Mid Essex Hospital Services NHS
NHS Trust

ANTIBIOTIC GUIDELINES FOR NEONATES AND PAEDIATRICS	**CLINICAL GUIDELINES** **Register No: 08066**

Developed in response to:	Best clinical practice Review of Guideline
Contributes to Core Standards No	C5a

Consulted With	Individual/Body	Date
Dr Lipscomb	Service Director for Women and Children	December 2008
Professionally Approved By		
Dr Babu	Clinical Director for Paediatrics	December 2008
Dr Saravanan	Consultant Lead for Risk Management	December 2008

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Author/Contact for Information	Dr. M. Babu, Dr. R Thomas, S.Pilgrim,
Policy to be followed by (target staff)	Medical and appropriately trained nursing staff
Distribution Method	Hard copies to all ward areas and managers Electronic copies to all appropriate staff on email
Related Trust Policies (to be read in conjunction with)	This guideline is in addition to 06045 Trust Antibiotic Policy

Document Review History

Review No	Reviewed by	Review Date

It is staff's responsibility to ensure that they always access the most up to date documents – these will always be the versions on the intranet

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1.0 Purpose of Guideline

1.1 To develop a cohesive prescribing policy for early and late sepsis in the neonatal to paediatric population.

2.0 Scope of practice

2.1 This guideline is being published in addition to the current 06045 Antibiotic Policy

3.0 Aim

3.1 To identify and treat sepsis and suspected sepsis promptly with antibiotic therapy.

3.2 To optimise the antibiotic therapy for each individual case, monitor its effectiveness and reassess and change therapies as necessary.

4.0 The Procedure

4.1 Assess the infants' clinical condition and the presence of any risk factors for sepsis such as prolonged rupture of membranes (PROM), maternal fever, chorioamnionitis, indwelling catheters, long lines or the presence of clinical signs compatible with infection such as respiratory distress or if the infant is in unexpectedly poor condition at birth.

4.2 If sepsis is suspected before 7 days of age a cannula should be sited and bloods sent for full blood count, urea and electrolytes (U&E's), C-reactive protein (CRP) and blood cultures. Benzylpenicillin and gentamicin should be commenced. The dose of benzylpenicillin can be increased in cases of severe infection. If a line sepsis is suspected the initial antibiotic regime should be vancomycin and cefotaxime.
(Refer to appendix A for details on administration)

4.3 When blood results are back reassess the illness and its' severity. If the blood cultures are negative and other bloods are within normal range and infant is well antibiotics may be discontinued. If the cultures are negative but the other bloods have been abnormal depending on clinical picture antibiotics may need to be continued. If the infant is unwell with negative cultures or their condition worsens, discuss with a consultant and consider cefotaxime and gentamicin.

4.4 If blood cultures are positive, a full seven day course of the appropriate antibiotic should be completed. If following this, there is no response or the condition worsens, discuss with a consultant and consider cefotaxime and gentamicin. A lumbar puncture is indicated in all babies with positive blood cultures except when the organism is coagulase negative staphylococcus aureus.

4.5 Late sepsis is classified as sepsis at greater than 7 days of age. If this is suspected a cannula should be sited and bloods sent as above. Flucloxacillin and cefotaxime should be commenced.

4.6 When blood results are back reassess the illness and its severity if the blood cultures are negative and the infant/child is well antibiotics may be discontinued. If the cultures are negative but the other bloods have been abnormal depending on clinical picture antibiotics may need to be continued. If the infant/child is unwell with negative cultures or their condition worsens, discuss with a consultant and consider cefotaxime and gentamicin or vancomycin and gentamicin depending on the clinical situation after repeat cultures.

4.7 If blood cultures are positive a full seven day course of the appropriate antibiotic should be completed if following this there is no response or the condition worsens, discuss with a consultant and consider cefotaxime and gentamicin or vancomycin and gentamicin depending on the clinical situation after repeat cultures. Lumbar puncture is indicated in all babies with positive blood cultures except when the organism is coagulase negative staphylococcus aureus.

4.8 If necrotising enterocolitis is suspected benzylpenicillin, bentamicin and metroniadazole should be commenced for a course of 7-10 days depending on presentation and clinical condition.

4.9 For suspected meningitis follow the protocol attached as appendix C depending on cultured organism.

5.0 Staff and Training

5.1 All medical staff involved in the prescription of antibiotics will have training in identification of correct antibiotic and this protocol as part of their induction. This will be recorded as part of their appraisal.

