West Middlesex University Hospital

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Relapsing Thrombotic Thrombocytopenic Purpura in Pregnancy

See full search strategy

1. Successful management of recurrent pregnancy-related thrombotic thrombocytopenia purpura: case report and review.

Author(s): Chen, H; Luo, L; Cai, J; Wu, Y; Liu, B; Wang, Z

Source: Clinical and experimental obstetrics & gynecology; 2016; vol. 43 (no. 2); p. 300-303

Publication Date: 2016

Publication Type(s): Case Reports Journal Article Review

Abstract: Thrombotic thrombocytopenic purpura (TTP) is a rare but potentially devastating complication of pregnancy. The authors report a case of a successful treatment of recurrent TTP complicating pregnancy. A review of the literature shows that recurrent TTP complicating pregnancy is uncommon and fresh frozen plasma exchange is important treatment; if the patient was treated properly, the pregnant showed favorable prognosis.

Database: Medline

2. Life after acquired thrombotic thrombocytopenic purpura: morbidity, mortality, and risks during pregnancy.

Author(s): Vesely, S K

Source: Journal of thrombosis and haemostasis : JTH; Jun 2015; vol. 13

Publication Date: Jun 2015

Publication Type(s): Journal Article Review

Available in full text at Journal of Thrombosis and Haemostasis - from Ingenta

Available in full text at Journal of Thrombosis and Haemostasis - from John Wiley and Sons

Abstract: Patients who have recovered from their acute episode of acquired ADAMTS13-deficient thrombotic thrombocytopenic purpura (TTP) were once thought to have complete recovery except for risk of relapse. Data from previous publications from the Oklahoma TTP-hemolytic uremic syndrome (HUS) Registry are summarized. Patients have decreased cognitive function and increased prevalence of hypertension, systemic lupus erythematosus, major depression, and albuminuria as compared to the expected values from the US population. The proportion of patients that died during the follow-up period was greater than expected based on the US population reference population. Among women who had a pregnancy following recovery from TTP, relapse during pregnancy or postpartum is uncommon, but the occurrence of preeclampsia may be increased.

Thirteen of 16 pregnancies in these women resulted in healthy children. Increased morbidity and mortality in TTP patients following recovery suggest that TTP may be more of a chronic disorder than a disorder with acute episodes and complete recovery.

Database: Medline

3. Congenital thrombotic thrombocytopenic purpura during pregnancy

Author(s): Luterek K.; Pietrzak B.; Wielgos M.; Majewska A.; Ostas A.

Source: Journal of Maternal-Fetal and Neonatal Medicine; 2016; vol. 29 ; p. 270

Publication Date: 2016

Publication Type(s): Conference Abstract

Abstract: Introduction: Moschcowitz syndrome, also known as thrombotic trombocytopenic purpura (TTP) is a disorder of the blood-coagulation system, in which extensive microscopic clots form in the small vessels throughout the body. Most cases arise from the autoantibodies inhibition of ADAMTS13, a metalloprotease responsible for splitting large multimers of von Willebrand factor. It is a rare condition, affecting women 2-3 times more often than men. Pregnancy is regarded as a predisposing factor for inducing or recurrence of the disease. TTP is a severe, life-threatening disease that needs urgent diagnosis. Preterm delivery and intrauterine fetal demise are frequent complications of TTP. Clinical cases and summary results: A 34-year-old woman was admitted to Hematology Institute at 21st week of third gestation due to thrombocytopenia and rapidly worsened at 23rd week of gestation. Neurological symptoms, consciousness disorders and memory loss occured. It was followed by the increase of blood pressure, anuria and respiratory failure. Decreasing concentration of platelets (49000), increased LDH 954 and creatinine 269 umol/l was found. US revealed placental abruption with intrauterine fetal demise. Differential diagnosis included HELLP syndrome and TTP - ADAMTS13 concentration was evaluated. Due to a life threatening condition cesarean section and plasmapheresis was performed. Normal platelet count was achieved after 8 plasma exchanges. On the 9th day she developed cardiac and respiratory failure, requiring mechanical ventilation and catecholamine administration. Differential diagnosis included TRALI and fluid overload. Plasmapheresis was implemented again and her condition improved on the 19th day. Conclusion: TTP was diagnosed basing on clinical presentation and laboratory results. It is a rare disease that can be induced by or reoccur during pregnancy. Differential diagnosis of TTP should include HELLP, preeclampsia and DIC. Decisions regarding treatment should be based on the concentration of ADAMTS13. Undiagnosed TTP may pose a major risk for gestation and the pregnant patient. Plasmapheresis is the treatment of choice, in contrast to contraindicated transfusion of platelets.

Database: EMBASE

4. Rituximab for prevention of recurrent pregnancy related thrombotic thrombocytopenic purpura in high risk patients with previous episodes of thrombotic thrombocytopenic purpura during pregnancy

Author(s): Mariampillai A.I.; Garrison M.; Zervoudakis A.A.

Source: Blood; Dec 2016; vol. 128 (no. 22)

Publication Date: Dec 2016

Publication Type(s): Conference Abstract

Available in full text at Blood - from Highwire Press

Abstract: Introduction We describe the use of rituximab for the successful prophylaxis and delivery of a multiparous female with a history of pregnancy related thrombotic thrombocytopenic purpura (TTP) now presenting with a high risk of relapse during subsequent pregnancy. Case Presentation A 33 year-old African American female with a history of post-partum TTP diagnosed two years prior was referred to the hematology clinic for suspected recurrence of her TTP at 22 weeks gestation. Two years ago the patient had presented with symptoms of severe headache and hypertension which began 1 week after the delivery of her 3rd child. She was referred to the emergency department where she was found to have microangiopathic hemolytic anemia with a hemoglobin of 7.6g/dL, platelets of 10k/uL and abundant schistocytes on peripheral smear. Her blood chemistry revealed renal failure with an elevated creatinine of 2.7mg/dL, LDH of 2001 IU/L. She was found to have a moderately low ADAMTS13 level of 16% (normal >66%) and an inhibitor was detected (1.0 BEU). Her ANA, HIV, hepatitis and lupus serologies were all negative. Her C3 level was 105 (normal 70-225mg/dL) and C4 was 20 mg/dL (normal 14-55 mg/dL). She was promptly initiated on plasma exchange in addition to magnesium supplementation and strict blood pressure control. She underwent 11 days of daily plasma exchange and steroids with improvement of her platelets and resolution of schistocytes on peripheral smear. Despite this, she again had rise in her parameters and rituximab was added to the regimen which she responded to with continued normalization of her hematologic parameters and clinical resolution of symptoms. Approximately 2 years later, the patient presented again at 22 weeks gestation of her fourth pregnancy for suspected recurrence of her TTP. Blood chemistry revealed a low ADAMTS13 (<3%), anemia (Hb 10.8g/dL) and moderate thrombocytopenia (platelets 156k/uL). Her liver and renal functions were unaffected and she had no evidence of bruising or bleeding on physical exam. Serial repeat testing showed persistently low ADAMTS13 level (<3%) and worsening thrombocytopenia (platelets decreased to 113k/uL) without development of other clinical manifestation of TTP. Prophylactic plasma exchange was offered to the patient however the patient declined due to its associated risks. She was initiated on weekly rituximab (375mg/m2) with decadron (6mg weekly) from 27th to 30th weeks of pregnancy. After 4 infusions, her platelets improved to 190k/uL along with an increase in ADAMTS13 level to 62%. A healthy male child weighing 3.2 kilograms was delivered by C-section at 36 weeks without complications. Post-partum, the patient's CBC remained stable with platelets above 100k/dL along with her LDH, haptoglobin and renal function and was subsequently discharged with no further documentation of relapse in her TTP. Discussion TTP is a severe, and often life threatening condition characterized clinically by the pentad of microangiopathic hemolytic anemia, thrombocytopenia, renal dysfunction, neurologic changes and fever. Pregnancy is a known trigger for onset of TTP and has been well described in literature, usually presenting in the third trimester or post-partum period with a constellation of symptoms that may mimic other thrombotic microangiopathies (Martin JN Jr, et al. Thrombotic thrombocytopenic purpura in 166 pregnancies: 1955-2006. Am J Obstet Gynecol.2008; 199(2):98-104). Recurrent TTP complicating subsequent TTP is uncommon (George. JN, et al.Blood, 2014; 123 (11):1674-1680). Patients with a history of pregnancy related TTP continue to be at high risk of relapse with subsequent pregnancies and their management often presents as a challenge to both hematologist as well as obstetricians . While plasma exchange and immunosuppression is a cornerstone of successful treatment of confirmed pregnancy related TTP, literature regarding optimal prophylaxis to prevent the onset of subsequent TTP in women with a

history of pregnancy related TTP is lacking. Rituximab for the prevention of TTP relapse during pregnancy may be a viable option.

Database: EMBASE

5. Thrombotic thrombocytopenic purpura in parturient

Author(s): Kamaraj J.; Mathews J.; Ankichetty S.

Source: International Journal of Gynecology and Obstetrics; Oct 2015; vol. 131

Publication Date: Oct 2015

Publication Type(s): Conference Abstract

Available in full text at Intl Jrnl Gynecology and Obstet - from John Wiley and Sons

Abstract: Objectives: Thrombotic thrombocytopenic purpura (TTP) is a rare, life-threatening disorder with an estimated incidence of 4-11 patients per million population. It's occurrence during pregnancy causes higher maternal and fetal mortality. We describe the management of a parturient that was diagnosed to have TTP in the immediate postpartum period after having normal vaginal delivery under epidural analgesia. Case history: A 41 year old G2P1 parturient was admitted to the labour floor at 39 weeks of gestation. She had pregnancy induced hypertension at 24 weeks of gestation and was on antihypertensive medications. Her physical exam was unremarkable. On admission, her laboratory investigations were within normal limits except the platelet count of 85,000/cu.mm. The parturient had epidural analgesia and unevetful delivery. However, the patient's platelet count dropped to 60,000/cu.mm early after delivery and then to 23,000/cu.mm on 1st post-delivery day (PDD). The diagnosis of TTP was made based on clinical and laboratory work up (Table 1). Specifically, ADAMTS 13 activity was found to be 10%. She was discharged on 15th PDD. A warning card documenting the complications that she had during her post-partum period was issued. Conclusions: Pregnancy increases the risk of TTP relapses between 12 to 61%. The follow up of ADAMTS 13 activity during the pregnancy may identify the patients with the greatest risk for relapse. Plasma exchange is the cornerstone for the treatment of patients with frank TTP but its role to prevent relapse in patients with high risk has not yet been elucidated.

