R-GCVP

CD20 positive Diffuse Large B-cell Lymphoma, Stage II, III or IV, for patients unable to receive R-CHOP due to impaired cardiac function (ejection fraction < 50% or risk factors for cardiovascular disease)

All patients should be screened for hepatitis B virus before starting treatment

Drugs/Dosage:

Rituximab	375mg/m^2 (dose 'banded' according to dosing table below)	IV	Day 1
then			
Cyclophosphamide	750mg/m^2	IV	Day 1
Gemcitabine	750*mg/m^2	IV	Day 1 and Day 8
Vincristine	1.4mg/m^2 (max 2mg)	IV	Day 1
Prednisolone	100mg (flat dose)	po once daily	Day 1 to Day 5

*If no dose-limiting haematological toxicity is observed on Cycle 1, increase gemcitabine dose to 875mg/m^2 on Cycle 2 and 1000mg/m^2 for Cycle 3 onwards.

Age > 60 yrs and pre-existing constipation or neurological problems, consider vincristine dose of 1mg. If in doubt, check with Consultant.

Premedication:

Paracetamol 1000mg	po	60 minutes pre rituximab
Chlorphenamine 10mg	IV	15 minutes pre rituximab
Dexamethasone 8mg	IV	15 minutes pre rituximab

(IV dexamethasone only may be omitted if Day 1 of oral prednisolone 100mg taken at least 30 minutes before start of rituximab infusion)

Other drugs:

Allopurinol 300mg po daily, starting at least 24 hours before first dose – review after 3 weeks
Omeprazole 20mg od (or ranitidine) is recommended whilst treating with steroids
G-CSF as primary prophylaxis, starting on Day 9 of the cycle.

Frequency: 3 weekly cycle for 6 cycles

Main Toxicities: tumour lysis syndrome (ensure pre-medicated with allopurinol and good hydration)
severe cytokine release syndrome - usually occurs within 1-2 hours of the first rituximab infusion (see Comments); myelosuppression; peripheral neuropathy; constipation; haemorrhagic cystitis; alopecia; mucositis; ovarian failure; infertility
gemcitabine may cause: erythematous rash, flu-like syndrome, peripheral oedema, raised transaminases

Anti- emetics: Day 1: highly emetogenic (but oral dexamethasone not needed due to prednisolone)
Day 8: mildly emetogenic

Extravasation: vincristine is a vesicant

Administration: Rituximab should be given before chemotherapy, diluted in 500ml 0.9% sodium chloride & administered according to following instructions:

Reason for Update: info on split dosing of rituximab added	Approved by Chair of Alliance TSSG: Dr A Laurie
Version: 4	Date: 22.8.16
Supersedes: Version 3	Review Date: Sept 2018
Prepared by: S Taylor	Checked by: C Tucker

First infusion#: start at 50mg/hr, according to infusion table below; escalate in 50mg/hr increments every 30 minutes to a maximum of 400mg/hr.
Monitor patient's vital signs (blood pressure, pulse, temp and O_2 saturation) at baseline and then every 30 minutes (before each increase in infusion rate) until end of infusion.

	Infusion Rate (mg/hour)							
	50	100	150	200	250	300	350	400
Rituximab 'banded' dose	**Infusion Rate (ml/hour) for rituximab in 500ml volume only**							
450mg	55	111	166	222	277	333	388	444
500mg	50	100	150	200	250	300	350	400
600mg	42	83	125	167	208	250	292	333
700mg	36	71	107	143	178	214	250	286
800mg	31	62	94	125	156	187	219	250
900mg	28	56	83	111	139	167	194	222
1000mg	25	50	75	100	125	150	175	200
1100mg	23	45	68	90	114	136	159	182

Subsequent Infusions:

*** Patients who tolerated their first infusion at the standard recommended rate only***
Give 20% of dose (i.e. 100ml) over 30 minutes, then the remaining 80% (i.e. 400ml) over 1 hour, to give a total infusion time of 90 minutes.
Monitor patient's vital signs at baseline, then every 30 minutes until end of infusion.

*** Patients who did not tolerate their first infusion at the standard rate ***
Administer and monitor as per first infusion, or at a slower rate if required.

#If WBC ≥ 25 x 10^9/l, there is an increased risk of severe cytokine release syndrome with rituximab administration. Options include omitting the rituximab for this cycle, or splitting rituximab dosing over two days, as follows:

Day 1: **rituximab 50mg/m^2** in 50ml sodium chloride 0.9% IV infusion at 50mg/hr fixed rate throughout.
Day 2: **rituximab 325mg/m^2** in 250-500ml sodium chloride 0.9% IV infusion, start at 50mg/hr, escalate in 50mg/hr increments every 30 mins to max 400mg/hr.

Full resuscitation equipment must be available, with immediate access to clinical staff trained in resuscitation for the first hour of the first rituximab infusion.

If reactions occur at any time, stop the infusion. If symptoms improve, restart at half the previous infusion rate, and escalate as tolerated.

Gemcitabine infusion in 250ml sodium chloride 0.9% over 30 minutes
Vincristine diluted in 50ml 0.9% sodium chloride and infused over 5-10 minutes
Cyclophosphamide may be given as a bolus

Regular Investigations:

FBC	prior to each cycle and Day 8
LFTs	prior to each cycle
U&Es	prior to each cycle
LDH	prior to each cycle

Dose Modifications

Haematological Toxicity: All dose modifications should be made according to the blood count on the day of treatment. i.e. doses may be escalated back to 100% after a previous dose reduction if the blood count is adequate.

Neutrophils		Platelets	Day 1 R-GCVP dose adjustments	Day 8 Gemcitabine
≥ 1.0 x 10^9/l	and	≥ 75 x 10^9/l	100% doses	100% dose
0.5 – 0.9 x 10^9/l	or	50-74 x 10^9/l	75% doses for gemcitabine, vincristine and cyclophosphamide 100% dose rituximab and prednisolone	75% dose
< 0.5 x 10^9/l	or	< 50 x 10^9/l	Delay until neuts > 1.0 and platelets > 75, then give 100% doses	Omit (do not defer)

For any delay due to haemorrhage associated with thrombocytopenia or a second episode of febrile neutropenia, give 75% doses of gemcitabine, cyclophosphamide and vincristine in all remaining cycles.

Renal Impairment:

CrCl (ml/min)	Cyclophosphamide Dose
> 20	Give 100%
10 – 20	Give 75%
< 10	Give 50%

If CrCl < 30ml/min, consider dose reduction for gemcitabine – clinical decision

Hepatic Impairment: If bilirubin > 27 µmol/L, initiate treatment with gemcitabine 750mg/m^2, but escalate the dose with caution.

Bilirubin (µmol/l)		ALT / AST (units/l)	Vincristine Dose
26 – 51	**or**	60 – 180	Give 50%
> 51	**and**	≤ 180	Give 50%
> 51	**and**	> 180	Omit

Neurotoxicity: Curative intent: Stop vincristine if patient experiences Grade 3 – 4 toxicity.
Without curative intent: Give 50% vincristine dose if Grade 2 motor and/or Grade 3 sensory toxicity
If in doubt, discuss with Consultant.

Patient Information: Macmillan leaflets for R-CVP and Gemcitabine

References: NCRI R-GCVP protocol Version 6 April 2009
NCRI Lymphoma Clinical Studies Group Trial, presented at ASH 2011