DOBUTAMINE – INTRAVENOUS ADMINISTRATION – CARDIAC WARD CHW

PRACTICE GUIDELINE ©

DOCUMENT SUMMARY/KEY POINTS

- This guideline is for use on cardiac ward (Edgar Stephen Ward - ESW) at The Children's Hospital at Westmead only, and not intended for treatment of neonates.
- Patients can be commenced on dobutamine on the ward, at the direction of a Cardiologist.
- The dosage regimen must be directed by the Cardiologist.
- Continuous cardiac monitoring is required for patients on a dobutamine infusion.
- Cardiac monitoring can only be ceased in consultation with Cardiologist.
- Maximum concentration for infusion is 5mg/mL.
- Dobutamine should be administered via central venous access device (CVAD) if possible.
- Nurses caring for patients with a dobutamine infusion must be accredited to do so. Accreditation includes completing the Inotrope Infusion Worksheet in addition to practical competence deemed by the Clinical Nurse Educator.

Approved by:	SCHN Policy Procedure and Guideline Committee	
Date Effective:	1st June 2015	**Review Period**: 3 years
Team Leader:	Clinical Nurse Educator	**Area/Dept**: Edgar Stephens Ward CHW

Date of Publishing: 15 May 2015 9:58 AM Date of Printing:

K:\CHW P&P\ePolicy\May 15\Dobutamine Infusion on ESW- CHW.docx

CHANGE SUMMARY

- N/A – new document

READ ACKNOWLEDGEMENT

- All Registered Nurses (RNs) involved in caring for patients with a dobutamine infusion must be deemed competent in the nursing management of a dobutamine infusion. See ESW CNE for appropriate accreditation.
- All clinical staff in PICU and ESW must read and acknowledge they understand the contents of this document.

TABLE OF CONTENTS

Introduction **3**
Dobutamine **3**
Indications 3
Pharmacology 3
Contraindications 4
Adverse reactions 4
Special considerations 4
Compatibility 5
Dosage 5
Checking the order 5
Presentation 5
Preparation 6
Administration 6
Observations 7
Ambulation 7
Weaning 7
References **8**

Introduction

Positive inotropes are used in the management of patients whose haemodynamic stability is compromised. They are used commonly in the intensive care environment and at times, dobutamine may be used for patients situated on ESW. This Practice Guideline outlines the recommended management of a dobutamine infusion in the cardiac ward setting.

Dobutamine

Dobutamine is used in patients to provide inotropic support to the failing heart. Most commonly it is used to manage ventricular dysfunction in patients with congenital heart disease or cardiomyopathy. In addition, to this it can be used as a bridge to ventricular assist device implantation or cardiac transplantation. It is often used as an adjunct to oral inotropic and anti-failure medications.

Dobutamine is an inotropic agent, whose primary agonist effect is upon the beta 1 receptors of the heart, increasing contractility and heart rate.[1-3] The vasodilatory effect is mediated through both beta 1 and 2 receptors, allowing for increased cardiac output and decreased pulmonary capillary wedge pressure.[2,4,5] This allows for increase in cardiac output with the ultimate aim of optimising perfusion to vital organs and peripheries as well as decreasing pulmonary and venous congestion. In patients with heart failure, dobutamine increases stroke volume and cardiac output, and decreases pulmonary artery wedge pressure and total systemic and pulmonary vascular resistances.[5]

Indications

- Ventricular dysfunction.[2,3]
- Short term treatment of severe congestive heart failure not responding adequately to other medical therapies (e.g. digoxin, diuretics, vasodilators including ACE inhibitors).[3]
- Low cardiac output syndrome.[1-6]
- Bridging therapy to ventricular assist device implantation or cardiac transplantation.[3]
- To enhance cardiac output when circulating blood volume is adequate.[3]

Pharmacology

- Onset of action 1-2 mins.[2,4,5,6,]
- Half-life < 3mins.[2,4,5]
- Steady state plasma concentration achieved approximately 10mins after infusion commencement or rate change.[4,5]

Contraindications

- Phaeochromocytoma
- Ventricular arrhythmias
- Rapid atrial fibrillation
- Idiopathic hypertrophic subaortic stenosis.[2,5]
- Previous hypersensitivity to dobutamine.[2,5]
- Hypersensitivity to corn or corn products.[2]

