Carbamazepine Versus Resperidonein Treatment Of Autistic Symptoms

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Saummary

Background: Autism spectrum disorder (ASD), is a heterogeneous of neuro- developmental syndrome characterized by a wide range of impairments in social interactions, verbal and non- verbal communication and restricted and repetitive behaviors in the first three years of life. There is no curative treatment for ASD, The early and correct diagnosis is important in successful intervention program. Recently Risperidone is used to treat patients with ASD. The children with ASD that show Electro- Encephalo- Graphic (EEG) changes are about 10.3% to 72.4% of patients. The prevalence of epilepsy with Autistic children has been estimated at 7- 14%. The management of seizures waves using Anti- Epileptic Drugs such as Carbamazepine in children and adolescents with ASD may cause functional improvement and reduction of autistic symptoms. Although pharmacological treatment is beneficial in decreasing symptoms in ASD, Behavior Modification must associate these pharmacological agents.

Objectives: To assess the effect of Risperidone, Carbamazepine, and Behavioral Modification in decreasing severity of the symptoms of ASD.

Patients and Methods: Sixty patients were diagnosed as having ASD according to Diagnostic and Statistical Manual of Mental Disorders fifth edition (DSM- V), then the sample is divided into three groups. The first group will be given Risperidone and Behavior Modification. The second group will be given Carbamazepine and Behavior Modification. The third group will be given Behavior Modification only. The duration of the study was six months. Evaluation of symptoms of ASD was done before the study and after the study. Statistical analysis was done.

Results: Clinical and Statistical improvement occurred between before the study and after the study. On the other hand, there are no statistical significant results from comparing the three groups after the study.

Conclusion: Risperidone and Carbamazepine are effective and tolerable agents in the course of treatment of ASD. Behavior Modification is non- pharmacological effective treatment of ASD.

Key words: Autism- Autism Spectrum Disorder- Risperidone- Carbamazepine- Behavior Modification

دراسة مقارنة بين الكاربامازيبين والريسبريدون فى علاج الاعراض الذاتوية

مقدمه: اضطراب طيف الذاتوية هو أحد اضطرابات تشوه النمو العصابى التى تتصف بسلوك تكرارى محدود ونقص فى التكامل الاجتماعى التى يتميز به الأطفال فى الثلاث سنوات الأولى من أعمارهم. لا يوجد عقار بحد ذاتة لعلاج هذه الاضطرابات ولكن التشخيص الصحيح والعلاج المبكر لهذه الاضطرابات يعتبر هاما لعمل البرامج التدخلية المناسبة لكل طفل. حديثا فأننا قد نستعمل بعض العقارات لعلاج الإعراض الموجودة بهذه الاضطرابات مثل عقار الريسبريدون. مرضى الذاتوية يعانون من تغير فى القوة الكهربية لرسم المخ منهم يعانون من مرض الصرع لذا فإن استخدام مضادات الصرع مثل عقار الكاربامازيبين للأطفال والشباب الذاتويين قد يحسن أسلوب الحياة ويقلل الأعراض الذاتوية. وبالرغم أن العلاج العقارى يعتبر هاما لتقليل الأعراض الذاتوية فإن تعديل السلوك يعتبر هاما أيضا ولابد منه بجانب العقارات.

الهدف: تقدير فاعلية ريسبريدون بالمقارنة بالكاربامازيبين والعلاج السلوكى فى علاج وتقليل الأعراض الذاتوية.

المنهج: دراسة مقارنة.

الوصف: ستون طفلاً يعانون من ن اضطرابات طيف الذاتوية بواسطة اختيار الكارز كما تم قياس الذكاء ورسم المخ الكهربائى.ت م يقسم هؤلاء الأطفال إلى ثلاث مجموعات متساوية فى العدد: المجموعة الأولى أعطيناهم عقار الريسبريدون مع جلسات التعديل السلوكى.ا لمجموعة الثانية: أعطيناهم عقار الكاربامازيبين مع جلسات التعديل السلوكى. المجموعة الثالثة: أعطيناهم جلسات التعديل السلوكى فقطا لمدة ستة أشهر ثم أعدنا قياس الأعراض بمقياس الذاتويين CARS واختبار النضج الإجتماعى وإختبار تقييم العلاج للذاتويين ATEC ثم أعدنا رسم المخ الكهربائى أيضاً.

