CASE REPORT

PERINATAL DENGUE INFECTION

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Abstract. We report a case of vertical transmission of dengue infection in an infant. The mother's was a term pregnancy with a history of chronic hypertension. She presented with high fever of 3 days duration 5 days prior to delivery. Her initial complete blood count showed platelet count of 64,000/mm^3. Dengue hemorrhagic fever was diagnosed 2 days later and symptomatic treatment was given. During labor her platelets dropped to 11,000/mm^3 and platelet concentrate was given. Cesarean section was performed due to prolonged second stage of labor. Her infant was normal at birth except for petechiae on the left thigh. The child's platelet count was 34,000/mm^3 and low grade fever was detected on the first day. Clinical sepsis was suspected and antibiotic treatment was started and continued for 4 days until all the cultures came back as negative. Both mother and her baby made an uneventful recovery and were discharged 6 days after delivery with normal platelet counts. Maternal blood was positive for IgM antibody to dengue virus. Both cord blood and the baby's blood were positive for dengue virus serotype 2 by PCR.

Dengue hemorrhagic fever (DHF) has become endemic and causes significant health problems in many countries in Southeast Asia, the Western Pacific and the Americas (WHO, 1997). Although in early reports DHF mainly occurred in children under 15 years, more recent epidemiological data have shown an increasing incidence in older age groups and adults (Teeraratkul and Limprakarnjanarat, 1990), including pregnant women with severe peripartum bleeding at or after delivery (Chotigeat *et al*, 2000; Chye *et al*, 1997; Poli *et al*, 1991; Thaithumyanon *et al*, 1994). Although DHF is mainly (85%) a manifestation of secondary dengue infection, a primary infection can also manifest as DHF in infants who transplacentally acquire enhancing antibody from their mothers (Kliks *et al*, 1988). Care must be taken when dealing with dengue infection in pregnant women, regardless of primary or secondary infection to prevent severe complications such as bleeding and shock in the mothers and newborn infants.

We report a case of a pregnant woman who developed secondary dengue infection near the time of delivery and gave birth via cesarean section (C/S) to her infant who also experienced mild dengue 2 infection. Strategies for management of dengue viral infection in mothers and infants are discussed.

Mother: A 39 year old gravida3 para2 Thai woman, resident of Bangkok metropolitan area, with a history of asthma and chronic hypertension was closely followed in the high risk antenatal care clinic since week 13 of gestation. She had no asthmatic attack and her blood pressure was well controlled. Her fetus was regularly monitored with serial sonography, umbilical arterial flow doppler and non-stress test. She was admitted at week 38 of gestation with a history of high fever, chills, headache, backache and dysuria for two days. Physical examination revealed a normal pregnant woman with fever of 38.5ºC. Complete blood count (CBC) showed hematocrit 38.3% WBC 4,800/mm^3 (neutrophil 79%, lymphocyte 8%, monocyte 12%) platelet 64,000/mm^3. Urine analysis showed WBC 60/HPF, RBC 20/HPF, with negative results for protein and sugar. She was diagnosed as acute pyelonephritis and intra-

venous ampicillin was given.

Her fever resolved 24 hours later, when petechiae on the anterior abdominal wall were noted. The platelets dropped to 42,000/mm^3. She was then suspected of having DHF and was placed on close observation. The fetus was monitored with daily fetal movement count and non-stress test.

On the third day, hemoconcentration (17% increase) was noted as a hematocrit of 45% and the diagnosis of DHF was more certain. Treatment given includes adequate hydration, close serial monitoring of hematocrit, vital signs, fluid intake and urine output.

On the fourth day of admission, the petechiae progressed along the trunk and her platelets dropped further to 11,000/mm^3. Six units of platelet concentrate were given which raised her platelet count to 22,000/mm^3.

On the fifth day of admission, mild uterine contractions began and the cervical opening was dilated 1 cm. Early labor was diagnosed. In the evening, she developed superimposed severe preclampsia which was controlled with $MgSO_4$. In order to prepare for delivery, ten units of platelet concentrate were given which raised her platelet count to 69,000/mm^3. At midnight, a prolonged second stage of labor resulted in emergency C/S delivery while 6 units of platelet concentrate were transfused. The mother made an uneventful recovery and was discharged on day 9 with the platelet count 126,000/mm^3, hematocrit 40%, WBC 127,000/mm^3 (neutrophil 73%, lymphocyte 15%, monocyte 11%, eosinophil 1%). The mother's blood dengue IgM and IgG antibodies on the day of delivery were diagnostic of secondary dengue infection (Table 1). Her polymerase chain reaction (PCR) for dengue virus on day 5 was negative.

