Confirmed Congenital Rubella Syndrome - A Case Report

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ABSTRACT
Background: *Congenital Rubella Syndrome (CRS) is defined clinically as an illness usually manifesting in infancy, resulting from rubella infection in utero with certain specific signs and symptoms. Confirmed CRS is a clinically consistent case which is laboratory confirmed. A report of a 3month old male diagnosed with confirmed congenital rubella is here presented on account of its rarity and easy prevention with vaccination.*
Method: *The case notes of 3 month old male admitted with features consistent with CRS and managed for overwhelming septicaemia with heart failure and encephalitis and review of literature on the subject using manual library and Medline search.*
Result: *The infant's Rubella-specific immunoglobulin M (IgM) antibody demonstrated positive and the rubella antibody level was high at 11.6IU/ml.*
Conclusion: *This is the first report of confirmed CRS in our centre. Though few cases are seen, the effects and defects on the child are severe and irreversible thus, vaccination with Measles-mump-rubella (MMR) vaccine is recommended as part of the National Programme on Immunization and for all females of child bearing age, who did not receive it in childhood.*

KEYWORD: Confirmed; Congenital Rubella Syndrome; MMR vaccine.

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INTRODUCTION

The birth of a baby with congenital rubella is both a personal and a community tragedy[1]. Rubella is a major cause of birth defects among the TORCH group of agents causing congenital anomalies. Almost all the symptomatic infected infants have long-term neurological sequelae and many asymptomatic infants also develop deafness or psychomotor retardation later in life[2].

The clinical case definition of congenital rubella syndrome (CRS) [3] is any defect(s) or laboratory data consistent with congenital rubella infection. The infants usually present with more than one sign or symptom consistent with congenital rubella infection. These include:

a) Cataract /congenital glaucoma, hearing i mpairment, congenital heart disease, (most commonly patent ductus arteriosus or peripheral pulmonary artery stenosis), pigmentary retinopathy and
b) Purpura, hepatosplenomegaly, jaundice, microcephaly, developmental delay, meningoencephalitis and radiolucent bone disease.

However, infants may present with a single defect of which deafness is the most common. Laboratory criteria for diagnosis include isolation of rubella virus, or demonstration of rubella-specific immunoglobulin M (IgM) antibody, or infant rubella antibody level that persists at a higher level and for a longer period than expected from passive transfer of maternal antibody (i.e., rubella titer that does not drop at the expected rate of a twofold dilution per month) and Polymerase Chain Reaction (PCR) positive rubella virus[3].

The Case classification[3] of CRS include *Probable* CRS, defined as a case that is not laboratory confirmed and has any two complications listed in a) of the clinical case definition above, or one complication from a) and one from b), and lacks evidence of any other aetiology, *Suspected CRS* in which some compatible clinical findings are present but not meeting the criteria for a probable case and *Confirmed CRS,* a clinically consistent case that is laboratory confirmed. There is also the classification into *Infection only,* in which there is demonstrable laboratory evidence of infection, but without any clinical symptoms or signs.

Infants with CRS should be identified as early in life as possible in order to prevent further spread of the virus. Additionally, early diagnosis will facilitate early intervention for specific disabilities. Infants with CRS may shed virus for a prolonged period and should be considered infectious until they are at least 1 year old or until their urine and pharyngeal viral cultures, taken every month, are repeatedly negative for rubella[4].

Though CRS is not frequently seen in our centre, there has been no previously reported case of confirmed congenital rubella syndrome because of lack of laboratory diagnostic facility. The samples for analysis of IgM and IgG for rubella virus for this patient were sent to South Africa for analysis at an exorbitant cost. We hereby present a case of Confirmed CRS.

CASE REPORT

Baby PE is a 3month old male admitted into the Children's emergency ward of the University of Port Harcourt Teaching Hospital, with a 2-week history of non paroxysmal, distressful cough and fast and difficult breathing of four hours duration. He had been admitted two weeks earlier for nine days in this hospital; with similar symptoms and a diagnosis of congenital rebella

