A review of obsessive-compulsive disorder in children and adolescents

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This article is a review of recent literature on obsessive-compulsive disorder in the pediatric population. Areas covered include: a brief historical perspective, clinical presentation in relation to symptoms found in different age groups, epidemiology, psychiatric comorbidity, etiology (with regards to genetics, neuroimaging, and familial factors), clinical course and prognosis, and treatment, with special emphasis on individual and family-based cognitive-behavioral therapy and psychopharmacology.

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Introduction

The field of obsessive-compulsive disorder (OCD) owes much to French physicians. Pinel (1745-1826) coined the term *folie raisonnante*; Esquirol (1772-1840) identified *monomanie* and *folie du doute et du toucher*. Morel (1886) gave a good semiological description, and Luys (1883) was the first to use the word "obsession" in an article entitled "Des obsessions pathologiques." Pierre Janet[1] (1903) defined "psychasthenia" and viewed obsessions as the result of diminishing psychic energy and as a degradation product of higher mental activity. He was also one of the first to describe a pediatric case.

For a child psychiatrist trained 30 years ago, OCD in children was an infrequent encounter. Most clinical discussions revolved around the Freudian theory of neurotic anal regression secondary to an unresolved Œdipal conflict (although Freud postulated a certain predisposition), as outlined in the famous Rat Man case (S. Freud[2]) and specific defense mechanisms, such as affect isolation, reaction formation, retroactive annulation, pathological doubts, and rituals (A. Freud[3]). Much was said, and taught, about the psychodynamic treatment of this disorder in younger patients, and accounts of such therapies were published, even if the results were equivocal in the long run.

For older adolescents, clinicians debated the role of obsessive-compulsive manifestations as a prodromal

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symptom of schizophrenia, and there were anecdotal accounts of much older adults with severe obsessions, resistant to all known treatments, who in the 1940s and 1950s had neurosurgical procedures such as frontal lobotomy. The late 1960s and early 1970s saw the introduction of the first specific drug therapies for adults such as phenelzine and, most importantly, clomipramine. At the same time, the first behavioral treatments appeared, and were developed and studied in later years. In the late 1980s, fluoxetine was released and quickly recognized as a powerful antiobsessional drug.

It is worthy of note that in 1942, Berman,[4] in an article on obsessive-compulsive neurosis in children, reviewed the psychodynamic theories on the subject, giving an account of few cases; a prevalence of 0.02% was found in 2800 children admitted between 1935 and 1939, at the Bellevue Hospital in New York. It is with the pioneering work of Judith Rapoport[5] at the National Institute of Mental Health (USA) in the early 1970s, trying the then-unreleased drug clomipramine on adolescents with severe OCD, that serious research began. As related in the introduction of her book, *The Boy Who Couldn't Stop Washing*,[5] the fact that over 50% of adults with OCD had the first manifestations of their illness during childhood and adolescence emphasized the great importance of such work.

Clinical description

DSM-4-TR defines obsessions as recurrent, persistent thoughts, impulses, and images that are experienced as intrusive and inappropriate, causing marked anxiety or distress; compulsions are defined as repetitive behaviors (hand-washing, ordering, checking) or mental acts (praying, counting, repeating words silently) that a person has to perform in reponse to an obsession or according to rules that must be applied rigidly. These manifestations exclude pathologies such as eating disorders, body dysmorphic disorders, and impulse disorders such as trichotillomania and paraphilias. Recent discussions on *DSM-5* (as found on the Web site dsm5.org) revolve around more precise definitions, such as using urge instead of impulse, the addition of a tic-related specifier, and the possible creation of a new category for hoarding disorder. Most research teams use the CY-BOCS (Child Yale-Brown Obsessive-Compulsive Scale, Goodman et al), a specific and sensitive questionnaire that lists all types of obsessions and compulsions and measure, for both clinical fields, factors such as time span, interference, distress, resistance, and degree of mastery, in order to establish diagnosis and severity of illness.

