

Cerebral Venous Thrombosis During Pregnancy: Tertiary Centre Experience

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ABSTRACT

Introduction: Cerebral venous thrombosis (CVT) is a rare variant of stroke in the general population, but an important subtype among pregnancy- and puerperium-related cases. Studies describing its risk factors and clinical characteristics are limited. The aim is to study the prevalence of CVT with pregnancy in King Salman Bin Abdulaziz Medical City (KSAMC) for the past 23 years. In addition, detailing the presentation, symptoms, diagnosis and management of these patients. **Methods:** This a retrospective study to review files of pregnant women who was diagnosed as having CVT between first of January 2000 and end of October 2023. Aiming to study the prevalence of CVT with pregnancy in the past 23 years. In addition, detailing the presentation, symptoms, diagnosis and management of these patients. **Results:** There is only one patient with CVT during pregnancy out of 410355 deliveries in the past 23 years. Patient was diagnosed using MRI- venography. She was started on LMWH and patient delivered vaginally baby boy in good condition. **Discussion:** prevalence of CVT during pregnancy is 0.0002% and the incidence is 1case / 10,000,000 pregnancy per year. Normal physiological changes during first trimester may increase the risk of CVT. **Conclusion:** This finding of this study may provoke researchers in the country to study CVT during pregnancy on the national level to study such and important neurological issue during pregnancy.

Keywords: Cerebral venous thrombosis, Pregnancy, CT scan, Ultrasound, Hypertension, Beta Blockers, Progesterone, Estrogen, IUGR.

INTRODUCTION

Cerebrovascular issues are unusual however could have life-threatening and potentially disabling headaches all through pregnancy and the postpartum period. They pose vast dangers for each the pregnant woman and baby. They can be divided into two fundamental categories: thrombosis and ischemia, which consist of arterial and venous strokes and haemorrhage [1, 2]. there may be large variability inside the prevalence of stroke in pregnancy and puerperium,

encouraged via healthcare systems, geographical regions, look at populations, and look at designs. based totally on a systematic evaluation and meta-analyses, the pooled crude charge of stroke related to pregnancy turned into 30 instances in 100,000 pregnancies, with kind of identical rates among ischemic stroke, cerebral haemorrhage, and cerebral venous thrombosis (CVT) [3]. CVT represents 2–57% of strokes associated with pregnancy [4-10]. The majority of instances seem in the postpartum period [11].

being pregnant and postpartum period are related to complicated physiological changes and adaptation mechanisms, which can result in altered homeostasis and a high chance of headaches [1]. the primary causes for elevated CVT risk for the duration of the postpartum period are the hypercoagulability related to pregnancy, cesarean delivery, infections, blood loss, dehydration, fluctuations of intracranial stress during exertions and hypertensive headaches of being pregnant [12, 13]. The prothrombotic stat for the duration of being pregnant effects from a shift in the equilibrium among the fibrinolytic and haemostatic system to save excessive haemorrhage all through exertions. there's an improved stage of procoagulant elements, in addition to a decreased degree of anticoagulant factors which include protein S and C and reduced fibrinolytic activity. these haematological adjustments return to baseline most effective sex–eight weeks after transport [14-18]. A cesarean section contributes to the higher rates of CVT in puerperium. Most likely because the surgery caused tissue destruction results in increased thrombin activity, protein C activation and accelerated clearance from plasma. The surgical procedure-triggered decrease of protein C stat. This is due to pregnancy-related protein C resistance, resulting in increased threat of thrombosis [1]. The pregnancy- and delivery-related anemia can lead to thrombocytosis, which is a risk aspect for venous thrombosis [19].

Cerebral venous thrombosis is an unprecedented cause of stroke affecting all age groups, however with pregnancy because of hormone-related risk elements it is higher. Because of this and the nonspecific presentation of CVT with pregnancy, the diagnosis is tough, regularly delayed, and desires a high clinical organisation. Characteristically, in case of early diagnosis the outcomes are great and more beneficial to the patient [20].

