Acute painful crisis in patients with sickle cell disease: Clinical Guidelines (HN-506a)

Introduction
The majority of acute painful crises in patients with sickle cell disease will be managed independently by the patient at home, with simple analgesics and oral hydration.

This protocol addresses the management of an adult patient with an acute painful crisis as an inpatient. Note that specific contraindications to recommended pharmacological agents may apply in individual patients (e.g. the avoidance of non-steroidals in pregnancy – see appropriate protocol).

1. Presentation routes and haematology referral
Patients will present in a variety of ways. Some will self-refer to the Emergency Department; some will be admitted via the acute medical take, and most will use the haematology/oncology triage service.

In all cases, the appropriate haematology registrar should be informed:

- The laboratory SpR (bleep 1836) for daytime referrals at the John Radcliffe Hospital
- The Lymphoma Service ward registrar (Bleep via the Churchill switchboard) for acute admissions at the Churchill Hospital
- The on-call registrar for all admissions between 5pm and 9am (contact via Churchill switchboard).

All inpatients with acute painful sickle crises should be transferred to a bed at the Clinical Haematology Ward at the Churchill Hospital as soon as possible.

2. Assessment at presentation
A clinical assessment should be performed by the admitting doctor, noting:

- History, including potential precipitants and source of pain
- Typical/atypical nature of pain compared to patient’s usual sickle pain
- Likelihood of specific complications (e.g. avascular necrosis, chest crisis, priapism)
- Vital observations (to include BP, pulse, oxygen saturation on air, respiratory rate and temperature)

The initial assessment should be focused on detecting complications that require specific management, and the determination of urgent first line analgesics.

- Pain assessment should be undertaken as objectively as possible using an appropriate pain scoring tool (e.g. ten point scale)
- Note should be made of analgesia taken to date, including dose and timing.
3. Investigations
In all patients:
- Full blood count, reticulocyte count,
- Group and save (include extended phenotype if new to OUH)
- Urea, electrolytes and creatinine, ALT, bilirubin, alkaline phosphatase
- C-reactive protein
- Blood cultures
- MSU culture

Additional investigation should be performed as indicated:
- Plain chest radiograph if fever, chest symptoms/signs
- Arterial blood gases if oxygen saturations on air are <92%
- Amylase if abdominal symptoms or signs

4. Initial management
- All patients must be offered analgesia within 30 minutes of presentation to hospital with an acute painful crisis, and should be pain-free within 60 minutes of admission.

- A bolus of strong opioid should be offered to all patients who present with severe pain or moderate pain unresponsive to analgesia before presentation (see table on next page)

- A weak opioid (e.g. codeine phosphate 30-60 mg tds) may be given as an initial therapy for patients with mild to moderate pain who have not had any analgesia prior to presentation.

- The subcutaneous route is preferred for pain relief, providing intravenous access is not required for other treatments – e.g. hydration (see adjunct therapies, below).

- Do not delay analgesic treatment while attempting to secure venous access.

- Avoid cannulating legs and feet to avoid the increased risk of thrombosis; avoid central line placement unless essential for blood transfusion.
Sample plan for opiate use in painful sickle crises:

