Psychiatric evaluation of children with Fragile X- syndrome and Down syndrome

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Abstract

The objective: of this work is to identify neuropsychiatric problems commonly found in Down syndrome and Fragile-X syndrome. This has impact on both understanding neuropyhysiology of common behavior problems in children and in their management. Subject: were recruited from national Center for Research they were 15 children with Down syndrome and 15 children with Fragile-X syndrome. Methods: used was assessment of their clinical condition checklist and childhood Autism rating scale Results: showed high incidence of low IQ among both groups, increased hyperactivity and inattention in both groups. Children with Fragile-X syndrome showed high incidence of autistic disorder. Discussion: of the results was done and recommendations were given for further researches.

Introduction

Behavior phenotypes are the characteristic cognitive, personality, behavior and psychiatric patterns that typifies a disorder. ***(Cassidy and Morris, 2002)***, some patients will be referred because of their behavior problems to identify the presenting symptoms as apart of behavioral phenotype will allow referral to a geneticist and accurate genetic diagnosis. This is important for parental counseling regarding prognosis and risk in the following pregnancies. It also allow early interventional and treatment recommendations ***(Moldavsky et al, 2001).***

Down syndrome (Trisomy 21) is one of the commonest syndromes with psychiatric aspects. It has incidence of 1 in 600 live births ***(Davies and Hollman 2001).*** About 20% to 40% of children with Down syndrome have behavior problems such as aggression and hyperactivity ***(Visootsak and Sherman 2007)***. These problems persist through adulthood ***(Smith 2001).***

Fragile-X syndrome is also known chromosomal disorder with neuron-psychiatric disorders. It is caused by mutations in a signle gene in the left arm of the X chromosomes (X—27.3). It occurs in 1/2000-4000 live births in males and 1/6000-8000 in females. Affected males show specific physical features in the form of broad forehead, elongated face, large prominent ears and high arched Palat ***(Wattendrof and Muenke 2005)***. Children with Fragile –X syndrome suffer from mental retardation in the mild ---- severe range ***(Moldavsky et al 2001).*** In addition children with Fragile X syndrome display a characteristic profile of behavior disturbances ***(Hessel etal, 2001).***

These include social deficits with peers, abnormalities in communications, stereotyped behavior, impulsivity and hyperactivity.

The aim of this work is to recognize in systematic and accurate way the behavior and psychiatric syndromes that may be associated with both Down syndrome and Fragile-X syndrome.

This will help us in giving the prone care in all aspects of these handicapped children.

Subjects and Methods:

Thirty patients were collected from the National Research (clinic of children with special needs), 15 children was diagnosed as Down syndrome and 15 as Fragile –X syndrome.

Inclusion criteria for selection were the laboratory diagnosis of chromosomal abnormalities and the age group of the selected cases ranged from 4-17 years, so we have two groups:

Group I (N= 15) includes children with Down syndrome (7 males and 8 females). Group II (N= 15) includes children with Fragile –X syndrome. All of them are of course males.

Methods:

The two groups were subjected to:

1- Stanford Binet Intelligence Test (Terman and Nerril 1960).

2- Test for Assessment the ADHD and its severity Conner's Parent Rating Scale – Revised long version (CPRS-R-L) (Conners, 1997.

3- Children Behavior Checklist for ages 4 – 18 (CBCL 4 – 18 (Achenbach 1991).

4- Test for Diagnosis and Rating the Degree of autism: Childhood Autism Rating Scale (CARS) (Schopler etal 1988, El- Dafrawi etal , 1998).

Results

The results of our work showed four aspects of abilities and behavior problems of two important chromosomal syndromes. The major ability which is the intelligence measured by Stanford Binet (table1) showed that children with Down syndrome lie between mild and moderate IQ each of them 50% of the group. On the other hand only 20% of children with Fragile-X syndrome show Borderline IQ while 40% in the mild degree and the rest was in moderate and severe degree.

Autistic disorder associated with Fragile – X-syndrome was significantly evident in this study as shown in table (2) compared to association with Down syndrome.

Table (3) shows comparison between both groups CBCL .Both groups showed higher scores than norms on this test but no differences between both groups.

