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MIXED DEMENTIA AND PHYSICAL EXERCISE

DOCU AXELERAD DANIEL[1], DOCU AXELERAD SILVIU[2], DANTES ELENA[3], STROE ALINA ZORINA[4], DOCU AXELERAD ANY[5]

Abstract

Aim. The purpose of this study is to verify the potential improvement both in terms of the physique of patients with mixed dementia, but also in relation to the psychic and behavior of patients with mixed dementia after practicing mild difficulty exercises for 6 months.

*Methods.*A batch of 8 patients with mixed dementia is divided into two subgroups, one containing 4 patients who practice light exercise for 6 months and another group who continues their daily routine for six months. Using various scales we evaluated physically and mentally the patients before, during and after the six months.

*Results.*A clear improvement was demonstrated by the superiority of the results of the scales in the case of patients with mixed dementia who performed physical exercises for 6 months.

*Conclusions.*Considering the results obtained in this study, the idea of applying a similar study on a larger scale and even recommending a more active life to patients with mixed dementia, within the possibilities, is extrapolated.

*Keywords:*mixed dementia, Alzheimer's dementia, vascular dementia, physical exercise.

Introduction

The term "mixed dementia" refers to two or even three distinct entities that are found in the same organism, namely Alzheimer's dementia, vascular dementia as well as dementia with Lewy bodies. According to recent studies, there is growing evidence that particularly in older patients, the two main types of dementia, namely Alzheimer's dementia and vascular dementia, cause associated lesions. The lesions concerned interact in ways of major importance that increase the clinical probability of a significant cognitive decline.

The brain lesions correspondent with Alzheimer dementia are consisting of extracellular amyloid plaques and intracellular neurofibrillary tangles, while the brain lesions correspondent with vascular dementia consist of cerebral infarctions, multiple lacunar infarctions, and ischemic periventricular leukoencephalopathy. Dementia clinic cases that were autopsied revealed that coexisting vascular pathology occurs in 24% to 28% of Alzheimer disease cases.

The lack of consensus in clinical terminology, criteria and treatment in relation to Alzheimer's dementia associated with vascular dementia makes this complex pathology difficult to diagnose and treat. In many cases, several pathologies are subsequent to dementia, for example Parkinson's disease is additive to Alzheimer's dementia in 20% of cases, also dementia with Lewy bodies is associated in 50% of Alzheimer's dementia cases.Alzheimer's dementia pathology usually occurs in relatively young patients and initially asymptomaticwhile clinical dementia is more likely to be present when Alzheimer's dementia is associated with strokes and cerebrovascular changes.

The cognitive outcomes of vascular lesions are additive so that in vascular dementia and also in mixed dementia, the cognitive decline is conceivably avoidable if the vascular risk factors are controlled, therefore the recurration of strokes is stopped.

Also, more lightening evidence shows that the couse of events directioning to the progression of Alzheimer disease brain plaques and tangles might have the source due to ischemia developing from cerebrovascular disease.

The correlation of the apolipoprotein E ε4 genotype with an elevated liability for twain Alzheimer disease and cardiovascular disease farther indicates a possible connection between atherosclerosis, cerebrovascular disease, and Alzheimer disease. Interchangeably, amyloid deposition in cerebral blood vessels because of the Alzheimer disease arises the possibility of hemorrhagic strokes occuranceand afterward developing vascular dementia. These represent shared alternatives contributing from cerebrovascular disease to both Alzheimer disease and vascular dementia, therefore the existence of dementia amongst cerebrovascular disease, with these diseases' brain and neuronal pathways being strong connected, that should be considered a single entity named mixed

[1]Faculty of Physical Education and Sport, "Ovidius" University, Constanta, Romania.
[2]Faculty of General Medicine, "Vasile Goldis" University, Arad, Romania.
[3]Pneumology Department, Faculty of General Medicine, ,'Ovidius'' University, Clinical Pneumology Hospital of Constanta, Constanta, Romania.
[4]Neurology Department, County Clinical Emergency Hospital of Constanta, Constanta, Romania.
[5]Neurology Department, Faculty of General Medicine, "Ovidius" University, Constanta, Romania.
Email: docuaxi@yahoo.com
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dementia. Finally, mixed dementia is representative as cognitive decline being able to affect independent performance in daily life subsequently to the synchronicity of Alzheimer disease and cerebrovascular pathology, demonstrated both by clinical criteria or by neuroimaging discoveries.