Database: EMBASE

6. Incidence of obstetrical thrombotic thrombocytopenic purpura in a retrospective study within thrombocytopenic pregnant women. A difficult diagnosis and a treatable disease

Author(s): Delmas Y.; Helou S.; Combe C.; Chabanier P.; Ryman A.; Horovitz J.; Pelluard F.; Carles D.; Boisseau P.; Veyradier A.; Coppo P.

Source: BMC Pregnancy and Childbirth; Jun 2015; vol. 15 (no. 1)

Publication Date: Jun 2015

Publication Type(s): Article

Available in full text at BMC Pregnancy and Childbirth - from BioMed Central

Available in full text at BMC Pregnancy and Childbirth - from ProQuest

Abstract: Background: Thrombotic thrombocytopenic Purpura (TTP) defined as ADAMTS-13 (A Disintegrin And Metalloprotease with ThromboSpondin type 1 domain 13) activity <10 % is a rare aetiology of thrombocytopenia during pregnancy, although the precise incidence is unknown. During pregnancy, the diagnosis of TTP is crucial as it has high feto-maternal morbidity-mortality and requires urgent plasma exchange. The purpose of this study was to assess the incidence of TTP retrospectively and to describe case presentations and follow-up. Methods: A monocentric retrospective study (2008-2009) was conducted among pregnant women followed in a tertiary care

obstetrical unit who experienced at least one episode of severe thrombocytopenia (platelets <75 G/L) during 2008 and 2009. In cases of uncertain aetiology of thrombocytopenia, ADAMTS-13 activity was assessed by the full length technique. Results: Among 8,908 deliveries over the 2 year period, 79 women had a platelet count nadir <75 G/L. Eighteen had a known aetiology of thrombocytopenia and 11 were lost to follow-up. Among 50 remaining patients, ADAMTS-13 activity was undetectable (<5 %) in 4, consistent with the diagnosis of TTP. Platelet count spontaneously normalized in 3 patients after delivery. None presented focal cerebral involvement. Three of the four, who were primipara patients, had a sustained severe deficiency in the absence of anti-ADAMTS-13 antibodies, and ADAMTS-13 gene sequencing indicated a constitutive deficiency. The fourth, a multipara patient, had an acquired, auto-immune TTP. Placental pathology in the three primipara patients showed severe and non-specific ischemic lesions. Two patients lost their babies shortly after birth. In subsequent pregnancies in these two patients, prophylactic plasma infusion initiated early with increasing volume throughout pregnancy prevented TTP relapse, improved placental pathology, and led to normal delivery. Conclusions: The prevalence of TTP among thrombocytopenic pregnant women is high, up to 5 % in a tertiary unit. Platelet count normalization after delivery does not eliminate TTP. Clinicians should be aware of TTP during pregnancy, and, even if assessed retrospectively, ADAMTS-13 assessment is of particular importance for identifying patients with congenital TTP. In these patients, preventive plasma infusion and/or exchange can dramatically improve foetal prognosis, resulting in successful childbirth.

Database: EMBASE

7. Study of ADAMTS13 levels in patients with thrombotic thrombocytopenic purpura (TTP) during pregnancy

Author(s): Piras F.; Russo L.; Marchetti M.; Barcella L.; Testa M.; Falanga A.; Rambaldi A.; Noris M.; Savignano C.; Toschi V.

Source: Haematologica; Jun 2015; vol. 100 ; p. 571

Publication Date: Jun 2015

Publication Type(s): Conference Abstract

Available in full text at Haematologica - from Highwire Press

Available in full text at Haematologica - from National Library of Medicine

Abstract: Background: TTP is an acute, life threatening thrombotic microangiopathy associated to a congenital or acquired deficiency of the von Willebrand factor cleaving protease ADAMTS13. Limited data on utility of ADAMTS13 measurements during pregnancy are available. Aims: Aim of this study was to evaluate the importance of closely monitoring ADAMTS13 levels on pregnancy outcome. Methods: Four consecutive pregnant women with TTP (2 congenital, 1 acquired and 1 with probably congenital) were enrolled into the study. ADAMTS- 13 activity (chromogenic assay), inhibitors (mixing studies), and anti-ADAMTS- 13 antibodies (ELISA) were measured in plasma. Results: Patient 1, a 35 y.o. woman with acquired TTP history not-related to pregnancy had a TTP relapse at 21th week gestation (first pregnancy). A complete ADAMTS13 activity deficiency associated to anti-ADAMTS13 auto-antibodies was detected. Oral steroids and weekly plasma exchange (PEX) were started. However, ADAMTS13 activity remained significantly low (<5%) and she prematurely delivered (25th week) an alive baby. At remission she had persistent ADAMTS13 activity deficiency associated to auto-antibodies. Patient 2, a 21 y.o. woman developed TTP during her first pregnancy (15th week). She had a complete ADAMTS13 activity deficiency and no auto-antibodies, was successfully treated with plasma infusion therapy plus steroids, and delivered on term a healthy baby. At clinical remission, she had no ADAMTS13 activity and no auto-antibodies. A possible congenital TTP diagnosis was hypothesized. About two years later (May 2014) she was again

pregnant. No ADAMTS13 activity or auto-antibodies were detected, and at molecular analysis a compound homozygosity for two novel ADAMTS13 mutations was found. She received prophylactic plasma infusions and delivered (38th week) a healthy baby without disease manifestations. Patient 3, a 28 y.o. woman with a HELLP syndrome history during her first pregnancy. She developed TTP during her second pregnancy, PEX treatment was started, however cesarean section was performed at the 32th week because of clinical worsening, with a successful outcome. She had a persistent low ADAMTS13 activity levels with no auto-antibodies, and at molecular analysis a compound heterozygosity for two novel ADAMTS13 mutations was found. Patient 4, a 30 y.o. woman developed TTP after her first pregnancy. After the delivery, she developed severe thrombocytopenia, and an evaluation of ADAMTS13 levels was performed. She had a complete ADAMTS13 activity deficiency and no autoantibodies. The inherited nature of severe ADAMTS-13 deficiency in this patient was established by phenotype family analysis. The results of ADAMTS13 levels of parents showed a moderate reduction in ADAMTS13 activity in the mother (47%) and father (43%), associated with no antibodies. The genetic analysis is under investigation. Summary and Conclusions: Our data endorse the utility of ADAMTS13 study for differential diagnosis between congenital and acquired TTP and subsequent type of treatment with either plasma infusion or plasma exchange. In addition, our data indicate that the measurement of ADAMTS13 can represent an effective means to monitor women at risk of TTP recurrence in pregnancy.

Database: EMBASE

8. Recurrent pregnancy-related thrombotic thrombocytopenic purpura resistant to intensive therapeutic plasma exchange

Author(s): Marandiuc D.E.; Conradi R.; Von Auer C.; MacCagno G.; Hitzler W.E.

Source: Vox Sanguinis; Jun 2015; vol. 109 ; p. 327

Publication Date: Jun 2015

Publication Type(s): Conference Abstract

Available in full text at Vox Sanguinis - from John Wiley and Sons

Abstract: Background: Thrombotic thrombocytopenic purpura (TTP) is a life threatening thrombotic microangiopathy, characterized by a deficiency of ADAMTS13, a cleaving protease that prevents accumulation of large von Willebrand factor multimers. Aims: In this report, a recurrent pregnancy-related TTP case resistant to intensive therapeutic plasma exchange (TPE) is presented. The purpose of TPE is to replace ADAMTS13 and to remove anti-ADAMTS13 antibodies. TPE can increase the odds of surviving a TTP from 10% to 90%. Methods: A 39 year old secundigravida white woman in the 18th week of pregnancy with a past medical history of TTP developed a second bout with corresponding clinical signs (chest and thighs petechiae) and laboratory parameters (platelets 7x109/L, hemoglobin 10.2 g/dL, LDH 1228 U/L, ASAT 69 U/L, schistocytes 35/1000 erythrocytes, ADAMTS13 > 1%, anti-ADAMTS13 antibodies present, ultra large multimers of von Willebrand factor present). Concurrent, signs of preeclampsia were present (high blood pressure, proteinuria). First episode of TTP was 12 years prior during her first pregnancy, with multiple organ dysfunction syndrome and emergency c-section resolved in full recovery of mother and child. Results: Urgent TPE was begun, parallel to corticosteroid therapy and symptomatic treatment. After three-day low platelet count (PC) under once daily TPE, the therapy was enhanced to twice per day, five consecutive days with a rapid impact on PC and hemolysis parameters. A PC around 140x109/L was only for three days stable under TPE once daily, so that the therapy was again enhanced. Despite 2xTPE daily for 18 days, rituximab weekly for 8 weeks, PC rapidly decreased and remained at a low level (around 15x109/L). The clinical state of the patient deteriorated, so that the pregnancy was terminated in the 21th week. TPE was continued once daily. 20 days postpartum, due to persistent renal failure, dialysis was started. After three months therapy, PC slowly increased, followed by a

decrease of hemolysis parameters, so that TPE could gradually be tapered off. A total of 117 TPE were performed during 5,5 months. Dialysis continues 3 times per week to this date. Renal biopsy is planned for prognosis assessment. Summary/Conclusions: During pregnancy, a differential diagnosis with other conditions that present anemia and thrombocytopenia is often difficult, considering that they may also occur concurrently. In TTP suspected cases, a life-saving plasma exchange therapy must be immediately started even before the confirmatory results of ADAMTS13 activity are available. Rare cases of TTP are resistant to plasma exchange and repeated administration of rituximab. In this case, aggressive therapy, parallel to continuous TPE, ensured the patient a better outcome.

Database: EMBASE

9. The course of ADAMTS13-properties during pregnancy induced thrombotic thrombocytopenic purpura (TTP)

Author(s): Dittmer R.; Schneppenheim S.; Ayoub M.; Budde U.