Although certain repetitive activities, such as bedtime rituals, are part of child development, the clinician must distinguish between normal and pathological situations. Geller[6] reports a much higher rate of aggressive/harm obsessions—such as fear of catastrophic events or fears of death or ilnesses in self or parents—in children and adolescents than in adults, in relation to the developmental level and needs. In his studies, hoarding was seen more often in children. Rituals such as verbal checking with parents to gain reassurance are frequent, as is accompanying separation anxiety disorder (as high as 56%).

Butwicka et al[7] reported on a total of 44 adolescents, 43 late-onset adults, and 45 early-onset adults with OCD; adolescents showed more religious, sexual, and miscellaneous obsessions than late-onset adults; contamination obsessions were seldom found in adolescents, and cleaning compulsions were more frequent in early-onset adults than in adolescents. Checking compulsion was the rarest in the younger age group.

In an article on clinical features in children, Vera et al[8] pointed out that young children with OCD often heard an inner voice ordering ritualizations, were often doubtful on trivial matters, indecisive, exhibited an unusal slowness in everyday activities, and felt greatly relieved upon completion of compulsions. In a study of 93 subjects, aged 6 to 17 years, Canavera et al[9] found that obsessive-compulsive symptoms are usually minimized by children when compared with reports by their parents.

According to Bloch,[10] a meta-analysis of 21 studies in over 5000 participants yielded four symptom factors, namely: (i) symmetry: symmetry obsessions and repeating, ordering, and counting compulsions; (ii) forbidden thoughts: aggressive, sexual, religious, and somatic obsessions, and checking compulsions; (iii) cleaning: cleaning and contamination; and (iv) hoarding: hoarding obsessions and compulsions. Factor analysis of child-only studies showed that checking loaded highest on the symmetry factor and somatic obsesssions on the cleaning factor.

Juvenile-onset OCD is often defined as a subtype of the disorder with distinct features, in view of the clinical course and observations of high rates of comorbid dysruptive and tic disorders. Nestadt et al[11] reported an augmented familial risk for juvenile-onset OCD compared with adults.

With data collected from 257 participants with juvenile-onset OCD (20 children, 44 adolescents, and 193 adults), Mancebo et al[12] reported that children were less likely than either adolescents or adults to report aggressive obsessions and mental rituals. Males were over-represented in younger subjects. Gender was equally distributed in adults. Compared with lifetime comorbidity patterns of adults, patterns in juveniles showed elevated rates of attention deficit hyperactivity disorder and lower rates of mood, substance, and eating disorders. In addition, 70% of juveniles reported a continuous course of OCD. Ninety percent of participants reported multiple obsessions and compulsions. Across all age groups, the most common obsessions were over-responsibility for harm/catastrophic thoughts, contamination, and symmetry obsessions. The most common compulsions were checking, repeating routine activities, and ordering/arranging objects. There were no age differences in hoarding symptoms. One fifth of the sample met lifetime criteria for a tic disorder and half had a concurrent anxiety disorder.

Mataix-Cols et al[13] studied 238 children and adolescents with a mean age of 13. 8 years using the CY-BOCS scale. The mean for onset of illness was 10 years old; 16% had Tourette syndrome, 11% chronic tic disorder, and 9.7% had a positive family history. They found that sexual obsessions were more frequent in boys than girls (34% vs 18%), obsessions with symmetry and rituals involving ordering were more often associated with tics and Tourette disorder. Obsessive thoughts involving fears of contamination were found in equal frequency in girls and boys.

In a series of 257 patients (mean age: 13.6 years old), Masi et al[14] found that patients with OCD onset before 12 years presented a higher frequency of tic and disruptive behavior; regarding the types of obsessions, order and symmetry were more frequent in boys, and contamination and cleaning were observed more often in girls. Hoarding was present in 53% in girls vs 36% in boys, and was associated with pervasive slowness, increased reponsibility, indecisiveness, and pathological doubt, as well as a less than optimal treatment response, either pharmacology or cognitive-behavior therapy.

