A Quality Improvement Initiative for Reducing Late Onset Infection among Very Low Birth Weight Infants

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Aim: Late onset Infection is associated with neurodevelopmental impairment, bronchopulmonary dysplasia (BPD) and death among very low birth weight infants (VLBW). The incidence of late onset infection varies widely between neonatal units and the optimal strategy for reducing late onset infection is uncertain. We aimed to design, implement and evaluate the effect of a quality improvement initiative to reduce late onset infection. Specifically, we aimed to reduce the percentage of VLBW infants developing late onset infection with coagulase negative staphylococci to less than 5% within 18 months.

Setting: The Neonatal Unit of the Simpson Centre for Reproductive Health Edinburgh, a large tertiary neonatal intensive care unit serving 7000 deliveries per annum.

Mechanism: A multidisciplinary team carried out a literature review on topics specific to reduction of late onset infection. An action list across 13 domains was drawn up based on best available evidence and implemented simultaneously over a few months.

Methods: Patients: all VLBW infants treated between July 2011 and December 2013 (n= 276). We implemented quality improvement strategies that included but were not limited to: gloves for patient handling; avoidance of unnecessary movement of staff and objects into a baby’s space; promotion of early human milk feeds; skin antisepsis with chlorhexidine; peripheral and central line care bundles; and staff feedback. Late onset infection and BPD were classified according to Vermont Oxford Network definitions: infection after day 3 of postnatal life and oxygen requirement at 36 weeks postmenstrual age. Prevalence of late onset infection and BPD were recorded prospectively and analysed as 6 month rolling averages.

Data/Results: The rate of late onset infection reduced from 38% to 6%, attributable to reductions in all cause sepsis (figure 1). Over the same time period the absolute risk reduction for BPD was 23% (figure 2).

Discussion: Quality improvement initiatives can be implemented with relatively small additional resource and their effect size for reducing late onset infection can be large. The observed association between late onset infection and BPD focuses attention on infection and inflammation as a modifiable determinant of BPD. Challenges remain in sustaining the improvement achieved and in-depth case reviews of late onset infection are important to identify and address sources of avoidable harm.
Figure 1: Rolling average of percentage of VLBW infants with late onset infection.

Figure 2: Rolling average of percentage of VLBW infants with bronchopulmonary dysplasia