Opportunities and challenges in producing a regional online neonatal medicines formulary

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Background and aims

Developing regional guidelines aims to make clinical service more equitable across organisations. Research in neonatal units in the Yorkshire and Humber region showed that there was variation in doses prescribed, preparation, final concentrations and the administration of the most commonly used medicines.

Producing a centralised online medicines formulary accessible to units in the Yorkshire and Humber Neonatal Operational Delivery Network (ODN) aims to align practice across the region.

Methods

- Monographs have a standard layout containing information about indications, dosing, preparation, administration, known compatibilities and incompatibilities, additional information and references.
- 27 drug monographs have been published to date and the formulary continues to expand.
- Neonatal units access these monographs through their local online formularies or guidelines.

Opportunities

- Collaborative working across the network
- Challenging historical practice with up to date evidence
- Improve accuracy and confidence in prescribing medicines on neonatal units
- Provide clear guidance on preparation and administration of medicines
- Provide accessible medicines compatibility information
- Reduce error by reducing the need to make new infusions for transfer or when arriving in receiving unit
- Reduce waste by transferring babies on appropriately made infusions that can be continued in the receiving unit

Yorkshire and Humber Neonatal Operational Delivery Network Drug Administration Guide	
Sodium bicarbonate	
Indication	Resuscitation Correction of acidosis
Dose	Resuscitation: 2-4mL/kg of 4.2% sodium bicarbonate via UVC Correction of acidosis: Half correction (mmol of bicarbonate): $0.3 \times \text{base deficit (mmol/L)} \times \text{weight (kg)}$ Full correction (mmol of bicarbonate): $0.6 \times \text{base deficit (mmol/L)} \times \text{weight (kg)}$
Route of administration	Concentrations of 4.2% or greater should be administered via a central line over 20-30 minutes. Concentrations of 1.4% or less can be administered peripherally but should be given with great care. In an emergency 4.2% sodium bicarbonate can be given peripherally but where possible should be given via a large vein or central vein due to risk of thrombophlebitis and severe tissue damage caused by extravasation. If at all possible use a lower strength. 4.4% sodium bicarbonate = 1mmol/mL 4.2% sodium bicarbonate = 0.5mmol/mL
To prepare	If giving centrally: use 4.2% solution and withdraw the required dose or if diluting 8.4%, draw up the required dose and add the same volume of diluent to make 4.2% sodium bicarbonate If giving peripherally: ideally use 1.26% sodium bicarbonate and draw up the required dose or if diluting 8.4%, draw up the required dose and add 5 times the volume of diluent to make 1.4% (e.g. if using 2mL of 8.4% bicarbonate, add 10mL of diluent to make 12mL total) or if diluting 4.2%, draw up the required dose and add 2 times the volume of diluent to make 1.4% (e.g. if using 2mL of 4.2% bicarbonate, add 4mL of diluent to make 6mL total) Preferred diluents: glucose 5%, glucose 10% Other diluents: water for injection
Compatibilities	Acidovor, aminophylline, atropine, acetaminophen, caffeine citrate, erythromycin, fluconazole, heparin sodium, hydrocortisone, insulin, mannitol, midazolam, morphine sulphate, tazodol, potassium chloride, propofol, vancomycin, vasopressin
Incompatibilities	Adrenaline, amiodarone, amoxicillin, ampicillin, calcium infusions, dobutamine, dopamine, magnesium, meropenem, midazolam, parenteral nutrition
Notes	If there is no compatibility information for specific drugs, do not assume compatibility. For incompatible drugs or those with no compatibility information use a separate line or, for short infusions, flush well between drugs. For side-effects see the BNFc. References Leeds Teaching Hospitals neonatal prescribing and administration monograph, Neonatal Formulary 7th edition, Medicines Committee, Handbook on Injectable Drugs. Drug product information - Sodium bicarbonate 2021 - Johnson & Johnson. Produced by Yorkshire and Humber Neonatal Operational Delivery Network. Clinicians must accept individual responsibility for using this information and prescribing safely.
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Challenges

- Communication within the steering group – face to face meetings not achievable – email communication was deemed most effective
- Achieving agreement across the network
- Navigating individual unit governance processes
- Quality assurance
- Ensuring access to the formulary through individual units' IT systems

Conclusions

Achieving pharmacological consensus across a neonatal ODN can be challenging. Focusing on the aim to improve patient care is essential in overcoming challenges and making the project a success.

Feedback from nursing, medical and pharmacy staff across the region has been positive in terms of confidence in correct prescribing and clarity of preparation and administration instructions, particularly in emergency and time-sensitive clinical situations.