Source: Journal of Thrombosis and Haemostasis; Jun 2015; vol. 13 ; p. 768

Publication Date: Jun 2015

Publication Type(s): Conference Abstract

Available in full text at Journal of Thrombosis and Haemostasis - from Ingenta

Available in full text at Journal of Thrombosis and Haemostasis - from John Wiley and Sons

Abstract: Background: It is well known that pregnancy can precititate thrombotic thrombocytic purpura (TTP) with severe maternal and fetal complications. We present our data from the seventh pregnancy week until up to now 3 month after birth of a healthy full-term child. The 31 years old patient suffered from three cerebellar infarctions until the seventh week of pregnancy when we diagnosed an acute pregnancy induced TTP. From then on until the 29th week she was treated with initially daily plasma exchanges (PE) followed by two weekly PE0s. Thereafter until now she showed no relaps and the child was born by Caesarean section at the end of week 39. Aims: We would like to show a case report. Methods: ADAMTS13 activity, antigen and inhibitor (ELISA, Fa.Technocolone). Results: Since week seven we overlook 37 complete sets of her ADAMTS13 properties (activity, antigen and inhibitor) determined with Technoclone kits. From week seven until week 29, when PE0s were stopped, she showed a discrepancy between ADAMS13-activity and antigen with much higher ADAMTS 13 concentrations (mean 0.27 mug mL-1, range 0.11 - 0.53 mug mL-1, normal 0.5-1.6 mug mL-1) than activities (mean 3.8%, range 1.8 - 7%, normal 50 - 110%). From week 30 till birth, her ADAMTS13 properties were perfectly normal with no discrepancies between activity and antigen. But astonishingly she shows since childbirth again a discrepant pattern with hardly detectable ADAMTS13 antigens (between 0.03 and 0.07 mug L-1) but normal activities (57 - 92%) at all seven timepoints. Between 2009 and now we detected the pattern the patient showed after birthgiving in 22 additional patients (10 with acute TTP relapses, 3 with unrelated diseases and in the others we had no information). The relapsing patients had activities between 18 and 103% which would doubt the diagnosis of TTP, while the antigens were severely depressed (0.019 - 0.1 mug mL-1). Conclusion: Circulating immuncomplexes (IgG antibody and ADAMTS13) by acute TTP in pregnancy save the unborn child.

Database: EMBASE

10. Severe maternal morbidity and fetal death in a pregnant woman with recurrent acquired thrombotic thrombocytopenic purpura (TTP)

Author(s): Auer C.V.; Scharrer I.; Falter T.; Rossmann H.; Lebrecht A.; Marandiuc D.; Lammle B.

Source: Journal of Thrombosis and Haemostasis; Jun 2015; vol. 13 ; p. 713-714

Publication Date: Jun 2015

Publication Type(s): Conference Abstract

Available in full text at Journal of Thrombosis and Haemostasis - from Ingenta

Available in full text at Journal of Thrombosis and Haemostasis - from John Wiley and Sons

Abstract: Background: Pregnancy is a very strong trigger for initial and recurrent bouts in hereditary TTP patients. The association with acquired TTP is less clear. In pregnancy, TTP must be distinguished from severe preeclampsia and hemolysis, elevated liver enzymes, low platelets (HELLP) syndrome. Aims: We report the case of a 39- year- old woman who presented in 09/2014 in week 18 of her second pregnancy with multiple hematomas in her lower limbs. During her first pregnancy she had suffered a first acquired TTP bout. Methods: Now laboratory findings showed a second bout, she was immediately treated with corticosteroids (C) and plasmapheresis (PP). An ultrasound examination showed a fetus with adequate biometrics, normal placenta and low amniotic fluid. During the following days parameters deteriorated with renal failure, proteinuria, arterial hypertension and edema. Therapeutic procedures were intensified with PP twice daily, acetylcysteine, rituximab (R) and antihypertensive medication. There was no fetal growth and a zero-flow of the umbilical artery. An interruption was performed in week 21. Postpartum severe hypertension, edema and renal failure persisted with several episodes of pulmonary edema. Dialysis was performed since 10/2014 and eculizumab was given 5 times once weekly. Results: Eculizumab did not correct the severe renal failure but since 11/2014 platelets and hemolytic parameters improved and PP could be reduced. In 02/2015 the patient was still on dialysis, PP had been stopped for a few days. Conclusion: Our patient suffered from a prolonged severe TTP episode with additional signs of preeclampsia, HELLP and atypical hemolytic uremic syndrome (aHUS), not improving under standard therapy and after pregnancy interruption. She had a severe ADAMTS13 deficiency with inhibitor titer during and before pregnancy but both of her TTP episodes were triggered by pregnancy like in hereditary TTP. ADAMTS13 and alternative complement pathway mutations are still pending and will be presented for further differentiation.

Database: EMBASE

11. Current insights into thrombotic microangiopathies: Thrombotic thrombocytopenic purpura and pregnancy

Author(s): Von Auer C.; Lammle B.; Von Krogh A.-S.; Kremer Hovinga J.A.

Source: Thrombosis Research; Feb 2015; vol. 135

Publication Date: Feb 2015

Publication Type(s): Article

Abstract: The complex relation between thrombotic thrombocytopenic purpura (TTP) and pregnancy is concisely reviewed. Pregnancy is a very strong trigger for acute disease manifestation in patients with hereditary TTP caused by double heterozygous or homozygous mutations of ADAMTS13 (A Disintegrin And Metalloprotease with ThromboSpondin type 1 domains, no. 13). In several affected women disease onset during their first pregnancy leads to the diagnosis of hereditary TTP. Without plasma treatment mother and especially fetus are at high risk of dying. The relapse risk during a next pregnancy is almost 100% but regular plasma transfusion starting in early pregnancy will prevent acute TTP flare-up and may result in successful pregnancy outcome. Pregnancy may also constitute a

mild risk factor for the onset of acute acquired TTP caused by autoantibody-mediated severe ADAMTS13 deficiency. Women having survived acute acquired TTP may not be at very high risk of TTP relapse during an ensuing next pregnancy but seem to have an elevated risk of preeclampsia. Monitoring of ADAMTS13 activity and inhibitor titre during pregnancy may help to guide management and to avoid disease recurrence. Finally, TTP needs to be distinguished from the much more frequent hypertensive pregnancy complications, preeclampsia and especially HELLP (Hemolysis, Elevated Liver Enzymes, Low Platelet count) syndrome.

Database: EMBASE

12. Pregnancy complications in acquired thrombotic thrombocytopenic purpura: a case-control study.

Author(s): Ferrari, Barbara; Maino, Alberto; Lotta, Luca A; Artoni, Andrea; Pontiggia, Silvia; Trisolini, Silvia M; Malato, Alessandra; Rosendaal, Frits R; Peyvandi, Flora

Source: Orphanet journal of rare diseases; Nov 2014; vol. 9 ; p. 193

Publication Date: Nov 2014

Publication Type(s): Research Support, Non-u.s. Gov't Journal Article

Available in full text at Orphanet Journal of Rare Diseases - from BioMed Central

Available in full text at Orphanet Journal of Rare Diseases - from ProQuest

Abstract:BACKGROUNDPregnant women with a history of acquired thrombotic thrombocytopenic purpura (TTP) are considered at risk for disease recurrence and might be at risk for miscarriage, similar to other autoimmune disorders. However, the exact entity of these risks and their causes are unknown. The aim of this study was to evaluate risk factors associated with adverse pregnancy outcome, in terms of both gravidic TTP and miscarriage, in women affected by previous acquired TTP.METHODSWe conducted a nested case-control study in women with a history of acquired TTP enrolled in the Milan TTP registry from 1994 to October 2012, with strict inclusion criteria to reduce referral and selection bias.RESULTSFifteen out of 254 women with acquired TTP were included, namely four cases with gravidic TTP, five with miscarriage, and six controls with uncomplicated pregnancy. In the cases, ADAMTS13 activity levels in the first trimester were moderately-to-severely reduced (median levels <3% in gravidic TTP and median levels 20% [range 14-40%] in the women with miscarriage) and anti-ADAMTS13 antibodies were invariably present, while in the control group ADAMTS13 activity levels were normal (median 90%, range 40-129%), with absence of detectable anti-ADAMTS13 antibodies. Reduced levels of ADAMTS13 activity (<25%) in the first trimester were associated with an over 2.9-fold increased risk for gravidic TTP and with an over 1.2-fold increased risk for miscarriage (lower boundary of the confidence interval of the odds ratio). In addition, the presence of anti-ADAMTS13 antibodies during pregnancy was associated with an over 6.6-fold increased risk for gravidic TTP and with an over 4.1-fold increased risk for miscarriage.CONCLUSIONSADAMTS13 activity evaluation and detection of anti-ADAMTS13 antibody could help to predict the risk of complications in pregnant women with a history of acquired TTP.

Database: Medline

13. ADAMTS13 study in patients with thrombotic thrombocytopenic purpura (TTP) during pregnancy: Three case reports

Author(s): Piras F.; Russo L.; Barcella L.; Marchetti M.; Testa M.; Falanga A.; Noris M.; Savignano C.; Toschi V.

Source: Thrombosis Research; Nov 2014; vol. 134

Publication Date: Nov 2014

Publication Type(s): Conference Abstract

Abstract:TTP may present during pregnancy as an acquired or congenital form. We describe ADAMTS13 levels and pregnancy outcome in three women with a TTP history. Case 1: A 35 y.o. woman with acquired TTP history not-related to pregnancy has a TTP relapse at 21th week gestation (first pregnancy). A complete ADAMTS13 activity deficiency associated with auto-antibodies was detected. Oral steroids and weekly plasma exchange (PEX) were started. However, ADAMTS13 activity remained significantly reduced and she prematurely delivered (25th week) an alive baby. At remission she had persistent ADAMTS13 activity deficiency associated with auto-antibodies. Case 2: A 21 y.o. woman developed TTP during her first pregnancy (15th week). She had a complete ADAMTS13 activity deficiency and no autoantibodies, was successfully treated with plasma infusion therapy plus steroids, and delivered on term a healthy baby. At clinical remission, she had no ADAMTS13 activity and no auto-antibodies. About two years later (May 2014) she was pregnant again. No ADAMTS13 activity or autoantibodies were detected. She is currently (from the 13th to the 35th week gestation) successfully receiving prophylaxis with plasma infusion. Our patient was found to have two novel homozygote mutations of ADAMTS13 gene. Case 3: A 28 y.o. woman with a HELLP syndrome history during her first pregnancy, and a history of TTP on her second pregnancy (with ADAMTS13 activity deficiency) successfully treated with PEX. She has a TTP recurrence during her third pregnancy, PEX treatment has been started, however cesarean section has been performed at the 32th week because of clinical worsening, with successful overall outcome. She has a persistent low ADAMTS13 activity levels without auto-antibodies, and at molecular analysis a compound heterozygosity for two novel ADAMTS13 mutations has been found. In conclusion, measurement of ADAMTS13 levels in pregnancy may be useful for TTP subtype identification and prevention of relapses.