This research aims to study the prevalence of CVT with pregnancy in King Salman Bin Abdulaziz Medical City (KSAMC) for the past 23 years. Added to that, detailing the presentation, symptoms, diagnosis and management of these patients.

METHODOLOGY

This is a retrospective study which was conducted in King Salman Bin Abdulaziz Medical City (KSAMC), Obstetrics and Gynaecology department. This study review files of pregnant women who was diagnosed as having CVT between first of January 2000 and end of November 2023. This chart review was done in the medical record department. Included participants are pregnant woman diagnosed as having CVT before or during pregnancy. All patients satisfy previous condition will be included in the study and therefore no sample size calculation needed.

The retrieved data included the following variables; demographic data of the participants (Age, nationality, education, Gravidity and parity), number of visits, presence of CVT, when was diagnosed, symptoms and signs, management of the participant, any side effects, mode of

delivery, any maternal complications, neonatal APGAR score at 5 minutes, admission to NICU, any neonatal complications and neonatal deaths.

Ethical practices ensured by protecting patients' privacy and confidentiality by avoiding direct patient identification. The data stored in a password-protected computer that only principal researcher had access too. Data managed and analysed using Statistical Package for Social Sciences version 28 (SPSS 28) [21], the P-value is considered statistically significant when it is less than or equal to 0.05. For continuous variables, a student t-test will use to evaluate differences in means between the groups. For categorical data, a chi-square test will use to assess differences in proportions across the categories. Descriptive statistics will be used whenever possible. These including quantitative variables summarization as either Mean and Standard Deviation if normally distributed data or Median if data are skewed. While qualitative variables will be calculated using frequency and percentage.

Ethical approval obtained from the ethics committee of King Salman Bin Abdulaziz Medical City (KSAMC) by the number (23-059). All information provided for the purpose of the study will be treated as strictly confidential and all participants will be kept anonymous.

RESULTS

There were 410355 deliveries between first of January 2000 until the end of November 2023. Only one patient was identified as CVT with pregnancy during late 2023. This makes the prevalence of CVT occurring during pregnancy in KSAMC is 1/410355, in other words 0.0002%. Alternatively, the incidence in KSAMC is 1case / 10,000,000 pregnancy per year.

Patient was 25 years old with previous 2 vaginal deliveries and pregnant 8 weeks. Patient had history of deep venous thrombosis (DVT) in her left leg in the first pregnancy. She was on low molecular weight heparin (LMWH) during pregnancy then on warfarin 2 month postpartum. She did not take any medication in the second pregnancy and this pregnancy which is 6 months after last delivery. She presented in coma two hours post tonic clonic convulsions. She had headache in occipital area and vomiting 4 days ago. CT scan showed superior sagittal sinus thrombosis and MRI-venography showed right transverse venous sinus thrombosis (Figure 1).

