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Factors Influencing Time from Initial Presentation to Start of Plasma Exchange (PEX) in Patients with Acute Thrombotic Thrombocytopenic Purpura (TTP)

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Abstract Content: Acute TTP is a life-threatening medical emergency and plasma exchange is the only treatment shown to significantly impact acute mortality (Rock *et al*, N Engl J Med 1991). Diagnosis can be challenging and therein arrangements for PEX must be made, with most centres in the United Kingdom (UK) having to co-ordinate transfer to a tertiary site. To understand issues affecting practice the trainee research network HaemSTAR conducted a retrospective nationwide review of patients presenting to UK hospitals with TTP against British Society of Haematology clinical guidelines (Scully *et al*, B J Haem 2012). Analysis was conducted on the time from first full blood count to initiation of treatment and impact on patient outcomes.

Adults ≥18 years presenting to hospital between 1st June 2014 and 1st June 2019 with first episode acute TTP and ADAMTS13 level <10% were identified by local clinicians. Anonymized data of baseline characteristics and treatment times was submitted via an online secure server. Time to PEX was defined as time from receipt of the first full blood count sample in the laboratory to time of plasma release for PEX from blood bank. Where patients were transferred between sites data was linked retrospectively.

Data on 148 patients treated at 80 UK hospitals was used for analysis (Table 1). The overall median time to PEX from initial presentation was 15 hours (95% CI 11.3-18.7). Availability of on-site PEX was associated with earlier treatment initiation with median time to PEX for those treated on site 10 hrs (95% CI 7.7-12.3) vs. 21 hrs (95% CI 16.8-25.2) for patients transferred. A blood film comment of red cell fragments significantly impacted time to treatment: in 24 cases with no fragments documented median time to PEX was 110 hrs (95% CI 39-181) vs. 10 hrs (95% CI 8.5-11.5) in cases where fragments were reported.

On univariate and multivariate analysis age <60 years, haemoglobin (Hb) <100 g/L, presence of fragments, PEX available on-site and admissions occurring after May 2017 were significant predictors for PEX initiation within 8 hrs.

This is the first multi-centre record of time to treatment from initial presentation of acute TTP. Results comply with guidance for rapid initiation of PEX with 61% patients commencing within 24 hrs of presentation and, from June 2017, 34% of patients initiating PEX within 8 hrs. The recent increase in early PEX initiation correlates with initiatives to improve treatment pathway efficiency following diagnosis of TTP. Early use of steroids and rituximab correlated with earlier use of PEX indicating where timely diagnosis was made there was good compliance with guidelines. Inappropriate use of platelets appeared attributable to misdiagnosis.

Older patients, those with higher platelet counts and haemoglobin and absence of red cell fragments on film report were more likely to experience prolonged time to initiation of PEX. This does not appear related to PEX access, but most likely the difficulty of making TTP diagnosis in this cohort. That 22% of patients initiated PEX over 48 hrs from admission indicates the issue is relatively common and with several deaths occurring in this group we suggest initiatives to increase early diagnosis should be prioritised.

Abstract Table: Table 1: Numbers of patients meeting key performance indicators in the treatment of acute thrombotic thrombocytopenic purpura.

	No. of patients	(%)
Total included in analysis	148	
Received PEX (total)	142	*96*
Received PEX (at site of presentation)	67	*47*
Received PEX (after hospital transfer)	75	*53*
Received PEX within 8 hours of first full blood count	37	*25*
Received PEX within 24 hours of first full blood count	91	*61*
Died before receiving PEX	6	*4*
Received Steroids within 24 hours of first full blood count	96	*65*
Received Rituximab within 48 hours of first full blood count (of the 128 presenting with cardiac or central nervous system symptoms)	98	*77*
Received platelet transfusion in the absence of major bleeding	12	*8*
Died within 30 days of presentation	19	*13*

Disclosure of Interest: T. Bull: None Declared, R. McCulloch: None Declared, P. Nicolson: None Declared, R. Shaw: None Declared, Z. Sayar: None Declared, A. Langridge: None Declared, M. Pettit: None Declared, R. Perry: None Declared, D. Tucker: None Declared, M. Scully: None Declared, H. Investigators Conflict with: Sanofi and Octapharma provided separate grants to support the running of this project but had no input on project or abstract design.