The typical dementia is defined by a constant and continuous deterioration of cognitive functions. This deterioration conducts to issues like memory degeneration, aphasia, agnosia, apraxia and executive impairment, all of which inhibits the processes of daily living. Dementia can discommode the patient in various ways, but the most usual symptom pattern starts with a progressive effort to recall new facts and data. This difficulty appears due to the interruption of neurons in the regions of the brain implicated in forming new memories. Moreover, dementia is linked with losses of judgment, direction and capacity of comprehension and adequate communication and modifications in character and conduct.

The prevalence and intensity of neuropsychiatric symptoms differ by the category of dementia. The most prevalent symptoms of patients with Alzheimer's disease are lethargy, abnormal motor conduct, anger and disappointment. The patients with vascular dementia present symptoms like: irritability, anxiety and agitation were. Those with mixed dementia possess the most prevalent symptoms like: anxiety, agitation and depressive symptoms.

Supplementary to cognitive decline, a neuropsychiatric condition, reffered to as behavioral and psychological symptoms of dementia by the International Psychiatric Association Consensus Statement, usually is developed, with a preponderance of 10 to 73%. A study conducted in Brazil has concluded a behavioral and psychological symptoms of dementia preponderance of approximately 70% among individuals with dementia, with the most prevalent symptoms being: apathy (56%), depression (48%) and sleep disorders (34%). Furthermore, symptomatology and behaviour like agitation, misconceptions, hallucinations, tension, anxiety and verbal or motor aggresion are also prevalent amongst the dementia patients. The behavioral and psychological symptoms of dementia considerably extend the patient's discomfort, caregiver overload and risk of mortality.

Various studies have concluded that physical exercise decreases the neuropsychiatric manifestations and increases the performance of patients with dementia. Lethargy, depressive manifestations, sleep disorders, unrestness, emotional changes, and functional competence are the areas that have the most benefits from practicing physical exercise.Usual physical exercise, represents a valuable non-pharmacological instrument for public health and psychological symptoms management.

The usual perform of physical exercise enhances brain blood flow and oxygenation, providing a global improvement in neuronal activity, and therefore, in the intellectual status.

The outcomes of motor mediation can in a general way be illustrated by the neuroprotective results and neuroplasticity encouraged by physical activity. Previous studies have reported the beneficial results of exercise on brain neuroplasticity, neuroprotection, and neurogenesis intermediated by neurotrophins or different factors, for example: brain-derived neurotrophic factor, vascular endothelial growth factor, and insulin-like growth factor, with global positive achievements on functional neuroimaging.

Methods

The aim of this study was to evaluate the effects of sport pracice for patients with moderate mixed dementia. A number of 4 patients with moderate mixed dementia practiced physical exercise for six months, from June 2019 to December 2019, being compared to a control group of 4 patients with the same affection that did not change their daily activities. The patients were examined in Dr. Docu Axelerad Any's private clinic in Constanta, Romania. The patients that attended the study were suffering of moderate mixed dementia, both Alheimer dementia and vascular dementia with clinical and imagistic evidences. Also, the patients were individually diagnosed by dr Docu Axelerad Any and they met the basic principles for the entrance in the study.

The principals applicatedfor the entrance of the dementia patients in the study were the following: diagnosis of moderate mixed dementia, the ability to sign the informed consent.

The principals applicated for the exclusion from the study were the following: the inability of the patients to sign the informed consent, mild dementia and severe dementia.

The group of patients who met the standard criteria was then divided into two groups, namely: the control group and the group that practiced physical exercises. Patients were initially examined clinically physically andmentally to determine an accurate observation of each patient.

The tests that were performed consisted of the followings: Clinical Dementia Rating scale (CDRS), Global Deterioration Scale (GDS), Mini-Mental State Examination (MMSE).

The functional tests: Functional Assessment Staging Test (FAS), Barthel Index (BI), Functional

Independence Measure (FIM), Instrumental Activities of Daily Living (IADL).

The behavioural tests: Neuropsychiatric Inventory (NI), Cohen-Mansfield Agitation Inventory (CMAI).

The quality of life tests: Quality of life scale (QOL), DEM-QoL, Alzheimer's Disease-related Quality of Life scale (QoL-AD).

The tests for depression in dementia: Hamilton Depression Rating Scale (HDRS), Hamilton Anxiety Rating Scale (HARS).

