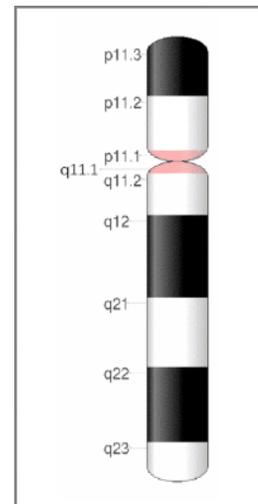




## TETRASOMY 18P

### Tetrasomy 18p

Tetrasomy 18p, also known as iso-chromosome 18p, is a rare chromosomal disorder characterized by the presence of four instead of two copies of the short arm of chromosome 18. The extra two copies are present in the form of a small extra chromosome, resulting in the additional metacentric chromosome appearing in a karyotype. It is proposed that this happens through nondisjunction during meiosis II of gamete formation and then centromeric mis-division.



Iso-chromosome 18p cases are rare and are only seen in less than 1 in 40,000 births<sup>1</sup>. However, it is one of the most frequently encountered isochromosomes seen within humans<sup>2</sup>. Almost all cases are from de novo mutations. The additional isochromosome 18p may be detected upon prenatal diagnosis by performing a karyotype on fetal DNA. However, in most instances, diagnosis before birth was made virtually by chance (for example, upon examination by maternal age) because as a rule the ultrasonographic examination of the fetus does not reveal any specific abnormalities requiring cytogenetic examination.

The condition is characterized by cognitive impairment, developmental delays, feeding difficulties and delayed growth, dysmorphic features, birth defects and abnormal MRI findings.

Individuals with iso-chromosome 18p always have cognitive impairments which can range anywhere from moderate to severe and profound. As a result, most patients need to receive speech and language therapies. Patients may also have less developed metacognitive skills, which can translate into social interaction problems<sup>1</sup>.

Developmental delays for most individuals include delays in gross motor and expressive language development. As a result, key milestones such as walking alone and using two or three word phrases take as long as 3 years and 5.5 years respectively<sup>3</sup>. Another key feature of iso-chromosome 18p is feeding

difficulties and delays in growth. When measured for height, 52% of patients were less than the 25th percentile and 19% were less than the third percentile for their age groups. 19% were also at or below the third percentile for weight and 42% were below the third percentile for head circumference. This is often a result of a lack of growth hormone being present with many failing growth hormone provocative tests<sup>3</sup>. Feeding difficulties feed into this lack of growth.

As a rule, the patients with iso-chromosome 18p have a set of distinctive dysmorphic features. Microcephaly may be found in more than a half of patients. Other dysmorphic features include a long philtrum, low set and malformed ears, palatal abnormalities, clinodactyly, strabismus, small mouth, and micrognathia<sup>4</sup>. Individuals may also have cardiac, skeletal, and renal abnormalities. Cardiac anomalies (23%) can include ventricular septal defect, pulmonary stenosis, and valvular abnormalities. Skeletal anomalies include foot anomalies, kyphosis, and scoliosis. Renal and genital anomalies (41%) include small kidneys, cryptorchidism, micropenis, and hypospadias<sup>5</sup>. Several patients had pyloric stenosis. Basically, all visceral defects are not life-threatening, and vital prognosis for such patients is almost normal. However, cases of premature mortality due to cardiac complications and recurrent infections are possible.

Around 70% of individuals with iso-chromosome 18p who undergo MRI imaging have shown to have abnormal findings. These findings include a thin corpus callosum, brain atrophy, and lateral ventricle enlargement<sup>5</sup>.

Behavioral anomalies may include aggression, tendency to self-injure and destructive behavior<sup>5</sup>.

A wide range of support is needed for those with iso-chromosome 18p. It is recommended that patients see a multidisciplinary team with a wide range of professionals in order to get the most adequate care. This includes, but is not limited to, genetic counselors, pediatricians, psychoneurologists, cardiologists, ophthalmologists, systematic orthopedic, gastrointestinal and endocrinology evaluations, physiotherapists, and occupational therapists. If the patients are monitored appropriately there is little concern for premature mortality<sup>5</sup>.

## REFERENCES

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