Infant: A 2,970 g term female infant was born with APGAR scores 7 and 9 at 1 and 5 minutes, respectively. On the first day of life, she developed tachypnea, feeding intolerance and hypoglycemia. Physical examination revealed low grade fever, few scattering petechiae on her left thigh and hepatomegaly of 3 cm below the right costal margin. The gastric content from an orogastric tube was coffee ground in appearance. She received intravenous glucose bolus and infusion. Ampicillin and gentamicin were started after septic work up was performed. Her first complete blood count showed a hemotocrit of 52%, WBC count of 10,500/mm^3 and platelet count of 34,000/mm^3. Platelet concentrate 10 cc/kg was given. After platelet transfusion, the platelet count remained low at 28,000/mm^3. On the third day of life, her clinical status improved and antibiotics were stopped after blood culture was reported as negative. Her platelet count became normal on the fifth day and she was discharged from hospital on the sixth day. Both the cord blood and the baby's blood were positive for dengue virus serotype 2 by PCR technique (Table1).

High dengue specific IgM in the mother and positive dengue 2 PCR in both cord and baby's blood confirmed a vertical dengue transmission; the maternal negative PCR could be from the delay in obtaining serum specimen (2 days after lysis of fever). From our experience and previous reports as shown in Table 2 den-

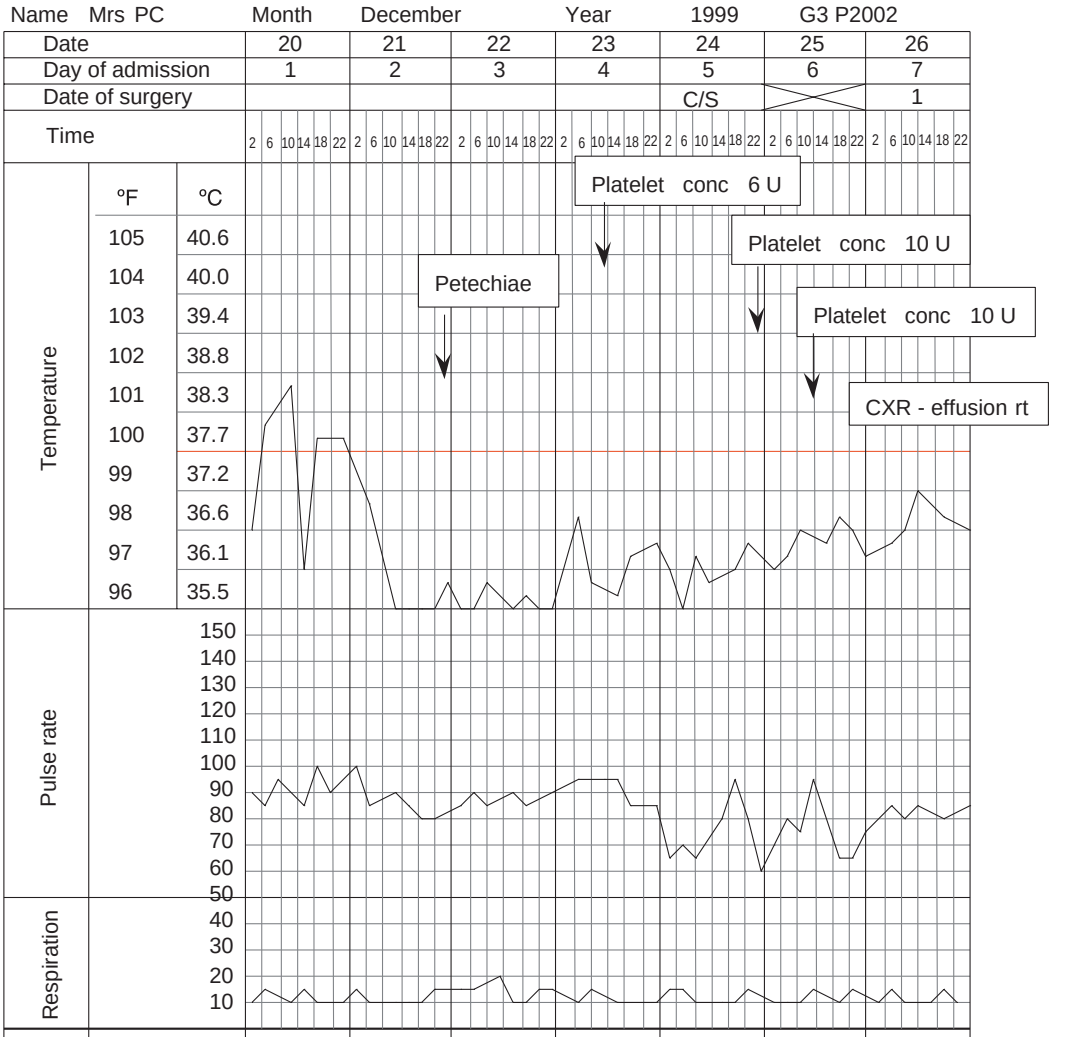
Table 1
Vival study in mother's blood, cord blood and baby's blood.

