Guideline for the Management of adult patients with a suspected diagnosis of Thrombotic Thrombocytopenic Purpura (TTP)

University Hospitals of Leicester NHS
NHS Trust

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1. Introduction

Thrombotic thrombocytopenia purpura (TTP) is a rare haematological condition with a reported incidence of six cases per million per year in the UK (Scully et al 2012). TTP is a haematological emergency; prompt recognition and treatment is vital as the untreated mortality is 90% but can be reduced with the prompt delivery of plasma exchange (PEX).

UHL is commissioned by NHS England in conjunction with Nottingham University Hospitals to provide the specialist TTP service for the East Midlands region.

2. Scope

This guideline applies to all staff who may be involved in the acute and ongoing management of patients with suspected TTP. This will include those staff in ED, Adult critical care and haematology.

3. Recommendations, Standards and Procedural Statements

TTP is due to a deficiency of von Willebrand factor (vWF) cleaving protein ADAMTS13. The normal function of ADAMTS13 is to cleave ultra large von Willebrand factor (ULVWF) strands into smaller multimeric forms. In the absence of ADAMTS13, circulating ULVWF released from endothelium are not cleaved appropriately and cause spontaneous platelet aggregates in conditions of high shear, such as in the microvasculature of the brain, heart and kidneys. Platelet consumption results in thrombocytopenia.

Subtypes of TTP

- Congenital TTP is due to a rare inherited deficiency of ADAMTS13. It is phenotypically variable and can present at any age with more severe types typically present in childhood. Presentation can occur in adulthood; in women, pregnancy is a common precipitant. The diagnosis of congenital TTP is made by detecting ADAMTS13 activity <5% in the absence of detectable ADAMTS13 antibodies. The diagnosis can be confirmed by mutational analysis of the ADAMTS13 gene.

- Acquired immune TTP is due to the reduction of ADAMTS13 caused by autoantibodies directed against the protein.

Clinical Presentation and Diagnosis

TTP remains a clinical diagnosis. It was originally described as a pentad of clinical signs including:

- Thrombocytopenia
- Microangiopathic Haemolytic Anaemia (MAHA)
- Fluctuating neurological signs
- Fever
- Renal impairment

However TTP can present without the full pentad therefore the revised diagnostic criteria state that TTP must be considered in the presence of thrombocytopenia and MAHA alone (Scully et al 2023). Presenting clinical features and signs are summarized below in table 1.

Thrombocytopenia	Epistaxis, bruising, petechiae, gum bleeding, haematuria, menorrhagia, GI bleeding, retinal haemorrhage, haemoptysis
Neurological Present in 70-80%	Often flitting and variable; confusion, headache, paresis, transient sensorimotor deficits, visual disturbance, aphasia, dysarthria, seizures, encephalopathy, coma
Fever >37.5º	
Non specific symptoms	Pallor, fatigue, arthralgia, myalgia
Jaundice	Resulting from MAHA
Renal impairment	Proteinuria, microhaematuria Acute renal failure requiring dialysis is rare in TTP
Cardiac	Chest pain, heart failure, hypotension, arrhythmias Ischaemic change on ECG is uncommon and associated with poor outcome
GI tract	Gastrointestinal ischaemia, abdominal pain

Table 1: Presenting clinical features

Admission

The diagnosis of TTP should be treated as a medical emergency (see appendix 1)

If a diagnosis of TTP is suspected, the haematology specialist trainee (ST) on call should be contacted immediately and the patient reviewed urgently. The haematology ST should inform the haematology consultant on call (as per medirota) to initiate the admission pathway. This will include discussion with the on call team for Adult critical care at LRI.

Patients who have a suspected diagnosis of TTP made outside of the Trust should be referred directly by consultant to consultant discussion to the non-malignant haematology consultant on call to accept the patient for transfer.

Transfer should, in the first instance, be arranged using the ACCOTS service. The accepting consultant will make the referral to the ACCOTS team using the agreed process (see appendix 1).

All patients with suspected TTP should be admitted to Adult ICU at LRI. If there are any delays to admission or ICU admission is felt to be inappropriate then this must be a consultant to consultant discussion. If anticipated delays, vascular access should be facilitated in the interim after discussion with AICU on call.

