Maternal Death due to Viral Sepsis

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Abstract
Sepsis accounts for approximately 10% of all maternal deaths and in pregnancy, as a result of cell-mediated immunity is altered and prone for infection. Varicella zoster virus (VZV) commonly causes chickenpox in children and herpes zoster in adults. In this case, viral sepsis probably due to VZV has caused a death of an apparently immune-competent young mother. A 19-year-old unmarried sex worker with Grave's disease presented in her second trimester with ankle oedema and shortness of breath. She was hypertensive and anaemic and was treated for secondary hypertension due to thyrotoxicosis. Later, she developed fever, oliguria and heart failure. She was treated in intensive care unit with hyperthyroid crisis induced by sepsis due to pneumonia. She developed high fever, intra-uterine death, hepato-renal failure, disseminated intravascular coagulation (DIC) and died on day fourteen. At autopsy, dermotomal vesicular skin lesions and vulval viral warts were seen. The internal organs showed sepsis. Blood for HIV was negative. Histopathology revealed viral pneumonia, myocarditis and DIC. Cause of death was given as sepsis due to viral pneumonia probably following VZV. The clinical diagnosis was septicaemia, due to pneumonia, but herpes zoster infection was not diagnosed. VZV infection can be life threatening even in immune-competent adults. The diagnosis of multi-organ failure from VZV should always be clinically suspected in the presence of atypical skin lesions and a temporarily immune-compromised state such as pregnancy.

Keywords: Viral sepsis, Chicken pox zoster, Immune-competent, Varicella zoster virus

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Introduction

Varicella-zoster virus (VZV) only affects humans, and commonly causes chickenpox in children, teens and young adults. VZV is known by many names, including chickenpox virus, varicella virus, zoster virus, and human herpes virus type 3 (HHV-3).[1] Herpes zoster (shingles) is caused by the reactivation of varicella-zoster virus from sensory neurons and affects adults and rarely children. The commonest complication following zoster is chronic pain termed post herpetic neuralgia.[2]

Sepsis accounts for approximately 10% of maternal deaths. Pregnant women are susceptible to certain infections because of alterations in their cell-mediated immunity. Obstetric sepsis requires early broad-spectrum antibiotic therapy and may necessitate surgical intervention.[3] In this case, report a death of a young pregnant sex worker due to viral sepsis.

Case report

She was a 19-year-old unmarried sex worker with Grave's disease presented in her second trimester with ankle oedema and shortness of breath. She was hypertensive and anaemic and was treated for secondary hypertension due to thyrotoxicosis. Hb was 5.5 g/dl and 3 pints of blood was transfused. Later, she developed fever, oliguria and heart failure. WBC was 24,000 mm^3. She was treated in intensive care unit with hyperthyroid crisis induced by sepsis due to pneumonia. Renal function test was abnormal (Blood urea was 105g/dl, serum creatinine 4.5 mg/dl), liver function tests were elevated (SGOT 296 and SGPT 81), repeat WBC was high (19,000) and Hb was low (9.5 g/dl). On day 10, blood picture showed platelet clumps. On day 11, blood picture showed large platelet clumps and blood platelets were low (85,000) and blood culture showed a mixed growth. Blood urea

remained high. Then she developed nasal bleeding and generalized oedema. CT showed generalized cerebral oedema. She was on antibiotics, but antiviral drugs had not been given. She developed high fever, intra-uterine death, hepato-renal failure, DIC and died on day 14th.

The autopsy performed 10 hours after the death revealed vesicular skin lesions on left ear and right side of the neck (Figure 01).