The first patient of the sport group, male, 71 years, the patient was diagnosed with Alzheimer's disease at the age of 50 and the diagnosis with vascular dementia was at the age of 68. The patient presented a moderate depression and a severe anxiety.

Results of the tests before the 6 months of physical exercise practice.

CDRS	GDS	MMSE	FAS	BI	FIM	IADL	NI	CMAI	QOL	DEM-qol	QoL-AD	HDRS	HARS
2	4	18	5	70	4	2	2	95	58	50	29	22	25

Table 1- Results of the tests before the 6 months of sport of the first patient of the sport group.

After the 6 months of practicing sport, the results of the tests were:

CDRS	GDS	MMSE	FAS	BI	FIM	IADL	NI	CMAI	QOL	DEM-qol	QoL-AD	HDRS	HARS
2	4	20	5	71	4	2	2	90	62	48	35	19	20

Table 2- Results of the tests after the 6 months of sport of the first patient of the sport group.

The patient's MMSE score has improved by two points by the enhacing of his calculating and spelling improvements, along with the command obedience. The Barthel Index has improved because of the enhance of the mobility during the six months. The Cohen-Mansfield Agitation Inventory score has decreased with 5 points because of the decreasing in the verbal aggresion, other aggresive behaviors and general restlessness. The patient's quality of life has improved and therefore, his depression and anxiety results have decreased. The score of DEM-QoL test has decreased with 2 points because of the increase in the patient's self-esteem and positive affects. The QoL-AD scale result has increased with 6 points because of the positive outcome in physical health, energy and mood that the patient has experienced in the 6 months of training. The depression and anxiety have decreased because of the improvement in the sleep quality after sport and the mood.

The second patient of the sport group, female, 69 years, the patient was diagnosed with Alzheimer's disease at the age of 54 and the diagnosis with vascular dementia was at the age of 68. The patient presented a mild depression and a severe anxiety.

Results of the tests before the 6 months of physical exercise practice.

CDRS	GDS	MMSE	FAS	BI	FIM	IADL	NI	CMAI	QOL	DEM-qol	QoL-AD	HDRS	HARS
2	4	20	5	65	4	2	2	92	60	49	29	17	27

Table 3- Results of the tests before the 6 months of sport of the second patient of the sport group.

After the 6 months of practicing sport, the results of the tests were:

CDRS	GDS	MMSE	FAS	BI	FIM	IADL	NI	CMAI	QOL	DEM-qol	QoL-AD	HDRS	HARS
2	4	22	5	67	4	2	2	88	64	48	35	16	23

Table 4- Results of the tests after the 6 months of sport of the second patient of the sport group.

The patient's MMSE score has improved by two points by the enhacing of her calculating and spelling improvements, along with the abstract spacial visual improvementThe Barthel Index has improved because of the enhance of the mobility and the alimentation during the six months. The Cohen-Mansfield Agitation Inventory score has decreased with 3 points because of the decreasing in the verbal aggresion and general restlessness. The patient's quality of life has improved and therefore, her anxiety became moderate. The score of DEM-QoL test has decreased with 2 points because of the decrease in the patient's negativity. The QoL-AD scale result has increased with 6 points because of the positive outcome in physical health, energy and mood that the patient has experienced in the 6 months of training.The depression and anxiety have decreased because of the improvement in the sleep quality after sport and the mood.

The third patient of the sport group, male, 80 years, the patient was diagnosed with Alzheimer's disease at the age of 53 and the diagnosis with vascular dementia was at the age of 77. The patient presented a moderate depression and a mild anxiety.

Results of the tests before the 6 months of physical exercise practice.

CDRS	GDS	MMSE	FAS	BI	FIM	IADL	NI	CMAI	QOL	DEM-qol	QoL-AD	HDRS	HARS

2	4	17	5	66	4	2	2	80	65	47	29	22	20

Table 5- Results of the tests before the 6 months of sport of the third patient of the sport group.

After the 6 months of practicing sport, the results of the tests were:

CDRS	GDS	MMSE	FAS	BI	FIM	IADL	NI	CMAI	QOL	DEM-qol	QoL-AD	HDRS	HARS
2	4	18	5	67	4	2	2	77	60	45	35	20	19

Table 6- Results of the tests after the 6 months of sport of the third patient of the sport group.