Table (1) IQ assessments of the groups

IQ	Group 1 (N= 15)	Group 2 (N= 15)	P
	Down syndrome	Fragile –X	
Dull average 80-90	0	0	NS
Borderline intelligence 70-80	0	3	0.05
Mild MR 55-70	8	6	NS
Moderate MR 40-50	7	4	NS
Severe MR 25 -40	0	2	NS

Table (2) comparison between Down syndrome and Fragile –X syndrome regarding Autism

CARS	Group 1 (N= 15)	Group 2 (N= 15)	P
	Down syndrome	Fragile –X	
Non Autistic	15	5	0.001
Mild to Moderate Autism	0	7	0.001
Severe Autism	0	3	0.001

Table (3) comparison between Down syndrome and Fragile –X syndrome on CBCL

CPCL	Group 1 (N= 15)	Group 2 (N= 15)	P
	Down syndrome	Fragile –X	
Social competence Mean ± SD	39.1 ± 9.6	33 ± 7.8	>.05 NS
Total competence Mean ± SD	31 ± 5.6	28.4 ± 6.2	>.05 NS

Table (4) comparison between Down syndrome and Fragile –X syndrome on Hyperactivity

	Group 1 (N= 15)	Group 2 (N= 15)	P
	Down syndrome	Fragile –X	
Hyperactivity Subscales	Mean = 58 ± 14	Mean = 69 ± 16	0.06 NS
• normal range	8	3	
• borderline	2	2	
• Possible problems	0	3	
• Evident problem	1	0	
• Significant problem	4	7	
Restless Impulsivity	Mean = 59 ± 9.8	Mean = 62 ± 10	0.32 NS
• Normal range	5	4	
• Borderline	4	2	
• Possible problem	2	1	
• Evident problem	2	4	
• Significant problem	2	4	
DSM-IV Hyperactivity	Mean = 61.8 ± 13	Mean = 66.7 ± 14	0.36 NS
• Normal range	6	3	
• Borderline	2	1	
• Possible problem	2	1	
• Evident problem	1	3	
• Significant problem	4	1	

Discussion

Genetic disorders have specific effect on behavior. This abnormal behavior is termed behavior phenotype of the syndrome.

In our research we selected two well-known syndromes, the Down syndrome and Fragile –X syndrome for deep systematized study.

As regard patients with Down syndrome assessment of intelligence revealed that they suffer from moderate MR. this result is in agreement with previous studies done by ***Pastore et al (2000, Ring and Clahsen (2005) and Palmer (2006)*** who reported that Down syndrome patients have mild to moderate cognitive impairment cognitive abnormalities in Down syndrome is caused by brain abnormalities cortical lamination, irregular clustering of neuronal cell bodies ***(Lubec, 2002).***

Social problems are associated in some cases of Down syndrome are yet were within borderline clinical range. These results are in agreement with ***Leudare et al, (1981)*** who concluded that socialization in Down syndrome was mainly through non-verbal modalities as they had weakness in communication relative to daily living and socialization skills.

On the other hand and against our results, ***Green et al (1989) and Bhatia et al (2005)*** diagnosed conduct disorder in a considerable ratio in children with Down syndrome.

Another finding in our study is that patients with Down syndrome have hyperactivity and attention problems. These results agreed with those reported by ***Green et al (1989).***

As regard patients with Fragile - X syndrome assessment of intelligence revealed that affected children fall in the range from mild to severe MR. These results are in agreement with previous studies done by ***Merenstein et al, (1996)*** and ***Jakala et al (1997)*** who experienced this cognitive disabilities by minor structural brain abnormalities found in Fragile – X syndrome.

Others studies done by ***Hesel et al, (2001)*** put individuals with Fragile –X syndrome within the range of moderate MR. On the other hand ***Kwon et al (2001)*** found that individuals with Fragile –X syndrome has no MR but only dull normal intelligence.

There is evidence from another longitudinal studies done by ***Borghgraef etal (1987)*** that these are progressive decline in intellectual abilities with age in individuals with Fragile –X syndrome.

Autistic symptoms were present in most cases with Fragile –X syndrome ranging from mild to moderate .These results are in agreement with ***Reiss and Freund (1992) and Hatton et al (2006)***

References

Achenbach, T. (1991): Manual for the child behavior checklist 4-18 and 1991 profiles .Burlington VT, university of Vermont. Dep. Of Psychiatry

Borghgraef, M., Fryns, J.P. Dielkens, A and Puck, K. (1987): Fragile-X syndrome: a study of psychological profile in 23 perpubertal patients clinical generics 32 (3):29-86

Bhatia US, Kabra. M. and Sapra, S (2005): Behavioral problems in children with Down syndrome. Indian Pediatrics, 42 (7):576-680

COnners, K (1997): User's manual and administration guide of the Conner's Rating

Scales Revised 1997. Multi health systems incorporated.