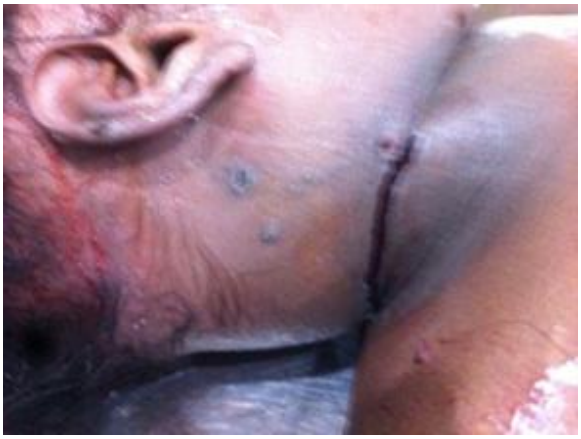

Figure1. Vesicular lesions

The vesicular lesions were also found on the back of the chest with dermatome distribution (Figure 02).

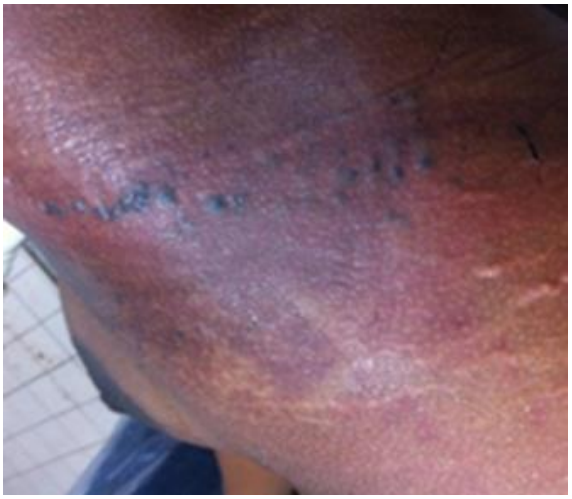

Figure 02: Dermatomal vesicular lesions

Viral warts were found in the vulva extending to vagina (Figure 3).

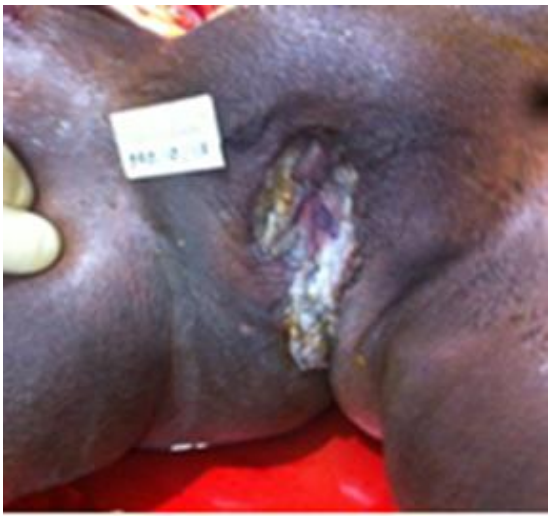

Figure 03: Vulval Viral warts

Thyroid gland was enlarged. The internal organs showed evidence of sepsis. Brain had cerebral oedema, diffuse congestion and brain stem haemorrhages. Microscopy of brain showed swollen parenchymal tissues, sulcal infarcts, focal haemorrhages, lymphocytic perivascular cuffing and micro thrombi.

There was blood stained pleural effusion and bilateral consolidated lungs (Figure 04). Microscopy showed alveoli filled with blood and infiltration of lymphocytes. Alveolar membranes were widened with congested blood vessels.

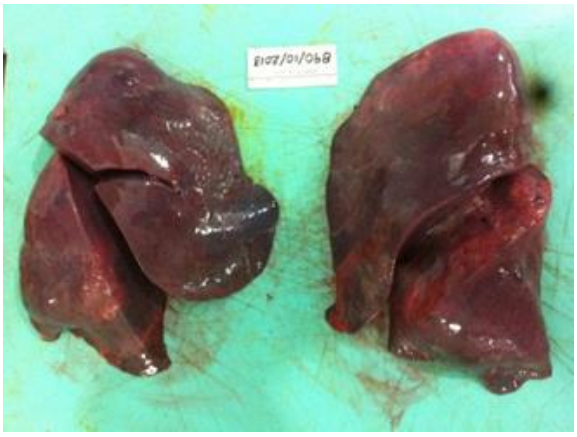

Figure 04: Bilateral pneumonia

Heart showed subendocardial and papillary muscle haemorrhages (Figure 5) with focal necrosis of myocytes, focal haemorrhages and focal infiltration of mononuclear cells.

