|| Print ISSN: 2589-7837 || Online ISSN: 2581-3935 ||
International Journal of Medical Science and Diagnosis Research (IJMSDR)
Available Online at www.ijmsdr.com
NLM (National Library of Medicine ID: 101738824)
Case study Volume 5, Issue 8; August:2021; Page No. 01-06

Thrombotic Thrombocytopenic Purpura (TTP)

Ashraf ALakkad[1], Mohamed Gamea[2], Hesham Hussien[3], Mahmoud Sami[4], Salah Eldin Khalil [5], Adel Ahmed[6] and Noorullah Mohammed[7]

[1]Internal Medicine Unit, Madinat Zayed Hospital, United Arab Emirates.

[2]Neurology Unit MZH, United Arab Emirates.

[3]Critical care Unit, MZH, United Arab Emirates.

[4]Critical care Unit, MZH, United Arab Emirates.

[5]Nephrology Unit, MZH, United Arab Emirates.

[6]Nephrology Unit, MZH, United Arab Emirates.

[7]Cardiology Unit, MZH, United Arab Emirates

Conflicts of Interest: Nil
Corresponding author: Dr. Ashraf ALakkad
DOI: https://doi.org/10.32553/ijmsdr.v5i8.833

Abstract:
Thrombotic thrombocytopenic purpura is a medical emergency with varied clinical manifestations. TTP is a rare condition, but one that carries a high mortality. High index of suspicion with careful evaluation of thrombocytopenia and hemolytic anemia is of paramount importance. Symptoms result from microthrombi affecting microcirculation and can be varied depending on the organs involved. Laboratory parameters of microangiopathic hemolytic anemia i.e. schitocytosis and increased LDH and indirect hyperbilirubinemia support the diagnosis. Plasma exchange is the treatment of choice. Other modalities that may provide therapeutic benefit in cases of relapsing TTP or in patients with slow or partial response to plasma exchange include vincristine and rituximab. Splenectomy done in remission may decrease recurrence in patients with relapsing TTP.

1. Introduction:

Thrombocytopenic purpura is an uncommon blood disease. It is the condition in which clots are formed in the blood. These clots block the flow of blood into the body. It damages multiple organs in the body such as the heart, kidney and brain due to the Lack of enough oxygen supplies and results in serious problems. Thrombocytopenic purpura use platelets within the blood. The blood clots are formed by the fragments of cells are stick together with the platelets and seal the blood vessels by stopping blood flow. They also break down blood vessels and the number of platelets decreases from the natural level. Symptoms of the TTP include fever, skin patches, anemia, renal dysfunctions, large bruises, breathlessness, misperceptions and headache. (Stanley & Michalski., 2020)

Literature Review:

2.1 History

It was first identified in 1924 and was labelled as a fatal disease back then too but the cause of it was unknown. It was 1997 when it was discovered that this disease happened due to the deficiency of the ADAMTS13 enzyme.

2.2 Epidemiology

Talking about epidemiology as we know that TTP is a very infrequent disease, it usually happens about annually 1 o 13 cases per million people and it quite happens more in women. There is a 90% chance that it will happen in adults. While in children it happens up to 10% but the chance is that majority of cases would be genetic, it is not common in pregnant women.

2.3 Etiology

The actual cause of this disease is not known yet but it is believed that it happens due to deficiency of an enzyme that is involved in the process of blood clotting, with its deficiency there's not much efficiency in the blood clotting process leading to TTP. (Thrombotic Thrombocytopenic Purpura, 2021)

2.4 DIAGNOSIS

TTP should be suspected in patients with thrombocytopenia and Microangiopathic hemolytic anemia (MAHA). It can be diagnosed by acute pancreatitis or bloody diarrhoea and other than that TTP can be diagnosed with visceral organ involvement as we know it is the nervous system that is most commonly affected visceral organ so this disease occurs in this case in like 40% to 80% depending upon some symptoms like a minor headache to severe seizures, stroke or even coma. These acute neurological abnormalities like stroke or seizure are involved in preceding MAHA and thrombocytopenia so it can be diagnosed from these symptoms.

Also, blood tests can be done to measure the amount of RBC's or WBC's to know if there is anaemia that may lead to a diagnosis of TTP. (Domingo-González A, 2021)

Case study:

This study is based on a 43 years old male patient. He was a heavy smoker and alcoholic. Two years before, he was known as a chronic alcohol abuser and he stopped smoking and alcohol consumption.

He was admitted to another facility with an acute confessional state, high-grade fever, dehydration and severe hypotension. He had speech difficulty and generalized weakness. Ct scan of the brain shows that his brain was normal.

