Pulmonary complication of dengue fever with Pregnancy in Port Sudan

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1- Abstract

Dengue fever is the commonest arthropod – borne viral infection, that caused by a flavivirus. There are four antigenic types of dengue virus , the virus is transmitted by Aedes aegypti mosquito, Since 2005 dengue fever occurred in a significant number in Port Sudan, In east Sudan, and at this time WHO consider Port Sudan as endemic area. Dengue fever in this area showed bad outcome in pregnancy due to pulmonary complication, so this descriptive study done in 36 pregnant women with dengue fever, who were developed respiratory symptoms throughout their hospital course. From those 36 patients 75% was classic dengue fever, 13.7% dengue haemorrhagic fever, and 11.3% dengue shock syndrome. The pulmonary complication appear as pneumonia in 17 (47.2%) patients, pleural effusion in 8 (22.2) patients, pulmonary embolism in 8 (22.2%) patients , ARDS in 3 (8.3%) patients. 3 (8.3%) were terminated chemically, 5 (13.9%) terminated by cesarean section and 28 (77.8 %) underwent normal vaginal delivery at term. These complications worsening the outcome, affecting both morbidity and mortality of dengue fever in pregnancy, so need early detection and standered interventions.

Key words: Dengue, Pregnancy, pulmonary, complication, Port Sudan.

2- Introduction :

Dengue fever is a flue like viral infection, caused by flavivirus, and it consider the commonest arthropod viral infection. It transmitted by Aedes aegypti mosquito, which is a day time mosquito (1), that survive in Port Sudan and other localities in Red sea state - eastern Sudan. WHO consider dengue fever as the most

rapid spreading mosquito born disease. The virus has four different genetic serotypes, those are DEN1, DEN2, DEN3, and DEN4, the latest is more serious and usually presented with haemorrhagic dengue fever. Infection with one serotype usually gives lifelong immunity against this specific serotype, but second infection with other serotype usually presented with severe pattern and showed poor course and prognosis, because of ineffective antibodies (2). Dengue fever has three different presentation, these are classic dengue fever, dengue haemorrhagic fever, and dengue shock syndrome, although classic dengue fever consider non haemorrhagic, but still there is unusual bleeding, either GIT, or secondary to DIC, while DHF is the stage in which features of haemorrhage due to several factors appear, and it is not always preceded by classic DF, but may be the first presentation. Dengue shock syndrome is the stage in which circulatory collapse occur, and usually associated with poor outcome.

The symptoms of dengue fever are high grade fever of 40 c, severe headache, retro- orbital pain, joint and muscle pain, nausea, vomiting, skin rash, and bleeding. The clinical diagnosis is based on presence of high grade fever and two symptoms (2). Dengue fever is diagnosed clinically depending on symptomatology specially in endemic areas and confirmed serologically using rapid immunological tests, and ELISA to detect the antigens, IGM, and IGg (1) and rarely need PCR (2).

Pregnancy interfere with diagnosis and course of dengue fever, this associated with several complications, because of physiological change in pregnancy such as marked fluid retention and significant reduction in platelets count (3). Pulmonary complications are one of these complications, which is need early detection and standard management.

Dengue fever was firstly recognized in 1950 in Philippine and Thailand. WHO estimate about 50 million cases of dengue fever per year (2). Since 2005 dengue fever occurred in a significant number in Port Sudan, in east Sudan, and this is due to increasing awareness and improving diagnostic tools (4) . In this area dengue fever has two beaks one in January and other from May to July, the disease showed worse course and outcome in pregnant women, it occurred in the three trimesters, although it is common in first trimester it is more serious in third trimester. In 2014: 1128 suspected cases of dengue fever was registered: 37 (3.3%) of them was confirmed in pregnant women.

In 2014 (19.1%) of maternal death caused by dengue fever, (30.7%) of those were developed pulmonary complication (4).

3- Objectives:

This study was done to know the pulmonary complications that occur in pregnancy with dengue fever, its presentation, raising awareness of detection, diagnosis and treatment of such cases.