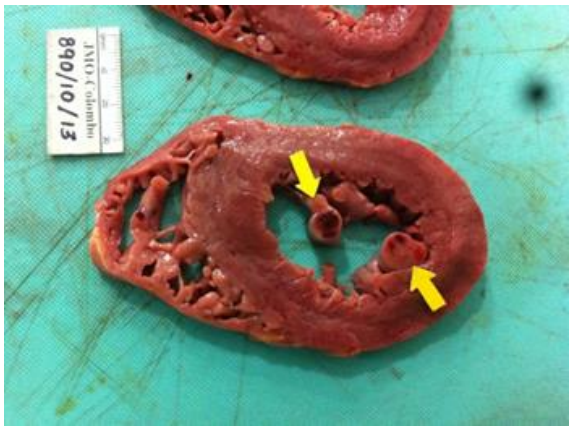

Figure 5. Papillary muscle haemorrhages

There were fatty liver and perivenular congestion with infiltration of lymphocytes in the liver parenchyma and portal tracts. Spleen was effluent with congested red pulp and reactive hyperplasia of the white pulp.

Kidneys showed focal areas of haemorrhages in the interstitial renal tissues and formation of RBC casts in the distal convoluted tubules with congested blood vessels in the renal tissues. Adrenals showed focal medullary and cortical haemorrhages.

Uterus was bulky with evidence of sepsis (400 g). Weight of the fetus was 400g and placental weight was 150g with macerated fetus (Figure 6). In the foetus, crown heel length was 31 cm and crown rump length was 21cm.

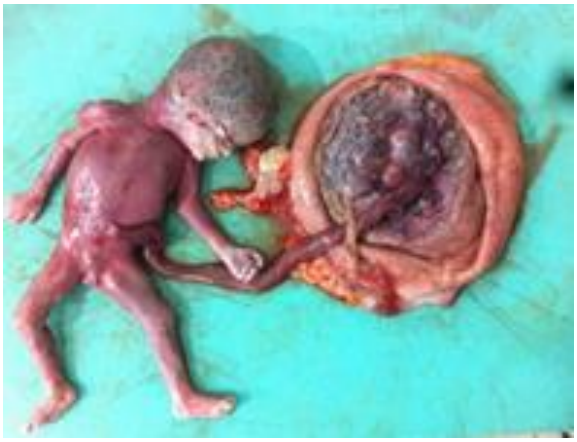

Figure 6. Macerated foetus and placenta

Blood for HIV was negative. Blood culture showed mixed growth. Blood picture was compatible with viral infection and disseminated intra vascular coagulation (DIC).

Cause of death was sepsis due to viral pneumonia probably following chicken pox. Further, the following comments were given. No evidence of violence, the skin lesions were compatible with chicken pox zoster (varicella zoster) and the deceased was suffering from sexual transmitted disease (viral warts).

Discussion

Pregnant women are more susceptible for infection than non-pregnant women and severe pneumonitis caused by influenza virus and varicella zoster infection may occur more in pregnancy.[3]

Sepsis is a condition in which the body is fighting a severe infection that has spread via the bloodstream. The common feature of all forms of "shock" is inadequate functional tissue perfusion, usually manifested by arterial hypotension.[4] This condition is termed as "septic shock", when an infection is the cause of shock and in septicemia, the diagnosis is essentially clinical.[5] In this case, the clinicians diagnosed that the septicaemia was due to pneumonia. High blood pressure and albuminuria was explained by hyperthyroidism.

