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My46 Trait Profile

Multiple Endocrine Neoplasia type 1

Multiple Endocrine Neoplasia Type 1 is a rare genetic condition in which individuals have a higher chance to have certain noncancerous tumors of the endocrine system. It is caused by mutations in the MEN1 gene which makes a protein called menin.

Characteristics of Multiple Endocrine Neoplasia type 1

Multiple Endocrine Neoplasia Type 1 (MEN1) is a rare genetic condition characterized by an increased risk for developing tumors of the endocrine (hormone-producing) system. Tumors primarily affect the parathyroid gland (organ located in the neck on the thyroid gland), pituitary gland (organ near the brain), and pancreas.

Parathyroid tumors occur in more than 95% of individuals with MEN1. These tumors cause high parathyroid hormone (PTH) and increased calcium (i.e, hyperparathyroidism). The high calcium can cause problems including kidney stones and osteoporosis.

Prolactinomas are the most common pituitary tumor seen in MEN1. These tumors cause the pituitary gland to overproduce the prolactin hormone. This results in the decrease of certain sex hormones (e.g., estrogen in women and testosterone in men) often causing fertility problems.

A variety of pancreatic tumors (e.g., gastrinomas, insulinomas, glucagonomas, and vasoactive intestinal peptidomas (VIPomas)) occur in approximately 40% of individuals with MEN1. These tumors cause a variety of symptoms depending on the type of tumor. For example, gastrinoma causes the stomach to release too much gastrin acid which leads to the development of severe ulcers in the stomach and small intestine. Insulinomas cause too much insulin to be produced which results in low blood sugar. Glucagonomas produce too much glucagon which can cause diabetes, and VIPomas produce too much vasoactive intestinal peptide which often causes watery diarrhea.

Other features seen in some individuals with MEN1 can include carcinoid tumors (i.e., an endocrine tumor inside the chest or stomach), adrenal tumors (i.e., a tumor of the adrenal gland the organ that sits on top of the kidney), and benign skin growths (e.g., angiofibromas, collagenomas, and lipomas). The clinical symptoms of MEN1 are typically seen at young ages, with 95% of affected individuals presenting with symptoms by the fifth decade of life.

Diagnosis/Testing

Approximately 75-95% of individuals with MEN1 have a change or mutation in a gene called MEN1. The MEN1 gene is a tumor suppressor gene which means that it keeps cells from growing too fast. Mutations in the MEN1 gene do not allow the menin protein to work normally and as a result, cells may grow uncontrollably. This uncontrolled growth is what can cause the tumors and cysts in affected individuals.

Management/Surveillance

Management of MEN1 generally includes frequent screening and early intervention for associated tumors, with surgical removal of tumors when necessary. Recommendations for screening include regular blood tests (to check specific hormone levels), and imaging (e.g., CT scans and MRIs) of the pancreas, small intestine, adrenal gland, pituitary gland, and thymus.

Although the symptoms of MEN1 are usually related to the excess hormones being produced by the associated tumors, certain tumors (e.g., gastrinomas, carcinoid tumors) are often cancerous. In particular, carcinoid tumors are

unlikely to cause symptoms until the tumor is at an advanced stage, when they are most difficult to treat. These tumors occur most frequently in the stomach, pancreas, thymus (in males), and lungs (in females).

Mode of inheritance

MEN1 is inherited in an autosomal dominant pattern. This means inheriting one MEN1 gene mutation is enough for an individual to be affected and have an increased risk of developing MEN1-associated tumors. The mutation is usually inherited from an affected parent, but in about 10% of individuals, it occurs as a brand new (de novo) mutation.

Risk to family members

The risk to family members depends on whether or not the individual with MEN1 also has a parent affected with MEN1. If a parent also has the condition, the risk of having a child with MEN1 is 50% with each pregnancy. If a parent does not have the condition, the risk of other siblings being affected is very low.

Special considerations

None

Resources

Association for Multiple Endocrine Neoplasia Disorders
http://www.amend.org.uk
National Endocrine and Metabolic Diseases Information Service
http://endocrine.niddk.nih.gov/pubs/men1/men1.aspx
Genetics Home Reference: Multiple endocrine neoplasia
http://ghr.nlm.nih.gov/condition/multiple-endocrine-neoplasia

References

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