P1127

Screening neonates for *Pseudomonas aeruginosa*; does it help prevent infection in babies at risk?

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Introduction

The Neonatal Intensive Care (NICU) of North Bristol NHS Trust is a 34-cot unit providing level 3 care for very premature infants. In August 2012 8 babies over a 10-day period were found to have *Pseudomonas aeruginosa* (PA) in clinical specimens, including 1 baby with bacteraemia.

Weekly screening for PA of all NICU neonates was commenced as one of several measures undertaken, which also included water testing and environmental swab sampling, to identify potential sources of PA within the unit.

The aim of screening was to identify neonates colonised with PA, assuming that they would be at highest risk of developing PA infection and, using strain typing, to identify any cross infection occurring between neonates or from the environment.

Though there were no further clusters of colonisation or infection with PA after August 2012, sporadic PA colonisation and occasional infection continued to occur in NICU babies.

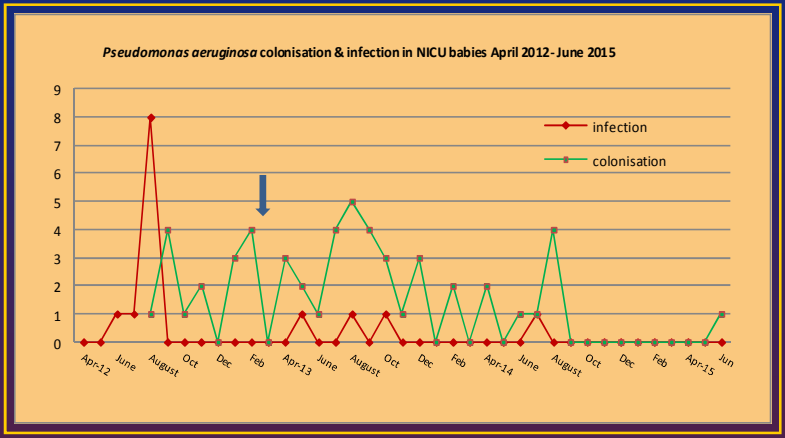

Figure 1. Arrow shows move into refurbished NICU.

Method

Neonates were screened for PA on arrival into NICU and weekly thereafter using the same nose, axilla, groin, wound site swabs submitted for MRSA screening. Swabs were streaked on to CLED media, cultured at 37^{0}C and read at 24hr for presence of PA. Susceptibilities were determined by BSAC methodology. Neonates colonised with PA were either cohorted on the unit when feasible or otherwise nursed in cots in the corner of the clinical area. No topical or systemic decolonisation treatment was given.

Environmental swabs, collected from moist areas including incubators and sink plugholes, were processed as above.

Water samples were collected by a validated water testing company for culture and quantification. To ascertain evidence of possible cross infection from an environmental source or from other colonised babies, all isolates of PA identified from screening swabs or other sources were submitted for Variable Number Tandem Repeat (VNTR) typing at the national PHE Reference Unit. Data on all positive isolates from neonates from August 2012-June 2015 was obtained from the hospital pathology system.

Water sampling specifically for PA was already undertaken as part of a rolling programme on NICU, in accordance with Department of Health UK guidelines.

In 2012, at the request of the Infection Control Team, additional water sampling was undertaken whenever a neonate developed a severe PA infection or when a cluster of babies were colonised in a short time period.

Despite remedial measures, PA persisted in several outlets and so replacement of pipework including all deadlegs and replacement of all taps was undertaken and completed in March 2013, largely eradicating PA from all outlets.

Water testing continues as per DH recommendation on a rolling 3 monthly basis.

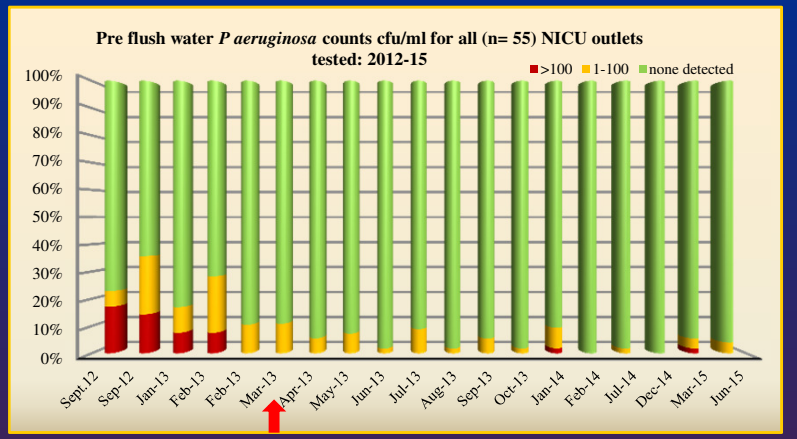

Figure 2

Results

- Over 32 months, 21 different PA strains were identified in 52 / 2213 babies admitted to the neonatal unit.
- 5 neonates acquired their PA prior to transfer to NICU.
- 12 babies developed PA infection requiring systemic antibiotics, four following the first 8 babies in August 2012.
- None of the 40 colonised babies identified by weekly screening developed PA infection.
- The 4 babies with PA infection in the months after screening had been introduced all had PA negative screens (range 1-3 screens) in the weeks preceding their PA infection.
- VNTR typing of strains cultured from colonised and infected babies and water outlets showed no evidence that neonates were acquiring strains from other neonates present in the unit at the same time or from any environmental source which cultured PA.

Conclusions

Screening of neonates for PA was not useful in preventing cases of PA infection in neonates.

It did not predict babies who would subsequently develop PA infection.

It did not support evidence of direct cross-infection from the environment or other neonates.

It did not trigger any preventative intervention measures for colonised babies.

Sources other than water outlets and colonised babies must contribute to acquisition of PA in neonatal units. Local data indicate that approximately 1 in 200 pregnant women carry PA in the vaginal flora and this needs to be explored further as a potential source.

As a result of this study, screening of neonates for *Pseudomonas aeruginosa* has now ceased in our neonatal unit.

North Bristol NHS Trust