Trust Policy		Worcestershire Acute Hospitals NHS Trust

Guideline for the management of Tumour Lysis Syndrome

Department / Service:	Women & Childrens
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Accountable Director:	Dr Kamalarajan
Approved by:	Women & Children's Governance
Date of approval:	15th January 2025
First Revision Due: **This is the most current document and should be used until a revised version is in place**	15th January 2028
Target Organisation(s)	Worcestershire Acute Hospitals NHS Trust
Target Departments	Women & Children's - Paediatrics
Target staff categories	Paediatric medical, nursing and pharmacy staff

Policy Overview:
Guideline developed to support clinical staff in the management and treatment of tumour lysis syndrome

Key amendments to this document

Date	Amendment	Approved by:
Feb 2016	*No amendments*	*Chemotherapy Working Group (BCH)*
Feb 2018	*No amendments*	*Chemotherapy Working Group (BCH)*

1. Introduction

Tumour Lysis Syndrome is an oncological emergency that can occur in haematological malignancies with high tumour burden. The laboratory changes of hyperuricaemia, hyperkalaemia, hyperphosphatemia, and hypocalcaemia occur when dying malignant cells release purines, potassium, and phosphate into the circulation faster than they can be excreted by the kidney. Unless precautions are taken uric acid or phosphate salts will deposit in the renal tubules resulting in reduced renal function. A domino effect occurs in the remaining nephrons and patients may rapidly enter established anuric renal failure.

Tumour lysis syndrome is common in the haematological malignancies of childhood. Around one in five children with acute leukaemia or non-Hodgkin's lymphoma will develop the condition. Fortunately, most can be managed medically without the need for dialysis. The condition also rarely occurs in small children with bulky stage 4S neuroblastoma or hepatoblastoma. The risk of tumour lysis syndrome depends mainly on the extent of the tumour burden, and to a lesser extent the rapidity with which the malignant cells both proliferate and respond to treatment.

The main principles of tumour lysis syndrome management are:

1. identification of high- risk patients with initiation of preventive therapy and
2. early recognition of metabolic and renal complications and the prompt administration of supportive care, including haemodialysis.

Risk stratification as per Cairo-Bishop

Three risk groups can be identified from the following pre-treatment factors:

	Low	Intermediate	High
Renal function	Normal renal function	High 'normal' serum creatinine	Pre-existing renal impairment
WCC (X 10^9/l)	<25	25 to 100	> 100
Lymphadenopathy	Minimal lymphadenopathy	Significant lymphadenopathy	Massive lymphadenopathy or malignant effusions (Stage 3 +4 Lymphomas)
Hepatosplenomegaly	None	Mild (2-3 cm)	Major
Serum Urate	low	<450 µmol/l	> 450 µmol/l
Other			L3 ALL (Burkitt's leukaemia) Rising creatinine and or phosphate

The consultant on-call will advise on the most appropriate risk group for a particular patient.

1.1 Low Risk

Dextrose Saline (usually Sodium chloride 0.45% / Dextrose 5%) by IV infusion at not less than 2000 ml/m^2/24 hours for at least 48 hours. **No added potassium unless specifically directed by consultant.**

Monitor fluid balance - weight patient twice daily.

- Monitor U&Es, creatinine, Ca & PO_4 12 hourly for at least the first 24 hours after treatment starts, then daily until IV hydration stops.
- Give allopurinol at 100 mg/m^2 three times per day by mouth for 7 days (maximum 400mg/24hours if below 15 years old).

1.2 Intermediate Risk

Dextrose Saline (usually Sodium chloride 0.45% / Dextrose 5%) by IV infusion at not less than 3000 ml/m^2/24 hours for at least 48 hours. No added potassium unless specifically directed by consultant.

- Give Allopurinol 100 mg/m^2 three times per day by mouth (Round up to nearest 50 mg, maximum single dose 200 mg). Continue for 7 days (maximum 400mg/24hours if below 15 years old).
- If risk status increases (see above) then consider Rasburicase (recombinant urate oxidase) – see below for dose.
- Observe strict fluid balance. Allow insensible losses of 300 - 500 ml /m^2 /24 hours depending on presence or absence of pyrexia. If urine output falls give furosemide - inform consultant if there is no response within 1 hour. Fluid challenge and/or higher dose may be required. Weigh patient twice daily.
- Monitor U&Es, creatinine, Ca & PO_4 6 hourly for at least 48 hours. Reduce to 8 hourly, then 12 hourly and then daily in consultation with the consultant in charge.

