Cyclophosphamide 2000mg/m^2 For Stem Cell Mobilisation

INDICATIONS FOR USE:

INDICATION	ICD10	Regimen Code	*Reimbursement Status
Mobilisation of peripheral blood stem cells for future stem cell rescue following high dose chemotherapy		00438a	Hospital

**If a reimbursement indicator (e.g. ODMS, CDS[i]) is not defined, the drug and its detailed indication have not been assessed through the formal HSE reimbursement process.*

TREATMENT:

A single cycle is administered prior to stem cell harvest

The recommended cut off level for stem cell harvest is Hb ≥ 8.0g/dL and Platelets >20 x 10^9/L

Note: **Hydration therapy is required for the safe administration of [a]cyclophosphamide (See Table below)**

Day (Time)	Drug	Dose	Route and Method of Administration	Diluent & Rate
1 (T 0)	[b]Mesna	800mg/m^2	IV bolus	Into the side arm of a fast-flowing 0.9% NaCl drip immediately prior to cyclophosphamide
1 (T 0)	[a]Cyclophosphamide	2000mg/m^2	IV infusion	1000ml 0.9% NaCl over 2hours
1 (T +3 hours)	Mesna	800mg/m^2	[b]IV Bolus	Into the side arm of a fast-flowing 0.9% NaCl drip 3 hours post start of cyclophosphamide
1 (T +6 hours)	Mesna	800mg/m^2	[b]IV Bolus	Into the side arm of a fast-flowing 0.9% NaCl drip 6 hours post start of cyclophosphamide
4[c]	G-CSF	10mcg/kg (round to nearest full syringe)	SC	Continue daily until stem cell harvesting has been completed.
[a]Cyclophosphamide Hydration: (Refer to local policy or see suggested hydration below). Pre-Hydration :Administer 1000 mL sodium chloride 0.9% over 2-3 hours. Post-Hydration:Administer 1000 mL sodium chloride 0.9% over 2-3 hours.				
[b]Alternative Mesna regimens may be used at the discretion of the prescribing consultant				
[c]Alternative G-CSF starting day may be used at the discretion of the prescribing consultant				
Maintain strict fluid balance during therapy, by (1) monitoring fluid balance and (2) daily weights. If fluid balance becomes positive by >1000mls or weight increases by >1 Kg, the patient should be reviewed and consideration given to diuresing with furosemide				
Consider plerixifor in poorly mobilized patients at the discretion of prescribing consultant				

ELIGIBILTY:

- Indications as above

EXCLUSIONS:

- Hypersensitivity to cyclophosphamide or any of the excipients.

PRESCRIPTIVE AUTHORITY:

The treatment plan must be initiated by a Consultant Haematologist working in the area of haematological malignancies.

TESTS:

Baseline tests:

- FBC, renal and liver profile
- Uric acid, LDH
- Creatinine Clearance
- ECG +/- echocardiogram if clinically indicated
- Virology screen -Hepatitis B (HBsAg, HBcoreAb), Hepatitis C, HIV.
  *See Adverse Effects/Regimen Specific Complications re Hepatitis B Reactivation

Regular tests:

- FBC, renal and liver profile required daily

Disease monitoring:

Disease monitoring should be in line with the patient's treatment plan and any other test/s as directed by the supervising Consultant.

DOSE MODIFICATIONS:

- Any dose modification should be discussed with a Consultant.
- This is a single dose therapy used as priming for stem cell collection, therefore once decision has been made to proceed there is generally no dose reduction

Renal and Hepatic Impairment:

Table 1: Recommended dose modifications in patients with renal or hepatic impairment

Drug	Renal impairment		Hepatic impairment
Cyclophosphamide	**Cr Cl (ml/min)**	**Dose**	Not recommended in patients with a bilirubin >17micromolmol/L or serum transaminases or ALP more than 2-3 x upper limit of normal. Clinical Decision
	>20	100%	
	10-20	75%	
	<10	50%	

SUPPORTIVE CARE:

