



Dandy-Walker Syndrome

Alternative Names

DWS
Dandy-Walker Malformation
DWM

WHO International Classification of Diseases

Congenital malformations, deformations and chromosomal abnormalities

OMIM Number

220200

Mode of Inheritance

Autosomal recessive cases; heterogeneous

Gene Map Locus

3q24, 3q24

Description

Dandy-Walker syndrome is a congenital brain malformation that consists of the triad hypoplasia or absence of the vermis, upward displacement of the falx, lateral sinuses, and torcular, and a large, thin walled retrocerebellar cyst formed by the roof of the fourth ventricle. It is frequently associated with disorders of other areas of the central nervous system including absence of the corpus callosum, and malformations of the heart, face, limbs, fingers and toes. Symptoms, which often occur in early infancy, include slow motor development and abnormally rapid increase in head circumference with bulging at the back of the skull. In older children, symptoms of increased intracranial pressure such as irritability, vomiting, and convulsions, and signs of cerebellar dysfunction such as unsteadiness, lack of muscle coordination, or jerky movements of the eyes may occur. There may also be problems with the nerves that control the eyes, face and neck, and abnormal breathing patterns.

Molecular Genetics

Through physical mapping of 3q2 interstitial deletions in several individuals with Dandy-Walker syndrome, the first critical region associated with the disease was defined, encompassing two adjacent Zinc fingers in cerebellum genes, ZIC1 and ZIC4. These genes are members of the ZIC family of C2H2-type zinc finger proteins, important during development. ZIC1 is expressed in medulloblastoma and encodes a transcription factor that can bind and transactivate the apolipoprotein E gene. ZIC4 encodes a protein of unknown function.

Epidemiology in the Arab World

Oman

Koul et al. (2000) reported a monozygotic twin with Dandy-Walker syndrome. The twins, both males, were born full term to non-consanguineous parents. There were no antenatal or perinatal complications. However, the parents noted delayed motor and mental development in both. At the age of 2 years and 8 months, the children could just stand with support. Both children presented big heads and dysmorphic features. In addition, there were significant cafe-au-lait spots on the trunk and other minor features consistent with the diagnosis of neurofibromatosis. At the time, this was the first report with the combination of Dandy-Walker syndrome with neurofibromatosis in monozygotic twins.

Palestine

Al-Gazali et al. (1996) reported a child, born to unrelated parents of Palestinian-Jordanian origin, with typical features of Meckel syndrome in whom both encephalocele and Dandy Walker malformation (DWM) existed. This female child, as well as two previous females born to the family, were born with posterior encephalocele, polycystic kidneys and



no polydactyly. Both died a few hours after birth. At birth, the propositus was noted to also have wide sutures with an occipital encephalocele. CT scan of the brain showed hypoplastic cerebellar hemispheres, an absent vermis and a very large posterior fossa cyst communicating with the fourth ventricle, and high attachment of the tentorium. Renal ultrasound showed hugely enlarged hyperchogenic kidneys on both sides with loss of corticomedullary differentiation. The baby died on the second day of life.

Saudi Arabia

El Awad (1992) calculated the overall incidence of infantile hydrocephalus in the south-western region of Saudi Arabia as 0.81/1000 between January 1988 and December 1990. The series comprised 61 infants affected by infantile hydrocephalus. The total number of live births in this period was 74,923. Hydrocephalus associated with spinal dysraphism (spina bifida cystica and encephalocele) constituted 24 cases (39.3%), and there was aqueduct stenosis in 10 cases (16.4%). Nine cases (11.9%) were post-meningitic, and seven (14.8%) post-hemorrhagic. There was Dandy-Walker malformation in five cases (8.2%), three (4.9%) had congenital idiopathic hydrocephalus, two (3.3%) congenital toxoplasmosis, and one (1.6%) isolated Arnold Chiari malformation. There were congenital causes in 45 cases, 73.7% of all the cases in this series (incidence: 0.6/1000 births). Of the remaining 16 cases (26.3%) which were due to postnatal factors, seven (11.5%) were caused by acquired cerebral hemorrhage, only two of them being premature, and the other nine (14.8%) were due to meningitis.

Ohaegbulam and Afifi (2001) studied the incidence of DWS in a defined Saudi Arabian population of military personnel and their dependants during an 11-year period (1989-1999) from a cohort of 45,274 live births. Ohaegbulam and Afifi (2001) recorded an incidence of 1.0 DWS case per 100,000 live births per year. The incidence by sex per 100,000 live births per year was 1.24 for males and 0.78 for females. DWS formed 3.5% of studied cases of infantile hydrocephalus.

United Arab Emirates

Al Talabani et al. (1998) studied the pattern of major congenital malformations in 24,233 consecutive live and stillbirth at Corniche hospital, which is the only maternity hospital in Abu Dhabi, between January 1992 and January 1995. A total of 401 babies (16.6/1,000), including 289 Arabs, were seen with major malformation. Single gene disorders accounted for 24% of the cases, 76% were due to autosomal recessive disorders. In their study, Al Talabani et al. (1998) observed two cases of Dandy-Walker syndrome in consanguineous families from the United Arab Emirates. Recurrence of the disease was reported in other members of the families. Al Talabani et al. (1998) concluded that their study was very close to representing the true incidence of congenital abnormalities in the whole United Arab Emirates, as they investigated over 98% of deliveries in Abu Dhabi, the capital of United Arab Emirates.

[See also: Palestine > Al-Gazali et al. 1996]

References

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