Vascular access to facilitate apheresis will be required. This will be a vascath in the acute setting. Platelet transfusion is contraindicated in TTP (unless life threatening haemorrhage occurs) and should not be administered to facilitate line insertion.

Initial assessment and investigations

Baseline blood tests should be sent as shown in table 2 as well as further tests to investigate any potential underlying cause as shown in table 3. The haematology lab **must** be informed of the patient details and a blood film should be requested for urgent review. Typically in TTP, fragments (schistocytes) will be present on the blood film. However, note that schistocytes may not always be seen in the first 24-48 hours following clinical presentation. Sequential blood film examination should be requested if clinical suspicion is high.

Laboratory	Test	Bottle
Haematology	FBC & Blood film Reticulocyte count Coagulation screen & Fibrinogen	1 x EDTA 1 x SST gel 1 x citrate
Special Haematology LRI **MUST be taken BEFORE transfusion or PEX. Please label "pre-transfusion/PEX"**	ADAMTS13 levels ADAMTS13 antibodies *Note: this is a send away test and requires specific request form kept in special haematology*	3 x citrate green top
Chemical pathology	UE/ LFT/Bone Profile/CRP/TFTLDH & Haptoglobin Troponin/Amylase Ferritin, B12 and folate Glucose	1 or 2 yellow top
Transfusion	Group and save Direct Antiglobulin Test (DAT)	1 x EDTA (Pink top)
Virology **MUST be taken BEFORE transfusion or PEX. Please label "pre-transfusion/PEX"**	Hepatitis A/B/C Hep B core antibody HIV	1 x clotted

Table 2: Baseline blood tests required for patients with suspected TTP

The FBC shows anaemia and thrombocytopenia with a median platelet count typically 10-30 x 10^9/l at presentation. Haemolytic markers reflect microangiopathic haemolytic anaemia (MAHA) with a raised LDH (often very high due to a combination of haemolysis and ischaemia), increased reticulocytes and reduced haptoglobin. The DAT is negative. The coagulation screen is usually normal and helps differentiate between TTP and DIC. Troponin levels are frequently raised, reflecting cardiac involvement.

A sample for ADAMTS13 **must** be taken **before** PEX therapy or transfusion is initiated. ADAMTS13 samples should be sent to special haematology laboratory after discussion with the BMS on call. Other baseline investigations required include:

- Urinalysis (urine dip) to investigate for proteinuria
- Blood cultures if febrile
- Pregnancy test in all women of childbearing age
- ECG (ECHO if ECG is abnormal)
- CT/MRI brain if neurological signs are present; should not interrupt initiating PEX

A detailed clinical history for possible precipitants should be taken including:

- Recent infections
- Medication
- Family history of TTP or venous thrombosis
- Risk factors for HIV
- Associated illnesses such as SLE/autoimmune conditions
- Signs or symptoms of malignancy

Differential Diagnosis of TTP includes:

Autoimmune haemolysis	Malignant Hypertension	Pancreatitis
Disseminated Intravascular coagulation	Infections, typically viral (CMV, adenovirus, HSV) or severe bacterial	Malignancy
Pregnancy associated (including HELLP, Eclampsia, HUS)	Autoimmune disease/vasculitis, including catastrophic antiphospholipid syndrome	Scleroderma
Drugs, such as calcineurin inhibitors	Haemolytic uraemic syndrome	Severe aortic valve stenosis

Further consideration should be given to further imaging if an underlying malignancy is suspected. Other follow up investigations to investigate a potential underlying cause may include the following:

Laboratory	Test	Bottle
Haematology	Lupus anticoagulant	1 x citrate
Immunology	B_2GP_1 antibody Anticardiolipin antibody Rheumatoid factor ANA	1 x clotted
Microbiology	Blood cultures MSU Stool sample (If recent diarrhoea)	Culture bottles
Radiology (if indicated)	CT CAP	To look for underlying malignancy

Management

1. *Therapeutic plasma exchange (PEX)*

Daily plasma exchange is the mainstay of treatment for TTP. It removes the autoantibody and replaces ADAMTS13. PEX should be started within 4 hours of admission and within of 8 hours of initial diagnosis.

