Nottingham University Hospitals NHS
NHS Trust

Guideline for the intravenous to oral switch of antibiotic therapy

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Ratified by	• NUH Antibiotic Guidelines Committee • NUH Drugs and Therapeutics Committee
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Consultation:	• Members of Nottingham University Hospitals Antibiotic Guidelines Committee.
Evidence Base	• Published evidence from studies. • Recommended best practice based on clinical experience of guideline developers.
Inclusion Criteria	• Adult patients on intravenous antibiotic therapy
Exclusion Criteria	• Paediatrics, Patients with chemotherapy-related neutropenia and/or bone marrow transplant patients
Audit	• Directorate Audit Plans as appropriate
Acknowledgements	• This policy has been adapted from one written by the North west antibiotics pharmacist network advisory group
Distribution	• NUH antibiotic website http://nuhnet/diagnostics_clinical_support/antibioticsConsultants via trust e-mail. • NUH EDL website
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This guideline has been registered with the Trust. However, clinical guidelines are 'guidelines' only. The interpretation and application of clinical guidelines will remain the responsibility of the individual clinician. If in doubt consult a senior colleague or expert. Caution is advised when using guidelines after the review date.

Introduction

IV to oral switch is the prompt conversion of IV antibiotic therapy to oral. Patients may be considered candidates for switching from IV to oral therapy once the patient has shown clinical improvement and is medically stable.

Rationale

The majority of patients with a severe infection who are adequately absorbing oral medication and initially require IV therapy can be safely switched to oral therapy within 48 hours. There are a number of advantages to support the prompt switch from IV to oral therapy these are as follows[1,2,3]:

- Reduction in the likelihood of hospital acquired bacteraemia and infected/phlebitic IV lines.
- Saves both medical and nursing time.
- Reduces discomfort for patients and enables improved mobility and the possibility of earlier hospital discharge.
- Potential to significantly reduce treatment costs.
- Patient is more likely to receive antibiotics at the correct time.
- Potential reduction in the risk of adverse effects; errors in preparation are significantly higher with parenteral drugs, compared to oral formulation.

Considerations for the early switch to oral therapy COMS[1,2,3,4] (review at 24-48 hours)

C **C**linical improvement observed

O **O**ral route is not compromised (vomiting, malabsorptive disorder, NBM, swallowing problems, unconscious, severe diarrhoea)
NB: if NG/PEG feeding then please consult your pharmacist
Suitable oral antibiotic option available (see flow chart)

M **M**arkers showing a trend towards normal: Patient should be apyrexial for the last 24 hours (Temp>36^{o}C and <38^{o}C) and **NOT** have more than one of the following, heart rate>90/min, resp rate>20/min, BP unstable, WCC<4 or>12
White cell count should show a trend towards normal; absence of such should not impede the switch if all other criteria are met and not neutropenic.

S **S**pecific indication/deep-seated infection (Prior to switch refer to table 1)

High risk/deep-seated infections

Certain infections may appear to respond promptly to intravenous therapy, but warrant prolonged IV therapy. This is to ensure that adequate drug levels are attained at the site of infection and to optimise the response and prevent relapse.

Discuss with Microbiology before switching patients with a high risk/deep seated infection to oral therapy.

Table 1

Deep seated infections that may require an initial two weeks of IV therapy	High risk infections requiring prolonged IV therapy
• Liver abscess • Osteomyelitis,Septic arthritis (N.B. high-dose oral Clindamycin may be appropriate once patient is stable, see memo appendix A) • Empyema • Cavitating pneumonia	• Staphylococcus aureus bacteraemia • Severe necrotising soft tissue infections • Severe infections during chemotherapy related neutropenia • Infected implants/prosthesis • Meningitis/encephalitis • Intracranial abscesses • Mediastinitis • Endocarditis • Exacerbation of cystic fibrosis/ bronchiectasis • Inadequently drained abscesses or empyema

Certain multi-resistant organisms often require treatment with agents that are only available in an intravenous form, please seek advice from microbiology regarding the length of treatment.

