

# Rate, Clinical Features and Mortality of Venous Thromboembolism at Omdurman Maternity Hospital, Khartoum, Sudan

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## Abstract

**Introduction:** Venous thromboembolism (VTE) is a major medical complication during pregnancy and one of the leading causes of the maternal mortality. Pregnancy and puerperium are well-recognized risk factors.

**Objectives:** The study aimed to determine the rate, clinical features and mortality of venous thromboembolism (VTE) at Omdurman Maternity Teaching Hospital, Khartoum, Sudan.

**Methodology:** This is a cross-sectional descriptive, total coverage, hospital-based study carried at Omdurman Maternity Teaching Hospital from January 2015 to July 2015. Eighty patients had been studied, while their data were analyzed using Statistical Package of Social Sciences (SPSS) Version 17.

**Results:** The rate of VTE occurrence is 7 in 1000 births. The mean age of the study cases was 25.9 years and among all cases, 50% are primigravida. The mortality rate is high among cases with pulmonary embolism (PE) with significant P value of 0.005.

**Conclusion:** VTE occurs in low risk patients who have vaginal delivery and are primiparous. PE causes high maternal mortality. Prophylaxis measures are highly recommended for all deliveries along with risk factor studies.

**Keywords:** Venous thromboembolism; Deep vein thrombosis; Pulmonary embolism; Maternal mortality

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## Introduction

Venous thromboembolism (VTE) is a major health risk with high mortality rate worldwide [1]. Approximately 20% of these events are arterial and the other 80% are venous. VTE accounts for 1.1 deaths per 100,000 deliveries or 10% of all maternal deaths [1]. Approximately 80% of VTE cases during pregnancy is because of deep vein thrombosis (DVT) and the remaining is due to pulmonary embolism. Among all registered cases, approximately one third of pregnancy related DVT cases and half of pregnancy related pulmonary emboli cases occur after delivery only [2].

Pregnant women are probably at an increased risk for VTE as a result of decrease in hormonally induced venous capacitance and venous outflow and possibly as a result of mechanical obstruction by the uterus and questionably as a result of

decreased mobility. These factors, along with vascular injury are important, especially during the postpartum period but the risk of VTE is high during the first trimester as it is during the second and third trimesters [3].

Virchow's triad described the three broad categories of factors which are typically seen in pregnancy and thought to contribute to thrombosis are hypercoagulability, hemodynamic changes (stasis, turbulence) and endothelial injury/dysfunction [4].

Signs and symptoms of VTE are nonspecific and common in pregnancy and diagnosis of VTE by physical examination frequently gives inaccurate results. The symptoms those experienced by most of the pregnant women are mild tachycardia, tachypnea, dyspnea and lower extremity edema [5].

Pain and swelling of the lower extremity are the most common symptoms in DVT cases. Although there are only few diagnostic

reports available, around 80% of pregnant women with DVT experiences these symptoms.

Clinical signs and symptoms of PE are nonspecific and regularly includes dyspnea (82%), abrupt onset chest pain (49%) and cough (20%). The most common signs seen are tachypnea, crackles, and tachycardia. No commonly used scoring system for the prediction of PE has been studied systematically in pregnancy. All these signs and symptoms of PE are rarely encountered together. Therefore, if the clinician suspects PE, anticoagulation therapy and appropriate diagnostic testing should be performed immediately until the diagnosis is made or eliminated as a possibility [6].

Patients with massive PE may present with syncope, hypotension, pulseless cardiac electrical activity or death. An electrocardiogram may exhibit findings such as right ventricular strain and the S1Q3T3 pattern as a suggestive of pulmonary embolism though they are infrequent and generally nonspecific. Seventy percent of patients with PE have nonspecific electrocardiogram (ECG) abnormalities with findings such as tachycardia, nonspecific ST segment and T-wave abnormalities [6].

Upon positive signs and symptoms of VTE, objective testing and treatment with low molecular weight heparin (LMWH) should perform until the diagnosis is completed otherwise treatment is strongly contraindicated.

### Required investigations for the diagnosis of acute DVT

1. Compression duplex ultrasound is one of the recommended procedures to diagnose DVT. If ultrasound results are negative and there is a low level of clinical suspicion, anticoagulant treatment can be discontinued.
2. If high level of clinical suspicion exists, anticoagulant treatment should be continued along with ultrasound and the same can be repeated for one more week or an alternative diagnostic test should be employed.
3. Magnetic resonance venography or conventional contrast venography can be performed if iliac vein thrombosis is suspected (back pain and swelling of the entire limb).

