Plerixafor (stem cell mobilisation)

Indication

Used in combination with granulocyte colony stimulating factor (G-CSF) to enhance mobilisation of stem cells to the peripheral blood for collection and subsequent autologous transplantation.

Current funding is restricted to patients with Hodgkins disease, Non-Hodgkins lymphoma and multiple myeloma when either of the following criteria met:

1. The patient is scheduled for an autologous haematopoietic stem cell transplant but has failed at least one prior attempt at mobilisation using conventional regimens (chemotherapy and GCSF **or** GCSF alone).
2. The patient, whilst undergoing mobilisation (with a standard chemotherapy and GCSF **or** GCSF alone) has a low peripheral blood CD34+ cell count on the expected day of harvest and are not considered by the transplant consultant to have a reasonable chance of collecting enough cells (pre-emptive treatment).

Use outside of the above criteria requires individual funding approval prior to treatment.

ICD-10 codes

Codes pre-fixed with C81, C82, C83, C84, C85, C86 and C90

Regimen details

For patients who have failed previous stem cell mobilisation:

Day	Drug	Dose	Route
1-4 (+5 if further collection required)	GCSF	1 million units/kg (or as per local transplant protocol)	SC
4 (+5 if further collection required)	Plerixafor	240 microgram/kg (max 40mg/day)	SC

For patients with peripheral CD34+ counts <10 on first planned collection day following GCSF +/- chemotherapy primed mobilisation (patients will already have received priming chemotherapy and 4 days of GCSF):

Day	Drug	Dose	Route
Day of collection	GCSF	1 million units/kg (or as per local transplant protocol)	SC
Day of collection	Plerixafor	240 microgram/kg (max 40mg/day)	SC

May be repeated daily for up to 3 days (discuss with consultant and ensure apheresis and stem cell lab availability before second and subsequent doses).

Note: for GCSF dosing 1 million unit is equivalent to 10 micrograms

Cycle frequency

Maximum 3 doses in total – used either as recovery of suboptimal mobilisation and/or in combination with GCSF following a failed mobilisation.

Number of cycles

1 (see above)

Administration

Timing is crucial to the success of plerixafor treatment. Administration in the early evening (aim 18.00 hours) has been shown to enable stem cell collection the following morning, as the effects on CD34 mobilisation plateau out to 15-16 hours.

Plerixafor is supplied in ready-to-use vials. Each vial contains 1.2mL of 20mg/mL solution.

The volume of plerixafor (240 microgram/kg) to be administered is calculated as follows:
0.012 × patient's actual body weight (in kg) = dose to be administered (in mL)

Note: weight used should be calculated within 1 week of the first dose of plerixafor.

If the required volume exceeds 1.2mL, the dose may be split and given in 2 injections.

Plerixafor dose and treatment of patients weighing >175% of ideal body weight have not been investigated.

Ideal body weight can be determined using the following equations:
Male (kg): 50 + 2.3 x ((Height (cm) x 0.394) – 60)
Female (kg): 45.5 + 2.3 x ((Height (cm) x 0.394) – 60)

Patients should be observed by nursing staff for 60 minutes after each dose with blood pressure and pulse monitored every 15 minutes.

Pre-medication
Nil

Emetogenicity
This regimen has no emetic potential (no routine antiemetics required)

Additional supportive medication
Paracetamol, with or without codeine, if required for bone pain.

Extravasation
N/A

Investigations – pre first dose

Investigation	**Validity period**
FBC	24 hours
U + E (including creatinine)	72 hours
LFTs	72 hours
CD34	24 hours

Investigations – pre subsequent doses

Investigation	**Validity period** (or as per local policy)
FBC	Daily (before each plerixafor dose)
CD34	Daily (before each plerixafor dose)

Standard limits for administration to go ahead
If blood results not within range, authorisation to administer **must** be given by prescriber/ consultant

Investigation	**Limit**
Neutrophils	≥ 1.5 x 10^9/L
Platelets	≥ 100 x 10^9/L
Bilirubin	≤ 1.5 x ULN
AST/ALT	≤ 1.5 x ULN
Alkaline phosphatase	≤ 2.5 x ULN

Dose modifications

- **Haematological toxicity**

N/A

- **Renal impairment**

CrCl (mL/min)	**Plerixafor dose**	**Maximum daily plerixafor dose**
> 50	240 micrograms/kg/day	40 mg
20-50	160 micrograms/kg/day	27 mg
< 20	Consultant decision	

Patients on haemodialysis (HD)

Time of day	**Day number**						
	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6*	Day 7*
Morning	GCSF	GCSF	GCSF	GCSF	GCSF	GCSF	GCSF
Morning (after GCSF)					Apheresis	Apheresis	Apheresis
During the day	HD at any time			HD at any time		HD afternoon	
Evening (approx. 6pm)				Plerixafor	Plerixafor*	Plerixafor*	

*2nd and subsequent plerixafor and apheresis will depend on CD34 yield and should only be given following confirmation from the stem cell laboratory/apheresis unit that further collection is required

- **Hepatic impairment**

No dose modification required

- **Other toxicities**

Nil

Adverse effects - for full details consult product literature/ reference texts

- **Serious side effects**

Allergic reactions
Splenomegaly (potential for rupture)
Hyperleukocytosis
Thrombocytopenia

- **Commonly occurring side effects**

Local injection site reactions
Vasovagal reactions (usually within 1 hour of plerixafor administration)
Dizziness
Diarrhoea, constipation
Abdominal distention
Nausea and vomiting
Headache
Muscle cramps, musculoskeletal pain
Arthralgia

- **Other side effects**

Dyspepsia
Flatulence
Dry mouth
Insomnia
Fatigue

Significant drug interactions – for full details consult product literature/ reference texts

Nil known

Additional comments

Plerixafor should not be used in pregnant women.

Patients should be advised to use effective contraceptive measures during use of and for three months after plerixafor treatment, if appropriate.

References

- Summary of Product Characteristics Plerixafor (Sanofi) accessed 17 December 2014 via http://www.medicines.org.uk
- Douglas KW et al. Plerixafor for PBSC mobilisation in myeloma patients with advanced renal failure: safety and efficacy data in a series of 21 patients from Europe and the USA. Bone Marrow Transplantation 2012; 47 (1): 18-23.
- Douglas KW, Hayden P, Rahemtulla A, Lemoli R, Rao K, Maris M, Pagliuca A, Uberti, J, Scheid C, Noppeney R, Balasubramaniam T & Cook G. Plerixafor for PBSC mobilisation in myeloma patients with advanced renal failure: safety and efficacy data in a series of 12 patients from the U.S. or European Compassionate Use Programmes, and from the U.S.A. post-licensing. Abstract EBMT 2010, Vienna.

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