Von Hippel-Lindau Syndrome

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Overview

What is von Hippel-Lindau syndrome?

Von Hippel-Lindau syndrome (VHL) is a hereditary condition associated with hemangioblastomas (blood vessel tumors) of the brain, spinal cord, and eye. The eye tumors are also called retinal angiomas. People with VHL also have an increased risk of developing clear cell renal cell carcinoma [2] (a specific type of kidney cancer [2]) and pheochromocytoma [3] (a tumor of the adrenal gland [4]). Kidney cysts (a closed sac usually filled with fluid), pancreatic cysts, epididymal cystadenomas (tumors near a man?s testicles), and endolymphatic sac tumors (tumors of the ear, which may cause hearing loss) are also features of VHL.

What causes VHL?

VHL is a genetic condition. This means that the cancer risk and other features of VHL can be passed from generation to generation in a family. The gene associated with VHL is also called *VHL*. A mutation (alteration) in the *VHL* gene gives a person an increased risk of developing kidney cancer [2] and other symptoms of VHL. Nearly everyone who has VHL syndrome has an identifiable *VHL* mutation.

How is VHL inherited?

Normally, every cell has two copies of each gene: one inherited from the mother and one inherited from the father. VHL follows an autosomal dominant inheritance pattern, in which a mutation happens in only one copy of the gene. This means that a parent with a gene mutation may pass along a copy of their normal gene or a copy of the gene with the mutation. Therefore, a child who has a parent with a mutation has a 50% chance of inheriting that mutation. A brother, sister, or parent of a person who has a mutation also has a 50% chance of having the same mutation.

How common is VHL?

It is estimated that about one in 30,000 people has VHL. About 20% of people with VHL do not have any family history of the condition. They have a de novo (new) mutation in the *VHL* gene.

How is VHL diagnosed?

VHL is suspected when a person has:

- Multiple hemangioblastomas (blood vessel tumors) of the brain, spinal cord, or eye, or
- One hemangioblastoma and kidney cysts, pancreatic cysts, pheochromocytoma, or kidney cancer [2], or
- In young patients, VHL is also suspected with multiple bilateral clear cell renal cell carcinoma [5].

If a person has a family history of VHL, he or she is suspected of also having VHL if the person has any one symptom, such as hemangioblastoma, kidney or pancreatic cysts, pheochromocytoma, or kidney cancer. Genetic testing [6] for mutations in the *VHL* gene is available for people suspected to have VHL. Nearly all people with VHL will be found to have the genetic mutation once tested.

What are the estimated cancer risks associated with VHL?

The risk of kidney cancer [2] in families with VHL is estimated to be about 40%.

Would the treatment of kidney cancer change if I have VHL?

In general, treatment for kidney cancer is similar regardless of whether a patient has VHL. However, there is some evidence about specific VHL considerations regarding two types of treatment: surgery and targeted therapy. For a person with VHL and kidney cancer, surgery for a kidney tumor is generally considered when a tumor reaches three centimeters (cm) in size.

Targeted therapy is a treatment that targets the cancer?s specific genes, proteins, or the tissue environment that contributes to cancer growth and survival. Anti-angiogenesis therapy is a type of targeted therapy used in kidney cancer treatment. It is focused on stopping angiogenesis, which is the process of making new blood vessels. Because a tumor needs the nutrients delivered by blood vessels to grow and spread, the goal of anti-angiogenesis therapies is to ?starve? the tumor. For people with VHL, there is emerging research showing that an anti-angiogenic drug called sunitinib (Sutent), which is classified as a tyrosine kinase inhibitor (TKI), may be effective against kidney cancer. Learn more about this approach in the general Kidney Cancer Treatment Options section [7] of this website.

What are the screening options for VHL?

It is important to discuss with your doctor the following screening options, as each individual is different:

- Yearly eye examination to look for retinal tumors, beginning around age 2
- Yearly physical examination
- Yearly 24-hour urine test to screen for elevated catecholamines, beginning around age 2
- Yearly abdominal ultrasound [8] (which uses sound waves to create a picture of the internal organs) to look at the kidneys, pancreas, and adrenal glands beginning in the teenage years; change screening to abdominal computed tomography [9] (CT or CAT; creates a three-dimensional picture of the inside of the body with an x-ray machine) scan in adulthood
- Magnetic resonance imaging [10] (MRI; uses magnetic fields, not x-rays, to produce detailed images of the body) of the brain and spine every two years beginning in the teenage years

For more detailed screening recommendations by age group, see the National Cancer Institute screening protocol for VHL at www.vhl.org/meetings/meet98/efglen.htm [11].

Screening options may change over time as new technologies are developed and more is learned about VHL. It is important to talk with your doctor about appropriate screening tests.

Learn more about what to expect when having common tests, procedures, and scans [12].

Questions to ask the doctor

If you are concerned about your risk for kidney cancer [2], talk with your doctor. Consider asking the following questions of your doctor:

- What is my risk of developing kidney cancer [2]?
- What is my risk of developing other types of cancer?
- What can I do to reduce my risk of cancer?
- What are my options for cancer screening?
- When is surgery [13] needed to remove kidney tumors?

If you are concerned about your family history and think your family may have VHL, consider asking the following questions:

- Does my family history increase my risk of developing kidney cancer?
- Should I meet with a genetic counselor?
- Should I consider genetic testing [6]?

Additional resources

Guide to Kidney Cancer [2]

The Genetics of Kidney Cancer [14]

What to Expect When You Meet With a Genetic Counselor [15]

VHL Family Alliance

www.vhl.org [16]

National Cancer Institute

www.cancer.gov [17]

American Cancer Society
www.cancer.org

[18]

Cancer*Care*

www.cancercare.org [19]

To find a genetic counselor in your area, ask your doctor or visit the following websites:

National Society of Genetic Counselors

www.nsgc.org [20]

National Cancer Institute: Cancer Genetics Services Directory

www.cancer.gov/cancertopics/genetics/directory [21]

Links:
[1] http://www.cancer.net/about-us
[2] http://www.cancer.net/node/18969
[3] http://www.cancer.net/node/19437
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