

### Necrotising Fasciitis – for the Management in Adults Guidelines

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## Key Points

- Necrotising fasciitis is a medical and surgical emergency; it is a rapidly progressive serious bacterial infection which can result in sepsis, organ failure and death if not recognised and treated promptly.
- Patients with suspected necrotising infection require urgent surgical assessment and extensive debridement of the affected area as well as prompt initiation of antibiotics.
- This guideline outlines the management of necrotising fasciitis in adults.
- It guides the choice of antibiotics, route of administration and dosages for treating necrotising fasciitis.
- It lists the causes, risk factors and complications of necrotising fasciitis.
- It summarises the characteristics and diagnosis of necrotising fasciitis.
- Applies to all prescribers involved in the treatment of adult patients with necrotising fasciitis.

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## 1. Introduction

Necrotising fasciitis is a rapidly progressive bacterial infection of the deeper layers of the skin (i.e. dermis, subcutaneous tissue), fascia (fibrous connective tissue in muscles and organs) or muscle. Presenting signs are often non-specific. They may resemble cellulitis although the skin may initially be spared. Patients with suspected necrotising infection require urgent surgical assessment and extensive debridement of the affected area.

Necrotising fasciitis is a rare but serious infection. It can start from a relatively minor injury such as a small cut, but can progress very quickly and can lead to sepsis and organ failure. It can be life threatening if not recognised and treated promptly.

**If rapidly progressing, septic shock or if severe disproportionate pain, consider necrotising fasciitis. This is a medical and surgical emergency – please seek senior surgical and microbiology advice urgently.**

This document is to guide clinicians on the management of necrotising fasciitis in adults including the prescribing of antibiotics. It is to enable a consistent and evidence-based approach. Guidelines for antibiotic prescribing help minimise the development of resistance and reduce antibiotic-associated side effects.

## 2. Purpose and Scope

It is essential that necrotising fasciitis is treated both promptly and with evidence-based drugs for successful clinical outcome. This document guides the choice of antibiotic, route of administration and dosage. The guideline is to be used by all prescribers treating necrotising fasciitis in adults within the Trust.

## 3. Definitions of Terms

**Necrotising fasciitis** – see above.

**Cellulitis** is an acute bacterial infection of the dermis and subcutaneous tissue.

**Empirical prescribing** is prescribing for an infection where the organism responsible for the infection has not been isolated ('best guess prescribing').

**Resistance** is when an antibiotic has been shown to be ineffective against the isolated organism in the microbiology laboratory.

## 4. Causes

Spontaneous necrotising fasciitis is usually caused by *Streptococcus pyogenes*, also called group A Streptococcus (GAS), but following a penetrating injury is often polymicrobial with aerobic and anaerobic bacteria.

## 5. Risk Factors

Necrotising fasciitis can occur in healthy young patients and a common risk factor is skin injury including insect bite, trauma and surgical wounds. However patients with certain underlying conditions are particularly at risk, including:

- Alcohol abuse
- Intravenous drug users (IVDU)
- Chronic liver or renal disease
- Diabetes
- Malignancy
- Immunosuppression
- Possibly tuberculosis

Note that necrotising fasciitis can occur in previously healthy people with no underlying disease, particularly where GAS are involved.

## 6. Complications

Deep tissue necrosis leads to tense oedema, fever, overlying erythema with or without crepitus, bullae and cutaneous numbness. The patient usually has overwhelming sepsis and progression to organ failure is rapid. Necrotising fasciitis will progress rapidly and can result in death.

## 7. Characteristics and Diagnosis

Early diagnosis is important to make sure the appropriate treatment is given. Diagnosis is made on examination and confirmed by surgical exploration of the soft tissues. No laboratory or imaging studies, alone or in combination, are sufficiently sensitive and specific to definitively diagnose or rule out necrotising fasciitis.

Presenting signs are often non-specific. They may resemble cellulitis although the skin may initially be spared; the necrotising infection may already be deep in the skin and not visible. Pain is a major feature and often seems out of keeping with the early signs. Necrotising fasciitis should be suspected in any patient with a soft tissue infection accompanied by prominent pain and/or anaesthesia over the infected area, or signs and symptoms of systemic toxicity. Patients with suspected necrotising infection require urgent surgical assessment and extensive debridement of the affected area.

The symptoms of necrotising fasciitis may not be obvious initially and develop quickly over hours or days. Early symptoms (usually within 24 to 48 hours) can include:

- Intense and severe pain which may seem disproportionate to the localised damage to the skin or external physical signs of infection on the skin
- A small but painful cut or scratch on the skin

- Systemic illness – malaise, tachycardia +/- fever, dehydration and other flu-like symptoms
  - Advanced symptoms (usually within 3 to 4 days) include:
    - Swelling and redness in the painful area – the swelling will usually feel firm to the touch
    - Pain sensation may progress from intense tenderness to anaesthesia as the nerves are destroyed
    - The affected area develops tense oedema, extending beyond the margin of erythema
    - Dark blotches on the skin that turn into fluid-filled blisters
    - The subcutaneous tissues have a wooden-hard feel. Fascial planes and muscle groups are not palpable
    - Diarrhoea and vomiting
  - Critical symptoms (usually within 4 to 5 days) include:
    - Hypotension
    - Septic or toxic shock (the latter due to streptococcal endotoxin production)
    - Patient becomes confused and apathetic
    - Unconsciousness
  - Other useful questions to ask the patient include:
    - Any recent injury or illness
    - Any sea water exposure or fish sting
    - Any underlying conditions including IV drug abuse (see section 5 for other risk factors)

## 8. Management

Definitive treatment is surgical debridement of the involved tissue, repeated as necessary to ensure all the infected tissue is removed. Suitable samples e.g. tissue or swabs should be sent to the Microbiology Laboratory for identification of causative bacterial pathogens.

