Management of lower limb cellulitis in adult patients

via NHS Ayrshire & Arran Outpatient Parenteral Antimicrobial Therapy (OPAT) service

1. Patient with lower limb cellulitis presents at Combined Assessment Unit (CAU) or Emergency Department (ED) at University Hospital Ayr (UHA) or University Hospital Crosshouse (UHC).

2. Patient reviewed by attending clinician and diagnosed with lower limb cellulitis requiring intravenous (IV) therapy and assessed as suitable for IV antimicrobial therapy via the OPAT cellulitis pathway. (Category 2 on severity assessment). Print off this guidance and place in notes.

3. **Swab any areas of broken skin or suspected entry points for microbiological culture. Mark the cellulitis area with a skin marker.**

4. Cannulate with appropriate peripheral venous catheter (PVC) and take full set of bloods including U&Es, CRP, LFTs and FBC. Complete PVC bundle and place in notes.

5. **The following patients are <u>not</u> suitable for the OPAT lower limb cellulitis pathway:**
    - Patients who have been prescribed oral antimicrobials for the same infection for <48 hours, or have not complied with dosing directions for 48 hours.
    - Age < 18 years old
    - Upper limb, facial or orbital cellulitis
    - Complicated skin infection, e.g. sinus tract, diabetic foot infection, wounds with water exposure, bite wounds. (Note: this list is not exhaustive.)
    - Pain out of proportion to skin changes/rapidly evolving/blistering
    - Unstable co-morbidities (e.g. acute kidney injury (AKI), cardiac decompensation or uncontrolled blood sugar)

6. **The following patients should be discussed with specialist surgical or orthopaedic teams before consideration for OPAT:**
    - Recent surgery in relation to the cellulitis area
    - Bursitis
    - Possible bone and joint involvement

7. **<u>If no penicillin/ β-lactam anaphylaxis or life-threatening allergy, no MRSA, and low risk of *C.difficile* infection (CDI):</u>**

    - **IV Ceftriaxone 2g** and observe for 30 mins.

8. **<u>In patients with penicillin/ β-lactam anaphylaxis or life-threatening allergy, suspected MRSA or high risk of CDI:</u>**

    - Prescribe initial dose of **IV teicoplanin** following steps below and observe for 30 mins.
      (Note- dose recommendations within this table are off-label)

Reference: ADTC 394/02 **Supersedes:** ADTC 394/01
Written by: K Hamilton Antimicrobial Pharmacist, U Altmeyer Consultant Microbiologist, R Copeland Advanced Nurse Practitioner/CNM and M Manuel Consultant Physician **Approved by:** Antimicrobial Management Group
Date: 9th November 2022 **Review date**: November 2025

<table>
<tr><th colspan="2">NHS A&A Teicoplanin dosing for use in OPAT setting</th></tr>
<tr><td>Step 1</td><td>Calculate creatinine clearance (CrCl) using Cockcroft-Gault formula via online calculator or calculate manually:

$$\text{CrCl (mL/min)} = \frac{[140 - \text{age (years)}] \times \text{weight (kg)} \times 1.23 \text{ (male) OR} \times 1.04 \text{ (female)}}{\text{serum creatinine (micromol/L)}}$$