<table>
<thead>
<tr>
<th>Subcutaneous Bolus regimen</th>
<th>IV Bolus regimen</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Initial dose:</strong></td>
<td><strong>Initial dose:</strong></td>
</tr>
<tr>
<td>1. Morphine 0.2 mg/kg subcutaneously</td>
<td>1. Morphine, total dose 0.1 mg/kg</td>
</tr>
<tr>
<td>2. Cyclizine 50 mg subcutaneously OR proclorperazine 12.5 mg IM (maximum tds.)</td>
<td>Make in 10 mg in 10 ml sodium chloride 0.9% (1 mg/ml).</td>
</tr>
<tr>
<td><strong>Observations, at 20 minute intervals:</strong></td>
<td><strong>Observations, at 5 minute intervals:</strong></td>
</tr>
<tr>
<td>Respiratory rate</td>
<td>Respiratory rate</td>
</tr>
<tr>
<td>Sedation score (see appendix)</td>
<td>Sedation score (see appendix)</td>
</tr>
<tr>
<td>Oxygen saturations on air</td>
<td>Oxygen saturations on air</td>
</tr>
<tr>
<td><strong>Reassess after 20 minutes</strong></td>
<td><strong>Reassess after 20 minutes</strong></td>
</tr>
<tr>
<td>If pain score 5 or more: Repeat 50-100% of initial morphine dose as above</td>
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</tr>
<tr>
<td>Repeat every 20 minutes until pain controlled providing sedation score remains 1-2 and respiratory rate &gt;10</td>
<td>Repeat every 20 minutes until pain controlled providing sedation score remains 1-2 and respiratory rate &gt;10</td>
</tr>
<tr>
<td><strong>Once pain controlled (pain score &lt;5)</strong></td>
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</tr>
<tr>
<td>Commence PCA pump if needed</td>
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</tr>
</tbody>
</table>

- The preferred opioid is morphine.
- Pethidine should be avoided in patients with sickle cell anaemia due to its association with seizures.
- Fentanyl is an appropriate choice for patients who are allergic to morphine.

Suitable bolus doses of fentanyl for morphine allergic patients are:
- 50 microgram – 100 microgram IV, hourly, until pain controlled
- Respiratory rate and sedation monitoring every 15 minutes

Naloxone should be available on the ward for treatment of opioid excess. Naloxone 100 microgram IV should be administered in the event of severe respiratory depression or sedation, with repeat boluses after 2 minutes if required.

Monitoring of vital signs and sedation score should be performed every hour for the first six hours for patients receiving strong opioids, and every 4 hours thereafter.
5. Patient-controlled analgesia
This protocol should be used in conjunction with the Trust’s guidance on the use and administration of PCA.

PCA should not be commenced until the patient’s pain has been controlled by bolus injections of opioid. Patients with a pain score of 5 or less are suitable for PCA administration.

The PCA should be monitored by 1 hourly assessment of pain score in the first instance, reducing to 4 hourly when the patient is pain free. Standard monitoring of sedation score and respiratory rate should be performed as documented on the Trust PCA care plan.

A suitable PCA protocol is given below:

<table>
<thead>
<tr>
<th>Drug</th>
<th>Morphine 60 mg made up to 30 ml in sodium chloride 0.9%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concentration</td>
<td>2 mg/ml</td>
</tr>
<tr>
<td>PCA bolus dose</td>
<td>1 mg</td>
</tr>
<tr>
<td>Lockout time</td>
<td>5 minutes</td>
</tr>
<tr>
<td>4 hour dose limit</td>
<td>Not to be set</td>
</tr>
</tbody>
</table>

If pain control is inadequate with this regimen (e.g. pain score 8 or higher), the PCA bolus dose may be increased to 1.5 mg. Background infusions may be commenced if pain relief is still inadequate on the above regimen – see Trust PCA guideline for more details.

6. Withdrawing the PCA
- PCAs should generally be withdrawn early during the day to prevent problems with breakthrough pain overnight.
- The on-demand usage should be reviewed prior to disconnecting the PCA; a consistent pain score of <4 in the context of minimal on-demand usage may be used as an indication for withdrawal of PCA.
- Any background infusion should be converted to an equivalent oral morphine dose.
- Oral analgesia with non-steroidal anti-inflammatories and paracetamol (where not contraindicated) must be in place prior to withdrawal of the PCA.

7. Adjunct therapies
Unless contraindicated, all patients should receive
- regular paracetamol 1 g qds orally
- non-steroidal anti-inflammatory (ibuprofen 400 mg tds / diclofenac 50 mg tds orally)
- Laxatives (e.g. lactulose 10 ml bd or senna 2 tablets daily)
- Anti-emetics (cyclizine 50 mg tds orally, or prochlorperazine 5-10 mg tds orally)
- Low molecular weight heparin at prophylactic dose od subcutaneously
• If required, for opiate-associated pruritus, prescribe chlorpheniramine 4 mg tds max.