الخلاصة: إن عقار الريسبريدون وعقار الكاربامازبين هما عقاران فعالان ومحتملان فى علاج الأعراض الذاتوية. وتعديل السلوك هو جزء هام جدا فى علاج الذاتوية.

نتائج الدراسة: إن عقار الريسبريدون والكاربامازبين والعلاج السلوكى فعالين فى علاج اعراض مرض الذاتوية.

التوصيات: يعتبر الريسبريدون والكاربامازيبين فعالين فى اغلب حالات مرض الذاتوية ويعتبر العلاج السلوكى من افضل طرق علاج اعراض مرض الذاتوية. لابد من تطويل مدة العلاج عن مدة الدراسة واخذ عينة اكبر لتظهر نتائج افضل فى المستقبل.

Introduction:

Autism spectrum disorder (ASD), is a phenotypically heterogeneous neuro- developmental syndrome with polygenic heritability, characterized by impairments in social interactions, communication and restricted and repetitive behaviors in the first three years of life (Kaplan and Sadock, 2015). The current prevalence of ASD is about 1%- 2%. There is male predominance, that male to female ratio is 4~5:1 (CDC., 2016).

There is no curative treatment for ASD, but multimodel intervention programs show significant improvement. The early and correct diagnosis is important in successful intervention program. The goals of treatment are to increase socially acceptable behaviors, to decrease odd behavioral symptoms, and to enhance the verbal and nonverbal communication (Rapin and Tushman, 2017).

Recently, the second generation of antipsychotics (SGA) are used to treat patients with disruptive behaviors, mood disorders and ASD. Evidence based researches support the benefit of Risperidone for stereo typed behaviors in children with ASD (Stigler and Mc Douglas., 2016).

It was found that, ASD is usually coexisted with different types of epilepsies. This co- occurrence may be due to genetic element and biologic processes of both syndromes The children with ASD that show Electro- Encephalo- Graphic (EEG) changes are about 10.3% to 72.4% of patients. The prevalence of epilepsy with Autistic children has been estimated at 7- 14%, whereas the cumulative prevalence by adulthood is estimated at 20% to 35% of patients (Cohen, 2015).

The management of seizures waves using Anti- Epileptic Drugs such as Carbamazepine in individuals with ASD may cause functional improvement and reduction of autistic symptoms. The side effects of Carbamazepine are GI discomfort, Hepatic affection, and skin rash (Yasubara, 2016).

Early Intension Behavioral Intervention (EIBI) has positive outcome among children with ASD. EIBI is used to maximize the effect of pharmacological agents in the management of ASD. It is also used to decrease the mal adaptive behaviors and increase the adaptive ones (Unwin and Ded, 2017).

Objectives:

To assess the effect of Risperidone, Carbamazepine, and Behavioral Modification in decreasing severity of the symptoms of ASD.

Patients and Methods:

The study was conducted from November, 2011 to May, 2013. This study was conducted on children diagnosed with autistic disorder according to the criteria of (DSM- V), attending as outpatients in clinic of special needs in Institute of Postgraduate Childhood Studies, Ain Shams University. Risperidone and Behavioral Modification Therapy were given for six months to group (I). The drug dose were 0.5 mg/ day as initial dose, which could be increased after 4 weeks according to the patient response. Carbamazepine and Behavioral Modification Therapy were given for six months to group II. The drug dose was 50- 200 mg/ day. Behavioral Modification Therapy only (3 sessions per week, each session was 30- 45 minutes) was given to group (III) for 6 months. Then all patients were subjected to CARS, ATEC, Vineland Social Maturity Scale, Stanford- Binet IQ tests the fifth edition and EEG before and after 6 months of taking these therapies. Data obtained from the study will be analyzed and the three groups will be compared with each others.

- Inclusion Criteria: Patients are in good general condition and able to take oral medicine. Male and female patients are included. Age (3- 10) years old. CARS Score from 31 to 39. Medication free for one month.
- Exclusion Criteria: The presence of epileptic fits. The presence of any other co- morbid psychiatric disorder. The IQ below 50. Hearing or visual, Motor disabilities such as hemiplegia or paraplegia.
- Ethical consent: Written informed consent will be obtained from each child parents after explanation of the aim of the study and its benefits for their children and other children who might have the same disease. The study is not sponsored by any pharmaceutical company.