The initial surgery is the most important determinant for survival. In established necrotising fasciitis, surgery gives a 60-80% chance of survival. The earlier the first exploration and subsequent debridement, the less extensive the resection and postoperative morbidity is likely to be. Following initial debridement, the wound must be observed closely.

Antibiotic therapy is crucial, but is considered adjunctive to surgical management. Empirical antibiotics should cover major bacterial aetiological agents and group A streptococcal toxin production that can accompany necrotising fasciitis. See further details in section 9 and Appendix 1. Other supportive treatment including resuscitation and medical care are also important.

**9. Empirical Antibiotic Treatment**

See Appendix 1 for the empirical antibiotic regimens for necrotising fasciitis.

Consider dose reduction in renal impairment – see BNF and Antibiotic Microsite for further guidance.

All antibiotic prescriptions must be reviewed within 72 hours from prescribing and the outcome of the review should be documented in the medical notes.

**10. Ratification**

This guideline will be approved by the Antimicrobial Stewardship Committee and the Drugs and Therapeutics Committee (D&TC). It will then be ratified by the Quality Governance Operational Committee (QGOC).

**11. Distribution**

This guideline will be stored on the SharePoint document library and Trust document library available via the Trust intranet. It will also be on the Antimicrobial application.

**12. References**

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**Appendix 1 – Empirical treatment regimens for Necrotising Fasciitis**

1 <sup>st</sup> line	If MRSA positive or if penicillin allergy	Treatment duration
<p><b>Piperacillin/Tazobactam</b> IV 4.5g TDS + <b>Clindamycin</b> IV 1.2g QDS</p>	<p><b>Clindamycin</b> IV 1.2g QDS + <b>Ciprofloxacin</b> IV 400mg BD</p> <p><b>If MRSA positive:</b> Add <b>Vancomycin</b> IV (dosing as per local policy for Vancomycin).</p>	<p>Please discuss with Micro.</p>

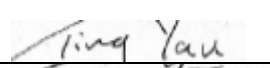
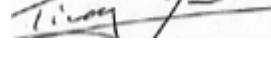
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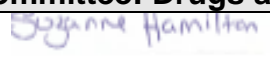

Appendix 2

		Y/N/n/a	COMMENTS (where necessary)
<b>1</b>	<b>Title of document</b> Necrotising Fasciitis – for the Management in Adults Guidelines(C1199)		
<b>2</b>	<b>Type of document (e.g. Policy, guidance)</b>	Guideline	
	Is it clear whether the document type is a policy, guideline, procedure?	Yes	
<b>3</b>	<b>Introduction</b>		
	Are reasons for the development of the document clearly stated?	Yes	
<b>4</b>	<b>Content</b>		
	Is there a standard front cover?	Yes	
	Are the key points identified? (Policies only)	N/A	
	Is the document in the correct format?	Yes	
	Is the purpose of the document clear?	Yes	
	Is the scope clearly stated?	Yes	
	Are the definitions clearly explained?	Yes	
	Are the roles and responsibility clearly explained? (policies only)	N/A	
<b>5</b>	<b>Evidence Base</b>		
	Is the type of evidence to support the document explicitly identified?	Yes	
	Are key references cited?	Yes	
	Are associated documents referenced?	Yes	
<b>6</b>	<b>Approval Route</b>		
	Does the document identify which committee/ group will approve it?	Yes	
<b>7</b>	<b>Process to Monitor Compliance and Effectiveness (policies only)</b>		
	Are there measurable standards or KPIs to support the monitoring of compliance with the effectiveness of the document?	Yes	
<b>8</b>	<b>Review date</b>		
	Is the review date identified?	Yes	
<b>9</b>	<b>Equality and Diversity (policies only)</b>		
	Is a completed Equality Impact Assessment	N/A	

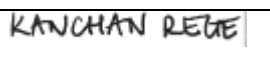
If answers to any of the above questions is 'no', then this document is not ready for endorsement, it needs further review.

Compliance Team:		
1.	Date of Compliance Team approval	25/3/2019
2.	Comments to author for any amendments	
3.	Name of compliance lead	Stanley Balachander, Quality Governance and Policies Administrator

Approval Committee: Antimicrobial Stewardship Committee			
Name		Date	5/04/2019
Signature			

Approval Committee: Drugs and Therapeutics Committee			
Name		Date	31.1.2019
Signature			

If the committee/group is happy to approve this document would the chair please sign below and send the document and the minutes from the approval committee to the author. To aid distribution all documentation should be sent electronically wherever possible.

Ratifying Committee: Quality Governance Operational Committee			
If the committee/group is happy to endorse this document would the chair please sign below and send the document and the minutes from the endorsing committee to the author. To aid distribution all documentation should be sent electronically wherever possible.			
Name		Date	12.4.19.
Signature	