Improving Timely Treatment of Patients with Suspected TTP - University of Alberta

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Background, Problem and Aim Statement:

Thrombotic thrombocytopenic purpura (TTP) is a life-threatening condition that must be treated as a medical | emergency to ensure that patients receive timely access to life saving plasma exchange. Plasma exchange, also referred to as plasmapheresis, has reduced mortality survival from as high as 90% to 10-20%. UK guidelines recommend initiating plasmapheresis in patients with suspected TTP within 4-8 hours of presentation. Timely definitive management of TTP is not being achieved in Northern Alberta. The current time from suspected diagnosis to plasmapheresis is 15.5 hours which may directly impact patient outcome. Our aim was to identify and implement salient interventions using cycle time analysis and the Shewhart Plan-Do-Study-Act iterative cycles to decrease the current cycle time within the TTP patient journey to achieve timely plasmapheresis treatment.

Process Assessment:

The QI method included value stream mapping, cycle time and root cause (Ishikawa) analysis to identify areas of improvement opportunity. A chart audit of baseline data from patients presenting with suspected TTP from 2016 showed that it took 9.3 hours (median) for a patient to receive plasmapheresis after arriving to the UAH emergency department (ED). Sources of delay included 3.3 hour delay for hemolysis lab workup to return to ordering physician, and 4.2 hour delay to book transportation after being diagnosed in an outpatient setting. 33% of patients presented to ED between 24:00 and 08:00 when PLEX is unavailable.

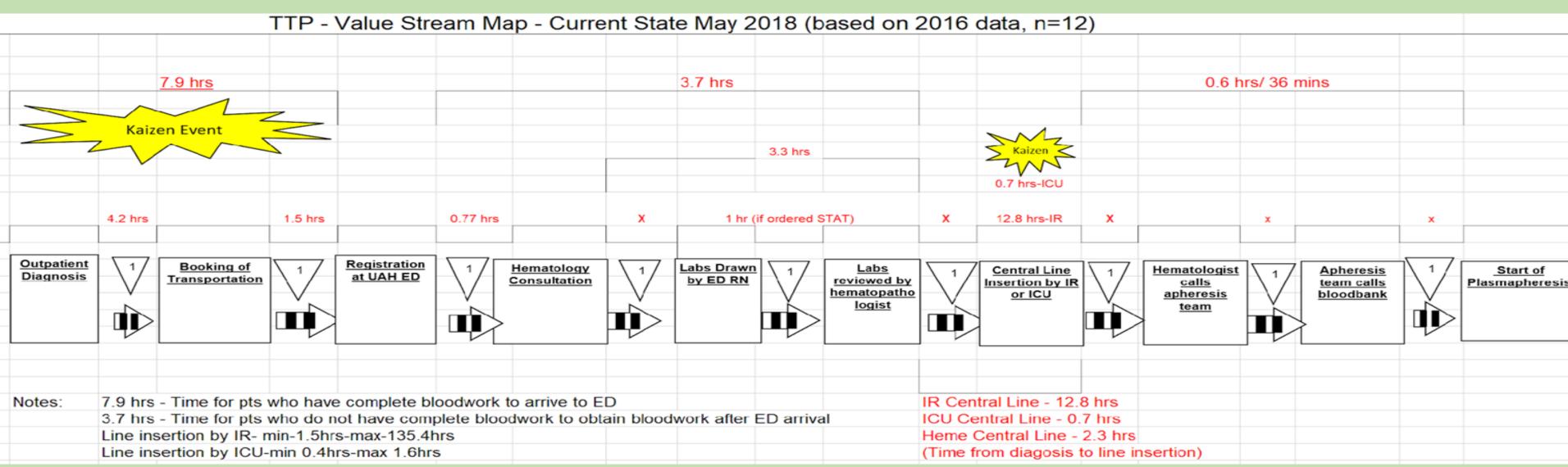
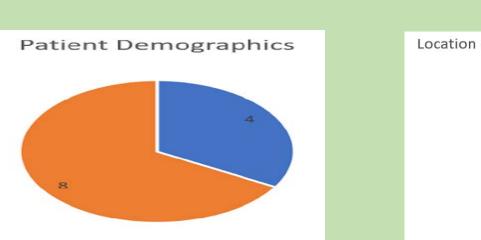


Figure 1. Value Stream Map of TTP patient pathway



Location of Patient Presentation with suspected

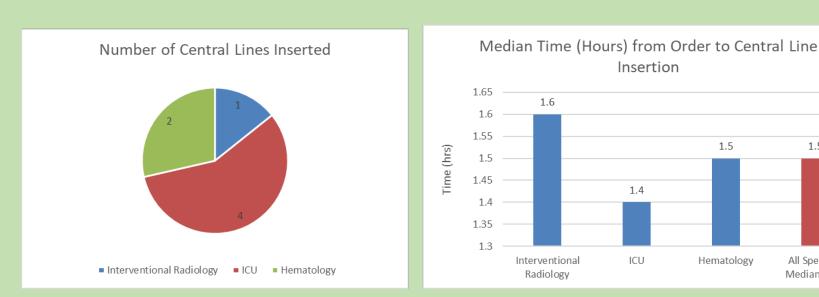


Figure 4 & 5. Central line distribution among medical specialties and insertion delay

