Administration sets/infusion tubing: How often should they be changed to prevent CRBSI?
Ms Emily Larsen, Griffith University, Australia
Broadcast live from the 2017 conference of the Australasian College of Infection Control

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AVATAR GROUP
Alliance for Vascular Access Teaching and Research

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Australasian College for Infection Prevention and Control
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Administration sets/infusion tubing: How often should they be changed to prevent CRBSI?

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Disclosures

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This study:
Intravascular device administration sets:
Replacement after Standard Versus Prolonged use
(The RSVP trial)

V3 02/05/2017

NHMRC project grant 2011-2015, AUD$1.7 million

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Background

- IVDs used extensively worldwide. Many use AS to deliver fluids, medication and pressure monitoring
- Since 1971, AS have been time limited for use (firstly 24 hours, then longer)
- Replacing AS may remove contaminated sets, or may instead allow contamination by breaking a closed circuit
- Routine AS change: ↑equipment, ↑ nursing time costs, and ↑ medical waste, ↑ profits for manufacturers.

Background

Cochrane Database of Systematic Reviews

Optimal timing for intravascular administration set replacement

New search | Conclusions changed | Review | Intervention

Amanda J Ullman, Marie L Cooke, Donna Gillies, Nicole M Marsh, Azlina Daud, Matthew R McGrail, Elizabeth O'Riordan, Claire M Rickard

First published: 15 September 2013

Editorial Group: Cochrane Anaesthesia, Critical and Emergency Care Group

DOI: 10.1002/14651858.CD003588.pub3 View/save citation

- A Cochrane systematic review (2013) included 16 RCTs (5001 pts) - Most papers included were of moderate to high risk of bias (or unclear)
- Cochrane has determined "There are currently an inadequate numbers of trials to examine the effect of AS use beyond 96hrs"
- Australian Infection Control Guidelines (2010): "Leave AS that do not contain lipids, blood/blood products in place up to 4 days"
- CDC Guidelines 2011: "In patients not receiving blood, blood products or fat emulsions, replace AS no more frequently than at 96-hour intervals, but at least every 7 days." Category 1A

The Team

Professor Claire Rickard
Chief Investigator

Ms Nicole Marsh
Project Manager

- (Other) Site Investigators:
  - Professor Joan Webster
  - Professor Jeanine Young
  - Professor John Fraser
  - Professor Geoffrey Playford
  - Dr Evan Alexandrou
  - Dr David McMillan
  - Dr Matthew McGrail
  - Dr Fenella Gill
  - Dr Bradley Wibrow
  - Dr Naomi Runnegar
  - Dr Adrian Regli
  - Dr Stuart Baker
  - Dr John Gowardman
  - Tim Spencer
  - Claire Reynolds

+ 26 Research Nurses over a period of 6 years. An amazing team!

Research Question

Aim: To compare the impact of 4 vs 7day administration set (AS) replacement on infective, clinical and cost outcomes?

Hypotheses:

- 7 day use is non-inferior (no worse) to 4 day for IADs for CRBSI - Sample: 680 IADs (baseline CRBSI 0.8%)
- 7 day and 4 day use is equivalent (+/- 2%) CVADs (all) for CRSBI - Sample: 2,220 CVADs (baseline CRSBI 1.9%)

PRIMARY OUTCOME: CRBSI (matched tip/blood; or differential time to positivity criteria) CDC 2011, IDSA 2009

Design

- Multi-centre, RCT of 2,941 patients
- Pragmatic design of 4 day vs 7 day policy for crystalloid based infusions and non-lipid PN
- Centralised, stratified, block randomisation (concealed)
- Not blinded to patients, clinical or research staff, but blinded primary endpoint CRBSI assessments (ID physician)
- One device per patient. Intention to Treat approach
- Data Safety Monitoring Committee

Inclusion criteria

- ✓ Any inpatient/any age

Update! Waiver of consent

- ✓ CVAD or IAD in situ with AS
- ✓ Device *in situ* >24 hours
- ✓ Device expected ≥7 days

Exclusion criteria

- X Current bloodstream infection
- X Device removal ≤24 h
- X Device in situ >96 h
- X Original AS replaced