**Hydration.** Sickle crises may be associated with dehydration, and all patients’ fluid balance should be carefully assessed. Where oral intake is unlikely to reach 3-4 L/day (e.g. in patients with nausea/vomiting), IV hydration with 0.9% saline should be commenced and reviewed after 24 hours.

**Oxygen.** Oxygen saturation should be measured on air at presentation and during titration of analgesia as above. Saturations of <95% on air should be supplemented with oxygen via facemask or nasal cannulae. Oxygen saturation of <92% should be investigated by arterial blood gas analysis and plain chest radiograph to investigate the possibility of sickle chest crisis.

**Antibiotics.** These are not central to the management of the acute painful crisis; however, sickle cell patients are susceptible to serious infection, especially with encapsulated organisms. Broad spectrum antibiotics should be started according to the Trust’s antibiotic policy if the patient has a fever of 38°C or higher, or if there are focal signs or symptoms suggestive of infection. The patient’s usual antibiotic prophylaxis may be withheld if therapeutic dose antibiotics with suitable pneumococcus cover are commenced.

**Transfusion.** This should be undertaken only after discussion with the haematology SpR or Consultant. Transfusion may be indicated for patients with Hb <50 g/L or those with a drop in Hb >20 g/L below their normal baseline level; however, the decision for top-up transfusion is also based on general clinical review, and should be individualized for each patient.

**Incentive spirometry.** This is advised for patients with back or chest pain.

**8. Discharge and Follow-up**

Patients should be discharged once confident with oral medication only. Where antibiotic regimens were used, arrangement must be made for the re-starting of penicillin prophylaxis (or alternative if allergic).

Follow-up should be arranged with the haemoglobinopathy clinic within six weeks, so that the frequency of painful crises and the need for intervention with hydroxycarbamide may be assessed.

Discharge letters should be with the GP within ten working days of discharge.

**Sources**

Manchester Hospitals guideline for the management of painful crises in sickle cell anaemia (author Dr K Ryan).
NICE guidelines for the management of a painful crisis in sickle cell anaemia (CG143)

Standards for the clinical care of adults with sickle cell disease in the UK. Sickle Cell Society, 2008

Authors:
Dr Deborah Hay, Haematology SpR; Dr Wale Atoyebi, Clinical Lead for Haemoglobinopathies, October 2012

Review

<table>
<thead>
<tr>
<th>Name</th>
<th>Revision</th>
<th>Date</th>
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<tr>
<td>Wale Atoyebi, Deborah Hay</td>
<td>Pre-peer review</td>
<td>Jan 2013</td>
<td>1.1</td>
<td>Jan 2015</td>
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<tr>
<td>Deborah Hay</td>
<td>Routine review</td>
<td>Aug 2015</td>
<td>1.2</td>
<td>Jan 2017</td>
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<tr>
<td>Deborah Hay</td>
<td>ODN meeting</td>
<td>Oct 2016</td>
<td>1.3</td>
<td>Oct 2017</td>
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Appendix: Ramsay sedation score:

<table>
<thead>
<tr>
<th>Sedation score</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Anxious, agitated and restless.</td>
</tr>
<tr>
<td>2</td>
<td>Cooperative, orientated and tranquil</td>
</tr>
<tr>
<td>3</td>
<td>Responds to commands only</td>
</tr>
<tr>
<td>4</td>
<td>Brisk response to loud auditory stimulus or glabellar tap</td>
</tr>
<tr>
<td>5</td>
<td>Sluggish response to loud auditory stimulus or glabellar tap</td>
</tr>
<tr>
<td>6</td>
<td>No response</td>
</tr>
</tbody>
</table>