Delays in treatment have been shown to increase treatment failure and is associated with worse prognosis.

The UK Department of Health recommends the use of solvent/detergent-treated (S/D) plasma in TTP patients – this is OctaplasLG® at UHL. Once a decision to commence PEX is made, the haematology ST must contact the blood transfusion laboratory to make arrangements of OctaplasLG® supply. Blood bank may initiate universal OctaplasLG® thawing on confirmation that referral has been accepted to avoid unnecessary delays. Blood group specific treatment will be then made available when a valid Group and Save sample is received.

If there is a delay in commencing PEX, plasma infusion of 15ml/kg OctaplasLG® should be administered. Plasma infusion is inferior to PEX so every effort should be made to commence PEX as soon as possible.

Consent should ideally be obtained as per trust policy. If the presence of neurological symptoms means that the patient is lacking the capacity to give informed consent or withhold consent for treatment, the patient may be treated if the treatment is in their best interest. In such cases, consent form 4 should be completed. No one can give consent on behalf of an adult lacking competency but it is good practice to involve the patients' next of kin in discussions. With clinical improvement, if capacity is resumed, formal consent should be documented.

In cases of severe disease (haemodynamically or neurologically unstable or new symptoms despite PEX) or sudden deterioration, consideration should be given to twice daily exchange. The optimum duration of PEX is unknown but consensus recommends that daily PEX should continue for a minimum of 2 days after complete remission, defined as a normal platelet count >150 x109/l. Tapering (reducing frequency and/or volume of PEX) has not been shown to reduce relapse rates and therefore is not recommended. PEX should be started daily with 1.5 the predicted plasma volume of the patient (PV) using OctaplasLG®. The patient should be reviewed daily and the volume of exchange decided by the attending consultant.he volume of exchange can be reduced to 1·0 PV when the clinical condition and laboratory test results are stabilizing.

Appendix 2 outlines roles and responsibilities for the ongoing care of those involved in managing acute TTP patients.

2. *Steroid therapy*

All patients should receive adjuvant corticosteroid therapy. Unless contraindicated, this should initially be pulsed methylprednisolone 1g IV daily for the first 3 days. All doses should be given immediately after PEX. A longer duration of steroids may be needed and this can usually be given orally but this will be decided following discussion with the consultant haematologist.

3. *Transfusion*

Platelet Transfusions are contraindicated in TTP - unless the patient has life-threatening haemorrhage. Platelet transfusion must not be given without prior discussion with a consultant haematologist.

Red cell transfusion should be administered according to clinical need. Patients with microangiopathy can decrease their Hb levels rapidly due to haemolysis which may occur suddenly. PEX can also reduce Hb levels. It is important that the transfusion laboratory have appropriate cross match samples to provide red cell support should this be required urgently.

4. *Caplacizumab*

Caplacizumab is a humanized, bivalent, immunoglobulin fragment which targets the A1 domain of von Willebrand factor, preventing interaction with the platelet glycoprotein Ib-IX-V receptor 12. It has been shown to improve time to platelet normalisation, significantly reduce exacerbations of TTP, more rapidly improve end organ biomarkers and reduce time in ICU and overall hospital stay.

Caplacizumab is approved by NICE for use in patients with:

- Acute acquired, immune TTP (with confirmed ADAMTS13 deficiency)
- Age more than 12 years
- Weight more than 40kg.

Caplacizumab treatment should only be initiated by a non-malignant haematology consultant

The differential diagnosis of TMA is wide. The use of caplacizumab for TMA other than TTP may be associated with organ related bleeding, particularly if there is severe thrombocytopenia and use is not recommended. Consideration should be given to whether the TTP is congenital because Caplacizumab should not be given in cases of congenital TTP.

Aspirin, other antiplatelet drugs and LMWH should not routinely be given during caplacizumab treatment

Dosing regimen:

An initial intravenous bolus of Caplacizumab 10mg should be given before plasma exchange

A further 10mg Caplacizumab subcutaneously should be given after plasma exchange.

Caplacizumab 10mg subcutaneously should be continued once daily, given after plasma

exchange for the duration of plasma exchange and at least 30 days afterward.

