Mini-BEAM

Relapsed or refractory intermediate or high grade Non-Hodgkins Lymphoma, or relapsed Hodgkins disease, suitable for subsequent PBSCH and autograft
MDTs should carefully assess patient suitability with respect to tertiary centre criteria for high dose treatment, prior to starting salvage therapy

Drugs/Dosage/Administration:

Day	Drug	Dose	Administration	Frequency
1	Carmustine	60mg/m^2	IV in 250-500ml Glucose 5% over 30 minutes (* with antihistamine cover)	Single dose
2 – 5 (4 days)	Cytarabine	100mg/m^2/dose (total 8 doses)	IV in 100ml 0.9% Sodium Chloride over 30 minutes	12 hourly
2 – 5 (4 days)	Etoposide	75mg/m^2/day	IV in 500ml 0.9% Sodium Chloride over 30–60 mins	Once daily
6	Melphalan	30mg/m^2	IV in 100ml 0.9% Sodium Chloride over 30 minutes **or** slow bolus via fast-running infusion of sodium chloride 0.9%	Single dose

Other Drugs: *Chlorphenamine 10mg IV 30 minutes before carmustine infusion
Allopurinol 300mg po daily, ideally starting 24 hours before chemotherapy – review after 3 weeks
Fluconazole as prophylaxis throughout and until neutropenia resolved
G-CSF primary prophylaxis may be considered, according to ASCO guidelines and local practice; G-CSF mobilisation for harvesting to start on Day 7

Frequency: 1 - 2 cycles may be used, with the second cycle given only once neutrophils > 1.0 x 10^9/L and platelets > 75 x 10^9/L

Main Toxicities: prolonged (> 7 days) myelosuppression, with risk of infections and haemorrhage; alopecia; mucositis; pulmonary toxicity (see Comments); ovarian failure; infertility

Anti- emetics: Highly emetogenic: Day 1 and Day 6
Moderately emetogenic: Days 2 – 5

Extravasation: Melphalan is a vesicant

Regular Investigations:	
FBC	alternate days until thrombocytopenia or neutropenia occur, then daily to recovery
U&Es	D1, D3 and D5
Mg^{2+} and Ca^{2+}	D1
LFTs	D1
LDH	D1
Cr^{51}-EDTA or 24hr urine collection	baseline if concerned
CXR	baseline

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Prepared by Oncology Pharmacist: S Taylor	Checked by Network Pharmacist: Jacky Turner

Comments: Carmustine-associated pulmonary toxicity may occur within 3 years of therapy and appears to be dose related, with total cumulative doses of 1200-1500mg/m² being associated with increased likelihood of lung fibrosis. Risk factors include smoking, the presence of a respiratory condition, pre-existing radiographic abnormalities, sequential or concomitant thoracic irradiation and association with other agents that cause lung damage.

Dose Modifications **Important note** - because this regimen is used in the context of salvage therapy for potentially curable patients, any dose reductions *must be confirmed by the treating Consultant and/or tertiary centre.* The dose modifications outlined below are not mandatory but are intended to guide discussion and decision making.

Haematological Toxicity: Proceed once neutrophils > 1.0 x 10^9/L and platelets > 75 x 10^9/L.
If low counts are thought to be due to marrow infiltration, discuss with Consultant.

Delay in count recovery after treatment should be managed according to local protocols/practice.

Renal Impairment:

CrCl (ml/min)	Etoposide Dose	Carmustine Dose
60	Give 85%	Give 80%
45	Give 80%	Give 75%
30	Give 75%	Give 50%
15	Give 50%	Give 25%

Melphalan - a dose reduction of 50% should be considered in moderate renal impairment. If in doubt, discuss with Consultant.

Hepatic Impairment:

Bilirubin (µmol/L)	Cytarabine Dose
> 34	Give 50% dose

Creatinine clearance is the strongest predictor of etoposide clearance. There is conflicting information about dose reduction with hepatic impairment. Use the table below but, if in doubt, discuss with Consultant.

Bilirubin (µmol/l)		AST (units/l)	Etoposide Dose
26 – 51	**or**	60 - 180	Give 50% dose
> 51	**or**	> 180	Clinical decision

Patient Information: CancerBACUP leaflets for Carmustine, Etoposide, Cytarabine and Melphalan

References: Chopra, R et al; Br J Haem (1992); 81: 197 - 202

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