1.3 High Risk

- Inform on-call consultant paediatric intensivist.
- Rasburicase (urate oxidase) 0.2mg/kg, IV **ONE DOSE ONLY**. Infuse in 50ml of Sodium chloride
  0.9% over 30 min.
- Caution: Risk of anaphylaxis, draw up adrenaline prior to first dose, administer with doctor present. Risk increased with history of atopy.
- Caution: Risk of haemolysis in G6PD deficiency. Please check G6PD status prior to administrating rasburicase. If the child is G6PD deficient then rasburicase should NOT be given.
- Caution: Urate assays, taken whilst patients are receiving rasburicase, must be sent to the laboratory on ice to prevent falsely low assay results. Uric acid should be checked again on day 3 of treatment.
  DO NOT send uric acid routinely with all samples sent to biochemistry.

If a second dose of rasburicase is indicated based on uric acid at Day 3 or worsening renal function, then this should be discussed with a consultant.

- Dextrose Saline (usually Sodium chloride 0.45% / Dextrose 5%) by IV infusion at not less than 3,000 – 4,000ml/m^2/24 hours until directed to stop by consultant. **No added potassium unless specifically directed by consultant.**
- Observe strict fluid balance. Allow insensible losses of 300 - 500 ml /m^2 /24 hours depending on the presence or absence of pyrexia. If urine output falls then give furosemide. Fluid challenge and / or higher dose may be required. Discuss with renal consultant about using higher dose of Furosemide.
  The patient should be weighed twice daily.
- Monitor U&Es, creatinine, Ca & PO_4 6 hourly for at least 48 hours. Reduce to 8 hourly, then 12 hourly and then daily in consultation with the consultant in charge.

- A rising creatinine and phosphate together with a falling calcium and urine output are indications that dialysis or haemofiltration may be required. Inform consultant and intensive care team **immediately** if this occurs.
- The tables – see Appendix I – should be completed for all patients with an intermediate or high risk of tumour lysis syndrome. Once renal function has returned to normal, they should be filed in chronological order in the narrative section of the patient's notes.

2. References

Jones, G.L., Will, A., Jackson, G.H., Webb, N.J.A and Rule, S. (2015) Guidelines for the Management of Tumour Lysis Syndrome in Adults and Children with Haematological Malignancies of the British Committee for Standards in Haematology.

Cairo, M.S., Coiffier, B., Reiter, A and Younes, A. (2010) Recommendations for the evaluation of risk and prophylaxis of tumour lysis syndrome (TLS) in adults and children with malignant diseases: an expert TLS panel consensus. British Journal of Haematology.

Appendix 1

Surname: Forename: D.O.B. _ _ / _ _ / _ _

Hosp No: Weight: _ _ _. _ Kg Surface area: _ _._ m^2

Date/ Time	Sampling frequency (hours)	Weight	Minimum hourly rate IV	Minimum hourly urine volume*	Signature

Minimum hourly urine volume equals hourly infusion rate – (13 X Surface Area)

Surname:_____Forename:_____D.O.B. _ _ / _ _ / _ _
Hosp No:_____Weight: _ _ _._ Kg Surface area: _ _._ m^2

Uric acid at diagnosis: _ _ _ mmol/l

Date	Time	Hb	WCC	Plat	Na	K	Creat	Ca corrected	PO_4	Urate

Monitoring

Page/ Section of Key Document	Key control:	Checks to be carried out to confirm compliance with the Policy:	How often the check will be carried out:	Responsible for carrying out the check:	Results of check reported to: (Responsible for also ensuring actions are developed to address any areas of non-compliance)	Frequency of reporting:
	WHAT?	HOW?	WHEN?	WHO?	WHERE?	WHEN?
P1	These are the 'key' parts of the process that we are relying on to manage risk. We may not be able to monitor every part of the process, but we MUST monitor the key elements, otherwise we won't know whether we are keeping patients, visitors and/or staff safe.	What are we going to do to make sure the key parts of the process we have identified are being followed? (Some techniques to consider are; audits, spot-checks, analysis of incident trends, monitoring of attendance at training.)	Be realistic. Set achievable frequencies. Use terms such as '10 times a year' instead of 'monthly'.	Who is responsible for the check? Is it listed in the 'duties' section of the Policy? Is it in the job description?	Who will receive the monitoring results? Where this is a committee the committee's specific responsibility for monitoring the process must be described within its terms of reference.	Use terms such as '10 times a year' instead of 'monthly'.

Supporting Document 1 - Equality Impact Assessment Tool

To be completed by the key document author and included as an appendix to key document when submitted to the appropriate committee for consideration and approval.

