Meckel Syndrome, Type 6

Alternative Names
MKS6

Record Category
Disease phenotype

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

Incidence per 100,000 Live Births
2-5

OMIM Number
612284

Mode of Inheritance
Autosomal recessive

Gene Map Locus
4p15.32

Description
Meckel syndrome, type 6 is a severe congenital disorder defined by the presence of occipital encephalocele, cystic dysplasia of the kidneys, hepatic fibrosis and bile duct proliferation, and postaxial polydactyly of the hands and feet. Other symptoms may include a cleft palate and club feet. 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.

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. Currently there is no cure for Meckel syndrome and treatment is focused on alleviating symptoms. Affected families may also benefit from genetic counselling.

Molecular Genetics
MKS6 follows an autosomal recessive pattern of inheritance. It is caused by mutations in the CC2D2A gene, which encodes a ciliary protein that helps prevent the diffusion of transmembrane proteins between the cilia and plasma membranes. The CC2D2A protein is also predicted to be involved in primary cilium assembly, determination of left/right symmetry and embryonic brain development. Mutations in this gene associated with MKS6 usually include homozygous and compound heterozygous transitions and indels.

Epidemiology in the Arab World

Saudi Arabia
Al-Hamed et al. (2016) analyzed a cohort of 44 Saudi families with antenatal ultrasound findings of bilateral cystic kidney disease, echogenic kidneys or enlarged kidneys. Six of these cases had homozygous CC2D2A mutations and were indicative of Meckel Syndrome 6. Ultrasound findings in these cases included occipital encephalocele, oligohydramnios/anhydramnios, and cystic kidneys. Other symptoms in this group included enlarged, echogenic kidneys in two cases, and polydactyly, corpus callosum agenesis, spina bifida, intrauterine growth restriction, clubfoot and ascites in one case each. The authors noted that all six cases resulted in fetal death.

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

Coiled-Coil and C2 Domains-Containing Protein 2A

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

Sayeeda Hana: 12.12.2016