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Syndrome with bronchopneumonia and anaemia in heart failure was made. He responded to antibiotic therapy and blood transfusion and was discharged. Pregnancy was uneventful and mother denied any history of fever or rash in the first trimester of pregnancy. He was delivered at term to a Para 2^{+5}, 26year old housewife. Mother did not receive MMR vaccine. Birth weight was 1.7kg. He received all immunizations, was being exclusively breastfed and had not achieved social smile. He was the second of two children, older sibling is 5 years. The mother had had 5 miscarriages, all at four months, in the past five years. On examination, he was moderately pale, febrile (37.9^0C), in respiratory distress with bilateral cataract, microcephaly (34.5cm), left microphtalmia, with opisthotonic posturing, bilateral fisting and scissoring, occasional seizures and generalised hypertonia. He did not respond to sounds. Weight was 2.6kg. (64.3% of expected). He had a tachypnoea of 80cycles/min with bilateral crepitations and tachycardia of 160beats/minute. Apex beat was displaced in the fifth left intercoastal space, mid-clavicular line. There was a Grade 1V, continuous murmur maximum in the pulmonary area. The liver was 4cm enlarged and tender, and the spleen non tender but enlarged by 2cm. He had a reducible umbilical hernia and bilateral scrotal hernia. There were purpuric rashes on both feet. A diagnosis of Septicaemia in heart failure, rule out meningitis in a child with Probable Congenital Rubella Syndrome was made. He received Cephtriaxone at 100mg/kg daily, Genticin at 5mg/kg 8hourly, digoxin, and phenobarbitone and was transfused with fresh sedimented cells. Complete Blood Count revealed leucocytosis, normal differentials, anaemia of 24% and elevated Erythrocyte Sedimentation Rate (ESR) of 110mm/hr. Renal function test was normal. Cerebro-spinal fluid (CSF) analysis had normal glucose of 3.1mmol and elevated protein of 60mg%. Chest radiograph showed pneumonic changes with mild cardiomegaly. X-ray of the long bones showed normal epiphyses. Rubella IgM was positive and Rubella Elisa IgG was 11.6 IU/ml. (Normal 0.00-4.99IU/ml). Blood culture yielded no growth. Temperature however remained high and a diagnosis of infective endocarditis was entertained but an Echocardiography was not done because of non availability of this test in our centre. He had frequent uncontrollable seizures and recurrent apnoeic attacks despite therapy, and died after three weeks of admission. Parents refused a postmortem.

DISCUSSION

Foetal infection with Rubella occurs transplacentally during the maternal viraemic phase, but the mechanisms by which rubella virus causes foetal damage are not well understood[5]. The fetal defects are likely secondary to vasculitis resulting in tissue necrosis without inflammation. Another possible mechanism is direct viral damage of infected cells. Cells infected with rubella in the early foetal period have reduced mitotic activity. This may be the result of chromosomal breakage or due to production of a protein that inhibits mitosis. Regardless of the mechanism, any injury affecting the fetus in the first trimester (during the phase of organogenesis) results in congenital organ defects[5].

Congenital rubella syndrome (CRS) can occur in a developing foetus of a pregnant woman who has contracted rubella during her first trimester. Problems rarely occur when rubella is contracted by the mother after 20 weeks of gestation [6]. The risk of occurrence of congenital defects is 50% or greater if infection occurs during the first month of gestation, 20% to 30% if during the second month and 5% if during the third and fourth months[7].

The classic triad of presentation of congenital rubella syndrome consisting of sensorineural hearing loss, ocular abnormalities and congenital heart disease were present in our patient. Sensorineural hearing loss is the most common manifestation of congenital rubella syndrome. It occurs in approximately 58% of patients. Though our patient did not have an audiometry done, he did not respond to sound throughout admission. Approximately 40% of patients with congenital rubella syndrome may present with deafness as the only abnormality without other manifestations. Hearing impairment may be bilateral or unilateral and may not be apparent until the second year of life [4]. Ocular abnormalities including cataract, infantile glaucoma, and pigmentary retinopathy occur in approximately 43% of children with congenital rubella syndrome. Both eyes had cataract in our patient. Bilateral cataract has been reported in upto 80% of patients with CRS and cataract and rubella retinopathy are the most frequent ocular manifestation[4].

