

# Patients with acute Thrombotic Thrombocytopenic Purpura (TTP) should be managed in a Critical Care Setting – A Single TTP Referral Centre Experience

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## INTRODUCTION

TTP is a thrombotic microangiopathy caused by ADAMTS13 deficiency, leading to microvascular thrombosis and critical organ ischaemia. Untreated TTP has a mortality of up to 90%. Despite recent developments, it continues to be associated with a significant risk of mortality, predominantly in the first 24 hours of presentation<sup>1</sup>.

Rapid diagnosis and early intervention with plasma exchange are crucial to avoid multi-organ failure and rapid deterioration due to sudden life-threatening cardiac or neurological manifestations, including cardiac arrhythmia, ischaemia, stroke and seizure. Organ support is not uncommonly required, with ventilator assistance in 30-50% of patients and renal replacement therapy in 0-19%<sup>2</sup>.

There is a growing consensus that all patients with suspected TTP should be admitted initially to the intensive care unit (ICU) for plasma exchange and necessary organ support<sup>2</sup>. This allows for:

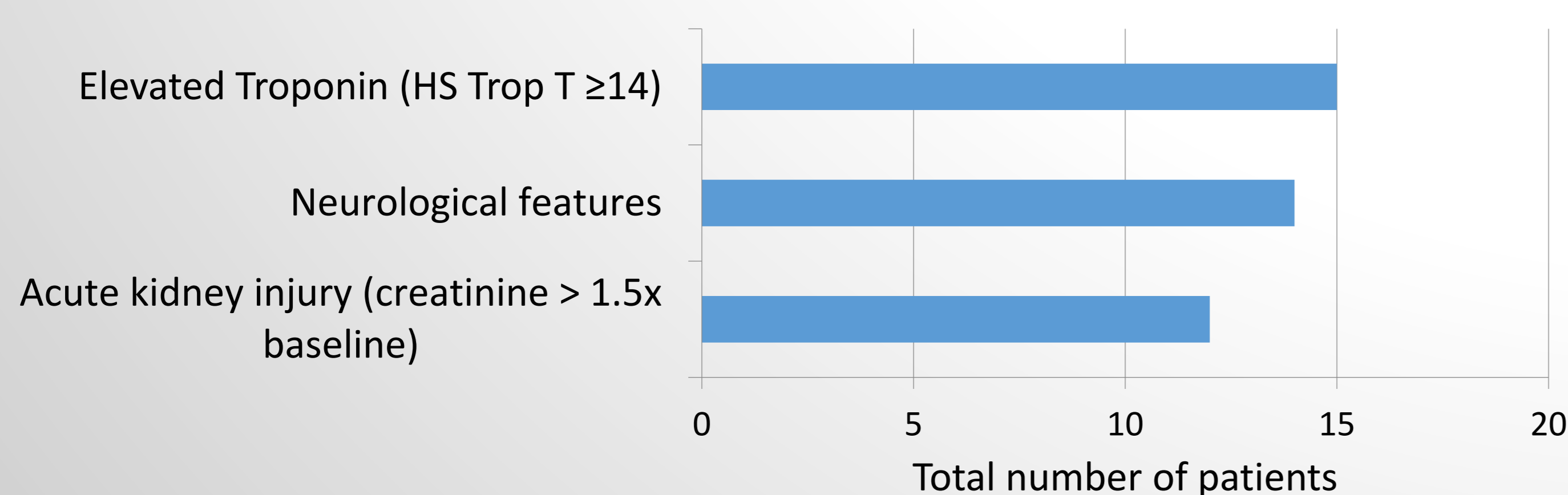
- Rapid and safe central line insertion in the setting of severe thrombocytopenia, and therefore initiation of treatment
- Close monitoring to facilitate rapid intervention if required
- Clinicians with expertise in managing rare life-threatening conditions

## MATERIALS & METHODS

A retrospective review of patients admitted with acute TTP to a regional specialist centre (June 2016-December 2019) was conducted. Twenty four patients were admitted over this 42 month period. All patients had an ADAMTS13 activity <10iu/dL at presentation. Case notes were reviewed to assess for evidence of organ dysfunction, requirement for critical care support and other parameters relating to hospital stay.