Adverse reactions

Include, but not limited to (see Product Information in MIMs for full listing):

- Increased heart rate.[3,5]
- Increased systolic BP.[2,5]
- Increase in ventricular ectopic activity.[2,4-6]
- Shortness of breath.[2,6]
- Hypotension.[4,5]
- Phlebitis at infusion site.[2,5]

Special considerations

- **Avoid extravasation – administer via CVAD if possible**
- Avoid bolus administration.[5]
- Patients can be commenced on dobutamine on the ward, at the direction of a Cardiologist with notification to the nursing unit manager to ensure adequate staffing ratios
- Patients with a dobutamine infusion require a 1 nurse: 2 patient maximum ratio
- Monitor renal function and electrolytes during the infusion, reduce dose in patients with impaired renal function[4,5]
- Use with caution in patients with hypotension prior to the commencement of the infusion
- If line patency compromised, change to alternative site immediately.

Compatibility

- Dobutamine is incompatible with many drugs. Please see the following link for a full list: http://aidh.hcn.com.au/browse/d/dobutamine
- Do not administer any other drug into same vein as dobutamine infusion.[4]
- Strongly alkaline solutions, e.g. Sodium Bicarbonate are incompatible with dobutamine.[5,6]
- Dobutrex® dobutamine powder must be reconstituted with either sterile water or glucose 5%. Saline solutions (sodium chloride) must not be used for initial reconstitution as chloride ions may impede initial dissolution.[5,6]

Dosage

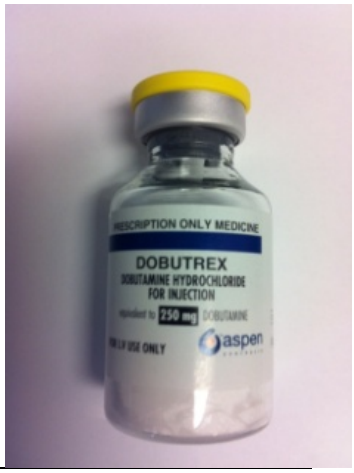
- The weight used for calculation will be decided by the Cardiologist and must be listed on each order
- The weight used to calculate the dosage should remain consistent as this will decrease the risk of errors occurring
- Rates required to achieve therapeutic effect normally range from 2.5 to 10 micrograms/kg/minute.[3,5,6] Higher doses can be used as directed by Cardiologist.

Checking the order

- The medication is to be reviewed and re-ordered every 24 hours
- Infusion is to be changed when necessary or at least every 24hrs.[1,2,5,6]
- Must be checked by 2 RN's, one of whom is appropriately accredited to load the infusion. Accreditation includes completing the Inotrope Infusion Worksheet in addition to practical competence deemed by the Clinical Nurse Educator.
- Both RN's must calculate the correct dosage of the infusion
- Both RN's must check the infusion when taking over care of the patient and sign on the continuous drug infusion chart
- The IV line must be clearly labelled Dobutamine

Presentation

Dobutrex ® Dobutamine Hydrochloride for Injection 250mg vial



Preparation

- Reconstitute vial (250mg) with 10mL water for injection or 5% glucose. [6]
- Maximum concentration for infusion 5mg/mL.[2,6]
- The formula for calculating the standard dilution of dobutamine is:

For children ≤16.66kg:

15 x weight (kg) = number of milligrams made up to 50mL

1mL/hr = 5 micrograms/kg/min

For children >16.66kg:

250mg made up to 50mL

= 5 mg/mL (i.e.5000micrograms/mL)

Calculate rate as follows, remember normal range is **2.5 to 10 microgram/kg/min**:

microgram/kg/min (2.5-10) x weight x 60 = micrograms/hr

microgram/hr ÷ 5000 = rate **mL/hr**

- After initial reconstitution with sterile water or glucose 5% the reconstituted fluid must then be diluted further up to 50ml in one of the following solutions: glucose 5%, glucose 10% , glucose and sodium solutions, Hartmann's, glucose 5% in Hartmann's, sodium chloride 0.9% and sodium chloride 0.45%.[2,4-6]