NHS Worcestershire Acute Hospitals NHS Trust

Herefordshire & Worcestershire STP - Equality Impact Assessment (EIA) Form

Please read EIA guidelines when completing this form

Section 1 - Name of Organisation (please tick)

Herefordshire & Worcestershire STP		Herefordshire Council		Herefordshire CCG	
Worcestershire Acute Hospitals NHS Trust	✓	Worcestershire County Council		Worcestershire CCGs	
Worcestershire Health and Care NHS Trust		Wye Valley NHS Trust		Other (please state)	

Name of Lead for Activity	

Details of individuals completing this assessment	Name	Job title	e-mail contact
Date assessment completed			

Section 2

Activity being assessed (e.g. policy/procedure, document, service redesign, policy, strategy etc.)	Title:			
What is the aim, purpose and/or intended outcomes of this Activity?				
Who will be affected by the development & implementation of this activity?	❑ ❑ ❑ ❑	Service User Patient Carers Visitors	❑ ❑ ❑ ❑	Staff Communities Other _____
Is this:	❑ Review of an existing activity			

	❑ New activity ❑ Planning to withdraw or reduce a service, activity or presence?
What information and evidence have you reviewed to help inform this assessment? (Please name sources, eg demographic information for patients / services / staff groups affected, complaints etc.	
Summary of engagement or consultation undertaken (e.g. who and how have you engaged with, or why do you believe this is not required)	
Summary of relevant findings	

Section 3

Please consider the potential impact of this activity (during development & implementation) on each of the equality groups outlined below. **Please tick one or more impact box below for each Equality Group and explain your rationale**. Please note it is possible for the potential impact to be both positive and negative within the same equality group and this should be recorded. Remember to consider the impact on e.g. staff, public, patients, carers etc. in these equality groups.

Equality Group	Potential positive impact	Potential neutral impact	Potential negative impact	Please explain your reasons for any potential positive, neutral or negative impact identified
Age				
Disability				
Gender Reassignment				
Marriage & Civil Partnerships				
Pregnancy & Maternity				
Race including Traveling Communities				
Religion & Belief				

Equality Group	Potential positive impact	Potential neutral impact	Potential negative impact	Please explain your reasons for any potential positive, neutral or negative impact identified
Sex				
Sexual Orientation				
Other Vulnerable and Disadvantaged Groups (e.g. carers; care leavers; homeless; Social/Economic deprivation, travelling communities etc.)				
Health Inequalities (any preventable, unfair & unjust differences in health status between groups, populations or individuals that arise from the unequal distribution of social, environmental & economic conditions within societies)				

Section 4

What actions will you take to mitigate any potential negative impacts?	Risk identified	Actions required to reduce / eliminate negative impact	Who will lead on the action?	Timeframe
		.		

How will you monitor these actions?	
When will you review this EIA? (e.g in a service redesign, this EIA should be revisited regularly throughout the design & implementation)	

Section 5 - Please read and agree to the following Equality Statement

1. Equality Statement

1.1. All public bodies have a statutory duty under the Equality Act 2010 to set out arrangements to assess and consult on how their policies and functions impact on the 9 protected characteristics: Age; Disability; Gender Reassignment; Marriage & Civil Partnership; Pregnancy & Maternity; Race; Religion & Belief; Sex; Sexual Orientation

1.2. Our Organisations will challenge discrimination, promote equality, respect human rights, and aims to design and implement services, policies and measures that meet the diverse needs of our service, and population, ensuring that none are placed at a disadvantage over others.

1.3. All staff are expected to deliver services and provide services and care in a manner which respects the individuality of service users, patients, carer's etc, and as such treat them and members of the workforce respectfully, paying due regard to the 9 protected characteristics.

Signature of person completing EIA	
Date signed	
Comments:	
Signature of person the Leader Person for this activity	
Date signed	
Comments:	

NHS Worcestershire Acute Hospitals NHS Trust · NHS Herefordshire Clinical Commissioning Group · NHS Redditch and Bromsgrove Clinical Commissioning Group · NHS South Worcestershire Clinical Commissioning Group · NHS Wyre Forest Clinical Commissioning Group · NHS Wye Valley NHS Trust

NHS Worcestershire Health and Care NHS Trust · 2gether NHS Foundation Trust · NHS · Taurus Healthcare · worcestershire county council · Herefordshire Council

Supporting Document 2 – Financial Impact AssessmenT

To be completed by the key document author and attached to key document when submitted to the appropriate committee for consideration and approval.

	Title of document:	Yes/No
1.	Does the implementation of this document require any additional Capital resources	
2.	Does the implementation of this document require additional revenue	
3.	Does the implementation of this document require additional manpower	
4.	Does the implementation of this document release any manpower costs through a change in practice	
5.	Are there additional staff training costs associated with implementing this document which cannot be delivered through current training programmes or allocated training times for staff	
	Other comments:	

If the response to any of the above is yes, please complete a business case and which is signed by your Finance Manager and Directorate Manager for consideration by the Accountable Director before progressing to the relevant committee for approval.