Caplacizumab may require continuation for longer for patients with ongoing low ADAMTS 13 levels (defined as <20iu/dL)

The exact duration of treatment will be determined by the non-malignant haematology consultant, once improvement in ADAMTS13 activity has been demonstrated

Patients do not require written consent for caplacizmab but a blueteq form should be completed by the registrar or consultant involved in their care.

Bleeding whilst receiving caplacizumab:

Caplacizumab prevents binding between VWF and platelets, thereby impairing primary haemostasis. Most bleeding in the clinical trials was mild, but in the event of any bleeding in patients receiving Caplacizumab, the drug must be withheld and the patient discussed immediately with a Haemostasis Consultant. Baseline blood samples should be taken for FBC/G&S. Consider sending VWF activity (Ricof) and Factor VIII levels, in discussion with the haematology consultant

5. *Rituximab*

Rituximab (Anti CD-20 monoclonal antibody) has been shown to be safe and effective in immune TTP with reduced time to remission in relapsed/refractory TTP as well as reducing the risk of relapse. A decision to give Rituximab should only be made in discussion with a Consultant Haematologist. In an acute iTTP admission, Rituximab therapy should be initiated within 3 days.

The dose of rituximab is 375mg/m2 IV given once every 3-4 days for a total of 4 doses. PEX

should be withheld for at least 4 hours after completion of rituximab. All patients should receive pre-medication with Piriton 10mg IV and paracetamol. Consent for treatment should be taken if the patient has capacity.

Exclusion criteria for Rituximab

- Women who are known to be pregnant or breast feeding
- Both male and female patients receiving Rituximab should ensure adequate contraception for 12 months following treatment.
- Patients who are HIV positive. (This group of patients may not benefit from Rituximab. HIV positive status is also a relative contraindication for Rituximab).
- Patients with haemolytic- uraemic syndrome which is not associated with reduced ADAMTS13 levels.
- Patients in whom TTP is secondary to transplantation.
- Some patients with drug-associated TTP (individualised patient discussion will be required)
- Active malignancy
- Patients with evidence of prior Hep B infection should be offered prophylaxis

6. Supportive measures

Commence Folic acid 5mg OD in all patients and continue this on discharge

All patients should receive a proton pump inhibitor for the duration that they remain on corticosteroids.

Fever is one of the defining features of TTP - the patient should be investigated for underlying infection; occult infection may prevent response to plasma exchange or precipitate relapse. Antibiotics should be prescribed if there is suspicion of infection or if the patient is hypotensive.

Hepatitis B vaccination should be offered to all patients once platelet count >50 x109/l

Thromboembolism is a recognized complication during rapid platelet recovery; all patients should wear graduated compression stockings from admission to discharge.

If the patient has NOT received caplacizumab for any reason:

- Aspirin 75mg OD should be commenced when platelet count >50 x109/l
- Low molecular weight heparin prophylaxis should be commenced when platelet count >50 x109/l
- For patients who have received caplacizumab, Aspirin 75mg OD can be started once caplacizumab treatment has been stopped.

All patients should be referred to the TTP nurse specialist at the earliest opportunity, who will provide ongoing advice and support.

<u>Monitoring</u>

Blood tests should be monitored daily. If the patient is persistently febrile and is responding to PEX (i.e., increase in platelet count, decrease in LDH), venous catheter related infection should be considered and intravenous antibiotics administered as per the advice of the microbiologists.

Response to PEX is judged by the progressive increase in platelet count, improvement in LDH and clinical parameters. An increase in platelet count is anticipated following the 2nd or 3rd daily treatment. LDH levels decrease following PEX but its return to normal is less predictable.

Anaemia develops and also recovers more slowly than thrombocytopenia.

Neurological recovery may be the first sign of response and complete recovery from critical neurological abnormalities such as coma and hemiparesis can occur. Renal failure is the last abnormality to recover and recovery of renal function is often uncertain. It should be borne in mind that the clinical course is often variable with some patients recovering quickly and others following a protracted course.

Management of subgroups of TTP

1. Congenital TTP

Plasma derived or recombinant ADAMTS13 concentrates are not yet available. Current treatment consists of use of Octaplas infusions, or a virally inactivated intermediate purity factor VIII concentrate containing ADAMTS13 such as 8Y or virally inactivated FFP such as Octaplas. Frequency of treatment is variable; some patients require regular prophylactic therapy to maintain normal platelet counts whereas more mildly affected phenotypes may only require occasional treatment.