Database: EMBASE

14. Management of thrombotic thrombocytopenic purpura and pregnancy

Author(s): Vanes N.K.; Stevenson H.; Raman S.; Sinha A.

Source: BJOG: An International Journal of Obstetrics and Gynaecology; Nov 2014; vol. 121 ; p. 4-5

Publication Date: Nov 2014

Publication Type(s): Conference Abstract

Abstract: Case A: 25-year-old, para 3 (NVD) was seen in antenatal clinic with previous a previous history of Thrombotic Thrombocytopenic Purpura (TTP). She was admitted with a reduced conscious level, headaches and nausea 5 years previously and investigations showed a low Hb 6.8 and platelet count 11. ADAMTS13 was checked and found to be deficient (<5%). In this pregnancy she was discussed within the joint haematology/ obstetric meeting and placed on clexane for the antenatal period and 6 weeks postnatal for thromboprophylaxis. Disease remission was monitored by LDH levels, platelet count, and the presence of schistocytes. She did not relapse. TTP is a rare disorder where microscopic clots form in the small blood vessels leading to end organ damage. The incidence of TTP is five cases per million people per year in the United Kingdom. Most cases arise due to an

inhibition of the ADAMTS13 enzyme, a metalloprotease enzyme that cleaves von Willebrand factor. Where this is not cleaved large VWF molecules circulating in the blood leads to hypercoagulability. Current therapy involves supportive care and plasmapheresis to reduce circulating antibodies against ADAMTS13. Conclusion: TTP affects about one in 25 000 pregnancies. Secondary TTP comprises about 40% of all cases, where TTP is secondary to a differential aetiology. Most patients with relapsing TTP receive immunosuppressive therapy with steroids. The prognosis for TTP is good for treated patients (90% survival), however mortality rate of 95% for untreated cases.

Database: EMBASE

15. Pregnancy complications in acquired thrombotic thrombocytopenic purpura

Author(s): Ferrari B.; Lotta L.A.; Maino A.; Artoni A.; Pontiggia S.; Trisolini S.M.; Malato A.; Rosendaal F.R.; Peyvandi F.

Source: Journal of Thrombosis and Haemostasis; Jun 2014; vol. 12 ; p. 100

Publication Date: Jun 2014

Publication Type(s): Conference Abstract

Available in full text at Journal of Thrombosis and Haemostasis - from Ingenta

Available in full text at Journal of Thrombosis and Haemostasis - from John Wiley and Sons

Abstract: Objectives: Pregnancy is considered an important risk factor for relapse of acquired thrombotic thrombocytopenic purpura (TTP). The risk of miscarriage could also be increased in these women, similar to other autoimmune disorders. However, the exact entity and causes of these risks are unknown. The aim of this study was to evaluate risk factors associated with gravidic TTP relapse and miscarriage in women with a history of acquired TTP. Methods: We conducted a nested case-control study in women with a history of acquired TTP enrolled in the Milan TTP registry from 1994 to Octobe 2012. Sixteen out of 254 women had a pregnancy after diagnosis of acquired TTP and inclusion in our registry. We contrasted women with a complicated pregnancy (i.e., cases of either gravidic TTP or miscarriage) with women with uncomplicated pregnancy (i.e., controls). Clinical variables (age at pregnancy, gravidity, time from the last TTP episode, TTP recurrence) and laboratory features (ADAMTS13 activity, anti-ADAMTS13 antibody) were studied. We used odds ratios as an approximation of relative risks for these variables. Results: According to pregnancy outcome, 4 cases with gravidic TTP, 5 with miscarriage and 7 controls with uncomplicated pregnancy were included. ADAMTS13 activity levels in the first trimester were reduced in the cases, severely (median < 3%) in gravidic TTP and moderately (20%, range 14-40%) in miscarriage; in the controls median ADAMTS13 activity level was 77% in the first trimester (range 40-129%) and remained above 39% until delivery, in the absence of detectable anti-ADAMTS13 antibodies. The presence of anti-ADAMTS13 antibodies during pregnancy was associated with an over 5-fold increase in the risk for both gravidic TTP and miscarriage (lower boundary of the confidence interval of the odds ratio). Conclusion: ADAMTS13 activity levels and anti-ADAMTS13 antibody assays may help to predict the risk of complications in pregnant women with a history of acquired TTP.

Database: EMBASE

16. Pregnancy outcomes following recovery from acquired thrombotic thrombocytopenic purpura.

Author(s): Jiang, Yang; McIntosh, Jennifer J; Reese, Jessica A; Deford, Cassandra C; Kremer Hovinga, Johanna A; Lämmle, Bernhard; Terrell, Deirdra R; Vesely, Sara K; Knudtson, Eric J; George, James N

Source: Blood; Mar 2014; vol. 123 (no. 11); p. 1674-1680

Publication Date: Mar 2014

Publication Type(s): Research Support, Non-u.s. Gov't Journal Article

Available in full text at Blood - from Highwire Press

Abstract:UNLABELLEDPregnancy may precipitate acute episodes of thrombotic thrombocytopenic purpura (TTP), but pregnancy outcomes in women who have recovered from acquired TTP are not well documented. We analyzed pregnancy outcomes following recovery from TTP associated with acquired, severe ADAMTS13 deficiency (ADAMTS13 activity <10%) in women enrolled in the Oklahoma TTP-HUS Registry from 1995 to 2012. We also systematically searched for published reports on outcomes of pregnancies following recovery from TTP associated with acquired, severe ADAMTS13 deficiency. Ten women in the Oklahoma Registry had 16 subsequent pregnancies from 1999 to 2013. Two women had recurrent TTP, which occurred 9 and 29 days postpartum. Five of 16 pregnancies (31%, 95% confidence interval, 11%-59%) in 3 women were complicated by preeclampsia, a frequency greater than US population estimates (2.1%-3.2%). Thirteen (81%) pregnancies resulted in normal children. The literature search identified 382 articles. Only 6 articles reported pregnancies in women who had recovered from TTP associated with acquired, severe ADAMTS13 deficiency, describing 10 pregnancies in 8 women. TTP recurred in 6 pregnancies.CONCLUSIONSWith prospective complete follow-up, recurrent TTP complicating subsequent pregnancies in Oklahoma patients is uncommon, but the occurrence of preeclampsia may be increased. Most pregnancies following recovery from TTP in Oklahoma patients result in normal children.

Database: Medline

17. Thrombotic thrombocytopenic purpura: Risks of pregnancy following recovery

Author(s): McIntosh J.; Knudtson E.; Jiang Y.; George J.; Terrell D.; Vesely S.

Source: American Journal of Obstetrics and Gynecology; Jan 2014; vol. 210 (no. 1)

Publication Date: Jan 2014

Publication Type(s): Conference Abstract

Abstract:OBJECTIVE: Thrombotic thrombocytopenic purpura (TTP) is a rare, acute disorder of systemic microvascular thrombosis (incidence: 2cases/106/year). Most patients are women, many of reproductive age. Pregnancy is a recognized risk factor for triggering acute episodes. However pregnancy outcomes following recovery have been described in only six case reports. Therefore, we aimed to determine maternal and perinatal outcomes following recovery from TTP. STUDY DESIGN: TheOklahoma TTP Registry is a prospective, population based inception cohort. Diagnosis of TTP was confirmed by severe ADAMTS13 deficiency (activity <10%). Pregnancy outcomes following recovery from TTP were documented by face-to-face interviews and medical records. Major complications were defined as TTP recurrence, pre-viable fetal loss, delivery <34 weeks, severe pre-eclampsia, other serious maternal medical complications, and NICU admission. RESULTS: 74 patients had severe acquired ADAMTS13 deficiency, 1995-2013; 57 (77%) were women; 46 (81%) survived their initial episode; 10 have had 15 subsequent pregnancies (Table). 12 (80%) pregnancies resulted in live born infants who have become healthy children. 5 women had major complications in 6 pregnancies; none died or had significant sequelae. The major complications were: 2 women (2 pregnancies) had recurrent TTP post-partum; 1 woman also had severe preeclampsia; both recovered with appropriate treatment. 1 woman developed severe pre-eclampsia in both of her pregnancies. 1

woman had a 20 week fetal loss. 1 woman had a severe lupus flare. 3 infants (25%) required NICU admission; 2 were related to the timing of elective delivery, not to a pregnancy complication. CONCLUSION: Pregnancy following recovery from TTP may have increased risk for complications, including recurrent TTP. However these risks are manageable and 80% of pregnancies resulted in healthy children. We conclude that these women should not be discouraged from future pregnancies.

Database: EMBASE

18. Thrombotic thrombocytopenic purpura and pregnancy. Experience on 7 cases

Author(s): Ferrari B.; Trisolini S.M.; Mohamed S.; Capria S.; Shafii Bafti M.; Vita F.; Canichella M.; Mallano S.; Polino A.; Tronnolone L.; Foa R.; Meloni G.