References

1. Sevinc F *et al*. Early switch from intravenous to oral antibiotics: guidelines and implementation in a large teaching hospital. Journal of Antimicrobial Chemotherapy 1993 **43**:601-606
2. Guidance for intravenous antibiotic 'switch' therapy. 2004. North West Antibiotic Pharmacists Network Advisory Group.
3. www.bsac.org/pyxis
4. McLaughlin C *et al*. Pharmacy-implemented guidelines on switching from intravenous to oral antibiotics: an intervention study. Q J Med 2005;98:745:752

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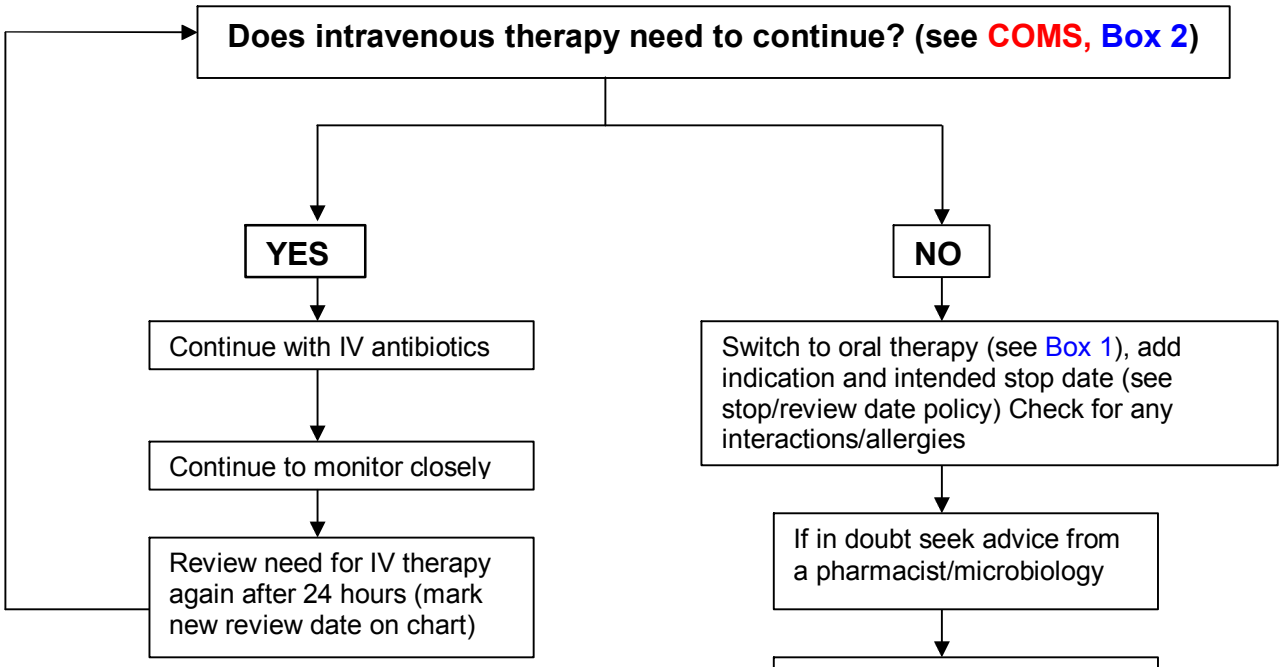

BOX 1- recommended empiric oral alternatives
N.B. Check for allergy/interactions/microbiology results:

IV	Oral
Amoxicillin 500mg-1g tds	Amoxicillin 500mg-1g tds
Cefuroxime 750mg-1.5g tds plus metronidazole 500mg tds	Co-amoxiclav 375mg tds plus amoxicillin 250mg tds
Cefuroxime 750mg-1.5g tds	Co-amoxiclav 375mg plus amoxicillin 250mg tds
Clarithromycin 500mg bd	Clarithromycin 500mg bd
Flucloxacillin 2g qds	Flucloxacillin 1g qds
Clindamycin 600mg qds	Clindamycin 300-450mg qds can use a maximum of 600mg qds if severe infection (see appendix A).
Ciprofloxacin 400mg bd	Ciprofloxacin 500mg bd (750mg bd recommended for *Pseudomonas sp.*)
Co-amoxiclav 1.2g tds	Co-amoxiclav 375mg plus amoxicillin 250mg tds
Tazocin, meropenem, imipenem, vancomycin	Seek advice from microbiology

od = once daily bd= twice daily tds= 3 times/day qds =4 times/day

BOX 2

Considerations for IV to oral switch

COMS

C **C**linical improvement

O **O**ral route not compromised
- -Vomiting
- -NBM
- -Unconscious
- -Mechanical swallowing disorder
- -Malabsorptive disorder