5.2 Tools such as the British National Formulary for Children (BNF) for prescribing antibiotics will be available on each ward.

6.0 Infection prevention

6.1 All staff should follow Trust guidelines on infection control by ensuring that they effectively ‘decontaminate their hands’ before and after each patient contact.

6.2 All staff should ensure that they follow Trust guidelines on infection control, using aseptic non-touch technique (ANTT) when carrying out procedures i.e. when preparing intravenous drugs.

7.0 Audit and Monitoring

7.1 As an integral part of the knowledge, skills framework, staff are appraised annually to ensure competency in computer skills and the ability to access the current approved guidelines via the Trust’s intranet site.

7.2 Quarterly memos are sent to line managers to disseminate to their staff the most currently approved guidelines available via the intranet and clinical guideline folders, located in each designated clinical area.

7.3 Guideline monitors have been nominated to each clinical area to ensure a system whereby obsolete guidelines are archived and newly approved guidelines are now downloaded from the intranet and filed appropriately in the guideline folders. ‘Spot checks’ are performed on all clinical guidelines quarterly.

7.4 Quarterly Clinical Practices group meetings are held to discuss ‘guidelines’. During this meeting the practice development midwife can highlight any areas for further training; possibly involving ‘workshops’ or to be included in future ‘skills and drills’ mandatory training sessions.

7.5 Where a baby’s notes have demonstrated that the appropriate action has not been taken a ‘risk event form’ is to be completed. This will address any further training needs for staff that require updating.

7.6 During the investigative process of reviewing ‘risk event forms’, numerous sets of notes will be requested and analysed in relation to compliance with the guidelines and identify where there is either non-compliance and where the guidance does not support the evidence based practice. This can be demonstrated in the Risk Management data trend analysis. Furthermore this process can also identify areas of good practice.

8.0 Communication

8.1 A quarterly ‘maternity newsletter’ is issued and available to all staff including an update on the latest ‘guidelines’ information such as a list of newly approved guidelines for staff to acknowledge and familiarise themselves with and practice accordingly.

8.2 Approved guidelines are published monthly in the Trust’s Focus magazine that is sent via email to all staff.

8.3 Approved guidelines will be disseminated to appropriate staff quarterly via email.

8.4 Regular memos are posted on the ‘Risk Management’ notice boards in each clinical area to notify staff of the latest revised guidelines and how to access guidelines via the intranet or clinical guideline folders.

9.0 References

Great Ormond Street Hospital, London. GOS.

Rosie Maternity Hospital, Neonatal Intensive care handbook (2005) Addenbrookes NHS Trust.

Royal Prince Alfred Hospital (2002) Neonatal Bacterial infection. www.cs.nsw.gov.au/rpa/neonatal. Sydney.

British National Formulary for Children (2007) BNF.

John Hunter Children’s Hospital, Australia.

Appendix A

Vancomycin
Vancomycin is a glycopeptide antibiotic with bactericidal activity against aerobic and anaerobic gram positive bacteria. It is useful for sepsis from Staphlococcus epidermidis, flucloxacillin and meticillin resistant staphaureus. It is effective for late onset sepsis along with an aminoglycoside
Reconstitution & dilution 500 mg displaces 0.3ml Add 9.7 ml water for injection to a 500 mg vial to produce 50 mg in 1 ml Add 19.4 ml water for injection to a gram vial to produce 50 mg in 1 ml Dilute to a concentration of 5 mg in 1ml with Sodium Chloride 0.9% or Glucose 5% and give by IV infusion Doses up to 500 mg may be infused over 90 minutes (Infusion rate must not exceed 10 mg /minute). **Vancomycin must not be given by IM or bolus intravenous injection**
Administration; Syringe pump infusion over 60 minutes **Dose :** <29 weeks gestation 15mg/kg OD given slowly over 60 minutes >29 weeks < 7 days of age 15 mg/kg 18 hourly given slowly over 60 minutes. >7 days of age 15mg/kg 12 hourly given slowly over 60 minutes. 1 month -12 years 15mg/kg loading dose & then 10mg/kg 6 hourly. 12 -18 years -500mg 6 hourly **Total daily dose should not exceed 2 grams. Total daily dose can be given in two or three divided doses** **Flush line well pre and post administration:** • Check trough levels before 3rd dose and before every 5th dose

- Trough level 10 - 20 mg/L
- Peak (1hr after 1hr infusion) 30 - 40 mg/L
- It takes 1-2 days to reach a steady state

Storage & Stability:

Reconstituted vials may be stored in the refrigerator (2-8 c) for up to 24 hours. Inspect for particulate matter & discolouration prior to use. Vials are for single use only. **Prepared infusion solutions should be used immediately and not stored**

Compatibility:

Fluids & Solutions: Normal saline, 10 % Dextrose, 5 % Dextrose, Total parental nutrition.