Blood test revealed, he had septicemia. He was treated empirically as sepsis for 5 days. He responded initially for this treatment but on the 5th day of post-admission, he developed some serious problems such as breathing difficulty, fatigue, hypotension and hypoxemia. Then, he was admitted to our hospital for further testing.

Urgent CT scan of the chest: Diagnosed cardiac tamponade from CT scan. Then, he was transferred to our hospital for urgent pericardiocentesis and 350ml fluid was drained which was hemorrhagic, it was sent for cytology.

Table 1:

Clinical presentation	Hypotension, Pulses Paradoxes, Tachycardia
Precipitating Factors	Alcohol, smoking , cardiac problems,
ECG	Electrical fluctuations (QRS rarely T), Non-specifically change ST-T wave, agonal phase,
Chest X-rays	Lungs clear, Cardiac silhouette enlarged,
M mode/2D	Diastolic collapse anterior RV free wall, RA collapse, LA and very rarely LV,
Echocardiogram	enlarged Wall thickness LV, VCL dilation, 'Swinging heart'
M-mode color Doppler	Breathing fluctuations in tricuspid/ mitral movement

Complete blood smear test shows (anaemia, thrombocytopenia, elevated creatinine, total bilirubin and LDH, negative direct Coombs test). All these tests are used to diagnose thrombotic thrombocytopenic purpura (TTP).

Acute confusion, fever, renal impairment and features of microangiopathic hemolytic anemia with high lactate dehydrogenase (LDH) level and low level of haptoglobin were consistent with a completely different diagnosis: TTP thrombotic microangiopathy.

Laboratory finding:

Table 2:

Lab view			
WBC	12.13 x 10^9/L	8.89 x 10 ^9/L	9.71 x10 ^9/L
RBC	1.8 x 10 ^12	3.13 x 10 ^ 12/L	*(c) 1.88/L
Hgb	66.0 g/L	75.0 g/L	70.0 g/L
Hct	0.212 L/L	0.273 L/L	0.224 g/L
MCV	114.6 fL	111.3 fL	119.1 fL
MCH	35.7 pg	35.2 pg	37.2 pg
MCHC	311 g/L	316 g/L	313 g/L
Platelet	82 x 10 ^9/L	103 x 10 ^9/L	105 x 10 ^9/L
RDW-CV	12.4%		
Reticulocyte			
Differential			
Neutron auto %	63.6	61.2 %	71.6 %
Neutro Auto #	7.72 x10 ^9/L	5.43 x 10 ^9/L	6.95 x10

ADAMTS Test
ADAMTS 13 ACTIVITY 0.8 IU/mL
Norma low 0.4 Normal High 1.3

Table 3:

Event	**Results**	**Ref . Range**
TSH	7.720 milli IU/L	0.270- 4.200
Free T3	2.39 pmol/L	3.10- 6.80
Glucose (POC)	6.8 mmol/L	
Sodium level	146.0 mmol/L	135-145
Potassium level	4.3 mmol/L	3.6- 5.1
Chloride level	106.0 mmol/L	98- 107
Co2	22.2 mmol/L	22- 29
Creatinine level	207.0 Micromol/l	62-106
Urea	15.70 mmol/L	0.00 8.3
Bilirubin Total	648.9 micromol/L	-<=21.0
LDH Lvl	879 IU/L	140-280 U/L
Bilirubin Direct	673.6 micromol/L	-<=5.4
WBC	9.71 x 10 ^ 9/L	4.00-11.00

Table 4:

Phosphate level		0.42 mmol/L	0.44 mmol/L
LDH level	879 IU/L		

Lactate dehydrogenase (LDH) Test greater than normal range.

Normal= 100-190 U/L

Haptoglobin level test

Haptoglobin Test < 0.10 g/L (LOW)

Normal Low 0.30 Normal high 2.00

Electrolyte panel:

Table 5:

General chemistry			
Sodium level	145.0 mmol/L	146.0 mmol/L	146.0 mmol/L
Possum level	4.2.0 mmol/L	3.4 mmol/L	3.6 mmol/L
Chloride level	107.0 mmol/L	108.0 mmol/L	109.0 mmol/L
Co2	13.0 mmol/L	19.8mmol/L	18.0 mmol/L
Creatinine level	333.0 mmol/L	302.0 micromitre	221.0 mmol/L
Urea level	29.80 mmol/L	25.00 mmol/L	18.20 mmol/L

Table 6:

ALT	27.6 IU/L	(0.00-41)
WBC	12.90x10^9/L	(4.0-11.00)
RBC	2.21x10^12/L	(4.50-6.50)
Hgb	74.0 g/L	(130.0-180.0)
HCt	0.236 L/L	(0.400-0.540)
MCV	106.8 fL	(76.0-96.0)

CRRT and TPE

The patient was intubated and we started Continues renal replacement therapy (CRRT) without anticoagulation for refractory acidosis and a rising creatinine.