2. Pregnancy associated TTP

Differentiating between the thrombotic microangiopathies (TMA) during pregnancy and in the postpartum period can be difficult. There is considerable overlap between the features of pre-eclampsia, HELLP (Haemolysis, elevated liver enzymes, low platelets), acute fatty liver of pregnancy (AFLP) and disseminated intravascular coagulation (DIC). However in any pregnant/postpartum women with a TMA and uncertainty of diagnosis, TTP and PEX should be considered.

Pregnancy is an important precipitant of acute TTP, accounting for approximately 5–10% of all cases of TTP in women. It is also increasingly recognized that late-onset congenital TTP may be unmasked by pregnancy.

Pre-treatment ADAMTS13 assays will distinguish congenital and acquired TTP from other pregnancy associated TMAs.

- In congenital TTP ADAMTS13 activity is <5% with no evidence of antibody
- Women with acquired TTP have evidence of anti-ADAMTS13 antibodies
- In pre-eclampsia or HELLP syndrome, ADAMTS13 activity is reduced but antibodies to ADAMTS13 are not found

If TTP is suspected during pregnancy, the patient should be managed as per the standard TTP protocol with direct admission to AICU. The Obstetric Haematology team should be informed at the earliest opportunity. The mainstay of treatment of acute TTP in pregnancy is PEX (or plasma infusion if there is a delay in accessing PEX).

The patient should be managed at LRI and management should be jointly between the obstetric and haematology teams. Decisions regarding ongoing management of the pregnancy will depend on the clinical scenario and gestation.

Steroids can be used until the results of ADAMTS13 antibodies are available. Rituximab has been used during pregnancy for a variety of autoimmune conditions but is reserved for severe or refractory immune mediated disease or when disease is life threatening and only after discussion with a consultant haematologist.

Caplacizumab is not licensed for use in pregnancy and there is no clinical experience in this

setting. Caplacizumab should therefore not be used in pregnant patients.

When the platelet count is >50 x 109/l aspirin 75mg and LMWH prophylactic dose (weight based as per UHL policy) should be started.

Subsequent treatment will depend on the gestation at presentation but PEX is likely to be needed regularly until delivery and in the postpartum period. It should be noted that delivery does not guarantee remission of TTP. For patients with immune TTP, frequency of PEX will guided by platelet counts and ADAMTS13 antibody levels. These patients should be followed up on discharge initially in the obstetric haematology clinic.

Women who have had TTP are at risk of relapse during any subsequent pregnancy. They also have a higher risk for pregnancy-related complications. These women should be referred to the combined obstetric haematology clinic for pre-pregnancy counselling. Women of child-bearing age should use adequate contraception other than the oestrogen containing oral contraceptive pill for the first 12 months after receiving Rituximab.

3. Refractory TTP

Refractory disease is defined as progression of clinical symptoms or persistent thrombocytopenia despite PEX. Management of these patients should be individualized and always in discussion with a consultant haematologist.

Follow up

Relapse of TTP occurs in 20-50% of cases; this is defined as an episode of acute TTP occurring more than 30 days after remission. All patients therefore require close follow up in the haematology clinic and an appointment in the TTP clinic should be made before the patient leaves the hospital. Prior to discharge all patients should be counselled regarding the risk and the symptoms and signs of relapse. Patients should be provided with the emergency haematology telephone number and counselled to contact the department if they have any signs or symptoms of relapse. An urgent FBC is absolutely necessary when symptoms of any illness occur.

The risk of relapse of TTP is associated with low ADAMTS13 activity and/or the presence of antibody. ADAMTS13 antigen and antibody should therefore be measured at least 3 monthly during the first year of follow up (or more frequently if there is a reduction in antigen levels). Subsequent ADAMTS13 testing should be decided on an individual patient basis.

In patients who have had previous TTP episodes and where a reduction of ADAMTS 13 activity from detectable levels to <5% is demonstrated, elective rituximab therapy has been successfully used, with normalization of ADAMTS 13 activity. Therefore patients with a documented reduction of ADAMTS 13 activity should be considered for elective therapy with rituximab.