(If calculating manually the weight used should be actual or maximum body weight (MBW) (whichever is lower). MBW can be determined from Scottish Antimicrobial Prescribing Group (SAPG) MBW table. (Appendix 1)</td></tr>
<tr><td>Step 2</td><td>Decide on using either ideal or actual bodyweight, whichever is lower, as per SAPG IBW table https://www.sapg.scot/media/4470/ideal-body-weight-tables.pdf). (Appendix 2)</td></tr>
<tr><td>Step 3</td><td>Prescribe teicoplanin once daily for a total of three days according to table below:
<table>
<tr><th rowspan="2">Creatinine Clearance (ml/min)</th><th colspan="3">Weight (kg)
(IBW or ABW, whichever is lower)</th></tr>
<tr><th>40-59kg</th><th>60-79kg</th><th>>80kg</th></tr>
<tr><td><60</td><td>600mg</td><td>800mg</td><td>1000mg</td></tr>
<tr><td>>60</td><td>800mg</td><td>800mg</td><td>1000mg</td></tr>
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</td></tr>
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9. **<u>If daily IV administration is not possible for logistical reasons</u>** e.g. geographically remote, care home resident, people who inject drugs, or with alcohol dependency, or a significant mental health morbidity or a history of deliberate self-harm, consider:
   - **Dalbavancin 1.5g** as a single dose, and observe for 30 minutes. (Reduce dose to 1g in patients with chronic renal impairment (CrCl < 30ml/minute) who are not receiving regularly scheduled haemodialysis).
   - **Dalbavancin can only be accessed Monday – Friday between 9am and 5pm**
   - **All patients assessed as suitable for dalbavancin via this pathway must seek approval from two members of the following staff:**
     i. **Mahanth Manuel or Ross Copeland and**
     ii. **Nominated Senior CAU pharmacist or Senior Antimicrobial pharmacist**

10. Contact CAU ANP team (page UHC #3129, UHA #1417) who will prescribe further IV doses for patients on ceftriaxone or teicoplanin and will arrange further return appointments and reviews.

11. The clinical notes should then be sent to the appropriate unit – either CAU reception if daily or MDU ward clerk (UHC).

12. Discharge patient with the secured peripheral venous catheter (PVC) left in situ and give advice sheet on self-care (attached). Remove PVC following infusion for patients on dalbavancin.

13. Daily assessment by medical day unit nurse (or ANP if within CAU) whilst on IV therapy (Patients on dalbavancin will be reviewed in SDEC seven days after dose):

    - Assess for signs of sepsis - Skin heat, erythema, pain, swelling, temperature (>38°C or < 36°C), Heart rate (>90bpm), Respiratory rate (>20/min), altered mental state.

- **Maintain vigilance for any signs of CDI – new frequent loose stools, persistent fever. If concerned, send stool samples and contact ANP.**
- Penumbra or erythema may spread beyond marker within first 24-36 hours before resolving
- Continue IV therapy until there is significant reduction in heat, erythema falling back below skin mark made on first review with skin marker, reduced pain and normal temperature (< 38°C), heart rate (< 90 bpm) and respiratory rate (< 20 breaths/ min)
- Average IV therapy length 3 – 4 days (including any initial doses given in CAU/ED).

**** If clinical deterioration observed at any time page ANP for review in CAU ****

14. Recheck bloods and swab culture after 3rd IV dose. When significant clinical improvement (Day 3/4), medical day unit will contact CAU ANP to arrange review in CAU with a view to switch from IV to oral antimicrobials. (Note patients who have received one dose of dalbavancin will not require any further antimicrobial treatment)

    - **Review culture results if available**, and base oral antimicrobial choice on reported susceptibilities.

    - If no positive culture results from the current infection episode are available complete course with **five days** of empirical oral antimicrobial:

        - **<u>If no penicillin/ β-lactam allergy and no MRSA isolated,</u>**
            ✓ switch to **oral flucloxacillin 500mg every six hours**

        - **<u>If penicillin/ β-lactam allergy/suspected MRSA</u>**
            ✓ switch to **oral doxycycline 100mg every 12 hours**

    - Discharge back to GP.

15. Self-care advice for patients:

    - Ensure compliance with good skincare e.g. application of non-perfumed emollient or soap substitute to the affected area(s)
    - Elevate the affected area where possible e.g. elevate leg as much as possible until infection resolves
    - Drink plenty of fluids to avoid dehydration
    - Contact appropriate unit directly (see contacts below) if you develop worsening swelling or pain.
    - Ensure good PVC/dressing care

16. **Patients on dalbavancin only**: Arrange follow-up appointment one week after dalbavancin dose for review and repeat bloods.

