8 Stem Cell Transplantation

8.1 Cyclophosphamide PBSC Mobilisation

- **Indication**

Mobilisation of peripheral blood stem cells for future stem cell rescue following high dose chemotherapy for non-Hodgkin's Lymphoma, Hodgkin's disease, multiple myeloma and acute leukaemias.

- **Pre-treatment Evaluation**

  - Document disease stage at diagnosis and current remission status.
  - Record current height, weight and surface area.
  - Review FBC, U&E and Creatinine.
  - Request formal measurement of urinary Creatinine Clearance.
  - Clinical assessment of patient’s cardio-pulmonary status.
  - Give adequate verbal and written information for patients and relatives concerning patient’s disease, treatment strategy and side effects from mobilisation regimen.
  - Discuss fertility issues with patient and relatives.
  - Book harvest date with National Blood Service.
  - Check patient’s HBV, HCV, HIV 1&2 and syphilis serology.
  - Ensure adequate venous access.
  - **Ensure that blood products transfused within 14 days of harvest are irradiated.**

- **Drug Regimen**

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<tr>
<th>Days</th>
<th>Drug</th>
<th>Dose</th>
<th>Route</th>
<th>Comments</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Mesna</td>
<td>1.2g/m²</td>
<td>IV</td>
<td>Bolus injection immediately prior to Cyclophosphamide infusion.</td>
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<tr>
<td>1</td>
<td>Cyclophosphamide</td>
<td>1.5-3g/m² (clinician’s discretion)</td>
<td>IV</td>
<td>Infusion in 500mls 0.9% NaCl over 2hrs.</td>
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<tr>
<td>1</td>
<td>Mesna</td>
<td>1.2g/m² x 5 doses</td>
<td>IV</td>
<td>Bolus injection; give every 3hrs starting 3hrs after Cyclophosphamide started</td>
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<td>+5 onwards</td>
<td>G-CSF (filgrastim or lenograstim according to local policy)</td>
<td>Refer to local policy</td>
<td>SC</td>
<td>Continue until stem cells have been harvested</td>
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**NB:** Additional doses of Mesna 1g IV should be prescribed as required if significant microscopic haematuria is noted.
• **Suggested Fluid Regimen**

  • **Prehydration:** 1000mls 0.9% NaCl + 20mmoles KCl given over 6 hours prior to Cyclophosphamide.
  
  • **Post-hydration:** 1000mls 0.9% NaCl + 20mmoles KCl given over 6 hours x 3 bags starting immediately after Cyclophosphamide infusion finished.

• **Dose Reductions**

  None; do not use Cyclophosphamide mobilisation if urinary Creatinine Clearance is ≤ 40 ml/min.

• **Anti-emetics**

  This regimen has **high** emetic potential - refer to local protocol.

• **Additional Requirements**

  • Check for microscopic haematuria using urine DipStix at least 6 hourly.
  
  • G-CSF (filgrastim or lenograstim according to local policy) SC daily from day +5 until adequate harvest obtained.
  
  • Mobilisation can be delayed in some patients so it is best to give the Cyclophosphamide on a Friday so that day +11 falls on a Monday.
  
  • Ensure that blood products transfused within 14 days of harvest are irradiated.
  
  • Ensure adequate venous access for stem cell collection e.g. Vascath.

• **Assessment of Response**

  • Check FBC and CD34⁺ count daily from day +11 onwards.
  
  • Aim for peripheral blood CD34⁺ count of >50 x 10⁶/l (i.e. >1% CD34⁺ cells with wbc >5 x 10⁹/l) before commencing harvest.
  
  • Ensure platelet count >40 x 10⁹/l on the days of harvest.

• **Possible Side Effects**

  • Nausea/vomiting.
  
  • Bone marrow suppression, expect nadir in neutrophil count <0.5 x 10⁹/l from days 7-10.
  
  • Alopecia.
  
  • Haemorrhagic cystitis.

• **References**


• To LB, Haylock DN, Dowse T et al. A comparative study of the phenotype and proliferative capacity of peripheral blood (PB) CD34+ cells mobilised by four different protocols and those of steady-phase PB and bone marrow CD34+ cells. Blood, 1994,84:2930-9.

• Dreger P, Schmitz N. Sources of stem cells: autografts. In: The EBMT handbook-blood and marrow transplantation, European School of Haematology, 1998:72-86.

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