

GUIDELINE FOR SKIN AND SOFT TISSUE INFECTION INCLUDING DIABETIC FOOT ULCER

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Date: August 2022

Approved by:Drugs & Therapeutics CommitteeDate:September 2022

Implementation Date: September 2022

For Review: September 2025

AMENDMENT FORM

Version	Date	Brief Summary of Changes	Author
3	August 2022	Revised guidelines	Dr Ken Agwuh Dr Bala Subramanian
2	March 2016	Revised guidelines	Dr Ken Agwuh
1	October 2012	New guidelines	Dr Ken Agwuh Dr John Hosker

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1. INTRODUCTION

Cellulitis:

- Is an infection of the deeper layers of the skin including the subcutaneous tissues
 - Usually acute in presentation
 - Main causative agents include Staphylococcus aureus and Beta haemolytic streptococcus, such as Groups A, B, C and G streptococcus.
- Clinical findings:
 - Skin is very red,
 - Hot/warm to touch,
 - Swollen, may be associated with blisters, or pyrexia.
 - The borders of cellulitis are not well demarcated or elevated as in erysipelas.
- Investigations:
 - Send deep swab for cultures if area of cellulitis on the skin is associated with skin ulcer, laceration/puncture wounds, and blisters.
 - Blood cultures x2 sets if temperature less <36 or >38° C
 - Inflammatory markers CRP/WBC
- Management:
 - Mark area of redness on skin (this will help with review of clinical progress)
 - Start empirical antibiotic as stated in table.
 - Consider switch to oral antibiotic with good clinical response.
 - Review antibiotics at day 5, can extend if not fully resolved.



Fig 1: Cellulitis of the left leg associated with oedema and blister.

2. **RISK FACTORS**

Risk Factors	Organism(s)	
MRSA colonisation	Meticillin-resistant Staphylococcus aureus	
Animal bite (e.g. cat, dog)	Pasteurella multocida,	
	Capnocytophaga canimorsus	
Human bite	Eikenella corrodens, anaerobes	
Intravenous drug abuse	<i>Staphylococcus aureus</i> , Streptococcus sp, Anaerobes (Clostridium), Gram negatives	
Sea or fresh water exposure	Vibrio vulnificus (sea water)	
	Aeromonas hydrophila (fresh water)	
Fish tank water exposure	Mycobacterium marinum	

The choice of antimicrobial therapy may be guided by:

- History of presenting complaint
 - Acute or chronic
 - Circumstances surrounding the development of the skin & soft tissue infection (SSTI)
- Significant past medical history,
 - Diabetes,
 - Immunocompromised state,
 - Similar presentation with SSTI previously, etc.
- Recent antimicrobial history within the last one month
- Previous or recent positive microbiology results

3. NECROTISING FASCIITIS

This is an uncommon severe infection involving the subcutaneous tissues and the fascia. It affects mainly the extremities but can occur in any part of the body. The infection spreads rapidly and is associated with a high mortality, as a result early surgery is essential to establish the diagnosis and debride infected and necrotic tissues.

Classification:

Necrotising fasciitis can be categorised into 2 groups

- Type 1 is a mixed infection including anaerobes, gram negative organisms and gram positive organisms. Mostly occurs in immunocompromised individuals. Typically occurs in the perineum and trunk, and
- Type 2 is mainly due to Group A streptococcus with or without Staphylococcus aureus. This is less common than the type 1. Typically occur in the limbs and affects healthy individuals, with often associated history of trauma (usually minor).

Presentation:

The most common presentation for necrotising fasciitis include:

- Evidence of skin infection, erythema and/or vesicles;
- A woody feel to tissues and crepitus that often appears late in the progression of the disease;
- Fever, rigors, nausea, vomiting or septic shock in a patient with an obvious skin infection;
- Severe pain and systemic features of infection
- Complaints of pain out of proportion to the clinical findings.
- Laboratory findings include rising CRP, WBC, and elevated serum creatinine kinase (CK) levels.