Bibliography

Scottish Antimicrobial Prescribing Group – Out-patients parenteral antibiotic therapy (OPAT) pathway for the management of adults with complicated skin and soft tissue infections (SSTI) affecting their upper or lower limb(s) or face (erysipelas) June 2022 20220627-sapg-opat-ssti-pathway-final.pdf

Lamont et al. Journal of Antimicrobial Chemotherapy 2009; 64 : 181-187

NHS Lothian Hospital at Home Infection Guideline version 2.2, December 2020

NHS Fife Teicoplanin three times per week guideline for adults ≥ 16 years, 2018

NHS Ayrshire & Arran Management of lower limb cellulitis severity assessment pathways

Category 1

- NEWS 0-1
- No signs of systemic toxicity
- No uncontrolled co-morbidities
- Not yet tried oral antimicrobial therapy

Manage with **oral antimicrobial therapy** as per NHS Ayrshire & Arran infection guidance

Category 2

- NEWS 0-1
- Mild systemic illness or well but with a co-morbidity such as peripheral vascular disease, chronic venous insufficiency or morbid obesity which may complicate or delay resolution of their infection.
- Well but cellulitis not resolving despite ≥48 hours of appropriate oral antimicrobial therapy

Requires **IV antimicrobial therapy**

Consider OPAT cellulitis protocol

Category 3

- NEWS ≥ 2
- Significant systemic upset such as confusion, tachycardia, tachypnoea, hypotension
- Unstable co-morbidities (e.g. AKI, cardiac decompensation or uncontrolled blood sugar)
- Septic shock
- Severe life / limb threatening infection such as necrotising fasciitis

Requires **inpatient antimicrobial therapy**

Additional assessment required

Discuss the following with patients with specialist surgical or orthopaedic teams:

- Recent surgery in relation to the cellulitic area
- Bursitis
- Possible bone and joint infection.

OPAT IV antimicrobial therapy- Initial management

1. If no penicillin/β-lactam anaphylaxis or life-threatening allergy/no MRSA/no CDI:

   Ceftriaxone 2g daily (max 4 days)

2. If penicillin/β-lactam anaphylaxis or life-threatening allergy/suspected MRSA/high CDI risk:

   Teicoplanin once daily as per guidance above **(max 3 days)**

3. If daily IV administration is not possible for logistical reasons (see above)

   Dalbavancin 1.5g as a single dose (reduce to 1g if CrCl <30ml/min)

REQUIRES APPROVAL PRIOR TO USE

Observe patient for 30 minutes

Exclusion Criteria

- Patients who have been prescribed oral antimicrobials for the same infection for <48 hours, or have not complied with dosing directions for 48 hours.
- Age < 18 years old
- Immunosuppression
- Patients who inject drugs
- Upper limb, facial or orbital cellulitis
- Complicated skin infection, e.g. sinus tract, diabetic foot, water exposure, bites (list not exhaustive)
- Pain out of proportion to skin changes/rapidly evolving/blistering
- Unstable co-morbidities (e.g. AKI, cardiac decompensation or uncontrolled blood sugar)

OPAT IV antimicrobial therapy- Ongoing management

- Page CAU ANP (UHC 3129, UHA 1417) who will refer patient to medical day unit
- Review swab culture results and complete course with 5 days of an appropriate oral antimicrobial agent (Not applicable to patients receiving dalbavancin)
- Provide patient with self-care advice.

