Behavioural disorders in adolescents with early-treated congenital hypothyroidism

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Summary

This study analyses the possible risk factors for the onset of behavioural disorders and psychiatric disturbances in a group of 30 early-treated congenital hypothyroidism (CH) subjects (12 children and 18 adolescents) compared with a control group of 116 age-matched normal subjects (58 children and 58 adolescents). The study also allowed us to evaluate the possible age at onset of behavioural disorders. Both the sample’s and the controls’ behaviours were assessed using a specific diagnostic instrument: Achenbach’s and Edelbrock’s Child Behaviour Checklist (CBCL). A clinical structured interview, the Diagnostic Interview for Children and Adolescents - Revised (DICA-R) was also administered to 18 adolescents with early-treated CH, in order to determine the presence of psychopathological disturbances. In accordance with literature data, the children and adolescents with early-treated CH showed more behavioural problems than age-matched, normal controls. In the children, a statistically significant difference versus the controls emerged only in their higher delinquent behaviour score, while the adolescents gave, on the CBCL, significantly higher scores compared with controls in the withdrawal, anxiety/depression, thought problems, attention problems and aggressive behaviour scales. In the DICA-R, 44% of adolescents with early-treated CH showed symptoms of anxiety disorder, in particular, separation anxiety disorder with phobic components; 18% showed mood disorder and depression and 11% showed behavioural disorders with attention deficit.

KEY WORDS: adolescence, behaviour, congenital hypothyroidism, psychiatric disorder.

Introduction

Neonatal screening for and early treatment of congenital hypothyroidism (CH) have successfully reduced the most severe effects of this disorder on neuropsychological development (1,2). However, several studies (3,4) show that subtle learning difficulties, defective language abilities, motor disorders (delayed achievement of the main milestones), and behavioural disorders (including attention deficit and hyperactivity) may still occur, as may non specific neurological signs (hypotonia, hyperlaxity), which present with greater frequency in early-treated CH children and adolescents than in the rest of the age-matched, unaffected population (5-8). It appears that high T4 and TSH levels contribute to poorer attention and it is very likely that thyroid hormone is involved in the regulation of attention and motor skills.

CH is a chronic disease, which has a negative impact both on the psychological development of children and on their relationship with their parents and with their social environment. Indeed, affective disorders, which are often present in CH children, are attributable more to difficult family relationships than to the subject’s neuropsychological deficit itself, because congenital diseases such as CH can generate, in parents, a sense of guilt and feelings of frustration and disappointment over the “loss” of their idealised “perfect child” (5,9).

Unlike other chronic diseases, CH is a latent condition, and while it can be treated, it cannot be cured. Furthermore, its onset cannot be prevented, and it can occur abruptly at any moment in life. The main fear of the parents of subjects with early-treated CH, and of the children themselves, is that the thyroid deficiency will result in impaired growth. Parents view this disease as a threat, a condition that will sooner or later reveal their child to be different from his peers (10). And however effective treatment may be, chronic diseases are associated with an ongoing need for medical therapy and monitoring that, while protecting the patient against the manifestations of the disease, also involves the prospect of endless dependence (11).

The present study analyses the behaviour of 30 early-treated CH subjects (treatment begun within the first month of life) and of a group of 116 age-matched normal controls in order to identify possible risk factors for psychiatric disturbances in subjects with early-treated CH. This study also allowed us to evaluate the possible age at onset of behavioural disorders in these subjects.

Materials and methods

Subjects

Our study group was composed of 12 CH children (4 males and 8 females) and 18 CH adolescents (6 males,
12 females), who had started treatment between the 20th and the 30th day of life and who underwent regular follow ups. They were compared, respectively, with 58 healthy children (27 males and 31 females) and with 58 healthy adolescents (30 males, 28 females). Recruited from schools, these normal control subjects presented no chronic illness (e.g., diabetes) or history of perinatal distress. The CH children had a mean age of 10 years 4 months and the control group children of 10 years 1 month. The corresponding values in the CH adolescents and adolescent controls were 13 years 5 months and 13 years 3 months.
The Wechsler Intelligence Scale for Children-Revised (WISC-R) was used to assess IQ both in the CH subjects and in the normal controls. The mean WISC-R score in the CH children was 92, versus 96 in the control group, while the mean WISC-R score recorded in the CH adolescents was 94, as opposed to 99 in the control group.
The pharmacological treatment regimens of the CH subjects were determined by the Department of Endocrinology of the University of Pisa, while neuropsychological aspects were investigated by the Division of Child Neurology and Psychiatry of the IRCCS Stella Maris Institute, University of Pisa.