All children will be subjected to:

1. Full Psychiatric history and examination to diagnose ASD according to (DSM- V) criteria (APA, 2013).
2. Complete Medical History and clinical examination to exclude any co-morid disorder.
3. Psychological Assessment by Childhood Autism Rating Scale (CARS), which is the most widely used to determine symptoms and severity of autistic disorder. It is done by (Schoppler et.al., 1980) and the Arabic version translated by (El Dafrawi, 1998). It covers social, emotional, and communication skills and repetitive behaviors, play routines and unusual sensory interests. The scale subjectively rate 15 items, (Relationship to people, Imitation, Emotional response, body use, Adaptation to change, Visual response, Listening response, Taste-smell- touch response and use, Fear or nervousness, Verbal communication, Non- verbal communication, Activity level, General impressions (Rellini, et.al., 2015).
4. The Vineland Social Maturity Scale: which measures social competence, self- help skills, and adaptive behavior from infancy to adulthood. It is used in planning for therapy and/ or individualized instruction for persons with mental retardation or emotional disorders. The Vineland scale, which can be used from birth up to the age of 30, consists of a 117- item interview with a parent or other primary caregiver. (There is also a classroom version for ages (3- 12) that can be completed by a teacher). Personal and social skills are evaluated in the following areas: daily living skills (general self- help, eating, dressing); communication (listening, speaking, writing); motor skills (fine and gross, including locomotion); socialization (interpersonal relationships, play and leisure, and coping skills); occupational skills; and self- direction. (An optional Maladaptive Behavior scale is also available). The test is untimed and takes (20- 30) minutes. Raw scores are converted to an age equivalent score (expressed as social age) and a social quotient (McCullough, 1992).
5. The Autism Treatment Evaluation Checklist (ATEC): it was

developed in 1999 to help researchers evaluate the effectiveness of various treatments for autistic children and adults and to help parents determine if their children benefit from a specific treatment. Parents and teachers use the ATEC to monitor or track how well their children are progressing over time, even without the introduction of a new treatment (Magiati et.al., 2015).

6. Assessment of Intelligence Quotient (IQ) by Stanford Binet Scale 5th edition (APA, 2013), Arabic version translated by (Abu Elneil, 2013). The test is scored manually from which verbal and performance score and intelligent quotient were obtained.
7. Electro Encephalo Gram (EEG), it will be recorded using twenty- one electrodes placed according to the International 10- 20 system with sixteen channels subset. The impedance of the silver- silver chloride electrodes, which were glued to the scalp coildion (Chadwick et.al., 2016).

Statistical analysis:

Data will be obtained from research will be tabulated and analyzed using the SPSS program on PC software (Rapin and Tushman, 2017).

Results:

Table (1) Group (I) The effect of Risperidone + Behavioral Modification on EEG

Case #	Before	After
1	Increased activity of left hemi sphere (all lobes)	increased activity of left hemi sphere (all lobes)
2	Biparietal Epileptogenic Discharge	Biparietal Epileptogenic Discharge
3	bitemporal and left occipital epileptogenic discharge	bitemporal and left occipital epileptogenic discharge
4	left temporal epileptogenic- abnormal slap records	left tempro- occipital epileptogenic activity- abnormal sleep records
5	Left Occipital Epileplpgenic Discharge	Left Occipital Epileplpgenic Discharge
6	Left Frontal Epileptogenic Discharge	Bilateral Frontal Epileplogenic Discharge
7	Left Temporal Epileplogenic Discharge	Left Tempro Occipital Epileptogenic
8	Left Frontal Epileplogenic Discharge	Bilateral Frontal
9	Left Occipital Epileplogenic Discharge	Bilateral Occipital
10	Abnormal Sleep Record	Abnormal Sleep Record
11	Left Frontal Epileplogenic Discharge	Bilateral Frontal
12	Left Temporal Epiteplogenic Discharge	Left Temporal Epiteplogenic Discharge
13	Left Temporal Epiteplogenic Discharge	Bilateral Temporal
14	Left Temporal- Left Occipital	Bilateral- Lateral Occipital
15	Left Occipital	Left Occipital- Left Temporal
16	Left Frontal Epiteplogenic	Left Frontal, Left Occipital
17	abnormal sleep record left frontal epileptogenic discharge	abnormal sleep record left frontal epileptogenic discharge
18	Left Temproccipital Epiteplogenic Discharge	Bilateral Tempro Occipital
19	Left Temporal Epiteplogenic Discharge	Bilateral Temporal
20	Abnormal Sleep Record	Abnormal Sleep Record

Risperidone may cause increase in the electrical activity and the EEG changes.

