



## Child with Trisomy 13, inherited from paternal translocation, rob(13;14)(q12.1;q11.2)

### KEYWORDS

Priyantha Julian Perera (MBBS, MD, DCH)

Senior Lecturer in Paediatrics, Department of Paediatrics, Faculty of Medicine, Ragama, Sri Lanka

### Introduction

First described by Thomas Bartholin in 1657, cytogenetics of Trisomy 13 (Patau syndrome) was first described by Klaus Patau in 1960. Incidence of Patau syndrome is 1 in 5000 live births<sup>1</sup>. Cytogenetically, like in other trisomies nondisjunction is the commonest, with Robertsonian translocation (RT) involving chromosome 13 accounting for about 20 percent and mosaicism in about 5%. Nondisjunction trisomy 13 tend to increase with maternal age, but association is not strong as in trisomy 21<sup>2</sup>. RT occur de novo, or inherit from a carrier parent, with a balance translocation. RT is where short arms of two acrocentric chromosomes are deleted and long arms fusing together forming one chromosome. Translocations between 13 and 14 chromosomes are the commonest RT involving chromosome 13, where carrier rate is 1 in 1,300<sup>3</sup>.

Individuals with RT have 45 chromosomes instead of 46, but as no significant loss of genetic material they remain clinically normal. Problems occur during gametogenesis with increased risk of trisomies. Females with balanced RT conceive normally, but encounter recurrent foetal loss during early pregnancy. In a female carrier with a balance RT involving chromosome 13, has a 1% chance of having a trisomy 13 baby<sup>4</sup>. Among male carriers of RT, problems associated with spermatogenesis causing oligospermia and/or sperm motility problems are common<sup>5,6</sup>. Therefore, paternal origin translocation causing Patau syndrome is relatively rare. Here we report a case of patau syndrome where father was a RT carrier.

### Case report

A couple with primary subfertility for more than two years, conceived following artificial insemination. Intrauterine growth restriction was detected from first trimester. Anomalous scan at 20 weeks of gestation revealed facial abnormalities and dilated ventricular system with absent corpus callosum indicating holoprosencephaly. Features were highly suggestive of Patau syndrome, but definitive diagnosis through antenatal chromosomal analysis was not carried out. The situation was explained to parents and after counselling, agreed to continue with pregnancy till term. Delivery was induced at term and baby was delivered vaginally. The baby did not cry at birth but responded to inflation breaths given via a self-inflation bag.

Baby had bilateral cleft lip, complete midline cleft palate and post axial polydactyly. Post-natal ultra sound scan confirmed holoprosencephaly and echocardiogram showed a large ventricular septal defect with a moderate Atrial septal defect. A venous sample of blood was sent for chromosomal studies. As requested by parents routine new-born care was given in the special care baby unit. Baby developed heart failure and severe sepsis, died on sixth day of life. Consent was not given by the parents for a pathological post-mortem. Baby's chromosomal analysis revealed 46,XX,+13,rob(13;14)(q12.1;q11.2). For genetic counselling purposes chromosomal analysis of parents was done. Father's Karyotype was 45,XY,rob(13; 14)(q12.1;q11.2), indicating a balanced RT. Karyotype of mother was normal. Parents were directed to a clinical psychologist for counselling and a clinical geneticist.

### Discussion

Trisomy 13 is associated with disturbed embryogenesis of the prosencephalon and the midfacies<sup>1</sup>. Multiple anomalies in trisomy 13 makes survival beyond infancy very rare, but mosaicism may cause less clinical features and longer survival. In conditions like Patau Syndrome, main focus of the management is on parental counselling, because irrespective of the management prognosis for the baby is poor. The psychological stress involved in carrying a foetus, knowing that the baby is having multiple abnormalities is an immense stress to the mother. In countries like Sri Lanka where termination of pregnancy is not allowed, value of doing an anomalous scan at 20 weeks is limited. With a history of subfertility and a previous pregnancy loss expectations of this couple was very high. It needed many counselling sessions to settle them at least to accept the nature of the baby. Parents requested to resuscitate the baby if required and provide the basic new-born care which we obliged. Counselling parents under these circumstance need experience and employing services of a clinical psychologist is advisable.

Other major aspect of management is advising parents on future prospects of fertility. A carrier female with RT involving chromosome 21, has a 10-15% risk of having a baby with trisomy 21, but with RT involving chromosome 13, the risk is only 1%. However when a male carries a RT risk of any trisomy is less than 1%<sup>6</sup>. This is due to disproportionately less number of chromosomally unbalanced sperms are produced by carrier men, and only 10 to 15% of the sperm will be chromosomally unbalanced<sup>7</sup>. In addition RT carrier males are more likely to be subfertile due to oligozoospermia and sperm motility problems. Primary subfertility observed in this couple initially and then conceiving through artificial insemination indicate this father would have had problems with his sperm motility. Though seminal fluid analysis has been done, report was not available with the father to confirm this. Low risk of trisomy 13 when mother carries RT is due to very early pregnancy loss, where the female may not even know that she had conceived. This highlights the importance of doing chromosomal analysis in couples with subfertility and recurrent foetal loss. As circumstances were complex in this case, parents were referred to a clinical geneticist to discuss about future prospects of parenting.

### References

1. Gilbert-Barness E, Raj Kapur, Oligny LL, Joseph Siebert J. Potter's Pathology of the Fetus, Infant and Child, 2nd dition. 2007; Elsevier
2. Parker MJ, Budd JL, Draper ES, et al; Trisomy 13 and trisomy 18 in a defined population: epidemiological, genetic and prenatal observations. *Prenat Diagn.* 2003 Oct;23(10):856-60
3. Gardner RJM, Sutherland G. 2004. Chromosome abnormalities and genetic counseling. Oxford: Oxford University Press.
4. Robertsonian translocations. Understanding chromosomal disorders. Unique : Rare Chromosome Disorder Support Group, www.rarechromo.org/information
5. De Braekeleer M1, Dao TN Hum Reprod. Cytogenetic studies in male infertility: a review ; 6(2):245-50.
6. E.Van Assche1 \* 3, M-Bonduel Cytogenetics of infertile men 1e1 , H.Tournaye2 ,HJoris2 , G.Verheyen2, P-Devroey1, A.Van Steirteghem2 and I.Liebaers. Human Reproduction 1996, Volume 11 Supplement 4, 1-24