FACTS ABOUT

Childhood-Onset Schizophrenia:

An Update from the National Institute of Mental Health

A child's stage of development must be taken into account when considering a diagnosis of mental illness.[1] Behaviors that are normal at one age may not be at another. Rarely, a healthy young child may report strange experiences—such as hearing voices—that would be considered abnormal at a later age. Clinicians look for a more persistent pattern of such behaviors. Parents may have reason for concern if a child of seven years or older often hears voices saying derogatory things about him or her, or voices conversing with one another, talks to himself or herself, stares at scary things— snakes, spiders, shadows—that are not really there, and shows no interest in friendships. Such behaviors could be signs of schizophrenia, a chronic and disabling form of mental illness.[2]

Fortunately, schizophrenia is rare in children, affecting only about 1 in 40,000,[3] compared to 1 in 100 in adults. The average age of onset is 18 in men and 25 in women. Ranking among the top 10 causes of disability worldwide,[4] schizophrenia, at any age, exacts a heavy toll on patients and their families. Children with schizophrenia experience difficulty in managing everyday life. They share with their adult counterparts psychotic symptoms (hallucinations, delusions), social withdrawal, flattened emotions, increased risk of suicide and loss of social and personal care skills. They may also share some symptoms with—and be mistaken for—children who suffer from autism or other pervasive developmental disabilities, which affect about 1 in 500 children. Although they tend to be harder to treat and have a worse prognosis than adult-onset schizophrenia patients, researchers are finding that many children with schizophrenia can be helped by the new generation of antipsychotic medications.[5]

Symptoms and Diagnosis

While schizophrenia sometimes begins as an acute psychotic episode in young adults, it emerges gradually in children, often preceded by developmental disturbances, such as lags in motor and speech/language development. Such problems tend to be associated with more pronounced brain abnormalities. The diagnostic criteria are the same as for adults, except that symptoms appear prior to age 12, instead of in the late teens or early 20s.[6] Children with schizophrenia often see or hear things that do not really exist, and harbor paranoid and bizarre beliefs. For example, they may think people are plotting against them or can read their minds. Other symptoms of the disorder include problems paying attention, impaired memory and reasoning, speech impairments, inappropriate, or flattened, expression of

emotion, poor social skills, and depressed mood. Such children may laugh at a sad event, make poor eye contact, and show little body language or facial expression.

Misdiagnosis of schizophrenia in children is all too common. It is distinguished from autism by the persistence of hallucinations and delusions for at least six months, and a later age of onset—seven years or older. Autism is usually diagnosed by age three.[7] Schizophrenia is also distinguished from a type of brief psychosis sometimes seen in affective, personality and dissociative disorders in children. Adolescents with bipolar disorder sometimes have acute onset of manic episodes that may be mistaken for schizophrenia. Children who have been victims of abuse may sometimes claim to hear voices of—or see visions of—the abuser. Symptoms of schizophrenia characteristically pervade the child's life, and are not limited to just certain situations, such as at school. If children show any interest in friendships, even if they fail at maintaining them, it is unlikely that they have schizophrenia.

Treatment

Treatments that help young patients manage their illness have improved significantly in recent decades. As in adults, antipsychotic medications are especially helpful in reducing hallucinations and delusions. The newer generation "atypical" antipsychotics, such as olanzapine and clozapine, may also help improve motivation and emotional expressiveness in some patients. They also have a lower likelihood of producing disorders of movement, including tardive dyskinesia, than the other antipsychotic drugs such as haloperidol. However, even with these newer medications, there are side effects, including excess weight gain that can increase risk of other health problems. The NIMH is conducting research studies to improve treatments (www.clinicaltrials.gov). Children with schizophrenia and their families can also benefit from supportive counseling, psychotherapies and social skills training aimed at helping them cope with the illness. They likely require special education and/or other accommodations to succeed in the classroom.

Causes

Although it is unclear whether schizophrenia has a single or multiple underlying causes, evidence suggests that it is a neuro-developmental disease likely involving a genetic predisposition, a prenatal insult to the developing brain, and stressful life events. The role of genetics has long been established; the risk of schizophrenia rises from 1 percent with no family history of the illness, to 10 percent if a first degree relative has it, to 50 percent if an identical twin has it. Prenatal insults may include viral infections, such as maternal influenza in the second trimester, starvation, lack of oxygen at birth, and untreated blood type incompatibility. Studies find that children share with adults many of the same abnormal brain structural, physiological and neuropsychological features associated with schizophrenia.[6] The children seem to have more severe cases than adults, with more pronounced neurological abnormalities. This makes childhood-onset schizophrenia potentially one of the clearest windows available for research into a still obscure illness process.