Specimen	Date	EIA				PCR for dengue
		Dengue		JE		
		IgM	IgG	IgM	IgG	
Mother's blood	22 Dec 1999	97	158	114	107	Negative
Mother's blood	14 Jan 2000	71	109	59	90	-
Cord's blood	25 Dec 1999	6	61	2	42	+ve Den 2
Baby's blood	25 Dec 1999	8	48	6	38	+ve Den 2
Baby's blood	14 Jan 2000	21	38	5	27	-

Table 2
Clinical and laboratory finding in 8 reports (27 cases).

Authors (year)	Number of cases	Mode of delivery	Mother: Presenting symptoms	Mother: Platelet count/mm³ < 20,000	Mother: Platelet count/mm³ 20,000-50,000	Mother: Platelet count/mm³ > 50,000	Mother: Complications	Infant: Platelet count/mm³ < 20,000	Infant: Platelet count/mm³ 20,000-50,000	Infant: Platelet count/mm³ > 50,000	Infant: Complications	Laboratory diagnosis: Mother	Laboratory diagnosis: Cord Blood	Laboratory diagnosis: Infant
Poli *et al* (1991)	5	Vg	Fever 1-4 days	-	-	1	None	1	2	2	Fever 1-2 days (5) GI bleeding (1) DSS (1)	IgM (4)	ND	IgM (5) HAI (2) Isolation(2)
Fernandez *et al* (1994)	4	ND	ND	-	-	-	None	-	-	-	None	Isolation (4)	ND	IgM (4)
Fiqueiredo *et al* (1994)	10	Vg- 9 Cs-1	ND	-	-	-	None	-	-	-	None	IgM (2)	ND	IgM (0)
Thaithumayaun *et al* (1994)	1	Cs	Fever 2 days, myalgia	-	-	1	Severe post partum bleeding	-	1	-	None	IgM	ND	IgM & Isolation D_2
Chye *et al* (1997)	2	Vg	Fever 3 days, gum bleeding, easy bruise	-	1	-	Post partum anemia	1	-	-	Fever, skin rash, CNS bleeding & death	IgM	ND	PCR-D_2
		Vg	Fever 2 days, petechiae	1	-	-	None	-	1	-	Fever 1 day (D-4)	IgM, HAI, isolation		IgM
Bunyavejchevin *et al* (1997)	3	Vg	Fever 5 days, epigastric pain, petechiae	-	1	-	None	1			None	HAI	ND	ND
		Cs	Fever 5 days, myalgia, petechiae	1	-	-	None				None	HAI		ND
		Cs	Fever 3 days, petechiae	1	-	-	None				None	HAI		ND
Chotigeat *et al* (2000)	1	Vg	Fever 2 days, myalgia	-	1	-	Severe post partum bleeding	-	1	-	Fever 1 day (D-1) thrombocytopenia for 2 months	HAI	ND	HAI
Kerdpanich *et al* (2000)	1	Cs	Fever 5 days, chill, headache	1	-	-	None	1	-	-	Fever 2 days (D-1), petechiae	IgM	PCR-D_2	PCR-D_2

ND : not determine; Cs : Cesarean section; Vg : vaginal delivery; HAI : Hemagglutination inhibition test; PCR : polymerase chain reaction; DSS : Dengue shock syndrome; D-2 Dengue serotype 2.