Study Population

Population	Clinical Setting	Devices
• Adults • Paediatrics	• Intensive Care • Cancer Care Services • Medical/Surgical	• Arterial Lines (IALs) • Central Venous Catheters (CVCs) • Peripherally Inserted Central Catheters (PICC) • Cuffed Catheters • Implanted Ports

10 Hospitals Included

WA
Sir Charles Gairdner

St John of God (Murdoch)

Princess Margaret Hospital

QLD
Royal Brisbane and Women's Hospital

Princess Alexandra Hospital

Lady Cilento Children's Hospital / Royal Children's Hospital

The Prince Charles Hospital

NSW
Royal Prince Alfred Hospital

Liverpool Hospital

Approvals

- Human Research Ethics Committees:

  Update: Children's Health Queensland Hospital and Health Services Human Research Ethics Committee (HREC) (5 Hospitals - from 2013-2016)

  - New South Wales (NSW): Royal Prince Alfred Hospital HREC (2 Hospitals)
  - Western Australia (WA):
    - Princess Margaret Hospital Hospital HREC (1 Hospital)
    - Sir Charles Gairdner and Osborne Park Health Care Group HREC (1 Hospital)
    - St John of God Health Care HREC (1 Hospital)
- Site Specific Approvals (for each hospital)
- QCAT (QLD Civil and Administrative Tribunal) and NCAT (NSW Civil and Administrative Tribunal)
- Public Health Act approval (permission to access confidential health information)
- Registered on the Australian and New Zealand Clinical Trials Registry

.....lots of paperwork.....

Study Population

	4 day	7 day
Age	49 yrs	50 yrs
Females	37%	37%
ICU / PICU	52% / 10%	51% / 9%
Med/Surg	4% / 11%	4% / 12%
Onc / Haem	4% / 20%	5% / 19%
Diabetes	16%	16%
Leucopenic	5%	5%

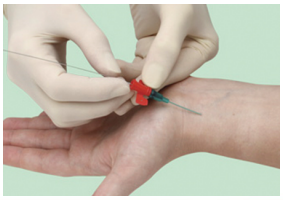
Results: CVADs

	4 day	7 day	IRR	p
Devices	1097	1124	-	-
CLABSI	48 (4.4%)	62 (5.5%)		
/1000 days	3.2	4.2	1.3	0.17
CRBSI	16 (1.5%)	20 (1.8%)	-	
/1000 days	1.1	1.4	1.26	0.50

Tip +ve
4 Day: 1.3%; 7 Day: 1.1%; p = 0.76
Mortality
4 Day: 5.1%; 7 Day: 3.7%; p = 0.12

Results: IALs

	4 day	7 day	IRR	p
Devices	363	357		
CLABSI	10 (2.8%)	6 (1.7%)		
/1000 days	3.8	2.4	0.63	0.38
CRBSI	0 (0%)	1 (0.28%)		
/1000 days	0	0.4	N/A	0.49



Tip +ve
4 Day: 0%; 7 Day: 0.8%; p=0.08
Mortality
4 Day: 6.6%; 7 Day: 7.3%; p=0.72

Interpretation

Now:

- ✓ 4 day & 7 day AS replacement equivalent for CVADs
- ✓ Day 7 is not worse than Day 4 for arterial devices
- ✓ **Policies can change to 7 day AS replacement for crystalloid-based infusions and non-lipid PN**
- ✓ Less AS replacement procedures reduce work and costs

Future:

- ✓ Many ICU (and other units) have CLABSI >1/1000 days
- ✓ Focus needed on highly prevalent ICU device failure
- ✓ Why are so many ICU devices removed "routinely"?
- ✓ Why are so many ICU and CCS "suspected CLABSIs" not confirmed?

Limitations

- Only outcome assessors were blinded
- PICC & CVCs unable to be powered separately
- Not generalizable to lipids, blood, chemotherapy, Cyclosporin, inotropes
- These are preliminary results and may change
- Multivariate, subgroup and cost-effective analysis to come

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Thank you for listening.
Any questions?

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