4- Method:

This is hospital based prospective, descriptive study done in period from January to December of 2014 in Sudan line hospital, Almwani hospital and Obstetric hospital in Port Sudan – eastern Sudan. 36 pregnant women with dengue fever were enrolled in this study, their age varies between 25 - 40 year, and they were in different trimester. Dengue fever was diagnosed according to local protocol clinically, and confirmed serologically with positive IgM. Those patients were developed feature of respiratory complication. Data was collected from hospital records this followed by history from patients who are followed clinically. Laboratory and radiological studies and ECG were done to diagnose the problem, then all data had been analyzed.

5- Result:

From those 36 patients 27 (75%)was DF, 5 (13.7%) DHF, and 4(11.3%) DSS. All 36 (100%) patients has cough and fever, 23 (63.9%) has SOB and 23 (63.9%) patients had chest pain while 17 (47.2%) had haemoptysis .

CXR showed consolidation in 12 (33.3%) patients, pleural effusion in 14 (38.9%) patients, bilateral parenchymal infiltration in 4 (11.1%) patients, collapse in 3 (8.3%) patients, prominent hilar shadow in 2 (5.8%) patients and CXR was unremarkable in 4 (11.1%) patients.

Electrocardiography showed sinus tachycardia in all 36 (100%) patients, T-wave inversion in anterior chest leads appear in 5 (13.9 %) patients, Rt axis deviation in 3 (8.3%) patients, RVH in 3 (8.5%) patients and classic triad of S1, Q3, T3 in 2 (5.8%) patients.

D- dimmer polymerase was done for 16 (44.4%) patients and was positive in 4 (11.1%) patients.

The final diagnosis was pneumonia in 17 (47.2%) patients, pleural effusion (due to non-pulmonary cause) in 8 (22.2%) patients, pulmonary embolism in 8 (22.2%) patients and ARDS in 3 (8.3%) patients. Those who developed ARDS were developed fetal distress secondary to severe hypoxia and those were terminated by chemical induction with vaginal prostaglandin and all these cases result in still birth, 5 (13.9 %) patients became critically ill and developed fetal distress due to severe

pneumonia or pulmonary embolism were terminated with caesarean section and their fetus was survive despite distress, the remainder 28 (77.8 %) underwent normal vaginal delivery at term despite fetal mild to moderate fetal distress that resolved with treatment of underline causes.