Source: Haematologica; Oct 2013; vol. 98 ; p. 108

Publication Date: Oct 2013

Publication Type(s): Conference Abstract

Available in full text at Haematologica - from Highwire Press

Available in full text at Haematologica - from National Library of Medicine

Abstract: Thrombotic thrombocytopenic purpura (TTP) is a rare life-threatening microangiopathic disorder caused by the absence or severe depletion of the metalloproteinase ADAMT13. Pregnancy can precipitate the onset of the disease or it can exacerbate its recurrence in patients with known prior TTP. We report hereby on 8 pregnancies in 7 patients. Three patients presented with a first episode of TTP during pregnancy, while 4 suffered from a chronic relapsing form of the disease. From this latter group, 1 patient developed a relapse during pregnancy. Cases 1 and 2 presented an acute single episode of TTP during the first pregnancy at 9 weeks of gestation and during the second pregnancy at 5 weeks of gestation, respectively. Both obtained a complete remission (CR) after daily plasma-exchange (PEX) plus methylprednisolone (MP). After remission, in case 2, as per request of the patient, an elective abortion was carried out. Case 3 developed TTP when the first pregnancy was complicated by placental abruption and intrauterine foetal death. Two years later a TTP relapse was documented during the second pregnancy at 20 weeks of gestation; ADAMTS13 activity was <5% with the presence of ADAMTS13 inhibitors. After PEX plus MP, a CR was obtained. Case 4 presented a TTP relapse during the first pregnancy at 18 weeks of gestation and obtained a CR after PEX plus MP. Prophylactic PEX were performed until delivery in cases 1, 3 and 4. Cases 5, 6 and 7 with chronic relapsing TTP in remission at the time of pregnancy, maintained a normal ADAMTS13 activity throughout pregnancy, requiring no specific therapy. All patients received low-dose aspirin and prophylactic low molecular weight heparin (LMWH) throughout pregnancy until delivery and during the postpartum for six weeks. Six healthy babies were delivered in the third trimester of gestation. Our data suggest that pregnancy- related TTP or TTP relapse during pregnancy should be treated with PEX, and PEX should be continued until delivery. When ADAMTS13 inhibitors are present, MP can be used because it does not cross the placenta. Evaluation of the ADAMT13 activity levels and the search of anti-ADAMTS13 antibodies before planning a pregnancy is essential in the management of pregnancy. ADAMTS13 activity should be monitored throughout pregnancy so that prompt PEX can be implemented. Due to the multifactorial thrombotic risk, a prophylactic treatment with aspirin and LMWH was initiated during gestation and continued in the postpartum.

Database: EMBASE

19. Successful pregnancy after rituximab prophylactic treatment in a patient with chronic relapsing thrombotic thrombocytopenic purpura

Author(s): Trisolini S.M.; Mohamed S.; Quattrocchi L.; Canichella M.; Mallano S.; Meo D.; Polino A.; Tronnolone L.; Capria S.; Foa R.; Meloni G.; Ferrari B.

Source: Haematologica; Oct 2013; vol. 98 ; p. 108

Publication Date: Oct 2013

Publication Type(s): Conference Abstract

Available in full text at Haematologica - from Highwire Press

Available in full text at Haematologica - from National Library of Medicine

Abstract: Thrombotic thrombocytopenic purpura (TTP) is an acute life-threatening microangiopathic disorder associated with a deficiency in the ADAMTS13 metalloprotease. The majority of cases are mediated by inhibitor antibodies to ADAMTS13. The severe reduction of ADAMTS13 activity are predictive of risk of relapse; moreover, pregnancy may precipitate a relapse in women with a history of TTP. Clinical data suggest that the Rituximab may be useful in treating acute refractory or chronic relapsing TTP and may be given as prophylaxis in selected cases to prevent relapse. We describe a successful pregnancy after prophylactic treatment with Rituximab in a patient with chronic relapsing TTP. The patient's first episode of TTP occurred when she was 26 yearsold; because of the unresponsiveness to plasma-exchange (PEX) plus steroids, 5 doses of Vincristine were administered to obtain a complete remission (CR). The second and the third TTP episode occurred when she was 28 and 30 years-old, and were successfully treated with PEX and steroids alone. At the time of the third acute episode, monitoring of the ADAMTS 13 activity was performed and a reduced ADAMTS13 activity with inhibitors was documented. After the achievement of the CR, immunosuppressive treatment with Azatioprine was administered for two years which was associated with a normalization of the ADAMTS13 activity. One year later, a reappearance of inhibitors with reduced ADAMTS13 activity was detected and due to the patient's pregnancy desire, Rituximab treatment (375 mg/m2 for 4 weekly doses) was started, which was followed by a rapid normalization of the ADAMTS13 activity and antibody disappearance within 10 months. One year later she became pregnant. Monthly ADAMTS13 monitoring was carried out during the pregnancy; a normal ADAMTS13 activity was detected until delivery and a caesarean section was performed at the 38th week of gestation. A fit baby was delivered. One month after delivery, ADAMTS13 activity was normal and anti-ADAMTS13 inhibitors were absent. Based on our experience, a successful pregnancy can be planned in women with a history of TTP who wish to have a baby despite the high risk of TTP relapse. Evaluation of the ADAMT13 activity levels and the search of ADAMTS13 inhibitors before planning the pregnancy are essential. A deficient ADAMTS13 activity pre-pregnancy predicts a high risk of relapse and could identify patients for whom the risk/benefit ratio justifies the prophylactic use of Rituximab.

Database: EMBASE

20. Recurrent thrombotic thrombocytopenic purpura with congenital ADAMTS 13 deficiency-a report of successful management in pregnancy

Author(s): Subramanian D.S.V.; Gale A.

Source: BJOG: An International Journal of Obstetrics and Gynaecology; Jun 2013; vol. 120 ; p. 109

Publication Date: Jun 2013

Publication Type(s): Conference Abstract

Abstract: Case Twenty-three year old LS booked at 8 weeks of gestation in her third pregnancy. She had a complex obstetric history including delivery by emergency caesarean section at 28 weeks for HELLP syndrome in her first pregnancy and at 35 weeks in her second pregnancy due to presumed severe pre-eclampsia, following presenting with severe thrombocytopenia and significant proteinuria. As there was no improvement post delivery, the diagnosis was revised to thrombotic thrombocytopenic purpura (TTP) and she was treated by plasma exchange and prednisolone. Investigations confirmed low ADAMTS 13 (A Disintegrin And Metalloproteinase with Thrombospondin Motifs) activity with no significant antibodies, which was suggestive of congenital TTP. She was followed up at the haemophilia centre and treated with weekly administration of factor 8Y. In this pregnancy LS was managed in a joint haematology/ obstetric service. She required twice weekly factor 8Y and was commenced on low dose aspirin and prophylactic clexane. Her platelet count was maintained in the normal range, being 304 at 33 weeks of gestation. Elective caesarean section was planned at 39 weeks of gestation. She developed an E. coli urinary tract infection at 35 weeks of gestation and subsequently was admitted with vomiting. She was started on intravenous antibiotics. Her platelet count dropped to 31 and hence clexane was withheld. The diagnosis of relapsed TTP secondary to E.coli sepsis was made. She received multidisciplinary care involving Obstetricians, Anaesthetists, Haematologists, Transfusion team and the Regional Haemostasis and Thrombosis centre. She had plasma exchange via a central line to increase her platelet count prior to delivery. She was delivered by uneventful caesarean section under spinal anaesthesia at 36 weeks of gestation. The baby's full blood count was normal at birth. Conclusion TTP can be caused by the deficiency of the von Willebrand's Factor-cleaving protease named ADAMTS13. In women, TTP is diagnosed during pregnancy or postpartum in 12- 25% of cases. The distinction between TTP and pregnancy related complications might pose challenges. But TTP does not resolve with delivery and may worsen in the absence of plasma therapy. Timely correct diagnosis, multidisciplinary integrated approach and prophylaxis in subsequent pregnancies are the key factors to optimise the pregnancy outcome in women with this condition.

Database: EMBASE

21. Management of pregnancy-associated thrombotic thrombocytopenia purpura

Author(s): Fyfe-Brown A.; Chandra S.; Jain V.; Clarke G.; Nerenberg K.

Source: AJP Reports; May 2013; vol. 3 (no. 1); p. 45-50

Publication Date: May 2013

Publication Type(s): Article

Available in full text at AJP Reports - from National Library of Medicine

Abstract: Thrombotic thrombocytopenia purpura (TTP) is an infrequent but serious disease. Pregnancy is a known risk factor for presentation or relapse of TTP. Difficulties in differentiating TTP from preeclampsia/HELLP (hemolysis, elevated liver enzymes and low platelets) syndrome, and current treatment recommendations are discussed in this case report. A woman with previously treated and stable TTP had a relapse at 36 weeks' gestation. Careful surveillance led to an early diagnosis. Severe disease in the peripartum period was treated successfully with cryosupernatant plasma-based plasmapheresis and platelet transfusion, with good maternal and neonatal outcomes. Cryosupernatant plasma is a viable alternative to fresh frozen plasma for plasmapheresis for TTP and may offer some therapeutic and logistical advantages. Platelet transfusion can be undertaken safely if needed to prevent or treat significant hemorrhage. Copyright © 2013 by Thieme Medical Publishers, Inc.

Database: EMBASE

22. A case of severe ADAMTS13 deficiency presenting as thrombotic thrombocytopenic purpura in pregnancy.

Author(s): Nikolaou, Marinos; Karakantza, Marina; Adonakis, George; Theodorou, George; Zoumbos, Nikolaos; Decavalas, George

Source: Medicinski pregled; 2012; vol. 65 (no. 9-10); p. 436-439

Publication Date: 2012

Publication Type(s): Case Reports Journal Article

Abstract:INTRODUCTIONThrombotic thrombocytopenic purpura is a rare life-threatening disorder characterized by thrombocytopenia and microangiopathic hemolytic anemia. It is caused by the absent or severe deficiency of the von Willebrand Factor-cleaving protease named ADAMTS13. Pregnancy is a well recognized factor precipitating the appearance of the disease both in women that had reduced levels of ADAMTS13 activity prior to gestation and in those with other inherited or acquired thrombophilic syndromes.CASE REPORTWe report a 25-year old woman with severe ADAMTS13 deficiency presented early in her 1st pregnancy and relapsed in two subsequent gestations. This presentation is uncommon for thrombotic thrombocytopenic purpura is associated with pregnancy (ADAMTS13 deficiency < 5%, without an inhibitor). In the first pregnancy she started with daily plasma exchange 1.5 x volume, corticosteroids and IV immunoglobulin and finally entered remission after 23 sessions and termination of pregnancy. In the second pregnancy she did not receive prophylactic treatment and relapsed in the 3rd trimester. Prophylactic treatment during the third pregnancy with plasma infusions proved also ineffective to prevent relapse.DISCUSSIONMany issues regarding treatment and prevention of thrombotic thrombocytopenic purpura relapses in subsequent pregnancies are unclear. Proposed guidelines recommend that the same treatment should be performed on pregnant and non pregnant patients without modification of plasma replacement dose according to ADAMTS13 levels. In addition, many authors suggest that pregnant patients with history of thrombotic thrombocytopenic purpura and severe deficiency of ADAMTS13 levels should received prophylactic treatment for prevention of relapses in the subsequent pregnancies.CONCLUSIONSevere ADAMTS 13 deficiency may present as thrombotic thrombocytopenic purpura of pregnancy. Pregnant women with thrombotic thrombocytopenic

purpura and especially with severe deficiency of ADAMTS13 levels require specific consideration regarding treatment and prophylaxis in subsequent pregnancies.

