

# Congenital Rubella Syndrome

Author: Doctor Elisabeth Robert-Gnansia<sup>1,2</sup>

Creation Date: November 2002

Update: November 2004

<sup>1</sup>member of Orphanet editorial committee

<sup>2</sup>Institut Européen des Génomutations, 86 Rue du docteur Edmond Locard, 69005 Lyon, France.  
[elisabeth.robert@ieg.asso.fr](mailto:elisabeth.robert@ieg.asso.fr)

[Abstract](#)

[Keywords](#)

[Disease name and synonyms](#)

[Historic](#)

[Clinical description](#)

[Incidence](#)

[Risk of fetal infection](#)

[Diagnosis](#)

[Conclusion](#)

## Abstract

*Congenital rubella syndrome is a group of physical abnormalities that have developed in an infant as a result of maternal infection and subsequent fetal infection with rubella virus. The main defects caused by rubella infection are: sensorineural deafness, which can progress after birth; eye defects such as cataracts; cardiovascular defects; brain damage, that only occurs after infection between the 3rd and 16th week of gestation, causing mild to severe mental retardation with microcephaly and spastic diplegia; major structural malformations are rare. In France, systematic vaccination of male and female newborns was introduced in 1985 and induced a marked reduction in the incidence of CRS, reaching less than 3 cases in 100,000 livebirths in 2002. The prenatal diagnosis of fetal infection is done on rubella contact counting with or without eruptive disease, associated with identification of the virus by gene amplification on amniotic fluid, or with a significant rate of IgM in fetal blood (fetal blood sampling can only be performed after 22 weeks of gestation).*

## Keywords

maternal rubella infection, sensorineural deafness, eye defects, cardiovascular anomalies.

## Disease name and synonyms

Congenital rubella syndrome

Fetal rubella syndrome

life of the embryo. Parents' interviews about their child's history enabled the correlation between these cataracts and the severe rubella epidemic that occurred few months before.

## Historic

In 1941, following a severe rubella epidemic in Australia, Norman McAlister Gregg, a Sydney ophthalmologist, reported several cases of babies born with congenital cataract in the first six months of the year. He contacted colleagues around Australia and eventually recorded a total of 78 cases of this anomaly that until then occurred rarely. These cataracts involved all but the outmost layers of the lens, which suggested that the cataract process had begun early in the

## Clinical description

The main defects caused by rubella infection are (Forrest *et al.* 2002): sensorineural deafness, which can progress after birth; various ocular abnormalities such as cataract, retinopathy or glaucoma; cardiovascular defects which can occur at any time after infection between the 3rd and 12th week of gestation, and the most common defects include patent ductus arteriosus,

stenosis of the pulmonary artery and its branches, and septal defects  
brain damage, that only occurs after infection between the 3rd and 16th week of gestation, causing mild to severe mental retardation with microcephaly and spastic diplegia; major structural malformations are rare.

Any combination of the above-mentioned list of defects in a context of maternal rubella is called congenital rubella syndrome (CRS). A constant feature of CRS is fetal growth retardation; Infection occurring between the fifth month and the end of pregnancy or later does not usually cause disability, although cases of deafness have been reported after infection as late as 28 weeks, and peripheral pulmonary artery stenosis as late as 23 weeks.

Long-term follow-up of newborn (Forrest *et al.* 2002) with CRS s has revealed that they are at increased risk of late onset chronic diseases such as insulin-dependent diabetes (risk 50 times higher than that in the general population), thyroid dysfunction, digestive disturbances, and a rare neuro-degenerative disorder called panencephalitis. These conditions may result from ongoing viral infection, or autoimmune response.

#### Incidence

In France, monitoring rubella infections during pregnancy and congenital rubella syndrome (CRS) has shown that vaccinations of females in childhood and childbearing age between 1976 and 1984 had a limited impact on the incidence of the infection (28 cases in 100 000 livebirths) [ref Six]. Systematic vaccination of male and female newborns was introduced in 1985 and induced a marked reduction in the incidence of CRS (from 13 to 5 cases in 100,000 livebirths). This incidence has increased to around 10 cases in 100,000 livebirths in the late 90s (Six C *et al.* 2002), probably due to immigrants who were not vaccinated at birth, but decreased afterwards to reach less than 3 per 100,000: in 2002, 21 cases of rubella infections during pregnancy were reported in France, among which 10 pregnancies continued to term and 11 were terminated. One child was born with a CRS. (Parent du Chatelet *et al.* 2004)

#### Risk of fetal infection

The risk of fetal infection varies according to the time of onset of maternal infection. The risk is above 80% between week 0 and 12 after the last menstrual period (LMP). Infection before LMP presents a negligible risk for the embryo. In case of later infection, ie between week 15 and week

30 after LMP, the risk decreases to about 30%, and increases again to reach almost 100% after week 36.

#### Diagnosis

The prenatal diagnosis of fetal infection is done on rubella contact counting with or without eruptive disease, associated with identification of the virus by gene amplification on amniotic fluid (Mace *et al.* 2004), or with a significant rate of IgM in fetal blood (fetal blood sampling can only be performed after 22 weeks of gestation).

A reinfection associates a previous proven immunity (certified by 2 positive previous serologies or by a vaccination followed by positive serologic checking) and a substantial variation of serum antibodies.

The measurement of avidity of IgG may help determining whether the patient has a primo-infection or a reinfection, and the absence of specific IgM excludes a primo-infection.

#### Conclusion

Besides the necessity to quickly improve and generalize the systematic vaccination of newborns, the policy should be to identify the largest possible number of non immune women in childbearing age in order to vaccinate them and avoid new epidemics and pregnancy terminations. The postpartum vaccination of seronegative women must be more promoted to clinicians.

#### References

- Forrest JM**, Turnbull FM, Sholler GF, Hawker R E, Martin FJ, Doran TT, Burgess MA. Gregg's congenital rubella patients 60 years later. *MJA* **177** : 664-667 (2002)
- Mace M**, Cointe D, Six C, Levy-Bruhl D, Parent du Chatelet I, Ingrand D, Grangeot-Keros L. Diagnostic value of reverse transcription-PCR of amniotic fluid for prenatal diagnosis of congenital rubella infection in pregnant women with confirmed primary rubella infection. *J Clin Microbiol.* **42** : 4818-20 (2004)
- McAlister Greg N**, Congenital cataract following German measles in mother. *Trans Ophthalmol Soc Aust* **3** (1941), pp. 35-46.
- Parent du Châtelet I**, Bouraoui L, Six C, Lévy-Bruhl D. La rubéole chez la femme enceinte et le nouveau-né en France métropolitaine en 2002 : les données du réseau Rénarub\*. *BEH*, **01** : 2-3 (2004)
- Six C**, Bouraoui L, Lévy-Bruhl D. La rubéole chez la femme enceinte et le nouveau-né en France métropolitaine: les données 2001 du réseau Rénarub\*. *BEH*, N°**21** (2003)