Fig 2: area of erythema with vesicles in a patient with necrotising fasciitis



Fig 3: Woody feel and crepitus in late progressive necrotising fasciitis

Management:

- If necrotising fasciitis is suspected the patient must be referred for IMMEDIATE review by a senior clinician, as this is a rapidly progressing, life threatening infection.
- Surgical exploration is essential to definitively establish the diagnosis from other entities, also in obtaining samples for culture to identify the pathogen involved and as part of treatment, which consist of wide debridement of skin, subcutaneous tissue, fascia and any necrotic muscle, and may require multiple debridements. The use of antibiotics without debridement is associated with mortality rate approaching 100%.
- Discuss with microbiologist if the region involved includes the perineum, scrotum (as in Fournier's gangrene) or if there is risk of polymicrobial involvement.
- Blood cultures are positive in about 60% and 20% of type 2 and type 1 necrotising fasciitis respectively.

4. EMPIRICAL ANTIBIOTIC GUIDE FOR SKIN AND SOFT TISSUE INFECTION:

CLINICAL CONDITION	FIRST LINE	PENICILLIN ALLERGY	MRSA	Duration	
Mild to moderate cellulitis	Oral Flucloxacillin 500mg -1g, 6 hourly	Oral Clarithromycin 500mg 12 hourly	Use options in Penicillin allergy.	5-7 days OR until full resolution, whichever is later.	
Moderate to severe cellulitis	IV Flucloxacillin 1-2g, 6 hourly	IV Clindamycin 600mg -1.2g, 6 hourly	<i>If resistant</i> to Clarithromycin and Clindamycin, use:		
Erysipelas and impetigo	Oral Flucloxacillin 500mg -1g, 6 hourly (consider IV if severe)	Oral Clarithromycin 500mg 12 hourly	IV Vancomycin (refer to Trust policy for dosing) OR Oral Linezolid 600mg 12 hourly (Ensure no drug interactions. Requires weekly FBC monitoring)		
Necrotising fasciitis: (see notes above for type) Type 1	IV Piperacillin/tazobactam 4.5g 8 hourly AND IV Clindamycin 1.2g 6 hourly	IV Meropenem 1g 8 hourly AND IV Clindamycin 1.2g 6 hourly	If resistant to Clindamycin use: IV Meropenem 1g 8 hourly AND IV Linezolid 600mg 12 hourly	5-7 days OR until full resolution, whichever is later.	
Туре 2	IV Benzylpenicillin 1.2 -2.4gm 6 hourly AND IV Clindamycin 1.2g 6 hourly	Non-severe allergy: IV Ceftriaxone 1 - 2g 12 hourly AND IV Clindamycin 1.2g 6 hourly Penicillin anaphylaxis: IV Ciprofloxacin 400mg 8 - 12 hourly AND IV Clindamycin 1.2g 6 hourly	If resistant to Clindamycin use: IV Ceftriaxone 1 – 2g 12 hourly AND IV Linezolid 600mg 12 hourly (Ensure no drug interactions. Requires weekly FBC monitoring)		
	Consider administering IVIG for patients with Type 2 infections who are critically unwell				

