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Effectiveness of a guideline to reduce vancomycin use in the neonatal intensive care unit.

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BACKGROUND:

The Centers for Disease Control and Prevention recommend hospitals develop guidelines for the appropriate use of vancomycin as part of comprehensive antimicrobial stewardship. The objective of this study was to evaluate the effectiveness and safety of a guideline to restrict vancomycin use in the neonatal intensive care unit (NICU).

METHODS:

A vancomycin use guideline was introduced in 2 tertiary care NICUs with low incidences of methicillin-resistant Staphylococcus aureus infections. We compared all infants >72 hours of age who were evaluated for late-onset infection before and after implementation of this guideline.

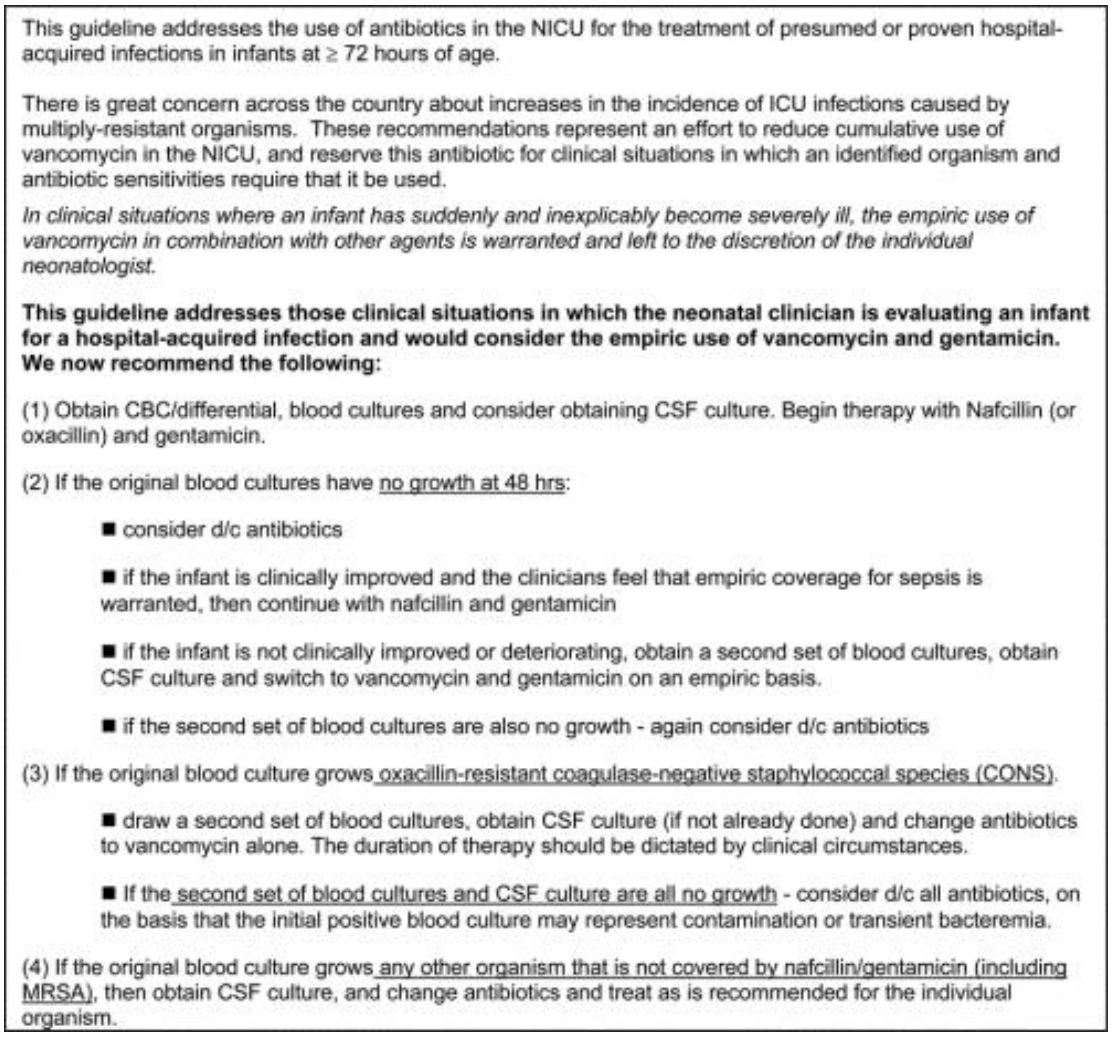
RESULTS:

Vancomycin start rates were reduced from 6.9 to 4.5 per 1000 patient-days (35% reduction; P = 0.01) at Brigham and Women's Hospital, and from 17 to 6.4 per 1000 patient-days (62% reduction; P < 0.0001) at Massachusetts General Hospital. The number of infants exposed to vancomycin decreased from 5.2 to 3.1 per 1000 patient-days (40% reduction; P = 0.008) at Brigham and Women's Hospital, and 10.8 to 5.5 per 1000 patient-days (49% reduction; P = 0.009) at Massachusetts General Hospital. Causes of infection, duration of bacteremia, and incidence of complications or deaths attributable to late-onset infection did not change significantly at either institution.

CONCLUSIONS:

Implementation of a NICU vancomycin use guideline significantly reduced exposure of newborns to vancomycin without adversely affecting short-term patient safety. Further studies are required to evaluate the long-term effect of vancomycin restriction on NICU patient safety and microbial ecology, particularly among institutions with higher rates of methicillin-resistant Staphylococcus aureus infections.

Figure 1. Vancomycin Use Guideline



This guideline addresses the use of antibiotics in the NICU for the treatment of presumed or proven hospital-acquired infections in infants at ≥ 72 hours of age.

There is great concern across the country about increases in the incidence of ICU infections caused by multiply-resistant organisms. These recommendations represent an effort to reduce cumulative use of vancomycin in the NICU, and reserve this antibiotic for clinical situations in which an identified organism and antibiotic sensitivities require that it be used.

In clinical situations where an infant has suddenly and inexplicably become severely ill, the empiric use of vancomycin in combination with other agents is warranted and left to the discretion of the individual neonatologist.

This guideline addresses those clinical situations in which the neonatal clinician is evaluating an infant for a hospital-acquired infection and would consider the empiric use of vancomycin and gentamicin. We now recommend the following:

(1) Obtain CBC/differential, blood cultures and consider obtaining CSF culture. Begin therapy with Nafcillin (or oxacillin) and gentamicin.

(2) If the original blood cultures have no growth at 48 hrs:

- consider d/c antibiotics
- if the infant is clinically improved and the clinicians feel that empiric coverage for sepsis is warranted, then continue with nafcillin and gentamicin
- if the infant is not clinically improved or deteriorating, obtain a second set of blood cultures, obtain CSF culture and switch to vancomycin and gentamicin on an empiric basis.
- if the second set of blood cultures are also no growth - again consider d/c antibiotics

(3) If the original blood culture grows oxacillin-resistant coagulase-negative staphylococcal species (CONS).

- draw a second set of blood cultures, obtain CSF culture (if not already done) and change antibiotics to vancomycin alone. The duration of therapy should be dictated by clinical circumstances.
- If the second set of blood cultures and CSF culture are all no growth - consider d/c all antibiotics, on the basis that the initial positive blood culture may represent contamination or transient bacteremia.

(4) If the original blood culture grows any other organism that is not covered by nafcillin/gentamicin (including MRSA), then obtain CSF culture, and change antibiotics and treat as is recommended for the individual organism.

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