For example, unlike most adult-onset patients, children who become psychotic prior to puberty show conspicuous evidence of progressively abnormal brain development. In the first longitudinal brain imaging study of adolescents,[8] magnetic resonance imaging (MRI) scans revealed fluid filled cavities in the middle of the brain enlarging abnormally between ages 14 and 18 in teens with early-onset schizophrenia, suggesting a shrinkage in brain tissue volume.[9] These children lost four times as much gray matter, neurons and their branch-like extensions, in their frontal lobes as normally occurs in teens. This gray matter loss engulfs the brain in a progressive wave from back to front over five years, beginning in rear structures involved in attention and perception, eventually spreading to frontal areas responsible for organizing, planning, and other "executive" functions impaired in schizophrenia.[10] Since losses in the rear areas are influenced mostly by environmental factors, the researchers suggest that some non-genetic trigger contributes to the onset and initial progression of the illness. The final loss pattern is consistent with that seen in adult schizophrenia. Adult-onset patients' brains may have undergone similar changes when they were teens that went unnoticed because symptoms had not yet emerged, suggest the researchers.

In addition to studies of brain structural abnormalities, researchers are also examining a group of measures associated with genetic risk for schizophrenia. Early-onset cases of illness have recently proven crucial in the discovery of genes linked to other genetically complex disorders like breast cancer, Alzheimer's and Crohn's diseases.[3] Hence, children with schizophrenia and their families may play an important role in deciphering schizophrenia's molecular roots. Evidence suggests that the rate of genetically-linked abnormalities is twice as high in children as in adults with the illness. Similarly, schizophrenia spectrum disorders, thought to be genetically related to schizophrenia, are about twice as prevalent among first-degree relatives of childhood-onset patients. In one recent study, a third of the families of individuals with childhood onset schizophrenia had at least one first-degree relative with a diagnosis of schizophrenia, or schizotypal or paranoid personality disorder. [11] This profile of psychiatric illness is remarkably similar to that seen in parents of adult-onset patients, adding to the likelihood that both forms share common genetic roots. Other anomalies associated with adult schizophrenia, such as abnormal eye movements, are also more common in families of children with the illness.

Families of children with schizophrenia who are interested in participating in research are encouraged to fill out the NIMH Childhood-Onset Schizophrenia Survey (http://intramural.nimh.nih.gov/chp/cos/index.htm), to help determine eligibility for studies.

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References

[1] US DHHS. Children and mental health (Chapter 3). In: *Mental health: a report of the Surgeon General*. Rockville, MD: U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration, Center for Mental Health Services, National Institutes of Health, National Institute of Mental Health, 1999; 123-220. http://www.surgeongeneral.gov/library/mentalhealth/chapter3/sec1.html

[2] NIMH Schizophrenia publications. http://www.nimh.nih.gov/publicat/schizmenu.cfm

[3] Nicolson R, Rapoport JL. Childhood onset schizophrenia: rare but worth studying. *Biological Psychiatry*, 1999; 46: 1418-28.

[4] World Health Organization. *The World health report 2001 - mental health: new understanding, new hope.* Geneva: World Health Organization, 2001.

[5] American Academy of Child and Adolescent Psychiatry. Practice parameters for the assessment and treatment of children and adolescents with schizophrenia. *Journal of the American Academy of Child and Adolescent Psychiatry*, 1997; 36(10): 177S-93S.

[6] Rapoport JL. *Childhood onset of "adult" pathology: clinical and research advances*. Washington, DC: American Psychiatric Press, Inc., 2000.

[7] American Academy of Child and Adolescent Psychiatry. Practice parameters for the assessment and treatment of children, adolescents and adults with autism and other pervasive developmental disorders. *Journal of the American Academy of Child and Adolescent Psychiatry*, 1999; 38(12): 32S-54S.

[8] Giedd JN, Blumenthal J, Jeffries NO, Castellanos FX, Liu H, Zijdenbos A, Paus T, Evans AC, Rapoport JL. Brain development during childhood and adolescence: a longitudinal MRI study. *Nature Neuroscience*, 1999; 2(10): 861-3.

[9] Rapoport JL, Giedd JN, Blumenthal J, Hamburger S, Jeffries N, Fernandez T, Nicolson R, Bedwell J, Lenane M, Zijdenbos A, Paus T, Evans A. Progressive cortical change during adolescence in childhood-onset schizophrenia: a longitudinal magnetic resonance imaging study. *Archives of General Psychiatry*, 1999; 56(7): 649-54.

[10] Thompson P, Vidal C, Giedd JN, Gochman P, Blumenthal J, Nicolson R, Toga AW, Rapoport JL. Mapping adolescent brain change reveals dynamic wave of accelerated gray matter loss in very early-onset schizophrenia. *Proceedings of the National Academy of Sciences*, 2001; 98(20): 11650-5.

[11] Asarnow RF, Nuechterlein KH, Fogelson D, Subotnik KL, Payne DA, Russell AT, Asamen J, Kuppinger H, Kendler KS. Schizophrenia and schizophrenia-spectrum personality disorders in the first-degree relatives of children with schizophrenia: the UCLA family study. *Archives of General Psychiatry*, 2001; 58(6): 581-8.

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