Table (2) Group (II) The effect of Carbamazepine + Behavioral Modification on EEG

Case #	Before	After
21	Bilateral Occipital Bilateral Parietal	Left Occipital- Left Parietal
22	Bilateral Temporal	Bilateral Temporal
23	Left Temporal	Normal
24	bilateral occipital and left temporal epiteplogenic discharge	Right Occipital And Left Temporal
25	Bilateral Temporal Epiteplogenic Discharge	Left Temporal Epiteplogenic Discharge
26	Right Occipital Epiteplogenic Discharge	normal
27	abnormal sleep record left parietal epiteplogenic discharge	Left Parietal Epiteplogenic Discharge
28	Right Frontal Epiteplogenic Discharge	normal
29	bilateral occipital epiteplogenic discharge and right frontal	Left Occipital Epiteplogenic Discharge
30	Left Temporal Epiteplogenic Discharge	Left Temporal Epiteplogenic Discharge
31	bilateral occipital and right temporal epiteplogenic discharge	Bilateral Occipital Epiteplogenic Discharge
32	Right Occipital Epiteplogenic Discharge	Normal
33	Right Temporal Epiteplogenic Discharge	normal
34	right temporal and left frontal epiteplogenic discharge	Left Frontal Epiteplogenic Discharge
35	Bilateral Tempro Occipital Epiteplogenic Discharge	Left Temporal Epiteplogenic Discharge
36	Left Temporal Epiteplogenic Discharge	Normal
37	Bilateral Occipital Epiteplogenic Discharge	Right Occipital Epiteplogenic Discharge
38	Bilateral Frontal Epiteplogenic Discharge	Left Frontal Epiteplogenic Discharge
39	Right Occipital Epiteplogenic Discharge	normal
40	Right Temporal Epiteplogenic Discharge	normal

Carbamazepine is an antiepileptic agent so, it cause decrease in the electrical activity and the EEG changes.

Table (3) Group (III) The effect of Behavior Modification Only (Without Drugs) on EEG

Case #	Before	After
41	Left temporal- right occipital epileptogenic discharge	Left temporal- right occipital epileptogenic discharge
42	Right Temporal Epileplogenic Discharge	Normal
43	Left Tempro Occipital Epileptogenic Discharge	Left Tempro Occipital Epileptogenic Discharge
44	Right Frontal Epileplogenic Discharge	Normal EEG
45	Right Parietal Epileptogenic Discharge	Right Parietal Epileptogenic Discharge
46	Abnormal Sleep Record	Abnormal Sleep Record
47	Left Temporal Epileptogenic Discharge	Left Tempro Occipital Epileptogenic Discharge
48	Bilateral Frontal Epileptogenic Discharge	Bilateral Frontal Epileptogenic Discharge
49	Right Temporal Epileptogenic Discharge	Right Tempro Occipital Discharge
50	Left Occipital Epileptogenic Discharge	Left Occipital Epileptogenic Discharge
51	Bilateral Frontal Epileptogenic Discharge	Bilateral fronto- temprol epileptogenic discharge
52	(Decreased connectivity) x left occipital	(Decreased connectivity) x left occipital
53	Right Temporal Epileptogenic Discharge	Bilateral Temporal Epileptogenic Discharge
54	Left Tempro Occipital Epileptogenic Discharge	Left Tempro Occipital Epileptogenic Discharge
55	Right Frontal Epileptogenic Discharge	Right Frontal Epileptogenic Discharge
56	Right Parietal Epileptogenic Discharge	Right Parieto Occipital Epileplogenic Discharge
57	Left Temporal Epileptogenic Discharge	Left Temporal Epileptogenic Discharge
58	Right Temporal Epileptogenic Discharge	Bilateral Tempro Occipital
59	Left Frontal Epileptogenic Discharge	Bilateral Frontal
60	Left Occipital Epileptogenic Discharge	Left Occipital Epileptogenic Discharge

The electrical activity may be increase as the child did not take treatment, or remain as it is, or even there is spontaneous improvement.

Table (4) The gender difference between groups before the study

			Groups			Total
			Risperidone & BM	Carbamazepine& BM	BM	
Gender	Male	Count	17	18	17	52
		% Within Groups	85.0%	90.0%	85.0%	86.7%
	Female	Count	3	2	3	8
		% Within Groups	15.0%	10.0%	15.0%	13.3%
Total	Count		20	20	20	60
	% Within Groups		100.0%	100.0%	100.0%	100.0%

Group (II) only has less in girls count than group (I) and group (II).