Where Rituximab is ineffective or contraindicated, Obinatuzumab should be given in line with NHSE commissioning criteria (NHSE, 2023).

Aspirin (if used) and folic acid should be continued on discharge. These will be reviewed in the haematology clinic during follow up.

4. Education and Training

Training for Emergency Department, Adult ICU and Haematology staff of the introduction of this guideline will be required. This will be arranged in line with the TTP service specification and will be the responsibility of the TTP Clinical team.

5. Monitoring and Audit Criteria

Key Performance Indicator	Method of Assessment	Frequency	Lead
As per TTP service Specification	SSQD data submission to NHS England	Annual	TTP Clinical Team

6. Supporting Documents and Key References

Scully, M., Cohen, H., Cavenagh, J., Benjamin, S., Starke, R., Killick, S., Mackie, I. & Machin, S.J. (2007) Remission in acute refractory and relapsing thrombotic thrombocytopenic purpura following rituximab is associated with a reduction in IgG antibodies to ADAMTS-13.

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Scully, M. Use of Caplacizumab in the UK; consensus statement on behalf of the UK TTP Forum (2019 (2))

Clinical Commissioning Policy: Obinutuzumab elective therapy to prevent immune Thrombotic Thrombocytopenic Purpura (TTP) relapse in patients who are refractory or intolerant to rituximab (adults) [2255] Publication date: 6 November 2023 version number: V1.0

7. Key Words

TTP, Thrombotic Thrombocytopenic Purpura, Apheresis, Caplacizumab

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This table is used to track the development and approval and dissemination of the document and any changes made on revised / reviewed versions

DEVELOPMENT AND APPROVAL RECORD FOR THIS DOCUMENT			
Author / Lead Officer:	Dr Amy Webster	**Job Title:**	Consultant Haematologist
Reviewed by:	Haemostasis team (Dr S Salta, Dr B Myers); AICU team (Dr G Williams, Dr A Keeshan); Obstetric team (Dr N Archer, Dr H Maybury)		

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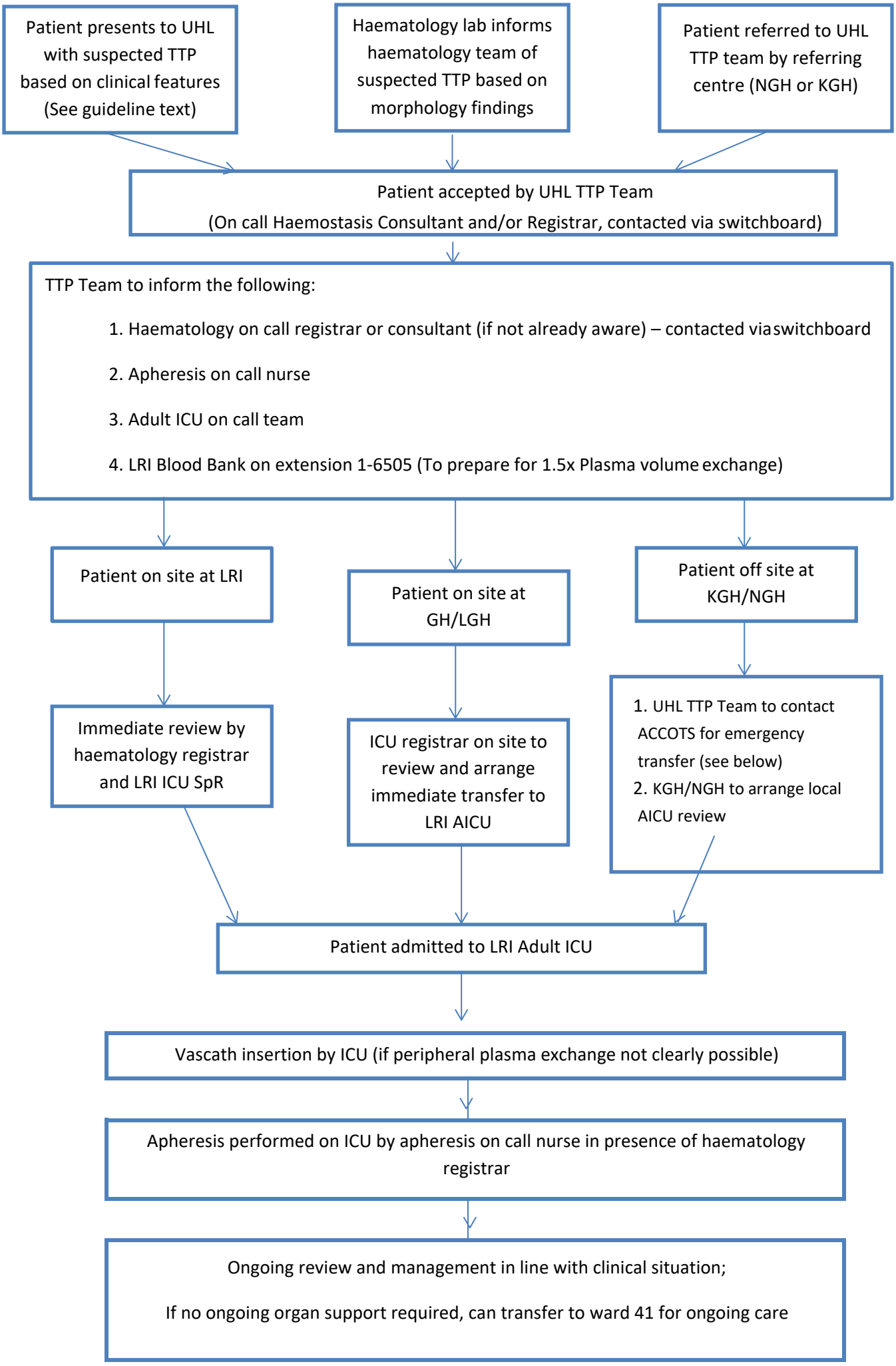
REVIEW RECORD