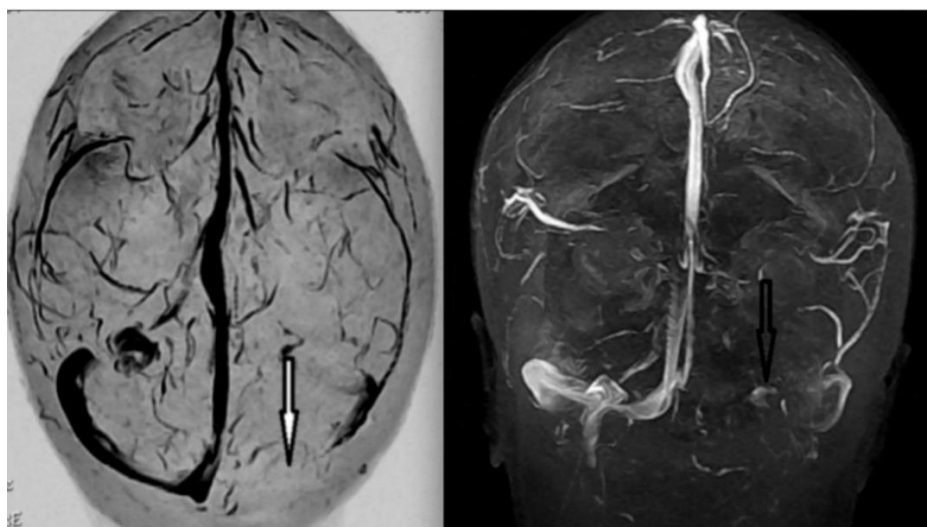


Figure 1: patient MRI-venography showing right transverse venous sinus thrombosis

Patient was diagnosed as CVT in first trimester of the pregnancy. She was followed by the medical team and the Obstetrical team in the ICU then in ward. Eventually, patient was discharged on full dose of LMWH twice daily until at 38 weeks patient admitted to the hospital and LMWH stopped for 24 hours and induction started. Patient delivered vaginally baby boy 3.1 kg's with APGAR score of 8 at 1 minute and 9 at 5 minutes. Patient kept on LMWH in the postpartum period then was followed by the medical team in good condition.

DISCUSSION

Current research in KSAMC found that prevalence of CVT during pregnancy is 0.0002% and the incidence is 1 case / 10,000,000 pregnancy per year. On the other hand, the incidence in most countries in the world are approximately 1 case / 100,000 pregnancies per year [22-25]. This difference in the incidence is mainly because all other studies are covering the incidence of the country but this study covers only one tertiary centre in one large city in the country. Accordingly, the result of this study cannot be generalized on the country but open the space for researchers in Saudi Arabia to start looking at CVT in general and during pregnancy as important research subject to study.

Many factors increase the risk of CVT during pregnancy. Vomiting during pregnancy and increasing age are considered minor risk factors. This is because physiological increase in cardiac output and plasma volume does not occur until late in the second trimester. So, during the first trimester, there is an increase in systemic vascular resistance leading to lower blood pressure coupled with increased venous capacity leading to venous stasis and raising the risk of CVT [24]. On top of that, there is a physiological increase in the production of coagulation factors VII, VIII, IX, and X. In addition, Increased platelet activation and decreased protein-S and Antithrombin III concentrations. All these results in increase the risk of CVT [23, 24]. During pregnancy, preeclampsia, eclampsia and HELLP syndrome are the most important disorders in the second half of pregnancy that may increase risk for thromboembolic complications leading to CVT [22, 24, 25].

CVT may present clinically as preeclampsia and progress gradually until it is seen as eclamptic fits [13, 20]. Our patient complained mainly of headache then after four days had a seizure followed by comma. Previous studies found that the most common clinical feature of CVT during pregnancy to be headache followed by seizures then lastly followed by coma and visual loss [23]. The preferred diagnostic method for CVT in pregnant women is preferably MRI-venography due to absence of radiation and non-invasive character of this method [3, 6].

The principal anticoagulant for CVT is warfarin. Unfortunately, warfarin crosses the placenta causing teratogenicity in the first trimester and increase risk of intracranial haemorrhage in the fetus in the third trimester [22, 24]. Accordingly, LMWH is the treatment of choice during pregnancy. LMWH does not cross the placenta and have no risk on the fetus for bleeding or teratogenicity [9, 20]. After CVT if patient want to get pregnant the risk is low but it is 9 cases /1000 pregnancy. It seems low but compared to before CVT it is extremely high [22, 24].

The main limitations of this study are the retrospective character and being single centre design. On the other hand, doing a prospective study will take long time since this study found only one patient during twenty-three years. Added to that, doing multicentre study would give better and more accurate results especially if it is done through national collaboration.

CONCLUSIONS

First trimester poses important risk for developing CVT. In childbearing age CVT is a challenge in diagnosis and management especially during pregnancy. The prevalence and incidence of CVT in KSAMC is lower than the global results. This finding may provoke researchers in the country to study CVT during pregnancy on the national level.

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