Table (5) The effect of variables (age and IQ) on groups before the study

Variables		N	Mean	SD	F	P Value
Age	Risperidone& BM	20	4.89	1.50	0.017	0 983
	Carbamazepine& BM	20	4.95	1.46		
	BM	20	4.97	1.34		
	Total	60	4.93	1.41		
Iq Before	Risperidone& BM	20	55.75	5.34	0.116	0 890
	Carbamazepine& BM	20	55.60	4.59		
	BM	20	55.05	4.52		
	Total	60	55.47	4.76		

The results were insignificant because there are no significant differences between groups in these variables.

Table (6) Paired t- test between the tests before and after the study in all groups:

		Mean	N	Std.Deviation	t	P Value
Pair 1	CARS B	4.7000	60	1.30579	19.309	0.000
	CARS A	2.1667	60	1.20966		
Pair 2	ATEC B	5.6833	60	0 72467	12.566	0.000
	ATEC A	4.5333	60	1.01625		
Pair 3	SQ B	1.3833	60	0 58488	2.955	0.004
	SQ A	2.4333	60	2.81862		
Pair 4	IQ B	1.3333	60	0 57244	6.606	0.000
	IQ A	2.1667	60	1.13745		

There are significant differences between the results of each test, before and after the study in all groups.

Table (7) Comparison among groups in all tests after the study

	N	Mean	SD	F	P Value	
CARS	Risperidone& BM	20	1.9500	1.19097	0.687	0.5
	Carbamazepine& BM	20	2.1500	1.26803		
	BM	20	2.4000	1.18766		
	Total	60	2.1667	1.20966		
ATEC	Risperidone& BM	20	4.5000	0 94591	0.904	0.4
	Carbamazepine& BM	20	7.5000	13.81266		
	BM	20	4.6000	0 99472		
	Total	60	5.5333	8.00099		
SQ	Risperidone& BM	20	3.0500	4.65069	0.714	0.5
	Carbamazepine& BM	20	1.9500	0 82558		
	BM	20	3.3000	4.58946		
	Total	60	2.7667	3.78385		
IQ	Risperidone& BM	20	2.6500	1.59852	2.892	0.06
	Carbamazepine& BM	20	1.9500	0 82558		
	BM	20	1.9000	0 64072		
	Total	60	2.1667	1.13745		

The results are statistically insignificant may be due to the are small numbered groups and the duration is relatively short.

Table (8) Comparison between tests before and after the study in group (I)

	Mean±SD	T Test	P Value
CARS			
Before	37.25±1.83	16.808	0.000**
After	31.55±2.36		
ATEC			
Before	109.00±13.53	11.204	0.000**
After	85.65±17.27		
SA			
Before	2.87±0.99	12.231	0.000**
After	3.68±1.06		
SQ			
Before	55.50±4.46	13.183	0.000**
After	60.95±4.94		
ATEC			
Before	55.75±5.34	25.354	0.000**
After	62.85±5.83		

There are statistically significant results between tests before and after the study which indicate the improvement of patients.

Table (9) The correlation

	N	Correlation	P Value
Carsbefore& Carsafter	20	0. 765	0. 000
Atecbefore& Atecafter	20	0. 844	0. 000
Sabefore& Saafter	20	0. 960	0. 000
Sqbefore& Sqafter	20	0. 927	0. 000
Iqbefore& Iqafter	20	0. 979	0. 000

Table (10) Comparison between tests before and after the study in group (II)

	Mean±SD	T Test	P Value
CARS			
Before	36.25±1.81	16.449	0.000**
After	32.50±1.96		
ATEC			
Before	104.95±12.17	19.894	0.000*
After	92.10±12.06		
SA			
Before	3.49±1.23	2.673	0.015*
After	3.93±1.07		
SQ			
Before	56.50±4.81	26.688	0.000**
After	61.35±5.04		
ATEC			
Before	55.60±4.59	16.508	0.000**
After	61.15±5.20		

There are highly significant improvements occurred in this group after the study.