Regarding very young children, Garcia et al[15] studied 58 children age 4 to 8; mean age at onset was 5 and mean age of presentation was between 6 and 7. Aggressive, catastrophic, and contamination obsessions, as well as washing and checking rituals, were the most frequent.

In general, clinicians and research show that multiple obsessions and rituals can coexist. As pointed by Lewin et al,[16] some clinical dimensions, such as low insight, significant avoidance, indecisiveness, pervasive slowness, and excessive sense of responsibility remain understudied, and are significantly related to functional impairment. As shown in their study in 89 youths, clinical improvement in OCD severity was related to reduction in avoidance, doubting, and sense of responsibility.

As reported by Leonard et al,[17] 90% of patients, in a NIMH study, exhibit changes in content and severity of obsessions and compulsions over time; early-onset OCD is viewed as a unique subtype, sometimes related to tic disorders.

Other areas of investigation include sleep patterns and the role of insight. Alfano et al[18] report, in a series of children with OCD, the occurrence of sleep fragmentation with a reduced total sleep time and longer wake periods after sleep onset.

Correlates of insight were studied (Lewin et al[19]) in 71 youths (mean age 11.7 years old) with OCD; poorer intellectual functioning, a decreased perception of control over the environment, younger age, higher levels of depressive symptoms, and lower levels of adaptation were significantly associated with low insight.

Epidemiology

Geller[6] reports, from a number of epidemiological studies, most using school surveys, a prevalence rate of pediatric OCD varying between 2% and 4% with a mean age of onset between 7.5 and 12.5 years. Flament[20] found in an adolescent epidemiologic study, a lifetime prevalence of 1.9%. It is suggested that OCD follows a bimodal distribution of incidence in childhood and adulthood. Regarding gender distribution, Geller,[6] in the same article, reports a 3:2 boys:girls ratio in children; older adolescents follow the adult pattern of equal distribution or slight female preponderance.

Psychiatric comorbidity

Although OCD in children can be encountered in its pure form in childhood, it is frequently a comorbid illness. Geller,[6] based on his own studies, reported that 39% of children and 62% of adolescents with OCD have symptoms of major depression at some point during the course of their illness. Tourette's disorder occurs, in asso-

ciation with OCD, in 25% of children and 9% of adolescents. Disruptive disorders are usually not reported in the adult OCD population; they are prevalent in youth (51% in children and 36% in adolescents for attention deficit-hyperactivity disorder (ADHD), 51% and 47% for oppositional disorder). Comorbid non-OCD anxiety disorders are prevalent in chidren and adolescents (31%) with an over-representation, in children and adolescents, of separation anxiety disorder (56% and 35%). Comorbid OCD occurs in 5% of patients with pervasive developmental disorders; it is important for this group of patients to distinguish between repetitive and rigid behavior as a core symptom of pervasive developmental disorder and true obsessive-compulsive manifestations. Accompanying substance abuse occurred in 2% of adolescents–the same prevalence as eating disorders.

Langley et al[21] studied 215 subjects aged 5 to 17 referred to university-based OCD clinic, examining anxious and externalizing disorder. No age or gender differences were found across groups. Higher OCD severity and lower rates of tics were associated with comorbid anxiety disorders and the co-occurrence of externalizing disorders predicted lower family cohesion and greater functional impairment.

Canavera et al[22] compared 2 groups of 28 subjects aged 10 to 17, one with OCD only and the other with OCD and comorbid depressive disorder; the latter was associated with more severe internalizing problems and obsessive-compulsive symptomatology, as well as higher family conflict. Janowitz et al[23] has studied 252 adults with OCD and found that early onset (before 10 years old) was associated twice as much (53.7%) with tic and Tourette disorder than late onset (after 10 years old).