EMETOGENIC POTENTIAL: High (**Refer to local policy).**

PREMEDICATIONS:

Hydration regimen for high dose cyclophosphamide **(See suggested hydration above or refer to local policy)**

OTHER SUPPORTIVE CARE:

- Proton pump inhibitor **(Refer to local policy)**
- PJP prophylaxis**. Do not give co-trimoxazole for 2 weeks prior to collection. Recommence when collection completed (Refer to local policy)**
- Tumour lysis syndrome prophylaxis **(Refer to local policy)**
- Anti-viral prophylaxis **(Refer to local policy)**
- Anti-fungal prophylaxis **(Refer to local policy)**
- All patients must receive irradiated cellular blood components starting 7 days prior to conditioning and until 12 months after stem cell infusion to prevent transfusion associated graft versus host disease.

ADVERSE EFFECTS / REGIMEN SPECIFIC COMPLICATIONS

The adverse effects listed are not exhaustive. Please refer to the relevant Summary of Product Characteristics for full details.

- **Neutropenia:** Fever or other evidence of infection must be assessed promptly and treated appropriately.
- **Haemorrhagic cystitis:** This may occur with this regimen. Ensure patient is well hydrated.
- **Hepatitis B Reactivation**: All patients should be tested for both HBsAg and HBcoreAb as per local policy. If either test is positive, such patients should be treated with lamivudine 100 mg/day orally, for the entire duration of chemotherapy and for six months afterwards. Such patients should also be monitored with frequent liver function tests and hepatitis B virus DNA at least every two months. If the hepatitis B virus DNA level rises during this monitoring, management should be reviewed with an appropriate specialist with experience managing hepatitis and consideration given to stopping chemotherapy.

DRUG INTERACTIONS:

- Current drug interaction databases should be consulted for more information e.g interaction potential with CYP3A4 inhibitors/ inducers.

ATC CODE:

Cyclophosphamide - L01AA01

REFERENCES:

1. Jantunen E et al. Stem cell mobilisation Low-dose or intermediate-dose cyclophosphamide plus granulocyte colonystimulating factor for progenitor cell mobilisation in patients with multiple myeloma. Bone Marrow Transplantation (2003) 31, 347–351
2. BCCA Protocol Summary for Single Dose Cyclophosphamide Priming Therapy for Multiple Myeloma Prior to Autologous Stem Cell Transplant (Leukemia/BMT Program of BC- BCCA) Accessed October 2017 http://www.bccancer.bc.ca/chemotherapy-protocols-site/Documents/Leukemia-BMT/MYHDC_Protocol_1Dec09.pdf
3. Estcourt LJ et al. Guidelines for the use of platelet transfusions British Journal of Haematology, 2017, 176, 365–394

4. Treleaven J et al. Guidelines on the use of irradiated blood components prepared by the British Committee for Standards in Haematology blood transfusion task force British Journal of Haematology,2010;152, 35–51
5. The North London Cancer Dosage Adjustment for Cytotoxics in Renal Impairment January 2009; North London Cancer Network. Available at http://londoncancer.org/media/65600/renal-impairment-dosage-adjustment-for-cytotoxics.pdf
6. Dosage Adjustment for Cytotoxics in Hepatic Impairment January 2009; North London Cancer Network. Available at http://londoncancer.org/media/65594/hepatic-impairment-dosage-adjustment-for-cytotoxics.pdf
7. Endoxana® Summary of Product Characteristics Accessed Sept 2018. Available at: http://www.hpra.ie/img/uploaded/swedocuments/LicenseSPC_PA0167-134-003_09022015121117.pdf

Version	Date	Amendment	Approved By
1	23/11/2018		Dr Kamal Fadalla

Comments and feedback welcome at oncologydrugs@cancercontrol.ie.

[i] ODMS – Oncology Drug Management System
CDS – Community Drug Schemes (CDS) including the High Tech arrangements of the PCRS community drug schemes
Further details on the Cancer Drug Management Programme is available at;
http://www.hse.ie/eng/services/list/5/cancer/profinfo/medonc/cdmp/