NB: if NG/PEG feeding then please consult your pharmacist
Suitable oral antibiotic option available

M **M**arkers showing a trend towards normal
Apyrexial: Temp>36 and <38°C
Plus not more than one of
-HR >90 beats/min
-Resp rate >20 breaths/min
-BP stable
-WCC <4 OR >12 (if abnormal, a trend towards the normal range and without neutropenia is acceptable)

S **S**pecific indication/deep-seated infection
(eg meningitis/encephalitis, endocarditis, mediastinitis, deep seated abscess/empyema, bone/joint infection, *Staph. aureus* bacteraemia/CF/bronchiectasis, implant/prosthesis

Appendix A: IV to oral switch of clindamycin

Intravenous clindamycin is a restricted agent for the treatment of serious streptococcal and staphylococcal soft tissue infections unresponsive to the penicillins, or in those who are penicillin allergic and in those with bone and joint infections who are penicillin allergic. All other cases require approval from a medical microbiologist. If approval obtained please ensure that this is documented in the medical notes. The price of IV clindamycin is significantly greater than oral clindamycin (see table). As clindamycin has an oral bioavailability of 90%[1,2,3], the antibiotic guidelines committee is recommending the use of oral clindamycin where appropriate. For all those patients requiring treatment with clindamycin oral treatment should be prescribed first line, except in the following cases:

EXCEPTIONS WHERE IV THERAPY IS RECOMMENDED

- Oral route compromised eg vomiting, malabsorptive disorder, NBM, swallowing problems
- Necrotising fasciitis
- Acute Osteomyelitis and Septic arthritis (change to oral when medically stable)
- Sepsis (Fever, confusion, tachycardia, tachypnoea, hypotension, oliguria, acidosis)
- Severe soft tissue infections unresponsive to penicillins
- Prolonged rupture of membranes if penicillin allergic
- Microbiology approval required for other uses

NB Clindamycin is not recommended for the treatment of erythromycin resistant streptococcal and staphylococcal infection.

Dosing

The maximum oral licensed dose is 450mg qds. However, higher oral doses of 600mg qds have been documented in the literature for a variety of different indications [1,4]. Therefore in **severe** infection an oral dose of 600mg qds can be used. Please note that this is an unlicensed dose and therefore responsibility lies with the prescriber. If using the higher dose, patients should be carefully monitored and the appearance of marked diarrhoea should be regarded as an indication that the product should be discontinued immediately[3].

Patients with swallowing difficulties

It is not recommended that the capsules are opened as they have a poor taste and give off an offensive smell when opened. The paediatric suspension has been discontinued within the UK but there is an oral suspension available, which can be imported via IDIS. However, due to the cost of the suspension and the volume required for adult dosing, it is recommend that where clindamycin is indicated that the IV route is used in this patient group.

COST COMPARISONS OF CLINDAMYCIN PREPARATIONS

FORMULATION	Cost for one day treatment (600mg qds)
Clindamycin capsules	£4.80
Clindamycin oral suspension 75mg/5ml	£23.60
Clindamycin 75mg/5ml oral powder	£34.40
Clindamycin injection (600mg qds)	£43.41

1.Drugdex System:Klasco RK (Ed): Drugdex® System.Thompson Micromedex, Greenwood Village, Colorado, USA, Available at: http://www.thomsonhc.com accessed <16 June 2006>
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3.Summary of product characteristics for clindamycin. Available at http://www.medicines.org.uk/ accessed<13 July 06>
4.Recommendations from the CDC, the national institutes for health, and the HIV medicines association/Infectious Diseases society of America. Treating opportunistic Infections Among HIV-Infected Adults and Adolescents - December 17, 2004