Reference: ADTC 394/02 **Supersedes:** ADTC 394/01
Written by: K Hamilton Antimicrobial Pharmacist, U Altmeyer Consultant Microbiologist, R Copeland Advanced Nurse Practitioner/CNM and M Manuel Consultant Physician **Approved by:** Antimicrobial Management Group
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Appendix 1

Maximum Body Weight Table

This table can be used to determine whether patients are classified as obese (>20% over ideal body weight) and determine the maximum body weight use in the Cockcroft-Gault equation

Maximum body weight table			
Height (ft inches)	Height (cm)	MBW (kg) (male)	MBW (kg) (female)
4' 8"	142	49	43
4' 9"	145	52	47
4' 10"	147	54	49
4' 11"	150	58	52
5' 0"	152	60	55
5' 1"	155	62	58
5' 2"	158	66	60
5' 3"	160	68	62
5' 4"	163	71	66
5' 5"	165	74	68
5' 6"	168	77	71
5' 7"	170	79	74
5' 8"	173	82	77
5' 9"	175	85	79
5' 10"	178	88	82
5' 11"	180	90	85
6' 0"	183	94	88
6' 1"	185	96	90
6' 2"	188	98	94
6' 3"	191	101	97
6' 4"	193	104	99
6' 5"	195	107	101
6' 6"	198	109	105
6' 7"	201	113	108
6' 8"	203	115	110

Scottish Antimicrobial Prescribing Group website [maximum-body-weight-table.pdf (sapg.scot)]

Appendix 2

Ideal Body Weight Tables

These tables can be used to estimate a patient's ideal body weight to determine the appropriate dose of teicoplanin.

Females

Height Feet	5'	5'1"	5'2"	5'3"	5'4"	5'5"	5'6"	5'7"	5'8"	5'9"	5'10"	5'11"	6'	6'1"	6'2"	6'3"	6'4"
Height Inches	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
Height cm	152	155	157	160	163	165	168	170	173	175	178	180	183	185	188	190	193
IBW kg	45.5	47.8	50.1	52.4	54.7	57	59.3	61.6	63.9	66.2	68.5	70.8	73.1	75.4	77.7	80	82.3

Males

Height Feet	5'	5'1"	5'2"	5'3"	5'4"	5'5"	5'6"	5'7"	5'8"	5'9"	5'10"	5'11"	6'	6'1"	6'2"	6'3"	6'4"
Height Inches	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
Height cm	152	155	157	160	163	165	168	170	173	175	178	180	183	185	188	190	193
IBW kg	50	52.3	54.6	56.9	59.2	61.5	63.8	66.1	68.4	70.7	73	75.3	77.6	79.9	82.2	84.5	86.8

Scottish Antimicrobial Prescribing Group website https://www.sapg.scot/media/4470/ideal-body-weight-tables.pdf

NHS Ayrshire & Arran

OPAT Service for Lower Limb Cellulitis

Information for patients returning for daily management and review where Peripheral Venous Cannula remains in situ.

It has been agreed that you may safely continue your intravenous antibiotic management through ambulatory pathway. This requires you return daily to the Medical Day Unit or Combined Assessment Unit for review and treatment.

How do we administer intravenous antibiotic treatment?
In order for us to give you your treatment into a vein, it is necessary for you to have a small, hollow, plastic tube inserted into your hand / arm.

This plastic tube is called a cannula.

The cannula goes through your skin and into a vein where it stays to allow us to give you your medications directly into your blood stream. You will have a waterproof dressing over the cannula to help keep it in place.

As the cannula is sitting in the vein, there is a risk of bleeding if the cannula becomes accidentally dislodged. **There is no need to panic.**

Usually any bleeding will stop within a few minutes with applied pressure.

If your cannula comes out.
- Apply pressure to the area with clean cotton- wool, gauze or tissue.
- Maintain this pressure until the bleeding has completely stopped. This may take a few minutes - do not be tempted to inspect the site every few seconds as this will prolong the bleeding
- Once the bleeding has stopped, apply a plaster.
- Phone the specified number below and inform the staff that the cannula has become dislodged.

If the bleeding does not stop.
- keep applying pressure to the area
- lift or place your arm above your head
- phone the specified number below

If the cannula site is painful or inflamed.
Phone the specified number below. The nurse there will arrange for you to attend for possible removal or re- siting of your cannula.

Medical Day Unit, Crosshouse: 01563 827018
CAU Crosshouse 01563 826842
CAU Ayr 01292 616851
NHS 24: 111
Or contact your G.P.

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