**Evaluation**

The behaviour of both the patients and the normal controls was evaluated using a specific diagnostic instrument: Achenbach’s and Edelbrock’s Child Behaviour Checklist (CBCL) (12). The CBCL, which is designed to be filled in by parents, is a structured questionnaire broken down into 8 behavioural scales exploring 8 cross-informant syndromes: I = withdrawal; II = somatic complaints; III = anxiety/depression; IV = social problems; V = thought problems; VI = attention problems; VII = delinquent behaviour; and VIII = aggressive behaviour. (The questionnaire asks, for example, whether the child/adolescent requires too much attention, shows off, is silent and irritable, and disobeys parents and teachers).
The sum of the first three scales gives the Internalising Score (IS) and that of the last two scales the Externalising Score (ES), while the sum of the scores reported in all the scales is the Total Score (TS).
Pathological scores do not constitute the basis for a psychiatric diagnosis, rather they indicate the behavioural areas in which parents experience the greatest problems.
In order to establish an overall level, the CBCL was applied to all the participants. Moreover, a structured clinical interview, the Diagnostic Interview for Children and Adolescents - Revised (DICA-R) was administered to the 18 adolescents with early-treated CH (aged 12), in order to determine the presence of psychopathological disturbances (13,14). The DICA-R (15) is organised in such a way as to gather information about the onset of the disease, its duration, and the severity of the symptoms in six different selected areas: relational disorders, school difficulties, learning difficulties, somatic symptoms, neurotic symptoms and psychotic symptoms.

**Results**

The data were analysed using Student’s T test (with p<0.05 taken as the level of significance). The mean scores recorded in the CBCL scales and in the IS, ES and TS by the CH children and normal controls were compared. A significant group interaction emerged only in the delinquent behaviour scale (T=1,927; p<0.05), in which the children with early-treated CH gave higher scores. No significant differences (p>0.05) were found in the other seven scales: withdrawal (T=1,067), somatic complaints (T=0,118), anxiety/depression (T=0,878), social problems (T=0,440), thought problems (T=0,165), attention problems (T=0,007), and aggressive behaviour (T=0,924).
No significant differences (p>0.05) were noted in IS (T=0,254), ES (T=1,277) or TS (T=0,749) (Fig.s 1 and 2).
The mean scores reported in the CBCL scales and in the IS, ES and TS by the early-treated CH adolescents and normal controls were then compared. Significant group interactions were found in the withdrawal (T=1,913; p<0.05), anxiety/depression (T=2,516; p<0.02), thought problems (T=1,750; p<0.05), attention problems (T=2,665; p<0.01), and aggressive behaviour (T=2,096; p<0.05) scales, the adolescents with early-treated CH recording higher scores in these scales. In addition, both the IS (T=2,774;
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p<0.01) and the TS (T=2.581; p<0.02) were higher in the study group versus the controls. No significant differences were noted in the following scales: somatic complaints (T=1.738; p>0.05), social problems (T=0.914; p>0.05), delinquent behaviour (T=1.501; p>0.05) (Fig. 3) and ES (T=1.512; p>0.05).

Both groups recorded IS, ES and TS that were within the normal range (Fig. 2).

The DICA-R interview was administered to 18 adolescents (aged >12) with early-treated CH; 5 out of the 18 subjects did not meet the inclusion criteria for any psychopathological disturbance, while 13 did: 7 females and 1 male showed anxiety disorder symptoms, 3 females showed mood disorders, and 2 females showed behavioural disorders (Fig. 4). Figure 4 summarises the psychopathological disturbances emerging, on DICA-R, in the 18 early-treated CH adolescents, the percentage values representing the ratio of affected CH adolescents to the total number of CH adolescents: anxiety disorders, 44%; mood disorders, 16%; behavioural disorders, 11%; and no disorders, 29%.