Joshi et al[24] examined the co-occurrence of bipolar disorder with OCD; two samples of referred youths (one with bipolar disorder and the other with OCD) were investigated for comorbidity. It was found that 21% (17/82) of bipolar patients had co-occurring OCD and 15% (19/125) of subjects with OCD also had a bipolar illness. The presence of both disorders was more often associated with hoarding, greater comorbidity, and poorer functioning. When these two ilnesses co-occurred, a higher frequency of multiple anxiety disorders, especially generalized anxiety disorder, and social phobia, as well as an earlier onset and greater impairment, were found. Peris et al[25] investigated a sample of 71 youths for, 62% male at a mean age of 12.7 years old, and found 21% scoring on a self-report measure of depression, associating depressive symptoms with older age and more severe OCD.

Storch et al[26] explored the impact of disruptive behavior disorder (DBD) comorbidity in 192 children and adolescents with OCD; conclusions were that comorbid DBD was related to greater family accommodation and less symptom resistance, augmented OCD severity, and internalizing problems and a 3.6 times greater chance of having been prescribed an atypical antipsychotic. Sheppard et al[27] reported on the strong association between ADHD and significant hoarding behavior in individuals with childhood-onset OCD. Children with Asperger's syndrome or high-functioning autism improved their functioning when their comorbid OCD was alleviated through treatment.[28]

Hirani et al[29] examined the type of OCD symptoms in children and adolescents with anorexia nervosa; contamination, and aggressive and somatic obsessions, were prevalent, and ordering, arranging, and checking compulsions were common. Lafleur et al[30] reported a higher rate of PTSD and trauma exposure in children with OCD than matched controls. Grant et al[31] studied 70 subjects with OCD (mean age 13.8 years) and found an association with impulse-control disorders, the most common being pathological skin-picking (12.8%) and compulsive nail-biting (10%); trichotillomania co-occurred in 1.4% of cases.

Differential diagnosis

It is important to distinguish developmentally normal repetitive behavior, such as bedtime rituals, from persistent distressing thoughts and compulsions. Recurrent thoughts occur in a number of clinical conditions. In eating disorders, the focus is one's appearance and the fear of gaining weight, with gross distorsions of body image, and much time is devoted to thinking about food and calories. The depressed patient will ruminate over and over with negative self-denying thoughts about him- or herself and his or her future, as well as guilt. Children with separation anxiety disorder will mainly worry about leaving their caregiver, with intense fears over their parent's health and safety. In social phobia, the main theme will be the fear of judgment by others. In generalized anxiety disorder, fear of catastrophe and exaggeration of everyday occurrences will be the main worries. In body dysmorphic disorder, a morbid preoccupation with a flaw in physical appearance

will be encountered. In pervasive developmental disorders (PDD), repetitive actions are linked to self-stimulation and stereotypical behavior, as part of the core symptoms of PDD along with specific interests. Recurrent bizarre thinking occurs in the psychotic illnesses. Trichotillomania is considered more an impulse disorder than an obsession, although both disorders can coexist. Hypochondriasis, the conviction of having a serious illness, must be distinguished from fear of contracting an illness, for example by contamination, as found in OCD.

Etiology

Biological factors

Basal ganglia dysfunction has been associated with obsessive-compulsive manifestations. For example, Tourette's disorder is associated with an increased rate of OCD. Von Economo, in 1931, decribed ritualized behavior following encephalitis secondary to influenza and linked to the destruction of the basal ganglia. Many studies associate Sydenham's chorea with OCD as a result of basal ganglia autoimmune inflammation. In a similar fashion, pediatric autoimmune neuropsychiatric disorders associated with streptococcal infections (PANDAS) are associated with sudden onset of tics and OCD following a Group A β-hemolytic streptococcal infection (GABHS) triggering, via antibody formation, an autoimmune reaction towards the basal ganglia.