Date	Issue Number	Reviewed By	Description Of Changes (If Any)
31.1.24	V1	Amy Webster	Update to reflect low molecular weight change in UHL Updated to reflect BSH guidance published 2023 (change to rituximab/obinatuzumab guidance) Updated to reflect agreed process for Octaplas thawing (agreed with Dr Qureshi, Head of Service Blood Transfusion 1.3.24) Updated appendix to reflect ongoing monitoring requirements and role of ACCOTS in facilitating intra-hospital transfer (AICU aware and approved change 2.2.2024) Appendix with SOP for inpatient management added

DISTRIBUTION RECORD:

Date	Name	Dept	Received

Appendix 1


Patient presents to UHL with suspected TTP based on clinical features (See guideline text)
Haematology lab informs haematology team of suspected TTP based on morphology findings
Patient referred to UHL TTP team by referring centre (NGH or KGH)
Patient accepted by UHL TTP Team
(On call Haemostasis Consultant and/or Registrar, contacted via switchboard)
TTP Team to inform the following:
1. Haematology on call registrar or consultant (if not already aware) – contacted via switchboard
2. Apheresis on call nurse
3. Adult ICU on call team
4. LRI Blood Bank on extension 1-6505 (To prepare for 1.5x Plasma volume exchange)
Patient on site at LRI
Patient on site at GH/LGH
Patient off site at KGH/NGH
Immediate review by haematology registrar and LRI ICU SpR
ICU registrar on site to review and arrange immediate transfer to LRI AICU
1. UHL TTP Team to contact ACCOTS for emergency transfer (see below)
2. KGH/NGH to arrange local AICU review
Patient admitted to LRI Adult ICU
Vascath insertion by ICU (if peripheral plasma exchange not clearly possible)
Apheresis performed on ICU by apheresis on call nurse in presence of haematology registrar
Ongoing review and management in line with clinical situation;
If no ongoing organ support required, can transfer to ward 41 for ongoing care

Arranging ACCOTS Transfer

TTP Clinician in accepting hospital should call ACCOTS call handler on **0300 200 1100** clearly stating that this is a time critical transfer due to potential TTP diagnosis.