Administration

- Avoid extravasation – administer via central venous access device (CVAD) if possible
- To be administered as a continuous infusion via a syringe pump.[2,5,6] Ensure infusion syringe is changed over rapidly, as there is potential for haemodynamic instability. A quick change is sufficient, it is not necessary to double pump.[7]
- Ideally, dobutamine should be infused via a central vascular access device (CVAD). Please refer to **CVAD Practice Guideline**: http://chw.schn.health.nsw.gov.au/o/documents/policies/guidelines/2013-9037.pdf
- In the event where central access is unable to be obtained, dobutamine should be infused via a large vein.[1,4,6]
- To avoid interruption of drug delivery a second venous access catheter should be available and patent at all times during infusion.

Observations

- Continuous cardiac monitoring is required for all patients on a dobutamine infusion.
- Cardiac monitoring can only be ceased in consultation with cardiologist
- Half hourly heart rate, respiratory rate and blood pressure with 4th hourly temperature checks for the first 12 hours and with each rate increase. If child remains stable these can be changed to hourly heart rate, respiratory rate and blood pressure with 4th hourly temperature checks.
- When stable, and with consultation with Cardiologist, all observations can be changed to fourth hourly.
- Given the very short half-life, line patency should be strictly monitored to avoid interruption of drug delivery
- Normal line insertion site checks should be performed to observe for signs of extravasation or phlebitis.[5] Please refer to:
  - **Intravenous Cannulation and Venepuncture Procedure**: http://chw.schn.health.nsw.gov.au/o/documents/policies/procedures/2006-8080.pdf
  - **IV Extravasation Management - CHW Practice Guideline**: http://chw.schn.health.nsw.gov.au/o/documents/policies/guidelines/2012-8007.pdf
- Fluid balance must be monitored strictly and weights must be measured daily

Ambulation

- May ambulate around ward as desired and as physical condition permits. Patients are not to leave the ward whilst receiving Dobutamine infusion

Weaning

- Weaning regimen is to be individualised to patient and dictated by Cardiologist
- Observations should include 15 minutely heart rate, respiration rate and blood pressure for 1 hour
- When ceasing a dobutamine infusion, 5mL normal saline should be infused at the same rate as dobutamine infusion to ensure that the line is flushed sufficiently and available for use if needed
- Flush and hep-lock CVADs per protocol

References

1. Parry A. Inotropic drugs and their uses in critical care. Nursing in critical care. 2010; 17(1):19-27.
2. Micromedex 2.0 [Internet] [updated 2014 Aug 8; cited 2014 Nov 28]. Available from: http://www.micromedexsolutions.com.acs.hcn.com.au/micromedex2/librarian/ND_T/evidencexpert/ND_PR/evidencexpert/CS/DF0E6B/ND_AppProduct/evidencexpert/DUPLICATIONSHIELDSYNC/20FD81/ND_PG/evidencexpert/ND_B/evidencexpert/ND_P/evidencexpert/PFActionId/evidencexpert.IntermediateToFullDocumentLink/docId/2502/contentSetId/31/title/DOBUTAMINE/servicesTitle/DOBUTAMINE
3. Parissis JT, Rafouli-Stergiou P, Stasinos V, Psarogiannakopoulos, Mebazaa A. Inotropes in cardiac patients: update 2011. Current Opinion in Critical Care. 2010; 16:432-41.
4. Coons JC, McGraw M, Murali S. Pharmacotherapy for acute heart failure syndromes. American Journal of Health System Pharmacy. 2011; 68:21-35.
5. MIMS [Internet] 2012 Mar 1 [updated 2010 Dec 1; cited 2014 Nov 28]. Available from: https://www.mimsonline.com.au.acs.hcn.com.au/Search/FullPI.aspx?ModuleName=ProductInfo&searchKeyword=dobutamine&PreviousPage=~/Search/QuickSearch.aspx&SearchType=&ID=2440001_2
6. Australian Injectable Drugs Handbook. 6th ed. [Internet] [cited 2014 Nov 28]. Available from: http://aidh.hcn.com.au/#/browse/d/dobutamine
7. De Barbieri I, Frigo AC, Zampieron A. Quick change versus double pump while changing the infusion of inotropes: An experimental study. Nursing in Critical Care. 2009; 14(4): 200-6.