Meckel Syndrome, Type 11

Alternative Names
MKS11

Record Category
Disease phenotype

WHO-ICD
Congenital malformations, deformations and chromosomal abnormalities > Other congenital malformations

Incidence per 100,000 Live Births
0-1

OMIM Number
615397

Mode of Inheritance
Autosomal recessive

Gene Map Locus
16q23.1

Description
Meckel Syndrome, type 11 is an extremely rare and fatal subset of MKS. Similar to other MKS subtypes, the ciliopathy is characterized by the triad of occipital encephalocele, polydactyly of the hands and feet and polycystic kidneys. Oligohydramnios may also be seen during pregnancy. The prognosis of the disorder remains poor, with most cases resulting in in-utero or perinatal death. MKS does not have a gender bias and is found to affect between 1/13,250 to 1/140,000 live births. The disorder has been seen to be more prevalent in Finnish, Belgian, Gujarati Indian and Kuwaiti Bedouin populations. However, the subtype MKS11 has so far only been reported in a handful of families, all of Arab origin.

Diagnosis of the disorder can be made prenatally by ultrasound examinations as early as the 14th week of gestation. Genetic analysis can be carried out by chorionic villus sampling to help confirm the diagnosis. There is currently no cure for Meckel syndrome and treatment is focused on alleviating symptoms. Affected families may benefit from genetic counselling

Molecular Genetics
MKS11 follows an autosomal recessive pattern of inheritance and is caused by mutations in the TMEM231 gene. This gene encodes a ciliary protein involved in protein localization, cilium assembly and Sonic hedgehog signaling. The protein is also predicted to play a role in in-utero embryonic development. Variants in TMEM231 associated with MKS11 include homozygous missense mutations such as p.Q301P (c.902A>C) or frameshift and premature terminations such as c.751G>A.

Epidemiology in the Arab World

Saudi Arabia
Al-Hamed et al. (2016) recruited a cohort of 44 Saudi families affected by antenatal cystic kidney disease. In one family, antenatal ultrasound imaging showed the fetus to have cystic kidneys, oligohydramnios/anhydramnios, encephalocele, corpus callosum agenesis, clubfoot and hepatic cysts. The case resulted in perinatal death. The proband, born to consanguineous parents, had another affected sibling that also died in the perinatal period. The patient was found to be homozygous for the known TMEM231 mutation c.751G>A (p.V251I).

References
Al-Hamed MH, Kurdi W, Alsahan N, Alabdullah Z, Abudraz R, Tulbah M, Alnemer M, Khan R, Al-Jurayb H, Alahmed A, Tahir AI, Khalil D, Edwards N, Al Abdulaziz B, Binhumaid FS, Majid S, Faquih T, El-Kalioby M, Abouelhoda M, Altassan N, Monies D, Meyer B, Sayer JA, Albaqumi M. Genetic spectrum of Saudi Arabian patients with antenatal cystic kidney disease and ciliopathy phenotypes using a targeted renal gene panel. J Med Genet. 2016; 53(5):338-47. PMID: 26862157.

Related CTGA Records
Transmembrane Protein 231

External Links

http://www.orpha.net/consor/cgi-bin/OC_Exp.php?lng=EN&Expert=564
https://ghr.nlm.nih.gov/condition/meckel-syndrome#diagnosis
https://rarediseases.org/rare-diseases/meckel-syndrome/
http://emedicine.medscape.com/article/946672-overview#a4

Contributors

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