Table (11) Correlation

	N	Correlation	P Value
Carsbefore& Carsafter	20	0.765	0.000
Atecbefore& Atecafter	20	0.844	0.000
Sabefore& Saafter	20	0.960	0.000
Sqbefore& Sqafter	20	0.927	0.000
Iqbefore& Iqafter	20	0.979	0.000

Table (12) comparison between tests before and after the study in group (III)

	Mean±SD	T Test	P Value
CARS			
Before	36.45±2.04	32.484	0.000**
After	32.65±2.01		
ATEC			
Before	102.00±26.47	1.743	0.097*
After	93.45±13.79		
SA			
Before	3.20±0.96	20.842	0.000**
After	3.79±0.98		
SQ			
Before	56.55±4.67	21.944	0.000**
After	61.80±4.79		
ATEC			
Before	55.05±4.52	18.800	0.000**
After	60.35±4.76		

Improvements are statistically recorded from before to after the study.

Table (13) Correlation

	N	Correlation	P Value
Carsbefore& Carsafter	20	0.967	0.000
Atecbefore& Atecafter	20	0.562	0.010
Sabefore& Saafter	20	0.992	0.000
Sqbefore& Sqafter	20	0.975	0.000
Iqbefore& Iqafter	20	0.964	0.000

Discussion:

The efficacy of Risperidone: in treating nervousness that associated with autism in 90 autistic individuals, aged (5- 17) years. This 8 weeks study compared risperidone to placebo on measurement of nervousness. Response was identified as≥ 25% decrease in the nervousness and rating of much improved. Result rates were 69% in the Risperidone treatment group and 12% in the placebo group, which was significant difference. Significant side effects in the risperidone group were increased weight (2.7 kg versus 0.8 kg in the risperidone and placebo groups, respectively), raised appetite, fatigue, drowsiness, dizziness and drooling. Among the patients of the risperidone group, about 68% maintained this response at 6 month follow up study. Side effects in the risperidone group included moderate sedation, raised appetite, weight gain (mean 2.8 kg), and mild, temporary dyskinesias. Risperidone is also effective in treating the restricted and repeated behaviors, raising the good behaviors in the areas of communication, socialization, and daily living skills (Stigler and Mc Douglas., 2016).

The management of seizures waves using Anti- Epileptic Drugs such as Carbamazepine in children and adolescents with ASD may cause functional improvement and reduction of autistic symptoms. Carbamazepine is used also in the treatment of bipolar disorder, and in neurogenic pain. The side effects of Carbamazepine are GI discomfort, Hepatic affection, and skin rash (Yasubara, 2016).

Many researches in behavioral therapy was done since 1960. They have shown that, special skills can be taught to autistic children. Specialist must put few points in consideration: First, behavioral therapy should be designed for individual child. Second, autistic children have an impaired ability to generalize from one situation to another, so specialists have to encourage generalization of behaviors. Third, early and intensive behavioral therapy should be done to increase the child's social development (Rapin and Tuchman, 2017).

In table (1) there are the EEG changes in group (I) which had increased in the electric activity of the brain from before to after the research, so Risperidone worsen the electric activity of the brain regions. In table (2) The EEG changes in group (II) had decreased in the electric activity of the brain from before to after the research, as Carbamazepine is an anti- epileptic medication. In table (3) The EEG changes in group (III), the electric activity of the brain showed no change, or spontaneous improvement, or even worsened as the patient did not take any treatment, so Behavioral Modification does not affect the electric activity of the brain regions. In table (4), it represents the stability of the sample as regards the gender. In table (5), it also represents the stability of the sample as regards the IQ and the age of the patients. In table (6), all results are statistically significant in all the 60 patients. In table (7), it represents comparison between all groups after the study; the results were statistically insignificant as the sample was very small to determine the results and also the duration is relatively short. In tables (8) to (13), they represent comparison between CARS, ATEC, and Vineland Social Maturity Scale before and after the study in group (I), (II), and (III). They show positive results which are statistically significant.

Conclusion:

This research was done to measure the effect of two different medications (Risperidone and Carbamazepine) besides Behavior Modification Therapy as three different lines of treatment of symptoms of ASD. The results of this research showed statistically significant improvements from before to after the research in the three groups. Risperidone and Carbamazepine are effective and well tolerated medications. The findings of Risperidone group were more significant in the treatment of autistic symptoms measured by CARS and ATEC, but it may increase the EEG abnormalities. On the other hand, Cabamazepine group show great improvements in EEG abnormalities more than improvements in autistic symptoms. Behavior Modification only group also, showed improvement in autistic symptoms but less than groupI.

Recommendations:

Large sample, and long duration studies are preferable to get more statistically significant results. Other atypical antipsychotic drugs such as Aripiprazole should be tried. The pharmacological treatment is important but, other lines of treatment are very important as well.

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