### Required investigations for the diagnosis of acute PTE

1. Initially chest X-ray should be performed.
2. If the result of chest X-ray is normal, then compression duplex doppler should be performed.
3. In case of positive persistent clinical suspicion, a ventilation-perfusion (V/Q), lung scan or a computed tomography pulmonary angiogram (CTPA) are recommended.
4. D-dimer testing may be of no use in diagnosis of acute VTE in pregnancy because d-dimer levels in blood can be raised in pregnancy but a low level is suggestive that there is no VTE.
5. Baseline blood investigations before anticoagulant treatment FBC, coagulation screen, urea and electrolytes and LFTs.

Thrombophilia screen prior to therapy is not routinely recommended [7-9].

### Initial anticoagulant treatment of VTE in pregnancy

1. Treatment with LMWH until the diagnosis is excluded by tests, unless treatment is strongly contraindicated.
2. LMWHs are more effective and are associated with a lower risk of hemorrhagic complications and are associated with lower mortality and lower risk for heparin-induced osteoporosis than unfractionated heparin.
3. Heparin LMWHs and unfractionated heparin should be given according to the body weight and followed by oral anticoagulant therapy.
4. Monitoring of the therapy is important to avoid drug side effect. Prophylaxis is mandatory whenever is needed and this should be provided in patient education with all precautions in travel, surgery and future planned pregnancy.

### Blood tests to monitor LMWH therapy in pregnancy

1. Measurement of peak anti-Xa activity only for in women at extremes of body weight (less than 50 kg and 90 kg or more) or with other complicating high-risk factors (for example with renal impairment or recurrent VTE).
2. Routine platelet count monitoring should not be carried out (unless unfractionated heparin has been given) for every 2 days to 3 days from day 4 to day 14 or until heparin is stopped, whichever occurs first [7-9].

### Additional therapies

1. Leg management and elastic compression stocking applied to reduce edema & mobilization should be encouraged.
2. Inferior Vena Cava filter in proven DVT reduces the risk of PTE [7-9].

Obstetrician, physician, hematologist, radiologist and physiotherapist are involved as one team in patient's care.

## Methodology

This is a hospital based cross-sectional total coverage study was designed to determine rate, clinical presentations for VTE and mortality from VTE at Omdurman Maternity Hospital (OMH) from January 2015 to June 2015. All patients of VTE were included in the study.

OMH is the leading maternity hospital in Sudan being the largest and most specialized in this vast Sub-Saharan African country. OMH was established in 1957, continued to provide obstetrics and gynecology services and training medical, nursing and other allied health specialties in this and related field. OMH registered around 36,453 deliveries in the year 2014.

Ethical approval was obtained from the Ethical Committee of

the Sudan Medical Specialization Board (SMSB) and the approval was countersigned by the medical director of OMH as a standard procedure. Informed consent was obtained from all patients and/or their guardians where appropriate. Confidentiality of these patients is maintained throughout and after the study, with only anonymous data sets being used with no patients' identifying details. All patients participating in this study are treated as they would normally be according to clinical practice standards used at OMH. When clinically suspected as having VTE and diagnosis subsequently confirmed, management of the patients was commenced with Heparin as treatment of choice, followed by oral anticoagulants and serial investigations to establish any possible underlying or related conditions.

Data were collected using purpose-designed structured data collection sheets. The sheet includes demographic details, the mode of delivery, medical history, clinical findings, laboratory findings, incidences of mortality. All the data obtained were entered in a master flow chart and was analyzed using statistical package program for social science (SPSS) version 17.0.

## Results

The number of enrolled cases is 80 among hospital deliveries which is 11,424 makes VTE rate 0.7% (80/11,424).

The confirmed diagnosis of VTE of all studied grouped is distributed as DVT seen in 88.8% and the PE is in 11.2% (all cases are popliteal or femoral vein thrombosis).

According to age, most of the cases were in age group of 25 years to 29 years (36.2%) with mean age of 25.9 years. Half of the cases developed VTE during their first pregnancy are primiparous, 40% are multiparous and 10% are grand- multiparous. Regarding the mode of delivery most of the studied cases delivered via spontaneous vaginal delivery 85% (2/3 delivered at home), 10% by Caesarean section (C/S), 2.5% by instrumental delivery and 2.5% still running their pregnancy (**Table 1**).