## RESULTS

### EVIDENCE OF END ORGAN DAMAGE AT PRESENTATION

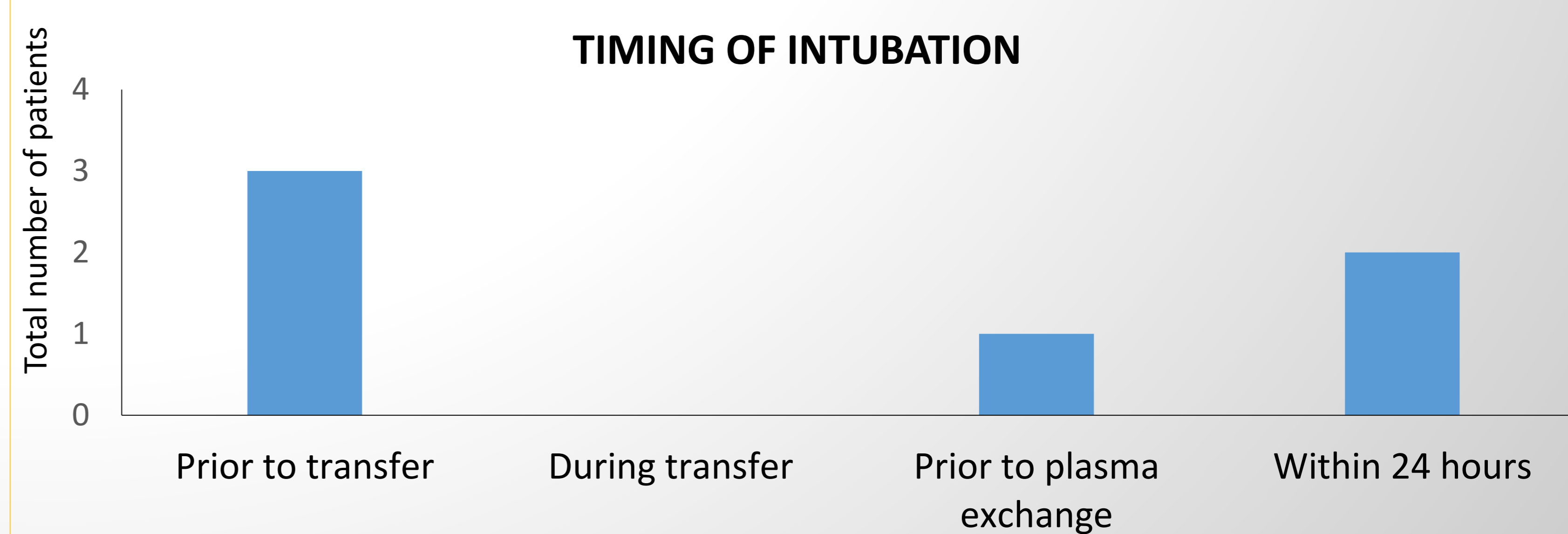


21/24 patients were admitted directly to ICU. 6/24 patients required intubation, with the indication in all cases being reduced conscious level/seizures. Of those patients requiring intubation, 3/6 were intubated prior to transfer to the regional centre and 3/6 within 24 hours of admission (mean time to intubation = 7.8 hours).

In 19/24 episodes, a central line was inserted for plasma exchange. The median platelet count at the time of line insertion was  $15 \times 10^9/L$  (range 8-59 $\times 10^9/L$ ); 1 report of slight oozing, with no other bleeding complications reported. The median duration of ICU stay was 6.5 days (range 2-25 days), being approximately ¼ of the total length of hospital stay. There was 1 patient death due to cardiac arrest.

### Patient Demographics and Outcomes TTP Cohort Admitted to ICU (N=24)

Mean age in years (range)	51 (19 – 77)
Female sex – number (%)	16 (67)
ADAMTS13 <10iu/dL – number (%)	24 (100)
Immune TTP – number (%)	23 (96)
Congenital TTP – number (%)	1 (4)
ICU admission at diagnosis – number (%)	21 (88)
Ambulance transfer with anaesthetist – number (%)	4 (17)
Neurological symptoms at presentation – number (%)	14 (58)
Elevated cardiac troponin at presentation – number (%)	15 (63)
Acute kidney injury at presentation – number (%)	12 (50)
Requirement for intubation during acute episode – number (%)	6 (25)
Neurological symptoms as indication for intubation – number (%)	6 (100)
Central line insertion for 1 <sup>st</sup> plasma exchange – number (%)	19 (79)
Median platelet count at time of line insertion $\times 10^9/L$ (range)	15 (8 – 59)
Renal replacement therapy required – number (%)	1 (4)
Median duration of ICU stay in days (range)	6.5 (2 – 25)
Median length of hospital stay in days (range)	26 (7 – 51)
TTP related death – number (%)	1 (4)



## CONCLUSIONS

- Patients with acute TTP patients are at high risk of sudden clinical deterioration. This data highlights at least 25% require intubation either prior to or shortly after acute transfer.
- Central venous line placement in ICU, despite profound thrombocytopenia, appeared to be safe.
- Despite the number requiring organ support at presentation, >95% patients were successfully discharged from hospital.
- Patients with TTP may benefit from direct admission to ICU for emergency treatment and critical care support; this approach is likely to improve patient outcomes.

## REFERENCES

1. Scully M, et al. Regional UK TTP Registry: correlation with laboratory ADAMTS 13 analysis and clinical features. *B J Haematol.* 2008; 142, 819–826.
2. Azoulay E, et al. Expert statement on the ICU management of patients with thrombotic thrombocytopenic purpura. *Intensive Care Med.* 2019; 45, 1518–1539.