Genetics in Cancer: The Future is Now

Ovarian Cancer Alliance Update meeting June 12, 2018

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What is a genetic counselor?



I am a translator



Learn more at http://www.aboutgeneticcounselors.com/



Hereditary

- Gene mutation is inherited in family
- Significantly increased cancer risk

Familial

- Multiple genes & environmental factors may be involved
- Some increase in cancer risk

Sporadic

- Cancer occurs by chance or related to environmental factors
- General population cancer risk





THE TWO-HIT HYPOTHESIS

Somatic/TUMOR TESTING VS GERMLINE TESTING

TUMOR TESTING VS GERMLINE TESTING

Tips for genetic testing for ovarian cancer

- Most informative to test individual with personal history of cancer
- Ashkenazi Jewish? Can start with the three founder mutations in *BRCA1* and *BRCA2*
- Single site testing for family members if relative tests positive
- Negative for BRCA and/or Lynch testing in the past? You are eligible for updated panel testing.

A word of caution about current events...

COMPANY NEWSROOM C

OM CONSUMER RESEARCH

THF

23andMe Granted First FDA Authorization for Direct-to-Consumer Genetic Test on Cancer Risk ... for only 3 of the 1,000s of possible mutations in only the BRCA genes.

Who should consider genetic testing? (A brief overview)

- 1. Young age at onset (for that cancer type)
 - ie Breast < age 45, Colon < age 50
- 2. A personal history of more than one primary cancer
- 3. A family history of multiple individuals with cancer
 - o 2 or more family members with the same or related types of cancer
 - o ie Breast/Ovarian; Colon/Uterine; Breast/Sarcoma/Brain
- 4. Rare cancer
 - Such as ovarian or male breast
- 5. A known gene mutation in the family

GENES ASSOCIATED WITH OVARIAN CANCER

and their associated risk ranges

Testing family

Take Away...

Testing family

Targeted treatment

Laws that protect against genetic discrimination in health insurance and employment

- HIPAA: Health Insurance Portability and Accountability
 Act
- Federal law
 - GINA (Genetic Information Non-Discrimination Act) 2008
 - Applies to family history and genetic test results
 - Does not cover life insurance, long-term care, disability
- State laws
 - Oregon law covers health insurance
 - Other types (life insurance, long term care, disability) uncertain

Types of results from genetic testing

- Negative: no mutation detected
 - Base cancer risks on family history
- Positive: mutation detected that causes an increased risk for cancer
 - Follow management guidelines for care
 - Offer genetic testing to other family members
- Variant of uncertain significance (VUS):
 - Change identified, but not enough evidence to determine if disease causing or benign. Will be reclassified over time
 - Identified in 30% or more of patients testing on panels
 - Do not test family members. Exception: Research study
 - Base cancer risks on family history

New genetic link reveals some ovarian cancer passed down by fathers

By Mark Lieber, CNN () Updated 8:37 PM ET, Fri February 23, 2018

RESEARCH ARTICLE

Paternal lineage early onset hereditary ovarian cancers: A Familial Ovarian Cancer Registry study

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ovariancancer.com

How are new genes identified?

- Ascertainment bias
- Small population

p22.33

p22.32

p22.31

p22.2

p22.11

p21.2 p11.4 p11.3

p11.23

p11.22 p11.1 q11.2

q13.1

q13.2

q21.1 q21.2

q21.31

q21.33

q22.1 q22.2

q23

q24

q25

q26.1 q26.3

q27.1 q27.3

q28

This is why adding new genes to a genetic testing panel will initially result in many variants of uncertain significance

Thinking about the future

- DNA banking
 - Store DNA at a facility for future testing
- Fertility preservation and family planning
 - Freezing eggs
 - Donor eggs
 - Pre-implantation Genetic Diagnosis (PGD)

ESTABLISHED EMBRYO TEST: PRE-IMPLANTATION GENETIC DIAGNOSIS

Perceived barriers to genetic testing

- "My insurance won't cover it / testing is too expensive"
 - Most payers support genetic testing if you meet criteria
 - For underinsured/uninsured patients, financial assistance and reduced OOP rates are available
 - Labs try to be up front about cost and limit financial surprises
- "I'm worried about insurance discrimination"
 - Genetic Information Nondiscrimination Act (2008)
 - Oregon State genetics privacy law (2006)
- "Test results won't change what I'm doing"
 - True in few cases
 - A positive result may lead to increased or additional screening, options for prevention
 - A negative result may reduce current screening
 - Impact on risk to family members

Resources

- Ovarian Cancer Alliance of Oregon and Southwest Washington
 - <u>www.ovariancancerosw.org/</u>
- Sherie Hildrith Ovarian Cancer Foundation
 - www.shocfoundation.org/
- FORCE (ovarian cancer page)
 - <u>http://www.facingourrisk.org/understanding-brca-and-hboc/KNOW-MORE.php</u>
- National Society of Genetic Counselors (to find a genetic counselor)
 - <u>www.NSGC.org/</u>

Genetic Risk Evaluation And Testing Program (GREAT) Call to schedule an evaluation: 503-297-7403