Cassidy SBand Morris CA (2002): Behavioral phenotype in genetic syndromes advances in pediatrics, 49:59-86

Davies, MKand Hollman (2001): stamps in cardiology: Down syndrome. Heart, 86 (2):130

Dykens, EM, Hodapp, RM and Evans, D.W. (1994): profiles and development of adaptive behavior in children with Down syndrome. AM.J. mental retardation 98 (5) 580-87

Einfold, S., Hall, W. and Levy, F. (1991): Hypercativity and the Fragile –X syndrome Journal of abnormal child psychology (3)253-62

Cornish, K., Burck, J.A. Rahman, A., Munir.F. Russo, N., and Grant , (2005): Theory of mind deficits in children with Fragile-X syndrome. J. of intelligence disability research, 49 (5)372-78

Farazin, F., Perry and Hessel, D. (2006): Autism spectrum disorders and attention deficit /hyperactivity disorder in boys with the Fragil-X prematuration. J. of Developmental and Behavioral Pediatrics, 27 (2)137-144

Careen, J.M. Dennis, J and Bennets LA (1989): Attention Disorder in a group of young Down's syndrome children J. of Mental deficiency Research (33):105 -122

Hessel , D., Dyer-Friedman, J and Glaser , B.(2001): The influence of environmental and genetic factors on behavior problems and autistic symptoms in boys and girls with Fragile-X syndrome pediatrics, 108 – (5): E88

Kwon, H., Menon, V. and Eliez, S., (2001): Functional neuro-anatomy of visiospatial and molecular measures as Am. J. psychiatry, (158 (7): 1040-51

Visootsak, J. and Sherman, S. (2007): Neuropsychiatric and behavioral aspects of trisomyzl. Current psychiatry reports 9 (2): 135 -140

Wattendrof, D.J. and Muenke, M. (2005): Diagnosis and management of Fragile-X syndrome. Am. family physician, 72 (1) 111-113

Reiss, A., L. and Freund, L. (1992): behavioral phenotype of Fragile-X syndromeDSM-IIIR autistic behavior in male children. Am.J. medical genetics, 43 (1-2)35 -46

Hatton, D., D., Sideris, J. and Skinner, M. (2006): Autistic behavior in children with Fragile-X syndrome: prevalence stability and the impact of FMRP. Am. J. genetics part A, 140 (17): 1804-13

Palmer, G.A. (2006): Neuropsychological profiles of persons with mental retardation and dementia. Research in developmental disabilities, 27 (3): 299 -308

Jakala, P., Hanninen, T. and Rynanen, M (1997): Fragile-X: neuropsychological test performance, CCC triplet repeat length and hippocampal volumes. The journal of clinical investigations 100 (2):331-38

Leudar, I., Fraser WI and Jeeves, MA. (1981): Social familiarity and communication in Down syndrome. Journal of mental deficiency research, 25: 133-42

Meren stein, SA., Sobesky WE., and Taylor, AK., (1996): Molecular-clinical correlations in males with an expanded FMR1 mutation. Am. J medical genetics, 64 (2) 388-94

Schopler, E., Reichler , R. J. and Renner, BR. (1988): The childhood autism rating

scale CARS Los Angeles: Western psychological services.

Smith, D.V. (2001): Health care management of adults with Down syndrome. American family physician, 64 (6): 1631 -1038

Pastore, E., Marinos, B, Calzdari, A., et al (2000): clinical and cardioresiratory assessment in children with Down syndrome without congential heart disease. Archives of pediatrics and adolescent medicine, 154 (4): 408-410

Moldavsky, M, Lev, D and Lerman-Sagie, T. (2001): Behavioral phentypes of genetics syndrome: a reference guide for psychiatrirsits J. of the American of child and adolescent psychiatry, 40 (7):749-61

Ring, M and Clahsentl (2005) L: Distinct patterns of language impairment in Down's syndrome and Williams syndrome: the case of syntactic chains .J.of neurolinguistics 18 : 479-501

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