The patient's MMSE score has improved by two points by the enhacing of his repeatting enhancement. The Barthel Index has improved because of the enhance of the mobility during the six months. The Cohen-Mansfield Agitation Inventory score has decreased with 3 points because of the decreasing in the verbal aggresion, other aggresive behaviors and general restlessness.The patient's quality of life has sligthly improved, along with the levels of depression and anxiety. The score of DEM-QoL test has decreased with 2 points because of the increase in the patient's satisfaction and positive affects. The QoL-AD scale result has increased with 6 points because of the positive outcome in physical health, energy, relationship with the familiy and mood that the patient has experienced in the 6 months of training.The depression and anxiety have decreased because of the improvement in the sleep quality after sport and the mood.

The fourth patient of the sport group, female, 65 years, the patient was diagnosed with Alzheimer's disease at the age of 52 and the diagnosis with vascular dementia was at the age of 62. The patient presented a moderate depression and a moderate anxiety.

Results of the tests before the 6 months of physical exercise practice.

CDRS	GDS	MMSE	FAS	BI	FIM	IADL	NI	CMAI	QOL	DEM-qol	QoL-AD	HDRS	HARS
2	4	20	5	66	4	2	2	92	70	52	32	20	22

Table 7- Results of the tests before the 6 months of sport of the fourth patient of the sport group.

After the 6 months of practicing sport, the results of the tests were:

CDRS	GDS	MMSE	FAS	BI	FIM	IADL	NI	CMAI	QOL	DEM-qol	QoL-AD	HDRS	HARS
2	4	23	5	66	4	2	2	88	73	50	36	18	19

Table 8- Results of the tests after the 6 months of sport of the fourth patient of the sport group.

The patient's MMSE score has improved by two points by the enhacing of her calculating and spelling improvements, along with the command obedience and abstract visualisation. The Barthel Index remained the same. The Cohen-Mansfield Agitation Inventory score has decreased because of the decreasing in the verbal aggresion, negativism and general restlessness.The patient's quality of life has improved and therefore, her depression and anxiety results have decreased. The score of DEM-QoL test has decreased with 2 points because of the decrease in the patient's negativity and nervousness. The QoL-AD scale result has increased with 6 points because of the positive outcome in physical health, energy, capacity to do chores and mood that the patient has experienced in the 6 months of training. The depression and anxiety have decreased because of the improvement in the sleep quality after sport and the mood.

The first patient of the control group, female, 75 years, the patient was diagnosed with Alzheimer's disease at the age of 48 and the diagnosis with vascular dementia was at the age of 73. The patient presented a moderate depression and a severe anxiety.

Results of the tests before the 6 months of physical exercise practice.

CDRS	GDS	MMSE	FAS	BI	FIM	IADL	NI	CMAI	QOL	DEM-qol	QoL-AD	HDRS	HARS
2	4	18	5	70	4	2	2	91	65	50	29	22	24

Table 9- Results of the tests before the 6 months of the first patient of the control group.

After the 6 months, the results of the tests were:

CDRS	GDS	MMSE	FAS	BI	FIM	IADL	NI	CMAI	QOL	DEM-	QoL-	HDRS	HARS

										qol	AD		
2	4	18	5	70	4	2	2	92	64	51	29	23	25

Table 10- Results of the tests after the 6 months of the first patient of the control group.

The patient's MMSE score has remained the same afther the six months. The Barthel Index remained the same. The Cohen-Mansfield Agitation Inventory score has increased because of the increasing in the negativism, therefore the patient's quality of life has decreased with 1 point. The score of DEM-QoL test has increased with 1 point because of the increase in the patient's negativity. The depression and anxiety scales results have increased with one point because increase in the negativism of the patient.

The second patient of the control group, male, 66 years, the patient was diagnosed with Alzheimer's disease at the age of 49 and the diagnosis with vascular dementia was at the age of 63. The patient presented a mild depression and a mild anxiety.

Results of the tests before the 6 months.

CDRS	GDS	MMSE	FAS	BI	FIM	IADL	NI	CMAI	QOL	DEM-qol	QoL-AD	HDRS	HARS
2	4	22	5	70	4	2	2	95	72	55	33	19	18

Table 11- Results of the tests before the 6 months of the second patient of the control group.

After the 6 months, the results of the tests were:

CDRS	GDS	MMSE	FAS	BI	FIM	IADL	NI	CMAI	QOL	DEM-qol	QoL-AD	HDRS	HARS
2	4	22	5	69	4	2	2	95	71	56	33	20	19

Table 12- Results of the tests after the 6 months of the second patient of the control group.