CLINICAL CONDITION	FIRST LINE	PENICILLIN ALLERGY	MRSA	Duration
Cellulitis associated with bite (e.g. Human, dog, cat)	IV Co-amoxiclav 1.2g, 8 hourly OR Oral Co-amoxiclav 625mg, 8 hourly if mild to moderate	Oral Ciprofloxacin 500mg, 12 hourly AND Oral Clindamycin 300mg- 450mg, 6 hourly	<i>If resistant</i> to Clindamycin and Ciprofloxacin: Add oral Linezolid 600mg 12 hourly (Ensure no drug interactions. Requires weekly FBC monitoring)	10 days
Cutaneous abscess (including Intravenous Drug Abuser)	IV Flucloxacillin 1-2g, 6 hourly AND Oral Metronidazole 400mg 8 hourly OR Oral Flucloxacillin 500mg-1g, 6 hourly AND Oral Metronidazole 400mg 8 hourly	Non-severe allergy: IV Cefuroxime 750mg -1.5g 8hrly AND Oral Metronidazole 400mg 8hrly Penicillin anaphylaxis: Oral Clindamycin 450mg 6hrly	Oral Clindamycin 450mg 6 hourly <i>If resistant to Clindamycin use:</i> Oral Linezolid 600mg 12 hourly (Ensure no drug interactions. Requires weekly FBC monitoring) <i>AND</i> Oral Metronidazole 400mg 8 hourly	5-7 days OR until full resolution, whichever is later.
Cellulitis associated with sea or fresh water contact	Oral Doxycycline 100mg 12 hourly AND IV Ceftazidime 2g 8 hourly	Oral Doxycycline 100mg 12 hourly AND Oral Ciprofloxacin 500mg, 12 hourly	If resistant to Doxycycline then use: Oral Linezolid 600mg 12 hourly (Ensure no drug interactions. Requires weekly FBC monitoring) AND Oral Ciprofloxacin 500mg 12 hourly	5-7 days OR until full resolution, whichever is later.
Cellulitis associated with fish tank water exposure	Contact Microbiologist			
Orbital cellulitis	IV Ceftriaxone 1-2g, 12 hourly AND Oral Metronidazole 400mg 8 hourly	Contact Microbiologist	Add Linezolid 600mg 12 hourly IV/PO (Ensure no drug interactions. Requires weekly FBC monitoring)	10 days

6. EMPIRICAL ANTIBIOTIC GUIDE FOR INFECTED DIABETIC FOOT ULCER:				
INFECTION	FIRST LINE	PENICILLIN ALLERGY	DURATION	
Mild to moderate infected foot ulcer	IV Flucloxacillin 1-2g 6 hourly AND oral Metronidazole 400mg 8 hourly	IV Clindamycin 600mg 6 hourly (monotherapy) OR Oral Clarithromycin 500mg 12 hourly AND oral Metronidazole 400mg 8 hourly	5-7 days OR until full resolution, whichever is later	
Severe infected foot ulcer	IV Co-amoxiclav 1.2g 8 hourly OR Oral Co-amoxiclav 625mg 8 hourly OR treat according to culture and sensitivity	IV Clindamycin 600mg -1.2gm 6 hourly OR Oral Clindamycin 450mg 6 hourly OR Treat according to culture and sensitivity	Review antimicrobial choice with culture results. Surgical debridement is essential	
Clinical evidence of osteomyelitis at site of foot ulcer (in mild to severe foot ulcer)	IV Flucloxacillin 1-2g 6 hourly AND oral Fusidic acid 500mg 8 hourly OR treat according to culture and sensitivity	IV Clindamycin 600mg – 1.2g 6 hourly AND oral Fusidic acid 500mg 8 hourly OR Treat according to culture and sensitivity	4-6 weeks	
History of positive MRSA from foot ulcer swab/tissue sample (in mild to severe cases)	Oral Linezolid 600mg 12 hourly (Ensure no drug interactions. Requires weekly FBC monitoring) AND Oral Metronidazole 400mg 8 hourly	Discuss with Microbiologist if patient cannot have any of first line treatment.	5-7 days OR until full resolution, whichever is later	

REVIEW ANTIBIOTIC AFTER 5 DAYS, FOR PATIENTS WITH RISK OF MRSA REFER TO TRUST GUIDELINES OR DISCUSS ALTERNATIVE ANTIBIOTIC WITH MICROBIOLOGIST.

Infected Diabetic foot ulcer- management includes:

- Sepsis screen (send deep swabs/tissues for cultures), and blood cultures if temperature spike present, before starting antibiotics
- Antimicrobial therapy (duration will depend on depth and severity of infection). Review antimicrobial choice with culture results
- Surgical debridement (liaise with vascular or orthopaedic team)

NOTE: Never use Fusidic acid on its own

6. **REFERENCES**

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