Genetics

In his 2006 review, Geller[6] states that the estimated familial risk for adults with an OCD-suffering relative is 11% to 12%; however, recent studies on family members of affected children show a 25% relative risk. Thus, the age of onset is considered the most important factor relative to genetic penetrance. Lenane et al[32] found that, in parents of children with severe OCD, 25% of the fathers and 9% of the mothers had the illness themselves. According to a recent review by Walitza et al,[33] so far, only a glutamate transporter gene has been associated with early-onset OCD thru linkage studies. Other areas under investigation for genetic studies include the serotononergic and dopaminergic systems. Van Grootheest et al[34] studied a large number of twin pairs at age 12, 14, and 16; only at age 14 and 16 were the prevalence higher in girls; genetic factors contributed at all age groups to obsessive-compulsive symptom liability, with no sex differences. Environmental factors shared by children in the same family contribute to symptom score only at age 12. The same group[35] studied mono- and dizygotic twin pairs from 8083 families through parental reports on the Obsessive Compulsive Scale of the Child Behavior Checklist, and concluded that obsessive-compulsive behavior is moderately stable in childhood due to genetic, shared, and non-shared environmental factors. Using the same scale, Hudziack et al[36] studied 4246 twin pairs and found genetic factors accounting for 55% of the results, with 45% due to environmental influences.

Neuroimaging studies

In a review article, MacMaster et al[37] reported on the results of an extensive literature search based on imaging techniques such as functional magnetic resonance (fMRI) and voxel-based morphometry, and concluded that the cortical-striatal-thalamic circuits are the most implicated in pediatric OCD. Glutamatergic signals from the frontal cortex would stimulate striatal activity, diminishing thalamic inhibition. Results of this meta-analysis included the following findings in youth with OCD: the cingular gyrus was found to be of greater volume and more active, the sriatum is diminished, gray matter density in the orbitofrontal cortex is more elevated and voluminous on the right side, and thalamic volume and corpus callosum are larger. Evidence from drug therapy studies indicates a role for the dopaminergic (use of atypical antipsychotics), serotoninergic (use of clomipramine and selective serotonin reuptake inhibitors, SSRIs), and glutamatergic (use of riluzole) systems. Lazaro et al[38] report on an fMRI study of 12 children with OCD compared with matched subjects; OCD patients presented significantly higher brain activation bilaterally in the middle frontal gyrus with decreased activation in the left insula and putamen after clinical improvement with 6 months of pharmacological treatment. MacMaster et al[39] studied 28 treatment-naive pediatric OCD patients compared with 21 controls using magnetic resonance imaging; OCD patients were found to have a larger right orbitofrontal cortex.

PANDAS

Karla and Swedo[40] examined the role of neuroimmune dysfunction in pediatric OCD. As stated, antibody formation may trigger an inflammatory reaction in the

basal ganglia following GABHS, as well as possibly other micro-organisms such as viruses, borrelia, and mycoplasma. They characterize PANDAS by 5 clinical features: presence of OCD or tic disorder, prepubertal symptom onset, abrupt onset or exacerbation of symptoms with an episodic course, temporal association between presence of symptoms and infection with GABHS, and associated neurological abnormalities such as choreiform movements. Mean onset occurs at 7.4 years, and boys outnumber girls 2.6 to 1.
Comorbidities are frequent (particularly ADHD, depression, oppositional defiant disorder). Antibodies (ASO) can be recovered up to 6 weeks after onset of symptoms. A throat culture should be performed and infections should be treated with an appropriate antibiotic such as penicillin or azythromycin. Prophylactic penicillin could prevent exacerbations; plasmaphoresis treatment has been performed with success during NIMH studies. Standard OCD treatment (cognitive behavioral infection, SSRI) should also be provided for PANDAS cases.
Bernstein et al[41] compared 21 children with PANDAS with 18 non PANDAS OCD patients; PANDAS children presented more often with urinary urgency, hyperactivity, impulsivity, deterioration in handwriting, and decline in school performance, as well as motor and vocal tics. Non-PANDAS OCD subjects were found to have a higher prevalence of separation anxiety disorder and social phobia. Leckman et al,[42] in a prospective longitudinal study of streptococcal upper respiratory tract infections and exacerbations of tic and obsessive compulsive symptoms in 31 PANDAS and 53 non-PANDAS subjects, found no evidence of a temporal association between GABHS infection and tic and OCD exacerbations in children with PANDAS. Alexander et al[43] published an interesting case of a 9-year-old boy with PANDAS and recurrent streptococcal infections whose neuropsychiatric symptoms resolved after tonsillectomy. Murphy et al[44] examined the medical history of the biological mothers of 107 children with OCD and/or tics and found a rate of 17.8% of autoimmune diseases, compared with 5% in the general population.