The patient's MMSE score remained the same afther the six months. The Barthel Index has decreased because of the decrease of the mobility. The Cohen-Mansfield Agitation Inventory score has increased because of the patient's increasing in the complaining therefore the patient's quality of life has decreased with 1 point. The score of DEM-QoL test has increased with 1 point because of the increase in the patient's complains. The depression and anxiety scales results have increased with one point because increase in the negativism of the patient.

The third patient of the control group, male, 75 years, the patient was diagnosed with Alzheimer's disease at the age of 55 and the diagnosis with vascular dementia was at the age of 71. The patient presented a moderate depression and a moderate anxiety.

Results of the tests before the 6 months.

CDRS	GDS	MMSE	FAS	BI	FIM	IADL	NI	CMAI	QOL	DEM-qol	QoL-AD	HDRS	HARS
2	4	20	5	69	4	2	2	92	63	50	32	21	21

Table 13- Results of the tests before the 6 months of the third patient of the control group.

After the 6 months, the results of the tests were:

CDRS	GDS	MMSE	FAS	BI	FIM	IADL	NI	CMAI	QOL	DEM-qol	QoL-AD	HDRS	HARS
2	4	20	5	69	4	2	2	93	63	50	32	21	21

Table 14- Results of the tests after the 6 months of the third patient of the control group.

The patient's MMSE score has remained the same afther the six months. The Barthel Index remained the same. The Cohen-Mansfield Agitation Inventory score has increased because of the increasing in the constant request of attention. The quality of life of the patient remained the same. The score of DEM-QoL test remained the same. The depression and the anxiety scales results of the patient remained the same.

The fourth patient of the control group, female, 79 years, the patient was diagnosed with Alzheimer's disease at the age of 51 and the diagnosis with vascular dementia was at the age of 78. The patient presented a moderate depression and a moderate anxiety.

Results of the tests before the 6 months.

CDRS	GDS	MMSE	FAS	BI	FIM	IADL	NI	CMAI	QOL	DEM-qol	QoL-AD	HDRS	HARS
2	4	17	5	68	4	2	2	87	62	48	29	23	24

Table 15- Results of the tests before the 6 months of the fourth patient of the control group.

After the 6 months, the results of the tests were:

CDRS	GDS	MMSE	FAS	BI	FIM	IADL	NI	CMAI	QOL	DEM-qol	QoL-AD	HDRS	HARS
2	4	17	5	68	4	2	2	87	61	49	29	24	25

Table 16- Results of the tests after the 6 months of the fourth patient of the control group.

The patient's MMSE score has remained the same afther the six months. The Barthel Index remained the same. The Cohen-Mansfield Agitation Inventory score has increased because of the increasing in the negativismtherefore the patient's quality of life has decreased with 1 point. The score of DEM-QoL test has increased with 1 point because of the increase in the patient's negativity. The depression and anxiety scales results have increased with one point because increase in the negativism of the patient.

Discussion

Ottavio Arancio, Sergio Ferreira et all have demonstrated that in mice with Alzheimer disease that practiced physical exercise is shown an increase in the secretion of the hormone irisin, known as the FNDC5 precursor protein, that increased memory and learning.

The researchers also verified that when the irisin hormone was null in the brain of the dementia mice, the beneficial cognitive effects due to the physical exercises were null too.

In other study by Lam, Freddy MH, evidence related to the improvements due to exercises in dementia patients showed positive results in the patient's balance, mobility, walking endurace, step length and sit to stand coefficients.

Eventhough there has been heightened concern in the attitude of dementia patients, even exists a deficiency of studies and reports in respect of the exercise outcomes of mixed dementia living in nursing homes.

Conclusion

In conclusion, although physical activity is not an usual practice for an important number of patients with dementia, the advanteges are however instituted between the patients who had a more advanced status of activeness. Because of the low amount of data and subjects in our study is not recommandable to rise innovative conclusions related to physical activity and its results. Although, it is conceivable to appraise that elevated levels of physical activity, such as walking or other aerobic exercises, were connected to the reduction of neuropsychiatric manifestations of patients with mixed dementia. For the patients with vascular dementia, the enhanced levels of physical activity had a beneficial outcome for their sleep quality.

Establishing approaches to inhance the constancy to a everyday schedule of physical exercise that will help in decreasingneuropsychiatric disruptions in patients remains a problem for both public health professionals and caregivers.

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