Talking Genomes with Your Patients

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Objectives

• Review the importance of physician familiarity with genomic testing and results

• Explore common patient (and physician) misconceptions and re-education techniques

• Discuss strategies for pre- and post-test conversations with your patients

• Identify resources for genetic and genomic information for patients and providers
Why Does This Matter?
You may be the sole source of genetic information for your patients

There are not enough genetic counselors/geneticists to handle every patient or every test that needs to be done

Genetics/genomics is becoming more ubiquitous and will be incorporated into healthcare of individuals along the health spectrum

Even if you don’t order any genetic tests, a patient will eventually bring in a test report and expect you to know what to do with it
Common Misconceptions
Misconception 1: “No one in my family has any genetic diseases, so I and my children are not at risk”
Small families
Confounding histories
Unknown family history
De novo pathogenic variants
Recessive conditions
Misconception 2: “I’m the first person in my family with this disease, so it can’t be genetic”
Small families

Unknown family history

Reduced penetrance

Variable expressivity

*De novo* pathogenic variants

Recessive conditions

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Misconception 3: “This condition runs in my family, so it must be genetic”
Common diseases

Family members share genes, but also environmental and lifestyle factors

Having affected family members *does* increase risk for many conditions
Misconception 4: “Even if this test is positive, it’s not going to change anything...what’s the point?”
Benefits of a Genetic Diagnosis

- Avoid additional tests
- Stop asking “why?”
- Recurrence risk
- Life/financial planning
- May indicate treatment
- May change surveillance
Misconception 5: “I’ve already had genetic testing, so I don’t need whole genome sequencing”
**Karyotype**

- Chr 1
- Chr 7
- Chr 18
- Chr X

Cost: $500-1200

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**Microarray**

- Chr 1
- Chr 7
- Chr 18
- Chr X

Cost: $1500-3000
Single site mutation

Sequencing a single gene

Sequencing a panel of genes

Exome sequencing
Genome sequencing
Misconception 6: “My whole genome sequencing was negative, so my disease must not be genetic”
~20,000 human genes

Only ~5,000 have been definitively associated with human disease

Variants of uncertain significance in genes that are not well known may not be reported

Causative variants may not be identified with WGS due to limitations of technology
Misconception 7: “Whole genome sequencing can tell me about my risk for any/all diseases"
Common, complex diseases
Multifactorial conditions
Threshold model
Dealing with Misconceptions

1. Elicit the misconception
2. Identify the misconception
3. Deconstruct the misconception
4. Replace the misconception
Pre- and Post-Test Discussion Points
Before You Order a Genome:

1. Is there another test that would be more appropriate for your patient?

2. Does your patient have reasonable expectations of the potential results of testing?

3. Has the patient had the opportunity to make appropriate choices regarding testing, and are they confident in their choices?
After You Receive a Report - Primary Findings

Potential Primary Results

Positive

Provide information and resources to family

Make appropriate specialist referrals

Follow guidelines for surveillance/management if available

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Counsel regarding uncertainty

Investigate research opportunities

Check for classification updates

Negative

Discuss limitations of a negative

Consider additional clinical evaluations

Consider reanalysis in 1-2 years

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After You Receive a Report - Secondary Findings

**Potential Secondary Results**

- **Diagnostic**
  - Interpret in context of medical/family history
  - Review implications for family members
  - Make appropriate specialist referrals

- **Carrier Status**
  - Discuss recessive inheritance - patient not affected
  - Review implications for family members
  - Facilitate testing for other family members

- **Predictive**
  - Interpret in context of medical/family history
  - Review implications for family members
  - Refer for additional genetic counseling
Where Can I Get More Information?
Questions?