Date			20	21	22	23	24	25	26
Day of admission			1	2	3	4	5	6	7
Date of surgery							C/S		1
Time			2 6 10 14 18 22	2 6 10 14 18 22	2 6 10 14 18 22	2 6 10 14 18 22	2 6 10 14 18 22	2 6 10 14 18 22	2 6 10 14 18 22
Temperature	°F	°C							
	105	40.6							
	104	40.0							
	103	39.4							
	102	38.8							
	101	38.3							
	100	37.7							
	99	37.2							
	98	36.6							
	97	36.1							
	96	35.5							
Pulse rate	150 140 130 120 110 100 90 80 70 60 50								
Respiration	40 30 20 10								
CBC	Hct		38.3	39	45	42.6	45	49.7	40
	Hb		12.8	13	15.4	111.1	15	16.6	13.9
	WBC		4,800	3,600	6,300	7,900	11,800	17,400	12,700
	PMN		79	77	43	50	75	64	73
	L		8	20	49	41	15	29	15
	M		12	-	7	6	10	7	11
	Eo		-	-	1	3			1
	B		-	-	-	-	-	-	
	Platelets		64,000	42,000	7,000	11,000	69,000	19,000	126,000
							22.30	4.00	
I/O			2,005/2,500	3,220/3,000	3,265/3,400		5,238/4,610	3,077/2,730	3,100/1,200
BP			150/90 120/90	120/80 160/100	140/90 142/90	180/103	130/90 157/104	180/100 160/90	150/100 150/100

Fig 1–Maternal vital signs chart.

Name Baby of Mrs PC Month December Year 1999 apgar 7, 9

Date	25 Dec 99	26	27	28	29	30	31
Age		1	2	3	4	5	6
	C/S						

Time: 2 6 10 14 18 22 (repeated)

Temperature (°F / °C): 105/40.6; 104/40.0; 103/39.4; 102/38.8; 101/38.3; 100/37.7; 99/37.2; 98/36.6; 97/36.1; 96/35.5

Petechiae

Heart rate: 150 140 130 120 110 100 90 80 70 60 50

Respiration: 40 30 20 10

CBC	25 Dec 99	26	27	28	29	30	31
Hct	52	51		49		46	
Hb	17.3	16.9		17.2		15.7	
WBC	10,900	12,500		14,500		10,800	
PMN	52	47		26		30	
L	36	35		57		52	
M	6	14		10		9	
Eo	6	2		6		9	
B	-	-		1		-	
Platelet	33,000	26,000		129,000		104,000	
BW	2,970	2,870	2,835	2,870	2,894		
I/O	147/170	240/142	241/128	271/147			
BP	75 76 69 62 / 40 39 42 40	80 77 84 91 / 46 54 56 51	81 80 79 80 / 52 51 44 54	80 82 90 84 / 54 44 62 62	81 91 85 / 58 58 60		

Fig 2–Infant vital signs chart.

gue infection in pregnant women does not appear to cause any fetal damage or malformation (Bunyavejchevin *et al*, 1997; Fernandez *et al*, 1994; Poli *et al*, 1991). There has been one report of a high prevalence of premature labor associated with dengue infection (Carls *et al*, 1999). Antenatal and postpartum dengue infections manifest like other adult dengue infections and management should be more or less the same (Bunyavejchevin *et al*, 1997). Management of perinatal dengue infection deserves special attention (Chye *et al*, 1997; Thaithumyanon *et al*, 1994). Dengue shock syndrome and/or bleeding complications may occur in both mothers and infants. The presence of wounds or trauma coinciding with a period of marked thrombocytopenia, abnormal platelet function or some coagulation abnormalities is a substantial risk. It has been shown that lack of awareness of dengue infection can lead to severe and prolonged postpartum bleeding in mothers who have a history of peripartum fever (Chotigeat *et al*, 2000; Thaithumyanon *et al*, 1994). Serological diagnosis may take some time, but clinical features combined with CBC and platelet counts at the appropriate time provide quicker suggestive evidence. Delivery should be planned as non-traumatic, in a hospital where blood components and a skilled neonatologist are available. Close observation, monitoring, prompt and adequate replacement therapy during the pre- intra- and post-delivery periods are essential. The longer the time interval between onset of maternal fever and delivery the sooner the appearance of fever in infants [4 days/day 2, 1 day/day 5-6] (Poli *et al*, 1991) confirms the incubation period of dengue infection as 5-7 days. The use of tocolytic agents and measures to postpone labor to a suitable time are issues to be explored. For infants, symptomatic and supportive treatment under close observation are the mainstay of treatment. Thrombocytopenic infants need no platelet transfusion unless bleeding supervenes. The number of intrapartum dengue cases has been too small to determine the preferred route of delivery although one infant who was born vaginally after induction of labor died of massive intracerebral hemorrhage (Chye *et al*, 1997) while three other infants who were born via C/S with marked thrombocytopenia within 3 days after birth did not require any intervention (Chotigeat *et al*, 2000; Bunyavejchevin *et al*, 1997; Thaithumyanon *et al*, 1994).

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