Genetic Issues and Huntington Disease

Katherine S. Hunt, MS, CGC
Assistant Professor in Medicine
Mayo Clinic Arizona
The information provided by speakers in workshops, forums, sharing/networking sessions and any other educational presentation made as part of the 2009 HDSA convention program is for informational use only.

HDSA encourages all attendees to consult with their primary care provider, neurologist or other healthcare provider about any advice, exercise, medication, treatment, nutritional supplement or regimen that may have been mentioned as part of any presentation.
Presenter Disclosures

Katherine S. Hunt

The following personal financial relationships with commercial interests relevant to this presentation existed during the past 12 months:

No relationships to disclose or list
Objective:

To review the genetics of HD and discuss the implications of undergoing gene testing
Outline

• Explain underlying genetic cause of HD
• Outline protocol for pre-symptomatic gene testing
• Discuss psychological, financial and familial implications of gene testing
• Explore gene testing options available to couples at risk to have a child with HD
Genetic terminology

• Gene: Contains information needed for our bodies to function properly
  • Encoded in the DNA molecule which is composed of bases
  • DNA alphabet: A, G, T, C
• Chromosome: Contains all of our DNA
  • 46 XX-female karyotype
  • 46 XY-male karyotype
Human Chromosomes
Chromosomes, DNA and Genes

Cell

Nucleus

Chromosomes

Gene

Protein
DNA
(deoxyribonucleic acid)

Bases

Adenine (A)
Thymine (T)
Cytosine (C)
Guanine (G)

Base pair
Huntingtin Gene

• Huntingtin gene is found on chromosome number 4-testing available since 1993

• HD is caused by an expanded number of CAG repeats on chromosome 4

• Number of CAG repeats can predict type of HD and other clinical characteristics

• HD is inherited in autosomal dominant manner-most families have an affected parent
Autosomal Dominant Inheritance

[Family tree diagram with symbols for affected (■) and unaffected (○) individuals]

■ = Affected
○ = Unaffected
CAG trinucleotide repeats…..

- **Unaffected**: HD gene = 26 or fewer CAG repeats
- **Indeterminate**: HD gene = 27-35 CAG repeats (at risk to have affected child)
- **Reduced penetrance**: HD gene = 36 -39 CAG repeats (may or may not be affected)
- **Affected**: HD gene = 40 or more CAG repeats
Genetic terminology

- Reduced penetrance: Individuals with the HD gene do not exhibit symptoms of the condition.

- Anticipation: Increasing severity or decreasing age of onset seen in successive generations.
  - Seen more frequently with paternal transmission of HD gene.
Pre-symptomatic Gene Testing for HD

*Support person*

- Genetic Counseling
- Psychological assessment
- Neurological evaluation
- Blood draw for testing
- Cost of gene test ~$255
- Discussion of results
- Follow-up
Rationale for Genetic Counseling
Prior to Testing

• Family disease-affects individuals beyond the patient
• Provide psychological support and assist patient in finding additional resources if necessary
• Educate patient and family on inheritance of condition
• Help patient understand implications of testing and how to prepare for results
Genetic Counseling Model

• Non-directive—patient decides what is best for them
• Provide accurate information about disorder and testing procedures
• Address concerns regarding health insurance, life insurance, disability, etc.
• Provide informed consent prior to test and disclose results following test
Questions to ask yourself prior to undergoing testing

• How will knowing the results change the way I feel about myself?
• How will knowing the results change my relationships?
• How will I communicate my results to my family, friends and co-workers?
• How have I coped with difficult information or situations in the past?
Questions to ask yourself prior to undergoing testing

• How will knowing the results change my life goals?
• What will I do differently with my life if I test positive?
• Am I afraid that I will lose my job if I test positive?
• What don’t I understand about this condition?
Questions to ask yourself prior to undergoing testing

• What will I do differently with my life if I test negative?

• Who can I talk with about my feelings?

• What will I do after I learn my results?

• What am I most afraid of?
Necessary prior to testing…

• Discuss financial future:
  • If you are primary caregiver, who will provide for family?
  • Do you have life insurance?
  • Do you have long term care insurance?
  • Do you have health insurance?
  • Do you understand Medicare/Medicaid laws?
Understand best timing for testing

- Lifecycle-
  - Adolescent/young adult-tested only when 18yo or older
    - Unmarried-do you want to get married?
    - Married-do you want to have children or how will you inform your children?
  - School and career choices
- Adult
  - Unmarried
  - Married
Benefits of Knowing

• Reproductive planning—for current children and for future offspring

• Need to know—reduce anxiety of not knowing

• To plan future life goals
Reason to Decline Testing

- Emotionally not prepared to handle results
- Unresolved grief over loss of an affected relative
- Conflict with family or friends over decision to be tested
- No insurance or long-term disability or life insurance
Options for Couples Who Want to Have Children

• Donor egg/donor sperm
  • Use the egg or sperm of an unaffected individual

• Pre-implantation genetic diagnosis
  • Test a developing fetus prior to implantation into mother’s uterus

• Prenatal testing
  • Test the fetus during pregnancy for the HD gene
Resources

• To find a genetic counselor to discuss genetic testing or prenatal testing:

• [www.nsgc.org](http://www.nsgc.org) National Society of Genetic Counselors

• Caring for People with Huntington’s Disease: [www.kumc.edu/hospital/huntingtons/index.html](http://www.kumc.edu/hospital/huntingtons/index.html)
Resources

- To find an attorney who specializes in Medicaid law:
  - [www.naela.org/memberdirectory](http://www.naela.org/memberdirectory)