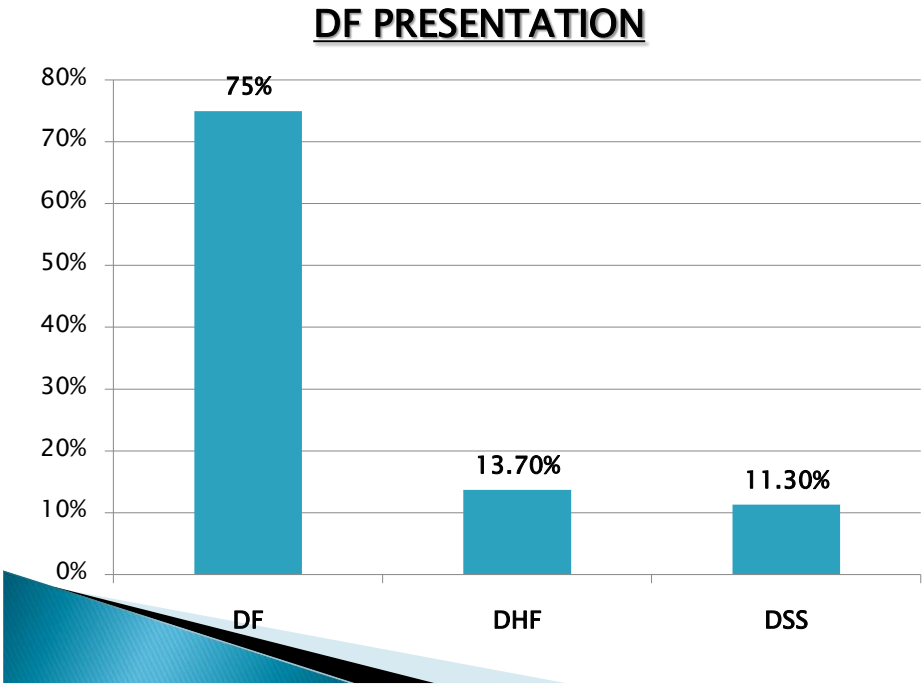


Figure (1) :Diagram showed stages of dengue fever

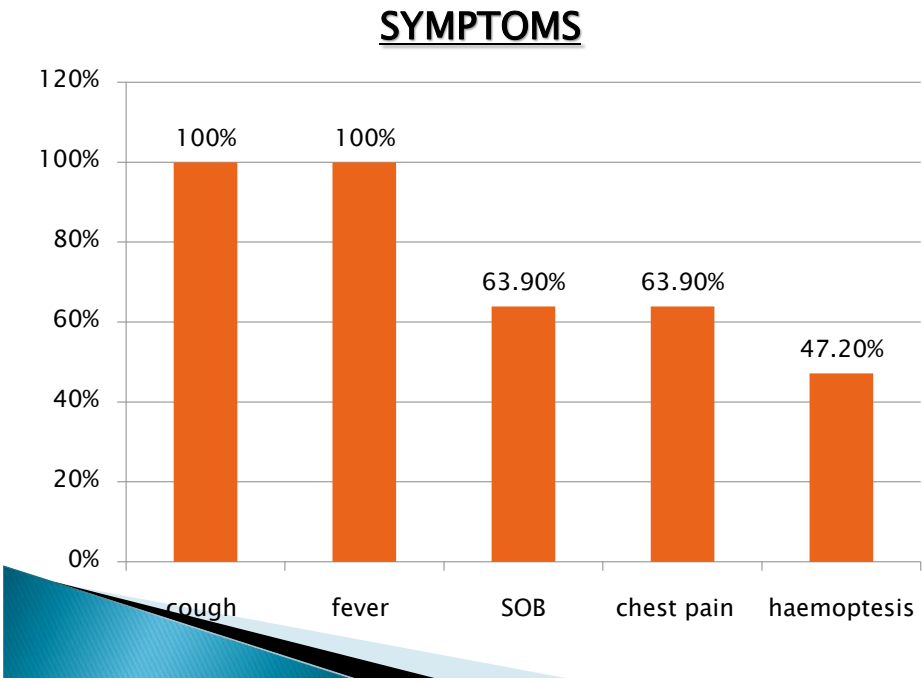


Figure (2): Diagram showed distribution of respiratory symptom



Figure (3): CXR showed bilateral obliteration of costophrenic angles and cardiomegaly

6- Discussion:

Dengue fever in Port Sudan is twice in female than in male (5), this may be return to a high number of non-employees female that stay in home where mosquito breeds due to suitable environment. Whenever, pregnant women developed dengue fever they usually shows bad course and poor outcome as diagnosis may delay because dengue features mimic some of physiological change occurs in pregnancy such as increase in temperature, reduction in platelets count (3). Again risk of pulmonary complication increase in pregnancy for many factors such as immunological changes and may occur throughout the pregnancy. At same time in endemic areas such as port Sudan over diagnosis may occur because of interference with the same physiological changes. But anywhere early accurate diagnosis of both dengue fever and its pulmonary complication improving outcome of both maternal and fetus.