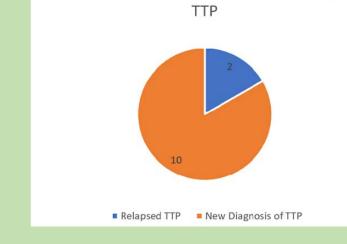
Death - other diagnosis Alive - Other Diagnosis

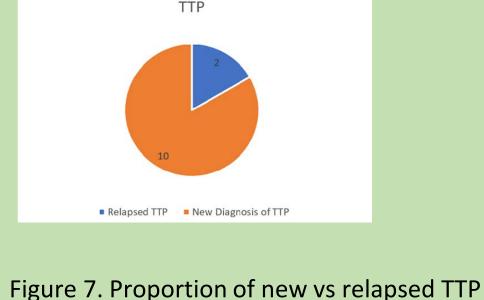
Figure 6. Clinical outcomes

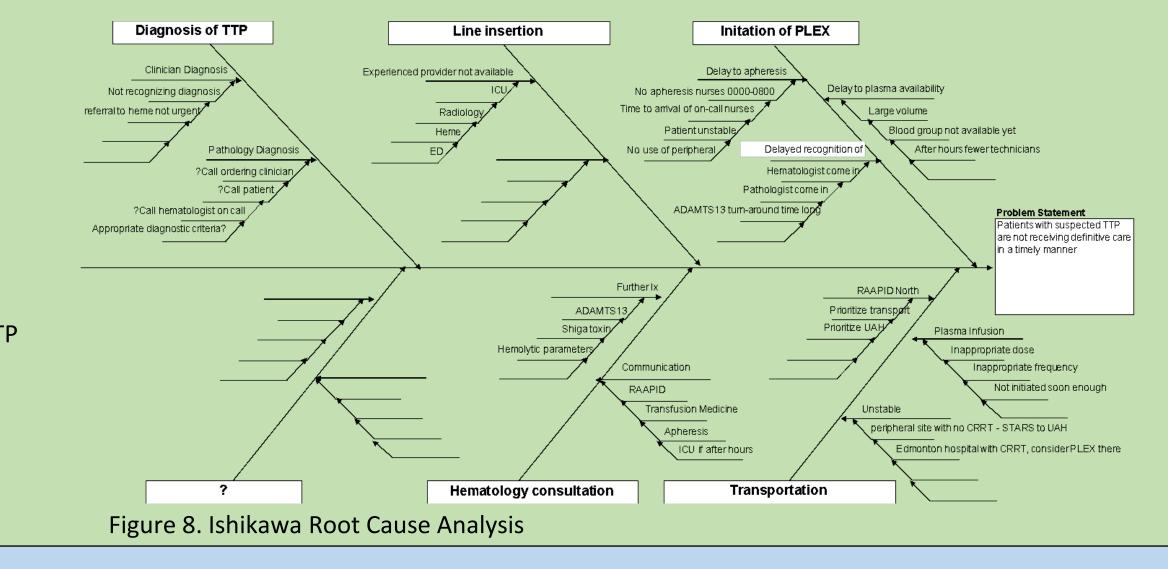
CHANGE

MANAGE

■ Rural Patients ■ Urban Patients







Collaborations & Communication Strategies:

Figure 2 & 3. Distribution of TTP patient location of residence and initial presentation

- A multidisciplinary meeting with RAAPID, hematopathology, transfusion medicine, and apheresis were held to co develop interventions
- Periodic meetings were held with frontline stakeholders from hematology, apheresis, and ICU.
- Collaboration with the head of the division of interventional radiology (IR) is ongoing to expedite the triaging process and central line insertion for suspected TTP patients
- Hematologists at UAH were also informed of quality improvement initiative through revised TTP management guidelines

Improvement Selection: December 2018 - December 2019

Figure 9. Sequence of TTP interventions to support timely TTP management

Gaps	Future Intervention	Who
Central line not placed promptly after arrival to UAH	ICU and interventional radiology physicians were informed of urgent need to insert central lines on patients with TTP and informed to triage TTP patients as an urgent priority	ICU and Interventional radiology physicians
PLEX not available via apheresis between 2400 – 0800 due to lack of nursing coverage	TTP patients will be prioritized by ICU for central line insertion if presenting between 21:00 – 08:00, and hematologist were informed to give an appropriate dose of plasma infusion if there was going to be an anticipated delay to receive plasmapheresis. • If patient is at the Royal Alexandra Hospital, then patient can receive urgent apheresis treatment at RAH and then be sent to UAH for further treatment. • Selected dialysis nurses were cross-trained to provide backup coverage for plasmapheresis after-hours	ICU, Dialysis RNs
Hemolysis lab workup not ordered as STAT, lab workup taking several hours to return	Job aide sheet to staff hematologists to ensure labs for query TTP are ordered STAT, appropriate hemolysis workup ordered for suspected TTP, and central line inserted urgently.	Hematologists
Delay in transportation of patient to UAH	Informed hematology staff to book transportation through RAAPID and to verbally request the patient to be transported as level red.	Hematologists, RAAPID

Reinforce Ownership, Measurement & Continuous Improvement:

To ensure that the reductions in cycle time are maintained, patient chart audits will be performed after each patient journey. Quarterly, the QI team will review each patient's chart findings to assess cycle time changes (impact of the interventions) and to identify areas of further opportunity over the upcoming year.