Parental characteristics

In a study of 40 OCD children and 40 matched controls, Alonso et al[45] examined parental rearing style and its relation to symptom dimensions; OCD patients perceived higher levels of rejection from their fathers but no differences were found with respect of perceived overprotection. Low parental emotional warmth was associated with hoarding behavior. Liakopoulou et al[46] reported on 31 OCD patients aged 8 to 15 years old and their parents; parental psychopathology (anxiety disorders, depression, OCD) was more prevalent than average, and fathers presented more severe obsessive-compulsive symptoms than mothers.
Peris et al[47] studied parental accommodation in 65 children and adolescents and their families; it was found that 46% of parents often participate in rituals. Parental psychopathology (particularly OCD), low family cohesion and organization, and greater severity of obsessive-compulsive symptoms in children were particularly associated with accommodation.
Wilcox et al[48] gathered datas from 465 families involved in an OCD genetics project; the Parental Bonding Instrument was used to assess different factors like parental care, overprotection, and control. Maternal overprotection was associated with OCD in offspring with a familial history of illness if neither parent was affected with the disease; paternal care was found to be a protective factor in subjects without a clear genetic risk.
Calvo et al[49] looked at obsessive-compulsive personality disorder (OCPD) traits and personality dimensions in 63 parents of 32 children with OCD compared with matched controls; a greater incidence of OCPD traits was found in the parents, especially hoarding, perfectionism, and preoccupation with details. Counting, ordering and cleaning compulsions in OCD children were associated with higher levels of perfectionism and rigidity in their parents.

Neuropsychological factors

Although there are conflicting results regarding neuropsychological deficits owing to the fact that tests may not have the necessary sensitivity to detect frontostriatal dysfunction or that cognitive deficits would not appear early in the course of the illness in children,[6] executive function deficits have been implicated. Ornstein et al[50] compared 14 OCD children with 24 healthy controls on a series of neuropsychological tests; OCD subjects appeared to have deficits in cognitive flexibility and planning abilities. Bloch et al[51] assessed 24 children over a 7.5-year period with various neuropsychological tests including the WISC-III; poor fine-motor and visuospa-

tial skills predicted persistence of pediatric-onset OCD into adulthood. Vloet et al[52] compared neuropsychological datas of ADHD, OCD, and healthy controls aged 10 to 18 years old; OCD subjects showed impaired implicit learning.

Clinical course and prognosis

Stewart and Geller[53] reported the following results of a meta-analysis on outcome in 16 samples of children with OCD: 41% persisted into adulthood (60% if subthreshold cases were included) and a majority kept some traits; 39% qualified for remission. Severity of illness, need for hospitalization, early onset, and psychiatric comorbidity were linked to a greater persistence of the illness. Fluctuation in symptoms occured in relation to stress factors, either in school, family, or social environment. Palermo et al[54] concluded in a longitudinal cohort study of 36 children with OCD that 42% experience a remission by early adulthood and that primary hoarding symptoms predicted a poorer life quality. Storch et al[55] examined 99 youth with OCD for predictors of functional impairment; contamination/cleaning and aggressive/checking dimensions were significantly associated with a poorer outcome as well as low insight, OCD symptom severity, family accommodation, and depressive symptoms. An important study by Micali et al[56] on 142 children and adolescents assessed over 9 years at the Maudsley Hospital in London showed a 41% persistence rate (main predictor being the duration of illness); 40% were found to have a psychiatric comorbidity at follow-up.