Discussion

In accordance with literature data, the children and adolescents with early-treated CH investigated in this study showed more behavioural problems than their age-matched controls. In the children (< 12 years), a statistically significant difference versus the controls emerged only in their higher delinquent behaviour score, while the adolescents (>12 years) gave, on the CBCL, significantly higher scores compared with controls in the withdrawal, anxiety/depression, thought problems, attention problems and aggressive behaviour scales. In the DICA-R, 44% of adolescents with early-treated CH showed symptoms of anxiety disorder, in particular, separation anxiety disorder with phobic components; 16% showed mood disorder and depression and 11% showed behavioural disorders with attention deficit.

A previous study (16) of chronic disease also reported how some affected subjects showed marked psychopathological traits. It can be hypothesised that these problems are attributable to family mechanisms created by the chronic illness.

As Rigardetto reports (17), patients with early-treated CH are characterised by aggressive behaviour, instability, inhibition, excessive emotionality and anxiety crises. Rigardetto also asserts that affective disorders depend, to an extent, on excessive parental control and on the inferiority complex developed by the child himself, as a result of his illness.

In this study, children with early-treated CH showed behavioural problems in the externalising area, especially in the area of delinquency (telling lies, stealing, calling others names, playing truant, refusing to accept blame). Adolescents with early-treated CH showed different externalising disorders, such as aggressiveness (arguing, demanding too much attention, showing off, being silent and irritable, disobeying parents and teachers) and, as some other authors have reported (18,19), serious attention difficulties.

Moreover, the higher scores in the CBCL withdrawal, anxiety/depression, and social problems scales indicate the presence of mental suffering in these patients. The DICA-R interview, showing 13 adolescents with early-treated CH to have anxiety disorders and/or mood disorders and/or behavioural disorders, confirmed these data.

Our findings indicate that adolescents with early-treated CH have more behavioural problems than the unaffected, age-matched population. Several studies have suggested that an early (pre- and neonatal) hormonal deficit (endogenous and/or exogenous) may influence the psychological development of subjects with CH: elevated levels of LT4 at birth lead more commonly to behavioural problems reflecting anxiety, social withdrawal and poor concentration (20,21). In our sample, given that no hormone alterations emerged on frequent dosage during endocrinological follow up, it is very likely that the environmental component was the more important. It can be hypothesised that in most cases the behavioural difficulties identified result from the mechanisms that become established within the family when a chronic disease is diagnosed.

CH is a chronic disease associated with the need for continuous medical intervention and frequent monitoring; replacement therapy protects children and adolescents from the manifestations of the disease, but creates a state of dependence.

In fact, chronic illness in children and adolescents represents a risk factor for the individual’s psychological development, because it can affect both the self image and the social responses of the patient. Studies of other chronic diseases claim that chronicity, while not necessarily a risk factor for mental retardation, might increase
the risk of psychopathological problems instead. In children and adolescents with insulin-dependent diabetes mellitus, for example, a clear and direct relationship between psychopathological disorders (anxiety disorder, mood disorder and behaviour disorder) and chronic diseases, significantly more frequent than in the unaffected population, has been reported (16). CH is also a subclinical disease whose few clinical signs are controlled by replacement therapy, but the disease can nevertheless result in impaired growth, neurological deficits or mental retardation later in life. The worries and anxiety of the parents of a child or adolescent with a congenital, chronic and possibly invalidating disease could generate, in the affected individual, emotional distress, a lack of self-confidence, and anxious or depressed behaviour. Some parents may even ignore the problem, paying little attention to the emotional well-being of their child and showing poor compliance with treatment.

It is also likely that young patients, aware of their condition, are more burdened than their normal peers by worries over their future, as well as by the need for therapy and medical checks. In particular, while the behavioural problems of younger children might be interpreted as a reaction, adolescents, older and more sensitive, show more elaborate and complex internalising problems, linked to their “poor” self image.

It seems crucial, therefore, to underline the importance of considering behavioural aspects during the follow-up of children and adolescents with early-treated CH, in order to identify early psychopathological problems and possibly to provide the patient and his family with early psychological support.

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