Congenital heart disease in CRS including patent ductus arteriosus (PDA) suspected in our patient and pulmonary artery stenosis is present in 50% of infants infected in the first 2 months of gestation. Cardiac defects and deafness occur in all infants infected during the first 10 weeks of pregnancy and deafness alone is noted in one third of those infected at 13-16 weeks of gestation[5]. This implies that our patient may have been infected within the first ten weeks of intrauterine life. Other findings in congenital rubella syndrome include

intrauterine growth retardation as seen in our patient, prematurity, stillbirth, and abortion. Congenital rubella in infants and children is diagnosed by viral isolation or by serologic testing. Viral isolation which cannot be done in our center is the preferred technique. Nasal, throat swabs, blood, urine and cerebrospinal fluid can yield virus particularly in congenitally infected children. Detection of rubella-specific immunoglobulin (Ig) M antibody as seen in our patient usually indicates recent postnatal infection or congenital infection in a newborn infant[7]. Congenital infection can also be confirmed by stable or increasing serum concentrations of rubella-specific IgG over several months[7]. Though done on only one sample and at age of three months, the IgG of the patient was elevated at 11.6IU/ml. (normal 0.00-4.99IU/ml). Congenital rubella syndrome has also been diagnosed using placental biopsy, rubella antigen detection by monoclonal antibody, and Polymerase chain reaction (PCR)[5]. The diagnosis of CRS in children over one year of age is difficult[7].

Treatment for CRS is supportive. Vision and hearing screening are indicated for asymptomatic newborns. Treatment of symptomatic newborns includes a careful evaluation of the eyes and ophthalmology review of babies with corneal clouding, cataract, and retinopathy. Those who develop respiratory distress may require supportive treatment in the intensive care unit.

Drug therapy is currently not a component of the standard care for rubella. Though not applicable to our patient who died, careful follow-up care after discharge from the hospital for patients includes hearing evaluation, vision and development screening.

All persons who have contact with children with congenital rubella syndrome (e.g., caregivers, household contacts, medical personnel, laboratory workers) should be immune to rubella to prevent rubella outbreaks from persons infected with rubella virus. Contact isolation is indicated for children with proven or suspected congenital rubella infection until they are aged at least 1 year, or until two consecutive nasopharyngeal swabs and urine cultures taken after the age 3 months and done one month apart are negative for rubella virus[1].

Rubella vaccine is available in 2 forms as a combined vaccine with measles, mumps, and rubella (MMR), which is most widely used, and in monovalent rubella vaccine, which is less frequently used. Both forms of vaccine are administered by subcutaneous injection at a standard dose of 0.5mL. After administration of a single dose of rubella vaccine, protective serum antibody develops in at least 95% of recipients older than 1 year. Studies have shown that a single dose confers long-term immunity, probably lifelong immunity, against clinical and asymptomatic infection in more than 90% of immunized persons. MMR vaccine recommendation includes routine childhood immunization with 2 doses of MMR vaccine. The first dose of MMR is received at age 12-15 months and the second at age 4-6 years. Children who have not received the second dose by the time they enter school should receive it as soon as possible but no later than age 11-12 years. Persons at risk are those who have not received at least 1 dose of the vaccine or who have no serologic evidence of immunity to rubella. They are susceptible to rubella and should be immunized with MMR vaccine. MMR vaccine is especially recommended for all adults at risk of rubella infection (e.g., college students, military recruits, and health care personnel). All post pubertal females without documentation of immunity should be vaccinated unless they are known to be pregnant. Women receiving the vaccine should be counseled not to become pregnant within 3 months of vaccine administration[5,7].

CONCLUSION

This is the first report of confirmed CRS in our Centre. Though few cases are seen, the devastating consequences in the newborn are long lasting and so vaccination with Measles-mump-rubella vaccine (MMR) is recommended as part of the National Programme on Immunization and for all girls of child bearing age who did not receive it in childhood.

REFERENCE

1. Shoran S, Sharma S, Franzo FA. Congenital rubella cataract: a timely reminder in the new millennium? Clin Exp Ophthalmol 2006; 34:83 -84.
2. Chakravarti A, Jain M. Rubella prevalence and its transmission in children. Indian J Pathol Microbiol 2006; 49(1):54-6.
3. CDC. Case definitions for infectious conditions under public health surveillance. MMWR 1997; 46 (RR-10):30.
4. Reef S, Coronado V. Congenital Rubella Syndrome. http://www.deafblind.com.
5. Ezike E, Ang JY, Asmar B. Rubella. http://www.emedicine.com/cgi-bin/foxweb.exe/screen@d:/em/ga?.
6. Congenital rubella syndrome. http://en.wikipedia.org/wiki/Congenital_rubella_syndrome.
7. American Academy of Paediatrics. *2000 Red Book. Report of the Committee on Infectious Diseases*, 25th edn. Elk Grove Villiage: American Academy of Paediatrics, 2000:495-500.