need to be followed by colloids or blood products. If large volumes need to be infused it may reduce the risk of hyperchloraemic acidosis associated with sodium chloride infusion.
Pharmaceutical form, strength, route of administration	500ml and 1000ml IV infusion bags containing sodium chloride 0.6%, sodium lactate 0.32%, potassium chloride 0.04%, calcium chloride 0.027%. Each 1000ml contains; 131mmol (131mEq) Sodium 5mmol (5mEq) Potassium 2mmol (4mEq) Calcium 111mmol (111mEq) Chloride 29mmol (29mEq) Lactate pH: 5.0-7.0

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Dose, frequency and maximum number of doses or period of time for administration or supply	**diluent for oxytocin infusion for PPH** maximum of 500ml **maternal resuscitation (including sudden drop in systolic blood pressure)**: 500ml or 1 litre bag to be infused through a 14/16 gauge needle as quickly as possible Maximum of 2 litres in case of haemorrhage (unless no colloid or blood is available and women still haemorrhaging - continue until help arrives). If giving for any other reason maximum of 1 litre. Ideally when given rapidly the solution should be warmed to no more than 37°C.
Contra-indications/exclusion criteria	▪ known hypersensitivity to any component of the medicine Patients with: ▪ extracellular hyperhydration or hypervolaemia ▪ severe renal insufficiency (with oliguria/anuria) ▪ uncompensated cardiac failure ▪ hyperkalaemia ▪ hypernatraemia ▪ hypercalcaemia ▪ hyperchloraemia ▪ metabolic alkalosis ▪ severe metabolic acidosis ▪ lactic acidosis ▪ ascitic cirrhosis ▪ severe hepatocellular insufficiency or impaired lactate metabolism ▪ general oedema and ascitic cirrhosis
Cautions and action that will be taken if a caution applies	▪ restrict intake in impaired renal function, cardiac failure, hypertension, peripheral or pulmonary oedema, aldosteronism, pre-eclampsia or other conditions associated with sodium retention ▪ high volume infusion must be used under specific monitoring in women with cardiac or pulmonary failure ▪ monitor woman's clinical status and laboratory parameters during the use of this solution - plasma potassium level of the woman must be particularly closely monitored in all women at risk of hyperkalaemia ▪ avoid extravasation as calcium chloride is an irritant; use calcium-containing solutions with caution in impaired renal function or diseases associated with elevated Vitamin D concentrations such as sarcoidosis - they should be avoided in patients with calcium renal calculi, or a history of renal calculi ▪ due to risk of coagulation precipitated by calcium content do not add or simultaneously run through same tubing as citrate anticoagulated/preserved blood ▪ check and document any allergies ▪ check and document past medical and drug history and current medication to ascertain potential for overdose ▪ if a caution applies consult with a doctor before administration or supply ▪ document consultation in maternity record

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Medicine interactions and action that will be taken if a patient is taking a medicine that may interact	Must **not** be infused in the same line as blood. Potential for interactions with the following; ▪ corticosteroids ▪ potassium sparing diuretics ▪ ACE inhibitors, angiotensin –II receptor antagonists ▪ tacrolimus, ciclosporin ▪ digoxin ▪ thiazide diuretics ▪ vitamin D ▪ acidic drugs such as salicylates, barbiturates and lithium ▪ alkaline drugs such as ephedrine and pseudoephedrine ▪ if there is a drug interaction, consult with a doctor/GP before administration or supply ▪ document consultation in maternity record ▪ refer to current BNF for latest information on interactions
Potential adverse reactions and side effects including actions to be taken if adverse drug reaction is suspected	▪ *allergic reactions or anaphylactic/anaphylactoid symptoms such as urticaria, skin rash & erythema and itching/pruritus; skin swelling, periobial facial and/or laryngeal oedema, nasal congestion, coughing, sneezing, bronchospasm and/or difficulty breathing* ▪ *chest tightness, chest pain, with tachycardia or bradycardia* ▪ *hyperhydration and heart failure are very common in patients with cardiac disorder or pulmonary oedema* ▪ *feelings of anxiety, panic attacks* ▪ *metabolic alkalosis which may precipitate seizures* ▪ *injection site reactions such as vein irritation, extravasation, infection, febrile response* ▪ *on labour* *Nil* ▪ *on the neonate* *Nil* ▪ *on breast feeding* *Nil* ▪ *If a serious adverse reaction is suspected please report to the MHRA Yellow Card Scheme. http://yellowcard.mhra.gov.uk/*

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Overdose	Overuse or too fast administration can lead to water and sodium overload with oedema. Other symptoms due to excess of other ingredient; ▪ hyperkaleamia - paraesthesia, muscle weakness, paralysis, cardiac arrhythmias, heart block, cardiac arrest, and mental confusion ▪ hypercalcaemia- anorexia, nausea, vomiting, constipation, abdominal pain, muscle weakness, mental disturbances, polydipsia, polyuria, nephrocalcinosis, renal calculi, and in severe cases, cardiac arrhythmias and coma. Too rapid intravenous injection of calcium salts - chalky taste, hot flushes, and peripheral vasodilatation ▪ lactate - hypokalaemia and metabolic alkalosis- mood changes, tiredness, shortness of breath, muscle weakness, and irregular heartbeat. Muscle hypertonicity, twitching, and tetany may develop If used as a diluent the signs and symptoms of over infusion will be related to medicine added. ▪ immediate assessment/ treatment is essential - refer to medical staff ▪ management should be in accordance with established treatment guidelines or see BNF overdose section ▪ for further advice contact National Poisons Centre 0344 892 0111
Action if patient declines	▪ refer to authorised prescriber or doctor ▪ document in maternity record
Additional advice and information	▪ supply the manufacturer's patient information leaflet if requested
Patient monitoring arrangements during and after treatment and follow-up required	If used for sudden drop in blood pressure or postpartum haemorrhage urgent obstetric and anaesthetic help is required Monitor serum urea and electrolytes and if for PPH full blood count and send blood for group and screen. Position woman flat on one side. Monitor pulse and BP.
Particular storage requirements	Use only if the solution is clear, without visible particles and if the container is undamaged.

References

1. Summary of Product Characteristics Baxter HealthCare Text revision 12.12.2018 Accessed 17.12.19 www.medicines.org.uk
2. http://www.bnf.org