Furthermore, the interventions implemented in this QI project will be shared at UAH hematology divisional meetings to ensure that all hematology physicians are educated on the steps they must take to reduce delay in treatment of patients presenting with query TTP.

mbocytopenia and schistocytes	Received: 20/ / (yyyy/mm/dd): (24-hour clock)	
	Transmitted: 20/ / (yyyy/mm/dd) : (24-hour clock)	
	Abnormal Result Phoned? Time of Notification: (24-hour clock)	
e of peripheral blood film	Collected: 20/ / (yyyy/mm/dd): (24 hour clock)	
	Received: 20/ / (yyyy/mm/dd) : (24-hour clock)	
	Transmitted: 20/ / (yyyy/mm/dd): (24-hour clock)	
	Same day as above	
	Who was notified by <u>hematopatholoigst</u> (mentioned in blood film review comment)	
	(check all those apply) Hematologist Ordering physician Patient	
	Time of notification::	
	20/ / (yyyy/mm/dd)	
ed on time of 1) schistocytes on blood AND 2) thrombocytopenia AND 3)	: (24-hour clock)	
ratory evidence of hemolysis (any one etic count >2.5%, undetectable		
oglobin, indirect bilirbuin >34 umol/L)	_	
e transport was booked	20/ / (yyyy/mm/dd)	Figure 10 Excorpt of chart audit
	: (24-hour clock)	Figure 10. Excerpt of chart audit
	Transport triage level Red Yellow Green Unknown	
e of arrival to UAH ED (see ER triage	20/ / (yyyy/mm/dd) Same day as above	sheet. Process and outcome
t)	:(24-hour clock)	
	ER triage level Unknown	measures are captured after
e of hematology consultation	20/ (yyyy/mm/dd)	illeasures are captured after
	: (24-hour clock)	TTD 11 1 1 1
	If no time written on consult note, use the time of hematology admission orders (if	every TTP patient and reviewed
	admitted to hematology), or time hematology was called based on ER physician note	•
ma infusion?	No Yes, started in outside facility Yes, started at UAH	with the QI team to measure
	20/ (yyyy/mm/dd) Time given: : (24-hour clock) Dose of plasma infusion: units or mL	with the Qi team to measure
e of central line insertion	20/ (yyyy/mm/dd) Same day as above	intom/ontion impost
or central line moet tion	: (24-hour clock)	intervention impact.
	By whom? ☐ Radiology ☐ ICU ☐ Hematology staff/trainee	
	57 minum a nadiology at the minutiology statification	

serology, troponin, ECG. The hematologist should consider also testing b-HCG in females of reproductive age, complements, stool C&S, and Shiga toxin stool No need for ADAMTS13 inhibitor testing; order repeat ADAMTS13 after b. Specify how to collect/transport ADAMTS13 in remote sites (i.e. freeze plasma sample in sodium citrate tube STAT after collection) 2. If anticipated time from presentation to initiation of plasma exchange is longa. Request the consulting physician order a plasma Infusion 15 ml/kg IV bolus STAT, then continued infusion 100 mL/hour +/- diuretics and monitoring for volume overload b. Availability of plasma in rural hospitals may be found at AHS website http://www.albertahealthservices.ca/lab/Page3318.aspx; under Blood Inventory in Alberta Hospitals tab; exporting plasma to rural sites is often associated with delays, hence expediting patient transfer to UAH is the patients with suspected TTP should be arranged through RAAPID North, so they can ensure priority "red level" transportation. If the initial consultation did not come through RAAPID North, request the consulting physician call back through RAAPID North. a. Mon-Fri 0800-1700: call Dr. Qarni or Dr. Habib AND apheresis unit 780-

b. 1700-0000 or weekends: call apheresis nurse on-call through switch

exchange c. 0000-0800 Monday-Sunday: No apheresis nurse on-call. Consider critical

Figure 11. Excerpt of TTP treatment protocol sheet for hematologists which outline sequence of interventions which must be completed in the management of TTP.

Lessons learned:

- A limitation in this project is that TTP is a rare disease. PDSA cycles can only be implemented on a case by case basis as patients present over the course of a year. Impacting timely improvement analysis
- There is practice variability in how each specialty triages procedures such as line insertion for patients with TTP which then impact delays in patient treatment

Why this Quality Improvement matters

To Patients

Reduce mortality rates and receive life saving treatment faster for patients presenting with TTP

To Albertans

Optimizing resources already within the hospital to improve care for TTP patients – reducing the need for more costly interventions

To the healthcare system

Data on historic treatment of TTP allows us to make treatment protocol more formalized for healthcare practitioners, and reduces treatment related complications that extend patient stay