The following information should be provided:

Appendix 1 – Information required during the call to *ACCOTS*

Type of call	Escalation to specialist care *(please tell us if you believe the referral to be **time critical**)* Repatriation Capacity transfer
You	Referring clinician's name Location (the hospital you are calling from and the exact location of the patient within it – please be prepared for *ACCOTS* to ask for directions if the location is unusual) Contact number (ideally telephone nearest patient or mobile phone number of referring clinician) Your grade and specialty
Patient demographics	Name Gender DOB NHS no. Weight Named consultant with overall responsibility for the patient's care
Receiving hospital	Receiving hospital and destination within it if known (eg. ED, theatres, ICU, etc) Accepting specialty Accepting consultant name Contact number for receiving destination
Patient history and current status	History Key observations including HR, BP, RR, SpO_2, temperature, GCS Key interventions Oxygen requirements and ventilator settings (if applicable) Drugs and infusions administered
For transfers *ACCOTS* cannot meet	Escorting doctor – grade and specialty Escorting practitioner – profession (nurse, etc), grade,specialty Are you using your critical care transfer trolley?

Inpatient process for managing patient with confirmed TTP:

Ongoing haematology management

This document outlines the roles and responsibilities for those working within haematology and the wider TTP service once a case of TTP has been confirmed. Suspected TTP should be managed in line with the UHL TTP guideline. PLEX = plasma exchange

Staff member	Expectations	Responsibilities
TTP Consultant	• Provide clinical leadership and communicate with wider team members, including apheresis staff	• Consultant review within 14 hours of admission (as per service specification) • Consultant in charge of clinical care until discharge from hospital (or care taken over by nominated colleague) • Clinical decisions regarding on-going management (to include decisions re: PLEX and other therapies) • Arrange Network TTP MDT at earliest opportunity • Facilitate follow up plan on discharge
Consultant Haematologist of the Week (CHOW)	• Inpatient oversight whilst patient under haematology CHOW supervision	• As per responsibilities outlined in CHOW role
On call haematology registrar	• If alerted regarding ? TTP case, to communicate with relevant team members at earliest opportunity. This must include the TTP consultant on call.	• Acute oversight and management out of hours, to include planning for first PLEX procedure • To stay with Apheresis team for initial PLEX procedure
H&T registrar	• Provide on-going management during inpatient stay • Escalate to TTP Consultant if any absence/planned leave which may impact on-going care.	• Communicate with inpatient team regarding on-going management plan. • Provide leadership to apheresis team to facilitate on-going procedures, including blood product planning as appropriate
Apheresis/TTP Clinical Nurse Specialist	• Provide CNS support to new TTP cases, including pastoral support and provision of patient information • Provide apheresis procedures as required to support wider apheresis staff (within working hours)	• Provide support to apheresis nursing team • Plan apheresis procedures in liaison with TTP consultant
Apheresis Nursing Team	• Plan and cover on-going procedures alongside Apheresis	• Communicate to wider team at earliest opportunity if unable

	lead nurse	to cover Apheresis shift
Haematology junior doctors	• Provide emergency care in event of acute deterioration with escalation to relevant senior clinical team • Order and prescribe blood products for PLEX procedures as required	• Blood product requests and prescribing as required • Liaison with TTP Team (H&T Registrar/TTP CNS/TTP Consultant) as required
Haematology ward staff	• On-going care in line with UHL inpatient guidance once patient stepped down from ITU • Escalate to relevant medical team if concerns	• Line care • Blood product administration as required • On-going medication administration as required

<u>To enable efficient on-going management of TTP patients:</u>

1. Decisions regarding on-going PLEX procedures will be made using blood tests taken <u>immediately after</u> PLEX procedure – this will enable planning for the following day and appropriate blood products to be ordered in good time.
    a. Daily blood tests should include: FBC, LDH, Reticulocytes, LFTs, Bone Profile, Magnesium
    b. Once a decision to continue PLEX has been made, the patient can proceed to PLEX without routine medical review (unless specific concerns have been raised). Any clinical concerns out of hours should be handed over to TTP team at the earliest opportunity.
2. Once deemed competent under the Non-Medical Authorisation of Blood Components, the Apheresis/TTP CNS is able to request and authorise components required for plasma exchange procedures <u>once the first plasma exchange has been completed</u>. The volume required for on-going planned procedures must be clearly documented. Any relevant non-plasma products (such as red cells) must be requested and authorised by medical staff.