Database: Medline

23. Complications of pregnancy in women with thrombotic thrombocytopenic purpura

Author(s): Ferrari B.; Artoni A.; Pontiggia S.; Lotta L.A.; Peyvandi F.; Trisolini S.; Mikovic D.; Rosendaal F.R.

Source: Blood; Nov 2012; vol. 120 (no. 21)

Publication Date: Nov 2012

Publication Type(s): Conference Abstract

Available in full text at Blood - from Highwire Press

Abstract: Background: Thrombotic Thrombocytopenic Purpura (TTP) occurring in association with pregnancy or puerperium accounts for 12-25% of all TTP acute episodes. Pregnancy leads to acute TTP in women affected by congenital TTP in the absence of periodic prophylactic plasma infusions, while the risk of acute TTP during pregnancy for women with the acquired form is not well known. Moreover, it is not known whether the presence of anti-ADAMTS13 antibodies that characterize acquired TTP affect the outcome of subsequent pregnancies. The aim of this study was to evaluate maternal-foetal outcome of pregnancies started after the diagnosis of TTP. Methods: We analyzed clinical and laboratory features of 25 pregnancies of 22 women with TTP (all acquired TTP) out of 320 TTP patients in our cohort, all referred to the Milan TTP Registry, Milan (Italy), from 1994 to 2012. We tested the available biological samples for ADAMTS13 activity using FRET method, anti-ADAMTS13 autoantibodies by Western Blotting and ultra-large von Willebrand Factor (ULVWF) multimers ratio. Results: We found that 18 out of 25 pregnancies (72%) were complicated by either TTP recurrence (11/25, 44%) or spontaneous abortion in the first trimester (7/25, 28%). The incidence of TTP recurrence was 0.02 cases/week gestation (median duration of pregnancy at event: 32 weeks). The incidence of spontaneous abortion was 0.01 cases/week gestation (median duration of pregnancy at event: 6 weeks). Women's parity was associated with spontaneous abortion, with a relative rate of 2.8 (95% confidence interval: 0.5-14.2) for multigravidae versus primigravidae. Interestingly, almost all miscarriages (6/7, 86%) occurred in women who experienced a pregnancy-related TTP episode during a previous pregnancy. To understand if this high rate of spontaneous abortion could be related to TTP, we analyzed ADAMTS13 activity levels, anti-ADAMTS13 antibodies and ULVWF multimers pattern. In the pregnancies complicated by TTP relapse, ADAMTS13 activity was severely reduced in the acute phase, in association with the presence of antiADAMTS13 antibodies and reduction of ULVWF multimers (ULVWF ratio 1.21); in the group of uncomplicated pregnancies, the mean ADAMTS13 activity levels was 97% in the first trimester and remained > 35% until delivery, with absence of antiADAMTS13 antibodies and normal ULVWF multimers. Conclusions: Obstetric complications are frequent during pregnancies in women affected with acquired TTP. ADAMTS13 activity levels > 35% in the absence of antiADAMTS13 antibodies seem to confer little or no risk, while lower ADAMTS13 activity levels and the presence of antiADAMTS13 antibodies during pregnancy are predictive of poor gravidic outcome, either with acute TTP or spontaneous abortion in the first trimester. Surprisingly, although confidence intervals were wide, miscarriage rates were highest in multigravidae. Pre-gravidic and gravidic monitoring of ADAMTS13 activity levels and anti-ADAMTS13 autoantibodies is crucial in the management of pregnancies in TTP patients.

Database: EMBASE

24. Viridans group streptococcal bacteremia, thrombotic thrombocytopenic purpura, and lupus in pregnancy: A maternal mortality

Author(s): Williams T.; Carlan S.J.; Hergert J.V.; Ashrafi S.

Source: Infectious Diseases in Clinical Practice; Nov 2012; vol. 20 (no. 6)

Publication Date: Nov 2012

Publication Type(s): Article

Available in full text at Infectious Diseases in Clinical Practice - from Ovid

Abstract:BACKGROUND: Viridans group streptococci are a human commensal microorganism with low virulence in immune competent individuals. Active systemic lupus erythematosus and associated thrombotic thrombocytopenic purpura (TTP) in pregnancy can result in serious morbidity from both the diseases and their treatment. CASE: A 21-year-old primagravida with a history of systemic lupus erythematosus, recurrent TTP, and chronic hypertension presented with chest pain and severe pelvic pressure at 21 weeks' gestation. She was admitted with apparent relapse of TTP and active lupus and was started on supportive measures, parenteral corticosteroids, and plasmapharesis. She had a fatal respiratory arrest after the second plasmapharesis. A postmortem examination revealed lupus myocarditis and positive viridans group streptococci cultures from the amniotic fluid, heart, spinal fluid, and lung. CONCLUSION: Viridans group streptococci can be an invasive, deadly, refractory, and silent pathogen when combined with an already compromised second trimester pregnant patient who has undergone treatments that result in large fluid shifts. Copyright © 2012 by Lippincott Williams & Wilkins.

Database: EMBASE

25. Thrombotic thrombocytopenic purpura in pregnancy and the role of therapeutic plasma exchange: A report of five cases and review of the literature

Author(s): Tchakarov A.; Bai Y.; Chen J.

Source: Transfusion; Sep 2012; vol. 52

Publication Date: Sep 2012

Publication Type(s): Conference Abstract

Available in full text at Transfusion - from John Wiley and Sons

Abstract: Background/Case Studies: Thrombotic Thrombocytopenic Purpura (TTP) is a microangiopathic hemolytic anemia characterized by thrombocytopenia, anemia, renal failure, fever and neurological symptoms. It is caused by inhibition of ADAMTS-13 which leads to intravascular platelet aggregation. Pregnancy appears to be a risk factor for development of TTP with 10-25% of patients being pregnant or in the immediate postpartum period. The etiology of TTP in pregnancy has not been determined; however, it is postulated to be due to changes that occur in the hemostatic system, including hypercoagulability, venous stasis and decreased ADAMTS-13 activity. The diagnosis of TTP in pregnant patients can be challenging as there are several conditions such as preeclampsia/eclampsia and Hemolysis, Elevated Liver Enzymes and Low Platelets syndrome which can mimic TTP but have different treatment and therefore must be ruled out. Rapid diagnosis and intervention are essential in TTP as early treatment with plasmapheresis will decrease maternal mortality from 80-90% to 10-20%. Early treatment also reduces vascular bed thrombosis within the placenta which reduces fetal death, intrauterine growth retardation and premature delivery. TTP diagnosed in pregnancy may recur in future pregnancies or in the non-gravid state, and it has not been shown which factors increase risk of recurrence. Study Design/Methods: We identified five cases of TTP in pregnancy at two major hospitals over a 4 year period and the files were examined to determine the gestational age at presentation, ADAMTS-13 levels, ADAMTS- 13 inhibitor levels,

treatment protocol, and patient outcome. A review of the literature was also performed to gather the most recent data on TTP in pregnancy. Results/Findings: Please see the Table for findings of case study. Conclusion: While many studies have addressed the association between TTP and pregnancy, few have addressed the levels of ADAMTS-13 and inhibitor found in cases of pregnancy associated TTP. We present five cases of TTP occurring during or immediately following pregnancy with the ADAMTS-13 levels and treatment outcomes, along with a review of the literature. (Table Presented)
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Database: EMBASE

26. ADAMTS13 activity and the risk of thrombotic thrombocytopenic purpura relapse in pregnancy.

Author(s): Raman, Rachna; Yang, Shangbin; Wu, Haifeng M; Cataland, Spero R

Source: British journal of haematology; Apr 2011; vol. 153 (no. 2); p. 277-279

Publication Date: Apr 2011

Publication Type(s): Letter Case Reports

Available in full text at British Journal of Haematology - from John Wiley and Sons

Database: Medline

27. Thrombotic thrombocytopenic purpura (TTP) and pregnancy: Presentation and management in subsequent pregnancies

Author(s): Thomas M.R.; Camilleri R.S.; MacHin S.J.; Scully M.A.

Source: Pathophysiology of Haemostasis and Thrombosis; 2010; vol. 37

Publication Date: 2010

Publication Type(s): Conference Abstract

Abstract: Background/Aims: Half of all patients with acute TTP are women of child bearing age. Increasing use of ADAMTS13 assays and mutational analysis has improved pregnancy management. Materials and Methods: All UK cases of TTP referred for ADAMTS13 analysis or managed at UCLH were included. Results: 8/16 cases of acute TTP presenting in pregnancy had congenital TTP. Diagnosis was confirmed by ADAMTS13 activity <5%, no anti-ADAMTS13 IgG and homozygous/ compound heterozygous/heterozygous gene defects. The most commonly detected abnormality was located in exon 24, affecting the distal end of the ADAMTS13 protein. Presentation was in the 1st trimester (n=1), 2nd trimester (n=4) and 3rd trimester (n=3). Fetal deaths in untreated or presenting pregnancies were 6/11 (twins x1). Subsequent pregnancies were treated throughout with intermediate-purity FVIII, plasma infusion or plasma exchange (PEX) with live births in 5/7, although pregnancy-related complications such as hypertension were increased. 8 further women had pregnancy-associated TTP, most with anti- ADAMTS13 IgG. The majority presented in the 3rd trimester/ postpartum (n=5). We have managed 13 pregnancies in women with a past history of TTP including 2 sets of twins. All received low dose aspirin (LDA)+/-LMWH prophylaxis. ADAMTS13 activity was monitored regularly. Women with normal first trimester ADAMTS13 did not have TTP-associated complications. Elective PEX was required in one pregnancy when levels fell to 10-15%. Regular fetal US+/-uterine artery dopplers suggested management was satisfactory. There were no fetal deaths. Conclusions: Late onset congenital TTP must be considered when the disease presents in pregnancy. Women with congenital TTP require therapy throughout pregnancy. In women with previous acquired TTP, baseline ADAMTS13 activity and antibody status may identify likely relapse. Elective PEX should be considered in women with reduced ADAMTS13 (<10-15%) and/or raised IgG.

