

Postpartum Pulmonary Embolism and Outcome, Experience at a Tertiary Centre



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ABSTRACT

Introduction: Pulmonary embolism is a fatal condition leading to loss of life if delay in treatment and diagnosis is present. Every year many patients present to tertiary centre with features suggestive of pulmonary embolism and a large proportion belong to postpartum pulmonary embolism. Due to the hyper coagulable state during pregnancy, pregnant and postpartum females are more prone to pulmonary embolism.

Methods: All the patients records who were diagnosed as pulmonary embolism admitted in Manmohan Cardiothoracic Vascular and Transplant Center between Baisakh 2070 to Poush 2077 were investigated and observational cross-sectional study of patient population on the basis of demography, parity, day of diagnosis of postpartum Pulmonary embolism and modes of delivery was done.

Objectives: To categorize the patients with pulmonary embolism, to calculate the fraction of patients with diagnosis of postpartum pulmonary embolism, to define the various clinical signs and symptoms with which the patients with PE presented, relation of pulmonary embolism to postpartum day and parity.

Results: A total of 198 patients were admitted in Manmohan Cardiothoracic Vascular and Transplant Centre, among them a total of 19 patients (9.59%) had Postpartum pulmonary embolism. Most common symptom of Postpartum PE was sudden onset dyspnea (89.47%). Majority of patient with post partum PE were primipara (42.1%) followed by second parity (36.8%). Majority of Postpartum PE had cesarean section (57.9%Vs 42.1%) mode of delivery as compared to normal vaginal delivery. The time of presentation of patients with pulmonary embolism who had undergone lower section cesarean section was (4.18± 2.75 days VS 14.25±3.7 days) in comparison to normal vaginal delivery.

Conclusion: Postpartum pulmonary embolism represents a fraction of pulmonary embolism. Primigravida are more likely to present with postpartum pulmonary embolism with susceptible time within 4 weeks of delivery.

KEY WORDS: Pulmonary Embolism, Postpartum

INTRODUCTION

Pulmonary embolism, a fatal entity can have a high mortality if delay in diagnosis and treatment. As dictated by Virchow triad of hypercoagulable state, endothelial injury and stasis, these are the principle factors that governs the thrombosis, which may or may not start from Deep vein thrombosis leading to pulmonary embolism.

The pathophysiology is slightly altered during pregnancy as pregnancy is a hypercoagulable state, the signs and symptoms of pulmonary embolism is same. Various factors contribute as the gravid uterus and enlarged iliac arteries compresses the venous system, besides fibrinogen, factors II, VII, X and XII increase with enhanced thrombin production. As with progression of pregnancy the anticoagulant protein S decline and resistance of protein C is met during the termination of pregnancy. Besides decreased serum plasminogen activator inhibitor-1 and placental PAI-2 inhibits fibrinolysis. In addition to this heterozygous carriers of factor V¹ and prothrombin mutation ², antiphospholipid syndrome present with high risk of thrombosis ³. The stasis as produced by progesterone in pregnancy causes venodilation and increased capacitance^{4,5}, right iliac artery pressing on the left common iliac vein with more venous stasis in the left deep venous system.

Massive pulmonary embolism (saddle thrombus, main branch - right /left or two or more lobar pulmonary emboli with associated cardiogenic shock with hemodynamic disturbance) present with mortality in between 30% and 60%. ⁷⁻⁹. Patient with unexplained

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shock, tachypnea, tachycardia and poor perfusion of extremities, poor mentation, pallor, a high degree of suspicion of pulmonary embolism should be kept in mind. Pregnant women with acute onset of chest pain, breathlessness, with or without hemoptysis should produce a mind set of pulmonary embolism, many times ECG findings are normal only with sinus tachycardia.

With the diagnosis of pulmonary embolism, anticoagulation should be started. The decision regarding use of medical management or surgical management rests on the hemodynamic stability of the patient, hemodynamically stable patient may be kept under anticoagulation therapy whereas unstable patient with fall of BP by 40mmHg of the baseline or systolic BP less than 90 mmHg requires thrombolysis – systemic or catheter directed. Surgical role comes to play with the failure of medical management.