Medications : Acyclovir, Amikacin, Ampicillin, Aminophyllin, Caffeine, Calcium gluconate, Fluconazole, Intralipid, heparin up to 1u/ml,hydrocortisone succinate, insulin, lorezepam , magnesium sulphate, meropenem, midazolam, morphine, pancuronium bromide, propofol, potassium (KCL), ranitidine, sodium bicarbonate, zidovudine

Incompatibility:

Drugs: Adrenaline, Albumin, amphotericin, benzyl penicillin, calcium chloride, cefotaxime, ceftazidime, ceftriaxone, chloramphenicol, dexamathasone, erythromycin, frusemide, heparin, phenytoin,

Adverse effects:

- Ototoxicity & nephrotoxicity if administered with other ototoxic & nephrotoxic drugs
- Rapid infusion- Erythematous rash – (Red Man Syndrome)
- Systemic reaction - Anaphylaxis , fever, chills
- Local reaction- Thrombophlebitis, tissue necrosis. Consider hyaluronidase for extravasation

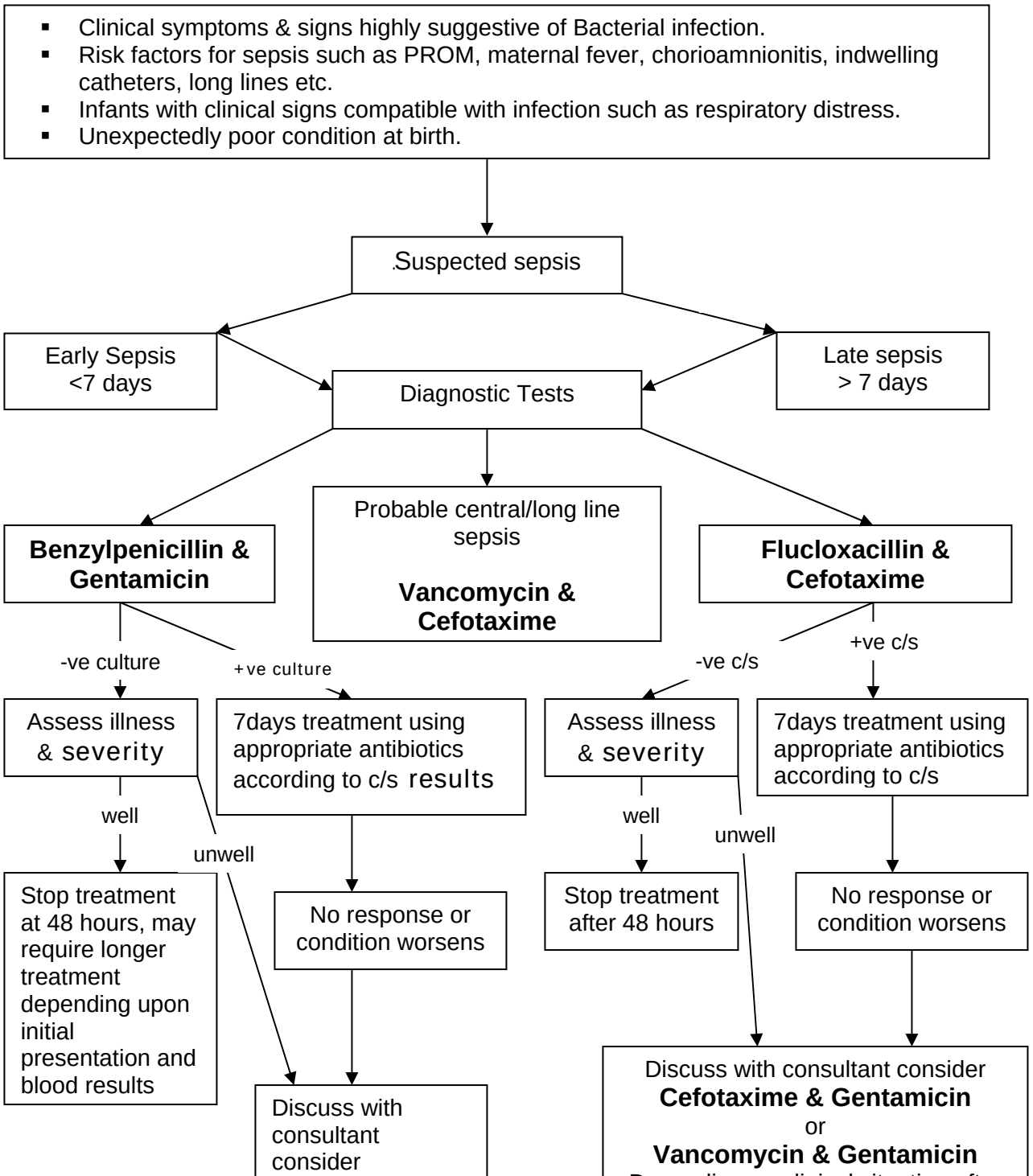
Appendix B

Gentamycin
Gentamycin is a broad spectrum antibiotic. It has a bactericidal action and is used against some gram positive and most gram negative bacteria (E.coli, Enterobacter, pseudomonas, proteus, serratia). It has poor activity against Haemolytic streptococci and pneumococci but is effective against staphylococcus species (including flucloxacillin and meticillin resistant strain
Administration: Gentamicin should be given as a slow intravenous bolus over 3- 5 minutes. **Gentamicin must not be given by IM** **Dose:** <32 weeks gestation - 5mg/kg 36 hourly >32 weeks gestation - 5mg/kg 24 hourly 1 month – 18 years - 7mg /kg once daily **Flush line well pre & post administration:** • Check trough levels before 3rd dose and before every 5th dose • Trough level <2 mg/L • Peak level 6-12 mg/L In newborn with decreased urine output / features of HIE, do trough before 2nd dose. If level high, increase the frequency to 36 hourly If renal function is normal, do not delay therapy whilst awaiting Gentamicin level