Pneumonia is the commonest pulmonary complication that occur in pregnancy with dengue fever in this study, it may occur due to dengue virus itself , or due to immunosupression that occur in dengue fever, or even to hospital organism as hospital acquired pneumonia, the diagnosis of pneumonia usually delays, because cough and shortness of breath may be explained by fluid retention that occurs physiologically in pregnancy and increased in total white blood cell count also occurs in pregnancy, and two third of this being neutrophils (3), so any change in TWBC would take consideration, as pneumonia increase the risk of shock and DIC (6). Pleural effusion occur in dengue fever even in non pregnant due to fluid over load, increased vascular permeability, and plasma leakage, but the risk increase in pregnancy with dengue and this may be secondary to heart failure secondary to fluid overload , increased contractility and anaemia, but again the diagnosis of heart failure may be delay as symptoms mimic physiological changes and even cardiothoracic ratio increased in pregnancy and also vascular marking are more prominent (7). Pulmonary embolism complicate dengue fever in pregnant women in this study in significant percentage, both dengue fever and pregnancy result in deficiency in natural protein s and protein c and the reduction in these protein increase the risk of PE (8), in addition to immobility state in ill pregnant women. Although PE occur in about one fifth of patients the diagnosis remain difficult because pregnancy increase cardiac output by 40% that result in tachycardia (7), beside SOB due to physiological fluid overload decrease the suspicion of PE, so result in late diagnosis and so increasing both morbidity and mortality. Presence of pulmonary embolism in pregnancy with dengue fever need special consideration, as we need to add anticoagulant in condition of high risk of

bleeding. Although ARDS is the least complication, it is the most serious one, ARDS may be due to DIC that complicate dengue fever or fluid overload, and it is usually associated with multiorgan failure that may be secondary to hypoxia or hypoperfusion. Early detection of ARDS and early intubation may improve outcome of both maternal and fetus.

Similar study done in Brazil in period 2007 – 2012 conclude that dengue fever increase the risk of maternal death by three time. Whenever, pulmonary complication occur in pregnant women with dengue fever the course of disease became more worse, and prognosis for both maternal and fetus became poor and therefore those patients need special care and regardless, the state of dengue fever pregnant woman should be admitted to hospital, and progression of disease would be monitored through vital sign, temperature degree and pattern, change in symptoms, Oxygen saturation , and urine output with close monitoring of features of fetal distress and viability, considering termination in real time and real indication, weighing risk benefit ratio.

7- Conclusion:

Pulmonary complication occur in dengue fever in both pregnant, and non pregnant and it deteriorate the condition in both, but in pregnancy the risk of pulmonary complication is more because of immunological changes in pregnancy, and the diagnosis of both DF and its pulmonary complication usually delay, because of physiological change of pregnancy that mimicking dengue features, and some diagnostic procedures are absolutely or relatively contraindication in pregnancy, despite this high suspicion of pulmonary complication in pregnancy with DF should be there, avoiding over diagnosis and treat following affordable, applicable guideline.

Early detection of pulmonary complication no doubt improving the prognosis of dengue fever and outcome of pregnancy. Usually termination of pregnancy is not recommended, but experience in Red sea state- Sudan showed improvement of condition after termination especially cesarean section, while termination with induction has poor outcome, but this of no significant here because induction used in those with ARDS which has very poor outcome.

Pneumonia, pleural effusion, pulmonary embolism and ARDS may complicate dengue fever in pregnancy, and it may be missed or delayed in diagnosis, and all these complications result in hypoxia and hence fetal distress or even death, so high suspicion should be there and early intervention is needed in such endemic area.

8- Recommendation:

Community and governmental effort should be integrated to control dengue fever as the eradication of vector is the cornerstone in management and this is a difficult issue in areas with constricted resources. Multidisciplinary team ought to follow pregnant women with dengue fever whenever, there is suspicion with early recognition of pulmonary complication, and those who develop pulmonary complication would be managed in ICU or in high dependant unit. Pulmonary embolism need special consideration and guidelines for PE in such condition should be there. Although guidelines mention no rule for termination on management, but practical evidence in Port Sudan showed obvious improvement, but still effect of termination, and need more studies, and the decision of termination must be discussed by an expert team.

9- Abbreviation:

1-ARDS :Adult respiratory distress syndrome

2-CXR:Chest x ray

4-DF:Dengue fever

5-DHF: Dengue haemorrhagic fever

6-DIC: Disseminated intravascular coagulation

7-DSS: Dengue shock syndrome

8-ECG: Electrocardiography

9-GIT:Gastrointestinal tract

10- ICU : Intensive care unit

11 -PE: Pulmonary embolism

12-Rt: Right

13- RVH: Right ventricular hypertrophy

14-SOB:Shortness of breath

15- TWBC: Total white blood count

16- WHO: World health organization

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