Treatment

Cognitive–behavioral therapy

It is generally agreed that cognitive-behavioral therapy (CBT) such as exposure and response prevention, as manualized by March and Mulle[57] and as studied in a 2008 meta-analysis of 161 young patients by Watson and Rees[58] should be the first approach to treatment, along with family counseling and psychoeducation. With younger patients, it is important to take into account the cognitive level of development in order to use an age-appropriate technique such as family-based CBT.
Storch et al[59] reported on an open trial of intensive family-based CBT in 30 young patients, either partial responders or nonresponders to medication; after 14 sessions (3 months of treatment) 54% showed symptom reduction. In a study of 96 youths with OCD (aged 7 to 19 years old), Storch et al[60] studied the impact of comorbidity on CBT response; 74% met criteria for one or more comorbid diagnoses; ADHD and major depression and the number of comorbid conditions were negatively related to outcome. Group CBT in 41 pediatric patients was found effective by Olino et al.[61] A study by Huyser et al[62] on the effect of CBT using fMRI compared 25 youths with OCD with healthy controls and showed normalization of planning impairments and a significant decrease in right posterior prefrontal activity after CBT.
Garcia et al[63] reported on predictors and moderators of treatment outcome in 112 patients in the Pediatric Obsessive Compulsive Treatment Study, randomly assigned to sertraline therapy, CBT, or combination treatment; subjects with a family history of OCD were not likely to benefit from CBT alone, but responded to combination therapy; those with a less severe illness, less functional impairment, greater insight, fewer externalizing symptoms, and lower levels of family accommodation showed greater treatment response. Whiteside and Jacobsen[64] described a 5-day (week-long) intensive treatment based on exposure and response prevention, along with family counseling on CBT techniques to be applied at home; OCD symptoms were shown to be improved up to 5 months post-treatment. A study of D-cycloserine (partial agonist of glutamate receptor to enhance exposure therapy) augmentation of CBT in 30 youths with primary OCD showed small to moderate treatment effects, warranting further investigation.[65]

Psychopharmacology

In severe cases, pharmacological intervention, with SSRIs is indicated; in the absence of clinical response, the usual protocol is the successive use of 3 different SSRIs followed by a trial of clomipramine. According to a recent review by Mancuso et al,[66] 21 studies of over 1300 pediatric patients report the efficacy of serotoninergic medications in the short-and medium–term treatment of OCD. Fluoxetine (20 to 60 mg/day), fluvoxamine (50 to 200 mg/day), and sertraline (50 to 200 mg/day) were all found to be efficacious, as well as citalopram and paroxetine, sometimes at high dosages, as reported by Leonard et al.[17] As for the drug regimen, appropriate medications should be started at low dosages and

increased every 3 weeks for a trial of 8 to 12 weeks; once sufficient symptom reduction is achieved, medication should be maintained for 6 to 12 months and then tapered slowly over months. Long-term maintainance is recommended after 2 to 3 severe relapses.

Augmentation strategies for SSRI involve CBT, when possible, as well as the addition of low-dose atypical antipsychotics such as risperidone; less often reported are the uses of clonazepam and low-dose clomipramine. A study by Masi et al[67] on the use of aripiprazole augmentation in 39 adolescents showed effectiveness in more than half of the patients. Successful SSRI augmentation in an adolescent patient with memantine, a drug used in Alzheimer's disease, was reported by Hezel et al.[68]

Side effects of SSRIs include behavioral activation, sedation, tremor, gastrointestinal symptoms, nausea, and more rarely serotonin syndrome, hypomania, akathisia, irritability, and extrapyramidal manifestations. In 2004, the US Food and Drug Administration issued a Black Box warning for SSRIs concerning the development of suicidal ideas, and recommendations for more frequent assessment of youths on these medications. It is important to point out that no suicides were reported in randomized trials.[66] Clomipramine (target dose: 3 mg/kg), a tricyclic, requires special attention regarding anticholinergic side effects, lowering of blood pressure, and EKG monitoring. Each SSRI can inhibit different cytochrome P450 enzymes; it is therefore most important to check interactions when other drugs are given simultaneously.

The Pediatric OCD Treatment Study by March et al[69] over 5 years on 3 different sites yielded the following results: remission was induced by CBT and sertraline in 53.6%, CBT in 39.3%, sertraline alone in 21.4%, and placebo in 3.6%. It is important to treat comorbidities, such as ADHD and depression, that impact on treatment.