He received daily 5 sessions of TPE therapeutic plasma exchange with FFP replacement

He was started on Methylprednisolone 10mg/kg/day then Prednisolone 1 mg/kg/day.

His Kidney function had improved from these medicines and he started to pass urine about 800 ml /24 hour. His Cardiac performance was also better and no more pericardiac collection were detected.

His number of platelets were improved and bilirubin level was decreased with nearly normal liver enzymes.

We removed his tube and PermCath. Now he was fully conscious and oriented. Initially, He was weak and unable to walk but later he had dramatic improvement and started walking.

For the treatment of hypothyroidism, we recommended synthetic thyroid hormone levothyroxine Synthroid, Levo-T. These medicines are consumed orally. Daily use helps to control hormonal levels in the body and restores thyroid hormone.

He was discharged from our hospital in a stable condition with home medications.

His discharge medication were:

1. Ferrous sulfate-foLIC acid: 1 cap, PO, Lunch PC
2. HydroCORTISone: 10 mg, 1 tab, PO, BID
3. levoTHYROxine: 150 mcg, PO, Bedtime
4. multivitamin: 1 tab, PO, BID
5. omeprazole: 40 mg, 2 tab, PO, Daily AC

Serum Electrolyte profile test on discharge:

Table 7:

Event	Result	Ref. Range
Creatinine	134.0 micromol/L	(62.0-106.0)
Urea Lvl	19.90 mmol/L	(0.00-8.30)
Calcium Lvl	2.430 mmol/L	(2.100-2.600)
Calcium Corr	2.36 mmol/L	(2.10-2.60)
Albumin Lvl	43.3 g/L	(35.0-50.0)
ASt	27.5 IU/L	(0.0-38.0)
Alt	26.7 IU/L	(0.0-41.0)
Phosphate Lvl	1.30 mmol/L	(0.87-1.45)

Discussion

This disease is said to be very rare but its rarity does mean that this is a fatal disease, if not treated it can get one's life. The cause of this disease was totally unknown before but now it is said that it happens when there is less amount of the enzyme ADAMTS13 which is basically enzyme of a gene that controls the process of blood clotting so a deficiency of this enzyme would mean that the process of blood clotting is not efficient. TTP can actually affect any organ system be it kidneys or the central nervous system.

MAHA which is basically a feature of TTP that is hemolytic anaemia that is characterized by schistocytes that are usually found in healthy people, these schistocytes may happen due to red blood cell defects that may lead to problems in clotting hence causing the TTP. (Patol., 2018)

Summary

It is summarized that TTP is a very deadly disease that happens in people that have quite large multimers of vWF leading to deficiency of ADAMTS13 that helps in blood clotting and it can be diagnosed by various processes like blood test measures, platelet counts and coagulation studies. (Sukumar S, 2021)

Conclusion

This study shows that TTP is a very dangerous but still treatable disease because there are ways to cure this disease such as corticosteroids, some anti-platelets agents such as aspirin and other ways like plasma infusion or plasma exchange.

TTP has been evolved from a disease that was once universally fatal to now an illness that if diagnosed early has a remission rate exceeding 90%. Because there has been a lot of success in the treatment of TTP with the infusion of plasma and its exchange this disease is now totally curable.

Reference

1. Domingo-González A, Regalado-Artamendi I, Martín-Rojas RM, Pérez-Rus G, Pérez-Corral A, Díez- Martín JL, Pascual C. Application of the French TMA Reference Center Score and the mortality in TTP Score in de novo and relapsed episodes of acquired thrombotic thrombocytopenic purpura at a tertiary care facility in Spain. Journal of Clinical Apheresis. 2021 Feb 3.
2. Patol., J. B. (2018, August). Thrombotic thrombocytopenic purpura: a case report. Retrieved from Scielo Brazil: https://www.scielo.br/j/jbpml/a/XV8cHXT4tWkvZNPsVm9k9xw/?lang=en
3. Stanley, M., & Michalski., J. M. (2020, 16 August). Thrombotic Thrombocytopenic

Purpura. Retrieved from NCBI: https://www.ncbi.nlm.nih.gov/books/NBK430721/

4. Thrombotic Thrombocytopenic Purpura. (2021). Retrieved from National Organzation of Rare Disease: https://rarediseases.org/rare-diseases/thrombotic-thrombocytopenic-purpura/
5. Sukumar S, Lämmle B, Cataland SR. Thrombotic thrombocytopenic purpura: Pathophysiology, diagnosis, and management. Journal of Clinical Medicine. 2021 Jan;10(3):536.