Compatible with Morphine, Pancuronium, Ranitidine, Medazolam, Total parental nutrition, acyclovir, insulin

Incompatible with Heparin, Bicarbonate, Cephalosporin, erythromycin and penicillin
Adverse Effects : Ototoxic and nephrotoxic in a progressive way so do not exceed 7 days of treatment if possible

Appendix C

Summary Sheet of Antibiotic Guidelines for Early and Late Sepsis



Appendix D

Other Specific Infections
Necrotising Enterocolitis (NEC) Suspect if clinical signs of sepsis, abdominal signs or abdominal x ray features suggest intra abdominal pathology. **Treatment:** Benzylpenicillin 50mg/kg twice/three times daily depending on age. Gentamicin 5mg/kg 24 – 36 hourly depending on gestation.GM Metroniadazole 15mg/kg loading dose then 7.5mg/kg twice daily. May need to continue for 10 days

Appendix E

Meningitis

Consider if signs of sepsis and if positive CSF findings present (Raised white blood cell count, Lowered Glucose, Positive culture)

Normal CSF values:

Gestational age	Cells	Red blood cells	Protein	Glucose
Preterm	0-25 MN 0-10 PMN	0-1000	40-300 mg/dl	3 mmol/L
New born	0-20 MN 0-10 PMN	0-800	45- 120 mg/dl	3 mmol/L
Neonate	0-5 MN 0-10 PMN	0-50		
Thereafter	0-5 MN			

CSF GLUCOSE – 70-80% of plasma glucose is normal. Plasma Glucose should be taken immediately prior to LP.

Low CSF glucose values can persist for many weeks following IVH
Always repeat LP 24 -48 hours later if CSF results are equivocal

Antibiotics of choice

- Group B Streptococcus (Gram +ve cocci)- Ben Pen & Gentamicin
- Coliforms (Gram negative bacilli) - Cefotaxime & Gentamicin
- Listeria (Gram positive bacilli) - Amoxicillin & Gentamicin
- No bacteria seen - Cefotaxime & Gentamicin

Duration of treatment

Group B Streptococcus - 14 days

- Coliforms – 21 days
- Listeria - 21 days

It is good practice to repeat a lumbar puncture after 1 week of treatment in all cases and after 3 weeks of treatment in the case of E.Coli meningitis.