LDA+/-prophylactic LMWH are used to reduce complications related to placental thrombosis. Successful pregnancy outcomes are possible in both acquired and congenital TTP.

Database: EMBASE

28. A case of multiple thrombotic thrombocytopenic purpura relapses in pregnancy

Author(s): Rommens K.; Puhl A.; Kolbl H.; Schinzel H.

Source: Archives of Gynecology and Obstetrics; Oct 2010; vol. 282

Publication Date: Oct 2010

Publication Type(s): Conference Abstract

Available in full text at Archives of Gynecology and Obstetrics - from Springer Link Journals

Abstract: Objective: Thrombotic thrombocytopenic purpura (TTP) is a rare but severe multisystem disorder. It has for a long time been a pathology that was difficult and frustrating to treat with a infaust prognosis. Since the introduction of plasma manipulation techniques, particularly plasmaexchange (PE), these patients have benefited greatly. Materials and methods: In our case report we introduce a 24 year old pregnant woman whose life probably depended on plasma-exchange techniques several times during her pregnancy and after the birth of her son. The followup of this woman was possible by regularly blood counts because she was a clinically stable patient, known with a history of TTPrelapses. But there is still discussion about the most adequate tests of diagnosing TTP in pregnant women to differ from hemolysis, elevated liver enzymes and low platelets syndrome (HELLP). Conclusions: Both pathologies have parallels in clinical signs and laboratory testings but need a different therapy. The deficiency of ADAMTS-13 activity is suggested to possibly be a prognostic factor of TTP-relapses in pregnancies and could be the best indicator to start therapy. On the other hand, the costs make it not attractive as a prognostic test. A literature study shows that, because of the rarity of the disease there is a need of international cooperative trials to give us more information on still unanswered questions.

Database: EMBASE

29. Successful prevention of thrombotic thrombocytopenic purpura (TTP) relapse using monthly prophylactic plasma exchanges throughout pregnancy in a patient with systemic lupus erythematosus and a prior history of refractory TTP and recurrent fetal loss.

Author(s): Abou-Nassar, Karim; Karsh, Jacob; Giulivi, Antonio; Allan, David

Source: Transfusion and apheresis science : official journal of the World Apheresis Association : official journal of the European Society for Haemapheresis; Aug 2010; vol. 43 (no. 1); p. 29-31

Publication Date: Aug 2010

Publication Type(s): Case Reports Journal Article

Abstract:BACKGROUNDThe occurrence of thrombotic thrombocytopenic purpura (TTP) in the setting systemic lupus erythematosus (SLE) is rare. In women of childbearing age, TTP is associated with high rates of recurrence in pregnancy. Furthermore, both TTP and SLE are associated with a significant risk of adverse pregnancy outcomes.CASE PRESENTATIONWe describe the case of a 36 year old female in her first trimester of pregnancy with a prior history of SLE-associated severe refractory TTP who was treated with a combination of corticosteroids and prophylactic plasma exchanges (PLEX) throughout pregnancy to prevent TTP recurrence. She delivered a healthy infant at 33 weeks of gestation after the onset of preterm labor. There was no evidence of TTP recurrence in the antepartum or postpartum period in this high risk patient.CONCLUSIONProphylactic PLEX should

be considered as a therapeutic option to prevent recurrent TTP during pregnancy in high risk patients, including patients with previous SLE-associated TTP.

Database: Medline

30. Successful management of recurrent pregnancy-related thrombotic thrombocytopaenia purpura in a renal transplant recipient.

Author(s): Lam, Kimberly; Martlew, Vanessa; Walkinshaw, Steve; Alfirevic, Zarko; Howse, Matthew

Source: Nephrology, dialysis, transplantation : official publication of the European Dialysis and Transplant Association - European Renal Association; Jul 2010; vol. 25 (no. 7); p. 2378-2380

Publication Date: Jul 2010

Publication Type(s): Case Reports Journal Article

Available in full text at Nephrology Dialysis Transplantation - from Oxford University Press ; Collection notes: To access please select Login with Athens and search and select NHS England as your institution before entering your NHS OpenAthens account details.

Abstract: Thrombotic thrombocytopaenic purpura (TTP) is a rare but potentially devastating complication of pregnancy. We report the first documented case of a successful treatment of recurrent TTP complicating pregnancy in a renal transplant patient.

Database: Medline

31. Thrombotic thrombocytopaenic purpura occurring in consecutive pregnancies in an HIV-infected patient.

Author(s): Robertson, C; Wiselka, M J

Source: International journal of STD & AIDS; Feb 2007; vol. 18 (no. 2); p. 142-143

Publication Date: Feb 2007

Publication Type(s): Case Reports Journal Article

Abstract: We present an HIV-infected patient who presented with thrombotic thrombocytopaenic purpura (TTP) during two consecutive pregnancies. To our knowledge, relapse of TTP during successive pregnancies in HIV infection has never been reported. This case reiterates that TTP should be considered in HIV-infected patients presenting with pregnancy-related complications.

Database: Medline

32. Successful management of pregnancy in women with a history of thrombotic thrombocytopaenic purpura.

Author(s): Scully, Marie; Starke, Richard; Lee, Richard; Mackie, Ian; Machin, Samuel; Cohen, Hannah

Source: Blood coagulation & fibrinolysis : an international journal in haemostasis and thrombosis; Sep 2006; vol. 17 (no. 6); p. 459-463

Publication Date: Sep 2006

Publication Type(s): Case Reports Journal Article

Available in full text at Blood Coagulation and Fibrinolysis - from Ovid

Abstract: Pregnancy is an initiating event for acute thrombotic thrombocytopaenic purpura (TTP). There is a high risk of relapse during pregnancy and of foetal morbidity. We describe five cases with successful maternal and foetal outcomes in patients with a history of TTP. Cases 1 and 2 presented with TTP in their first pregnancy and had second-trimester foetal losses. Case 3 had four TTP relapses and soon after achievement of clinical remission became pregnant. Case 4 presented with TTP and left-sided stroke in pregnancy. ADAMTS-13 activity was less than 5% at presentation in four patients and prior to therapy during pregnancy in cases 1-4. Case 5, who had a single acute episode of TTP and became pregnant 6 years later, had normal ADAMTS-13 activity throughout pregnancy. Only case 3 had evidence of an inhibitor on mixing studies. All five patients underwent close haematological and obstetric monitoring and continued low-dose aspirin throughout pregnancy. Patients 1-4 had regular plasma exchange and received low molecular weight heparin during pregnancy. Patient 4 also received rituximab during the third trimester with no observed maternal or neonatal toxicity. Live healthy infants were delivered in all five cases in the third trimester. These findings suggest that successful pregnancy outcome is achievable in patients with a history of TTP and that patients with severely reduced ADAMTS-13 activity at the onset of pregnancy, necessitates regular plasma exchange during pregnancy.

Database: Medline

33. Thrombotic thrombocytopenic purpura and pregnancy: report of four cases and literature review.

Author(s): Shamseddine, Ali; Chehal, Aref; Usta, Ihab; Salem, Ziad; El-Saghir, Nagi; Taher, Ali

Source: Journal of clinical apheresis; 2004; vol. 19 (no. 1); p. 5-10

Publication Date: 2004

Publication Type(s): Case Reports Journal Article Review

Available in full text at Journal of Clinical Apheresis - from John Wiley and Sons

Abstract: Thrombotic thrombocytopenic purpura (TTP) is a severe life-threatening hematological disorder affecting the microcirculation of multiple organ systems. Infection, pregnancy, cancer, drugs, and surgery are frequently associated with the initial episodes and relapses. Women who are either pregnant or in the postpartum period make up 10-25% of TTP patients, suggesting the interrelationship between TTP and pregnancy. The introduction of aggressive treatment with plasma transfusion and plasmapheresis has improved maternal and fetal survival rates. We report four cases of pregnancy-related TTP, describing the clinical course of patients, including response to therapy and pregnancy outcomes. Three out of four (75%) patients were treated by daily single session of plasmapheresis for a period ranged between 3 and 23 days. One patient had complete response to treatment with no sequelae, the second patient had resistant disease and died due to multiorgan failure, while the third patient had complete response after 2 episodes of TTP, which was complicated by intrauterine fetal growth retardation and death. Review of the previously reported

cases of pregnancy-related TTP and the current treatment options for this rare condition are discussed also.

Database: Medline

34. Thrombotic thrombocytopenic purpura and pregnancy: a review of ten cases.

Author(s): Castellá, M; Pujol, M; Juliá, A; Massague, I; Bueno, J; Ramón Grifols, J; Puig, L

Source: Vox sanguinis; Nov 2004; vol. 87 (no. 4); p. 287-290

Publication Date: Nov 2004

Publication Type(s): Case Reports Journal Article

Available in full text at Vox Sanguinis - from John Wiley and Sons

Abstract:BACKGROUND AND OBJECTIVESA series of women with pregnancy-associated thrombotic thrombocytopenic purpura, is presented. This study will focus on the relationship between thrombotic thrombocytopenic purpura and pregnancy and on maternal and neonatal outcomes.MATERIALS AND METHODSAmong forty-six consecutive patients with thrombotic thrombocytopenic purpura, nine pregnant patients were identified.RESULTSSeven patients presented an acute single episode associated with pregnancy and two patients had a chronic relapsing form of the disease. None of these two patients were diagnosed during pregnancy or in the postpartum period. There was one maternal death. Fetal mortality was 33%.CONCLUSIONSThe recurrence is rare in women who had the prior episode related to pregnancy. The risk of death for these patients seems not higher than that of the remaining patients in the series. Preterm delivery and intrauterine fetal death were frequent complications of these pregnancies.