METHOD

This is study of patients who were admitted in Manmohan Cardiothoracic Vascular and transplant Center with diagnosis of pulmonary embolism between Baisakh 2070 to poush 2077 were investigated and observational crosssectional study of patient population on the basis of symptoms, signs, parity, day of diagnosis of postpartum Pulmonary embolism and modes of delivery was done. Medical records of all the patients with diagnosis of PE were taken into account and evaluated. Fisher's Exact Test and chi-square test was applied at a significance level of 5% where possible. The SPSS program version 25 was used for the construction of tables and evaluation of data

RESULTS

A total of 198 patients were admitted in MCVTC within a period of period of 7 years with the diagnosis of pulmonary embolism. Out of total admitted patients in MCVTC, 19 patients (9.5%) were diagnosed as postpartum pulmonary embolism. The mean age of patients with postpartum PE was 27.4 ± 5.56 years. The common symptoms of patients was acute onset shortness of breath (89.47%), hemoptysis (10.5%), chest pain (52.6%). A total of 47.4 % had associated Deep Vein Thrombosis. Investigation used for diagnosis of pulmonary embolism was CT pulmonary angiogram which involved either of pulmonary artery or its segmental arteries or both. On the basis of involvement of segments of pulmonary artery and hemodynamic stability, severe form of pulmonary embolism was either classified into massive or submassive. The mean post partum day of presentation of pulmonary embolism was 8.4 ± 5.97 days. Majority of patients (57.9%) had undergone lower section cesarean section, 42.1% had normal vaginal delivery.

The patients diagnosed as postpartum pulmonary embolism were treated with anticoagulation with none of them requiring thrombolysis or thrombectomy. The mean duration of hospital stay was 5.789 ± 2.99 days.

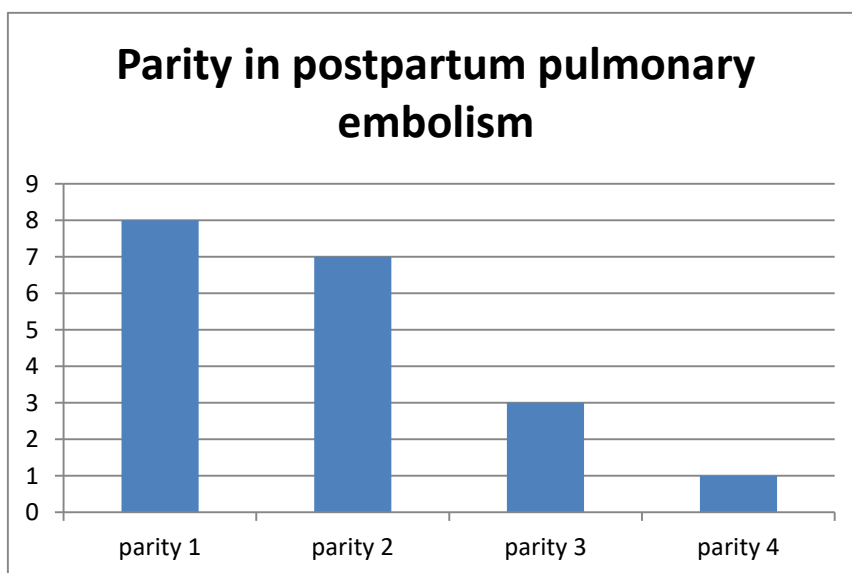


Figure 1- Parity in postpartum pulmonary embolism

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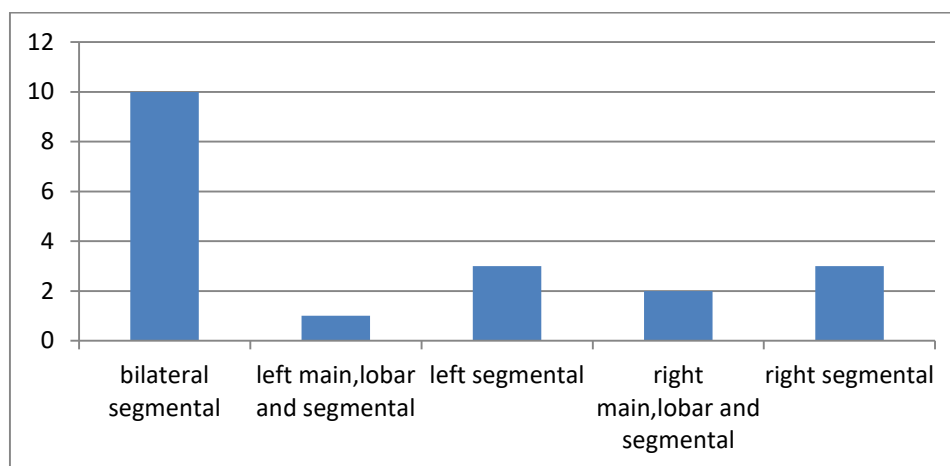