Following septic shock, the development of secondary liver and renal failure and GI mucosal necrosis occurs. They may combine with other insufficiencies such as cardio-respiratory and GI system leads to multi-organ failure which is fatal.[5]

Histological survey is vital for microbial and virological studies such as minimum of 6 blocks from lungs, swabs for culture from air passages and lung parenchymal, heart blood for culture and piece of lung for virological culture. The return of such PM microbial and virological studies is poor in terms of positive findings, both (a) because of the post-mortem interval and (b) because many of the micro-organisms found may be indistinguishable from commensals or PM contaminants.[6] In this case, the samples were taken 10 hours after death and the PM blood culture showed a mixed growth.

In this case, the spleen was large and soft and microscopy findings were compatible with viral infection. Liver showed features of fatty liver and hepatitis. Kidneys showed the signs of acute renal failure such as RBC casts in distal convoluted tubules with congested blood vessels in medulla. Enlarged soft spleen, prominent lymph nodes, hepato-renal failure are autopsy signs of septicaemia.[6]

In histopathology, heart showed myocarditis with myocardial necrosis and lymphocyte infiltration, and kidneys showed early changes of acute renal failure. The lung findings were compatible with viral pneumonia, and splenic findings with viral infection. Therefore, histopathology revealed viral pneumonia, myocarditis and DIC.

In viral encephalitis, brain shows severe oedema with perivascular cellular infiltrates and infiltration of the meninges. Cells are predominantly lymphocytes and polymorphs. Acellular plaques of necrosis may be seen throughout the brain.[7] When brain is subjected to global ischaemic insult due to shock, can cause sulcal infarcts at watershed areas.[4] In this case, CT and autopsy confirmed cerebral oedema. Autopsy revealed an angry looking brain and microscopy findings were compatible with the septic shock with viral encephalitis.

Septic shock can develop either as a result of the body's own defense system or from toxic substances made by the infecting agent such as a bacteria, virus, or fungus.[1] In this case, the clinicians identified pneumonia as the cause for the septicaemia but they have not identified the vesicular lesions found along dermatomes compatible with chicken pox zoster. Further, the autopsy and microscopic findings revealed that the pneumonia was viral and the cause for the sepsis was viral infection probably chicken pox.

Varicella zoster virus (VZV) infects the nerves, and causes a wide variety of symptoms. After the primary infection (chickenpox), the virus goes dormant in the nerves, including the cranial nerve ganglia, dorsal root ganglia, and autonomic ganglia. Many years after the patient has recovered from chickenpox, VZV can reactivate to cause a number of neurologic conditions and dermatomal vesicular lesions.[1] The severity of rash varies from person to person. Immunocompromised patients tend to have a more severe rash and are more prone to visceral involvement.[8]

Varicella infections can be life threatening even in immunocompetent adult patients. The importance of supportive care and significance of early bronchoscopy for the removal of gelatinous mucous plugs in the management of varicella pneumonia needs to be stressed in addition to antiviral therapy.[9] In this case, no such treatment had been attempted.

In patients with unexplained hyper-eosinophilia, VZV infection should be investigated.[10] In this case, though the WBC count was high, hyper-oeosinophillia was not found. According to Toi et al., clinical and asymptomatic reactivation of VZV with viremia may occur.[11]

Varicella is a well-known contagious disease that can affect both immune compromised and immune competent adults. An apparently healthy adult patient can present with a fulminant hepatitis evolving in multiorgan failure, associated with an atypical papulo-erythemateous cutaneous rash without fever. The diagnosis of liver disease due to VZV should always be clinically suspected in the presence of concurrent atypical skin lesions and a temporarily immuno-compromised state.[12]

Conclusions

The clinical diagnosis was septicaemia due to pneumonia but herpes zoster infection was not diagnosed. VZV infection can be life threatening even in immune-competent adults. The diagnosis of multi-organ failure from VZV should always be clinically suspected in the presence of atypical skin lesions and a temporarily immune-compromised state such as pregnancy. Finally, the cause of death was given as sepsis due to viral pneumonia probably following VZV.

Disclosure statement

Conflicts of interests: The authors declare that they have no conflicts of interests.

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