Database: Medline

35. Pregnancy outcomes after recovery from thrombotic thrombocytopenic purpura-hemolytic uremic syndrome.

Author(s): Vesely, Sara K; Li, Xiaoning; McMinn, J R; Terrell, Deirdra R; George, James N

Source: Transfusion; Aug 2004; vol. 44 (no. 8); p. 1149-1158

Publication Date: Aug 2004

Publication Type(s): Journal Article

Available in full text at Transfusion - from John Wiley and Sons

Abstract:BACKGROUNDRecurrent thrombotic thrombocytopenic purpura-hemolytic uremic syndrome (TTP-HUS) during a subsequent pregnancy is an important concern because pregnancy may increase the risk for relapse.STUDY DESIGN AND METHODSOutcomes of all pregnancies after recovery from TTP-HUS in the Oklahoma TTP-HUS Registry, a cohort of 301 consecutive patients during the period of 1989 through 2003, were assessed and compared to the total published experience.RESULTSIn the Oklahoma Registry, 3 of 7 (43%) women with idiopathic TTP-HUS, 2 of 11 (18%) women who were pregnant/postpartum, and 0 of 1 (0%) woman with a bloody diarrhea prodrome at their initial presentation were diagnosed with TTP-HUS during a subsequent pregnancy; all 5 women recovered. In published reports, 10 of 11 (91%) women with idiopathic TTP-HUS and 11 of 18 (61%) women who were pregnant/postpartum at their initial presentation, and all 11 (100%) women with congenital TTP-HUS were diagnosed with TTP-HUS during a subsequent pregnancy. Rates of recurrence in the Oklahoma Registry may be less because of case report bias for exceptional patients. Recurrent TTP-HUS was difficult to diagnose because other pregnancy-related complications were frequent.CONCLUSIONS Although pregnancies in these women were often

complicated, a future pregnancy may be a safe and appropriate decision for women who have recovered from TTP-HUS.

Database: Medline

36. Thrombotic thrombocytopenic purpura: medical and biological monitoring of six pregnancies.

Author(s): Ducloy-Bouthors, Anne-Sophie; Caron, Claudine; Subtil, Damien; Provot, François; Tournoys, Antoine; Wibau, Bénédicte; Krivosic-Horber, Renée

Source: European journal of obstetrics, gynecology, and reproductive biology; Dec 2003; vol. 111 (no. 2); p. 146-152

Publication Date: Dec 2003

Publication Type(s): Journal Article

Abstract:BACKGROUND Thrombotic thrombocytopenic purpura (TTP) is a rare cause of severe thrombocytopenia in pregnancy.METHODS Six pregnancies in five patients with TTP were followed prospectively over 5 years. Ultralarge von Willebrand factor (ULvWF) multimers and cleaving protease (cp) levels were measured.RESULTSTTP relapsed, complicating four of the six pregnancies. Of three patients who relapsed, two had complete or partial vWF-cleaving protease (vWF-cp) deficiency, and one had a normal vWF-cleaving protease level. In all three we found abnormal UL multimers. The two women who did not relapse had normal vWF-cleaving protease level and an absence or loss of UL multimers.CONCLUSIONS Pregnant patients with a history of TTP must be followed in a tertiary obstetric unit with plasmapheresis available. Influence of vWF-cleaving protease and vWF multimeric abnormalities on TTP relapsing during pregnancy has to be evaluated in a further multicentre study.

Database: Medline

37. Thrombotic thrombocytopenic purpura and pregnancy: a case report and a review of the literature.

Author(s): Proia, A; Paesano, R; Torcia, F; Annino, L; Capria, S; Ferrari, A; Ferrazza, G; Pacifici, E; Pantalissi, A; Meloni, G

Source: Annals of hematology; Apr 2002; vol. 81 (no. 4); p. 210-214

Publication Date: Apr 2002

Publication Type(s): Research Support, Non-u.s. Gov't Case Reports Journal Article Review

Abstract: Thrombotic thrombocytopenic purpura (TTP) is a severe disorder affecting the microcirculation of multiple organ systems. Plasma therapy has significantly reduced the mortality rate. Infections, pregnancy, cancers, drugs, and surgery were frequently associated with the initial episodes and relapses. Women who are either pregnant or in the postpartum period make up 10-25% of TTP patients, suggesting the interrelationship between TTP and pregnancy. The introduction of aggressive treatment with plasma transfusion or plasmapheresis improved maternal and fetal survival rates. We describe a case of a first successful pregnancy concomitant to a late relapse of TTP, in which the identification of important risk factors for both TTP and pregnancy allowed us easier hematological and obstetrical management. Proposed guidelines for pregnancy-related TTP management and a brief review of current treatment options for this rare condition are also included.

Database: Medline

38. Chronic relapsing thrombotic thrombocytopenic purpura in pregnancy: a case report.

Author(s): Puza, S; Malee, M P

Source: The Journal of maternal-fetal medicine; 1996; vol. 5 (no. 6); p. 328-332

Publication Date: 1996

Publication Type(s): Case Reports Journal Article

Abstract: Thrombotic thrombocytopenic purpura (TTP) is a disorder of unknown etiology affecting the microcirculation of multiple organ systems. Plasma therapy has significantly reduced the mortality rate; thus, an increased incidence of recurrence has been noted. Since corticosteroids, antiplatelet agents, and splenectomy do not prevent recurrences, monthly plasma infusion have been instituted to decrease the risk of recurrence. However, in pregnancy, increase in frequency of plasma infusions to weekly or biweekly intervals has been associated with avoidance of placental infarcts. This is the first report of a successful pregnancy in which bimonthly prophylactic single plasma-exchange plasmapheresis was the treatment regimen with no obvious maternal-fetal morbidity.

Database: Medline

39. Thrombotic thrombocytopenic purpura: relapse and pregnancy.

Author(s): Vianelli, N; Gugliotta, L; Catani, L; Baravelli, S; Tura, S

Source: Haematologica; 1993; vol. 78 (no. 4); p. 259

Publication Date: 1993

Publication Type(s): Letter Case Reports

Database: Medline

40. Successful pregnancies of two patients with relapsing thrombotic thrombocytopenic purpura.

Author(s): Ezra, Y; Mordel, N; Sadovsky, E; Schenker, J G; Eldor, A

Source: International journal of gynaecology and obstetrics: the official organ of the International Federation of Gynaecology and Obstetrics; Aug 1989; vol. 29 (no. 4); p. 359-363

Publication Date: Aug 1989

Publication Type(s): Case Reports Journal Article

Abstract: Thrombotic thrombocytopenic purpura is a severe multisystemic disorder of unknown origin. The association of relapsing TTP with pregnancy is rare but well documented and high mortality rates of mothers and fetuses have been reported so far. Since the introduction of plasma therapy for treating the acute exacerbations of the disease, overall mortality rates have decreased significantly. It is now evident that the manifestations of the disease may reappear even after long disease-free intervals and as many as a third of the recovering patients may develop a relapse. Presented are two TTP patients with relapsing TTP complicating their pregnancies. Prophylactic treatment with aspirin and dipyridamole during their last three successful pregnancies prevented or minimized the severity of TTP relapses. The course of these pregnancies and the management of such patients is discussed.

Database: Medline

42. Recurrent thrombotic thrombocytopenic purpura in early pregnancy: effect of uterine evacuation.

Author(s): Natelson, E A; White, D

Source: Obstetrics and gynecology; Sep 1985; vol. 66 (no. 3)

Publication Date: Sep 1985

Publication Type(s): Case Reports Journal Article

Abstract:A 29-year-old woman developed thrombotic thrombocytopenic purpura on two occasions, each with onset at about the 13th week of gestation. Despite therapy during each episode with corticosteroids, platelet aggregation-modifying agents and repeated plasmapheresis, she experienced only transient improvement. In both instances, however, prompt hematologic recovery followed evacuation of the uterus. During an 18-month interval between pregnancies, her blood count remained normal and she continues in remission. The authors suggest that when thrombotic thrombocytopenic purpura appears in early pregnancy and its response to conventional management is minimal, immediate evacuation of the uterus may be an effective therapeutic alternative.

Database: Medline

Strategy 195179

#	Database	Search term	Results
1	Medline	("thrombotic thrombocytopenic purpura").ti,ab	3976
2	Medline	exp "PURPURA, THROMBOTIC THROMBOCYTOPENIC"/	4152
3	Medline	(1 OR 2)	5114
4	Medline	(pregn*).ti,ab	395636
5	Medline	exp PREGNANCY/	806984
6	Medline	(4 OR 5)	889206
7	Medline	(recurr*).ti,ab	472772
8	Medline	exp RECURRENCE/	163046
9	Medline	(7 OR 8)	556366
10	Medline	(3 AND 6 AND 9)	67
11	Medline	(relaps*).ti,ab	150337
12	Medline	(3 AND 6 AND 11)	67
13	Medline	(10 OR 12)	108
14	EMBASE	("thrombotic thrombocytopenic purpura").ti,ab	5342
15	EMBASE	*"THROMBOTIC THROMBOCYTOPENIC PURPURA"/	6476
16	EMBASE	(14 OR 15)	8109
17	EMBASE	(pregn*).ti,ab	540510
18	EMBASE	exp PREGNANCY/	657786

19	EMBASE	(17 OR 18)	846757
20	EMBASE	(recurr*).ti,ab	653482
21	EMBASE	(relaps*).ti,ab	236560
22	EMBASE	exp "RECURRENT DISEASE"/	150419
23	EMBASE	(20 OR 21 OR 22)	901586
24	EMBASE	(16 AND 19 AND 23)	189
25	EMBASE	*"RECURRENT DISEASE"/	11597
26	EMBASE	(15 AND 19 AND 25)	3