Figure 2- Pulmonary artery involvement in study population

DISCUSSION

Pulmonary embolism a fatal entity can be life threatening if not treated immediately. High degree of suspicion is required for accurate diagnosis by clinician. As Pregnancy is a state of hypercoagulability, women are at risk of pulmonary embolism as the pregnancy progresses. The rate of pulmonary embolism is higher in postpartum period as compared to during the pregnancy (159.7 incidents per 100000 women to 10.6 incidents per 100000 women) with death occurring between 1 to 2 cases in 100000 pregnant women due to pulmonary embolism.⁶ In a total of 198 patients admitted with diagnosis of pulmonary embolism, 19 patients (9.59%) had postpartum pulmonary embolism. Although pulmonary embolism can present with wide range of symptoms. The most common symptom was acute onset shortness of breath (89%), hemoptysis (10.5%), chest pain (52.6%). As demonstrated by Doralisa Morrone et al dyspnea, chest pain and cough being the most common symptoms of pulmonary embolism, while tachycardia, fever, peripheral vascular collapse and pulmonary signs were the frequent physical findings in PE.¹⁶ For diagnosis of pulmonary embolism, Computed tomography (CT) angiography is required which delineates the anatomy of pulmonary artery with sensitivity 57-100% and specificity 64-100%.¹¹⁻¹² All the cases admitted in this center were diagnosed pulmonary embolism on the basis of CT pulmonary angiography.

As most of the patient with post partum pulmonary embolism were primipara (42.1%) followed by second parity(36.8%). With increase in parity the risk of pulmonary embolism was less. In a study done by Sayyed Ehtesham Hussain Naqvi et al it was noted that primigravida were more susceptible to DVT, however the association with Pulmonary embolism was not demonstrated.¹⁷ As the parity increases the risk of pulmonary embolism decreases.

Time of presentation of pulmonary embolism in post partum females ranged from 2 days to 18 days. The mean postpartum day of presentation being 8.4 ± 5.97 days. As pregnancy and postpartum state is a state of hypercoagulable state, immediate postpartum period lasting for 4 weeks is vulnerable period for venous thromboembolism as demonstrated by thromboelastography.¹⁵ Majority of patients (57.9%) had undergone lower section cesarean section, 42.1% had normal vaginal delivery. In comparison to normal vaginal delivery, patient undergoing cesarian section were more susceptible to thromboembolism as shown by Jacobsen et al¹⁸. The time of presentation of patients who had undergone lower section cesarean section was 4.18 ± 2.75 days whereas the time of presentation of patients with normal vaginal delivery was 14.25 ± 3.7 days. JM Morris et al highlighted that the vulnerable period for postpartum pulmonary embolism to be within 4 weeks following delivery but doesnot differentiate individual risk of occurrence of Postpartum pulmonary embolism in normal vaginal delivery as compared to cesarean section.¹⁹

Pulmonary embolism can involve any pulmonary lobe or arterial segments, in our study the commonest was bilateral segmental (52.6%) involvement followed by left segmental (15.8%) and right segmental(15.8%), data lacking for pregnancy. None of the patient were on prophylactic anticoagulant in the post partum period. It was demonstrated in by Oser and associates et al in interpreting the prevalence of acute pulmonary embolism in central and subsegmental pulmonary arteries that the prevalence of pulmonary embolism limited to subsegmental pulmonary embolism was in 23 of 76 (30%) with angiographically diagnosed PE.²⁰ Oser and associates Goodman and associates showed subsegmental PE in 4 of 11 (36%).²¹

Majority of the patients presented with submassive pulmonary embolism. Intervention in the form of thrombolysis, thrombectomy was not performed. All the patients were anticoagulated with unfractionated heparin followed by adjustment of dose of warfarin. Patients had smooth recovery with resolved dyspnea and improved clinical status. The mean duration of hospital

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stay was 5.7+_{2.99} days. In an analysis of treatment of isolated subsegmental pulmonary embolism, untreated patients with mostly subsegmental pulmonary embolism had no fatal consequences or recurrence in 3 months.²² This illustrates that not all pulmonary embolism requires intervention or treatment.

DVT was present in 47.4% of the study population with pulmonary embolism. This points to the fact that not all pulmonary embolism are preceded by DVT which can be demonstrated clinically. It has been shown that one third of clinically-overt DVT have silent pulmonary embolism. The concomitant presence of DVT and PE ranges from 10-93% historically but a more recent data shows coexisting DVT in 56% to 61% of symptomatic pulmonary embolism.^{23,24}

CONCLUSION

Postpartum pulmonary embolism represents a fraction of pulmonary embolism. Primigravida are more likely to present with postpartum pulmonary embolism with susceptible time within 4 weeks of delivery. This is a study with limited number of patients with more of a stable patient with pulmonary embolism admitted in hospital. For a more precise conclusion, larger study with multicentre involvement is required.

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