The majority of the cases (88.8%) developed VTE during the postpartum period (after delivery and almost all cases are seen in this period are around the third week of delivery) and the rest showed DVT during antenatal period (before delivery and still running their delivery mainly at early pregnancy period and DVT happened as a sequel of hyperemesis gravidarum).

Distribution of cases according to symptoms and signs of DVT 90% presented with swelling and pain, 8.6% had >2 symptoms and only 1.4% presented with pain. The commonest site for DVT is left lower limb.

Distribution of cases according to presenting symptoms of PE 66.6% presented with shortness of breath and chest pain, 22.3% presented with >2 symptoms and 11.1% presented SOB. Overall, 88.8% of the PE occurred in the lower lobes and 11.2% in the upper lobes.

Considering the VTE risk factors 73.8% had low risk (pregnant & postpartum), 25% had moderate risk (pregnant or postpartum+past medical history or one disease) and 1.2% had high risk.

Significant P value (P value=0.005) is observed in cross tabulation of cases outcome among DVT and PE where 7/80 cases reported death cases (**Table 2**).

## Discussion

The rate of VTE at OMH is 80/11,424 deliveries (7/1,000 births) which is higher than that found in the Norwegian studies (615 out of 613,232 deliveries) (1/1,000 births) and still more compared with local study at Khartoum Teaching Hospital (2008), 65 patients with VTE out 14,490 deliveries (4/1,000 births) [10].

Mean age of the study was 25.9 years, where in American literatures (2008) the mean age is around 35 years and older and here the affected group is younger.

There is no obvious difference between VTE distribution as DVT or PE from the international research findings.

The majority of the cases diagnosed with VTE delivered vaginally while much less are delivered by C/S in comparison with local study in Sudan which concluded Caesarean section deliveries is a risk of DVT [10].

Half of these women are primiparous, where two third are multiparous and much less are grand multiparous. There is no statistical relation between the parity & VTE with P value 0.310.

One observation is noted and closely related to the Sudanese delivery ceremonies and traditions (Dukhan) for skin care and fairness; mandating long sitting and squat position. Almost all those with DVT came with this tradition. Another risk; almost the delivered woman is bed recumbent especially the primiparous

**Table 1** Cases distribution of age, parity and mode of delivery (N=80).

Variable	Category	Frequency	Percent (%)
Age	<20 years	11	13.80%
	20-25	25	31.20%
	26-30	29	36.20%
	31-35	8	10.00%
	>35	7	8.80%
Parity	Primiparous	40	50%
	Multiparous	32	40%
	Grand-multiparous	8	10%
Mode of delivery	Spontaneous vaginal delivery	68	85%
	Instrumental delivery	2	2.50%
	Caesarean section	8	10%
	Running pregnancy	2	2.50%

**Table 2** Cross tabulation between confirmed cases and outcome among the VTE patients (N=80). P value is 0.000.

Confirmed cases	Confirmed Cases and Outcome of VTE		
	Outcome		Total
	Discharge in good condition	Maternal death	
DVT	71	0	71
PE	2	7	9
Total	73	7	80

as the family is serving her. Primiparous women and those who delivered at home mostly have no risk for VTE they passed with no prophylactic VTE measures exactly seen here where most of cases are primiparous and home deliveries this clinical observation of value in VTE occurrence and mandate proper action.

The clinical findings VTE and sites and well known risks like medical disorders body mass index are more or less typical to all researches.

No mortality from DVT patients while among PE patients' mortality is highly significant.

Lack of mortuary services for all deaths circumstances and social acceptability for mortuary issue with detailed statistical

records for maternal mortality makes some difficulties for PE confirmation.

## Conclusion

VTE occurs in the low risk patient as most of patients diagnose after vaginal delivery during postpartum and half of the patients were primiparous. This may reflect lack of prophylactic heparin as almost half of these ladies delivered at home. The mortality rate was high in patient with PE.

Establishment of prophylaxis modalities for all deliveries with antenatal education for pregnant women using simple measures like TED stocks and mobilization. Proper risk assessment and initiation of Heparin therapy with designed protocol for all health facilities. Further detailed for the risk factors is recommended.

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