

Introduction

Chromosome translocations involving one donor chromosome and multiple recipient chromosomes are referred to as jumping translocations (JT). Jumping translocations are very rare cytogenetic events with the majority of cases reported being in haematological neoplasms. Most reports of constitutional JT involve acrocentric chromosomes and breakpoints occurring within repetitive areas of DNA (telomeric, centromeric, and nucleolus organizing regions).

We report a 4-day-old baby girl who presented with very subtle dysmorphic features, hypoglycaemia, and poor feeding. Additional history revealed that the mother was on methadone maintenance and that the baby neonatally had withdrawal symptoms.

Cytogenetic Analysis

Conventional G-band analysis:

45,XX,der(10)t(10;14)(p15.3;q11.2),-14[192]/45,XX,-14,der(17)t(14;17)(q11.2;q25.3)[3]/45,XX,der(12)t(12;14)(p13.32;q11.2),-14[2].ish der(10)t(10;14)(10p006+)

A scan of 200 metaphases revealed three cell lines, with all containing unbalanced translocations involving chromosome 14q11.2, the telomeric region of the partner chromosome, and loss of the chromosome 14 centromere. The major line involved the p arm of chromosome 10, with the minor lines involving the telomeric regions of the q arms of chromosomes 12 and 17. In addition to defined cell lines, single cell abnormalities were also noted where 14q11.2 was involved in translocations with 1q, 6q, and 16q. This chromosomal picture is consistent with the presence of a jumping translocation involving chromosome 14q11.2.

FISH analysis was performed using Vysis 10p subtelomeric and CEP 10 probes (see fig 4). This analysis showed the 10p subtelomeric region to be intact, indicating that there is no significant monosomy of chromosome 10p. As would be expected a small number of cells showed a normal signal pattern on both chromosomes 10, consistent with the presence of multiple cell lines.

Both parents showed an apparently normal karyotype.

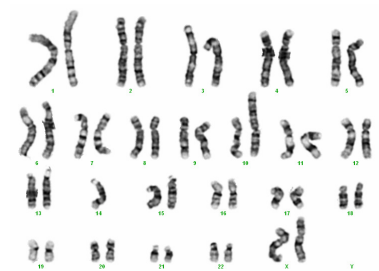


Fig 1. Karyogram of the major der(10)t(10;14) cell line.



Fig 2. Karyogram of the minor der(12)t(12;14) cell line

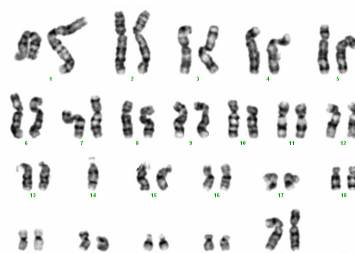


Fig 3. Karyogram of the single cell aberration der(10)t(1;14).

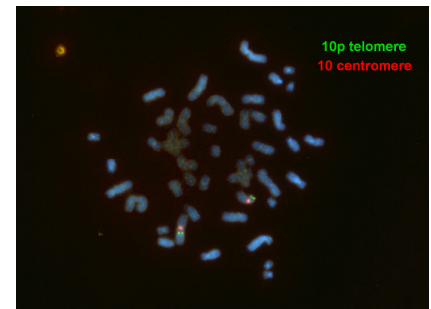


Fig 4. FISH image demonstrating the retention of the 10p subtelomeric region in the der(10)t(10;14).

Discussion

As many drugs, including methadone, are known to induce chromosomal damage, we would be concerned that these cytogenetic findings may be related to the methadone treatment. However, to our knowledge jumping translocations have not been previously reported in association with methadone use. Currently it is unclear to what extent the described phenotype of this infant is associated with the jumping translocation or whether it is the result of drug exposure. FISH evidence would suggest that there is no significant monosomy of the partner chromosome, which could have influenced the phenotype.

Despite constitutional JT typically involving acrocentric chromosomes there is no specific mention of the involvement of chromosome 14 in the literature. Therefore, there are no reports of possible phenotypic consequences of such an event.

Currently it cannot be fully ruled out that these cytogenetic findings are a transient event given that the baby had withdrawal symptoms at birth. It is planned that further cytogenetic studies will be undertaken when this child is over 6-months-old to determine if the proportion of cell lines remains constant.