An interesting article on treatment strategies of OCD in young people by Krebs and Hyman[70] yielded the following recommendations: treatment resistance should initiate a reformulation of the case regarding diagnosis, comorbidity, and environmental factors; failure of CBT relates more to a faulty technique than a patient characteristic; motivation enhancement strategies, intensive or home-based CBT, and the addition of a low-dose atypical antipsychotic to an SSRI are useful measures; special attention should be given to treatment and identification of comorbid disorders (such as externalizing disorders) as they influence treatment response in OCD patients. According to a metaanalysis by Ginsburg et al,[71] externalizing and tic disorders are key comorbidities in nonresponders to medication and sex, age, duration of illness, and comorbid internalizing disorders do not have a significant impact on treatment response.

Finally, the glutamate antagonist, riluzole (used in adults with amyotrophic lateral sclerosis) was tried by Grant et al[72] in 6 pediatric patients who failed standard treatment; 4 of 6 were much improved but 2 patients developed pancreatitis, warranting caution and further study.

Conclusion

The field of child psychiatry and the quality of care for our patients have greatly benefited from the many advances of neurosciences and from evidence-based approaches in the last decades. It is now agreed that OCD is a neurodevelopmental disorder, with the possibility of showing, by neuroimaging, brain changes as the result of the various therapies available. Without any doubts, more efficacious pharmacological treatments will be developed in the future, targeting neurotransmitters like glutamate as well as others. More specific genes and subtypes of the disorder will be identified. The evidence for PANDAS, although generally recognized, remains controversial as to the exact role of different types of micro-organisms.

Since every patient is unique, with different family dynamics, we have to learn more, through research, about parental characteristics, such as personality features and psychopathology as well as familial influences on symptoms and severity of illness. The identification of comorbidities has improved our treatment strategies; for example, we know that the treatment of comorbid ADHD enhances therapeutic response. We are more and more aware that OCD can be a risk factor for other psychopathologies such as depression; recently, Micali et al[73] reported on risk factors for eating disorders, identifying female gender and family history of eating disorders as specific factors when associated with a history of childhood OCD, raising the possibilities of predictors (among others) and early intervention.

Even if CBT is recognized, along with SSRI and psychoeducation, as the basis of treatment, new modes of distribution appear such as intensive, family-based, and even Web-based interventions, providing treatment to a larger number of patients. The understanding of (and work on)

family dynamics and developmental level is fundamental for the development of therapeutic alliance, compliance, and success of treatment with our patients, even if we know more about the genetic, neurological, and pharmacological aspects of anxiety disorders. For sure, in the future, fascinating discoveries and changes in practice will occur in the field of pediatric OCD, but an integrative approach will most probably remain essential. ❑

Una revisión del trastorno obsesivo-compulsivo en niños y adolescentes

Este artículo es una revisión de la literatura reciente sobre el trastorno obsesivo-compulsivo en la población pediátrica. Las áreas que se abordan son: una breve perspectiva histórica, la presentación clínica en relación con los síntomas que aparecen en diferentes grupos etarios, la epidemiología, la comorbilidad psiquiátrica, la etiología (incluyendo la genética, las neuroimágenes y los factores familiares), el curso clínico y el pronóstico, y el tratamiento con especial énfasis en la terapia cognitivo-conductual individual y familiar además de la psicofarmacología.

Une mise au point des troubles obsessionnels compulsifs chez les enfants et les adolescents

Cet article est une analyse de la littérature scientifique récente sur le trouble obsessionnel-compulsif dans la population pédiatrique. Les domaines étudiés recouvrent un historique bref, la description de la séméiologie clinique selon les différents âges, l'épidémiologie, les différentes comorbidités psychiatriques, l'étiologie (en particulier les aspects génétiques, la neuro-imagerie, les facteurs d'influence familiaux), le devenir et le pronostic, avec un intérêt particulier pour les traitements de thérapie cognitivo-comportementale individuels et familiaux ainsi que la psychopharmacologie.

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