http://dx.doi.org/10.1590/1981-86372016000100022854

Evaluation of oral conditions in patients with neurodegenerative diseases treated in geriatric centers

Avaliação das condições orais em pacientes com doenças neurodegenerativas atendidos em centros geriátricos

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ABSTRACT

Objective
To compare the general clinical conditions and oral alterations, and also evaluate the prosthesis, in subjects diagnosed with Alzheimer's disease (AD) or Parkinson's disease (PD), attended at two geriatric centers in the city of Fortaleza - Ceará.

Methods
70 patients were analyzed (between 57 to 91 years) with AD and PD, through evaluation of neurological medical records and oral clinical examination. Variables as sex, age, race, comorbidities, oral manifestations and prosthetic conditions were observed. A total of 20 elderly patients without neurological disease consisted the control group (CG). Fisher's exact test and Kruskal-Wallis were used as statistical analysis.

Results
In both groups, blood hypertension was the most frequent comorbidity. As for the oral examination in the group with AD, it was observed that 54.2% had periodontal disease, 34.2% caries. Similar results were found in PD patients (31.4%; 22.8% - respectively). However, no difference was observed between the groups, as the systemic and oral manifestations in both geriatric centers (p> 0.05). Was identified more than half of the subjects (57.7%) using dentures, and 86.5% of these had become maladaptive, with some kind of defect. There was statistical difference in the presence of associated oral pathology, denture stomatitis, between dementia and control group (p = 0.0213).

Conclusion
Elderly patients with AD and PD have poor oral health, as well as those without neurodegenerative diseases. However, have more defects and disorders associated with the use of removable dentures.

Indexing terms: *Alzheimer`s disease. Dentistry. Geriatrics. Parkinson`s disease.*

RESUMO

Objetivo
Comparar as condições sistêmicas e orais, além de avaliar as próteses removíveis, associadas aos portadores de Doença Alzheimer e Doença Parkinson, atendidos em dois centros geriátricos situados no município de Fortaleza - Ceará.

Métodos
Foram analisados 70 pacientes (entre 57 à 91 anos) com Doença Alzheimer e Doença Parkinson, por meio de avaliação de prontuários neurológicos e exame clinico oral. Tendo sido observadas variáveis de sexo, idade, raça, comorbidades, condições orais e protéticas. Um total de 20 pacientes idosos sem doenças neurológicas consistiu no Grupo Controle. Foi utilizado teste exato de Fischer como análise estatística.

Resultados
Em ambos os grupos estudados, a Hipertensão arterial foi a comorbidade mais frequente. Quanto ao exame oral, no grupo com Doença Alzheimer, foi observado que 54.2% apresentou doença periodontal, 34.2% doença cárie. Achados semelhantes foram encontrados em pacientes com Doença Parkinson (31,4%; 22,8% - respectivamente). Entretanto, não foi observada diferença entre os grupos estudados, quanto as manifestações sistêmicas e orais nos dois centros geriátricos (p>0.05). Foi identificado que mais da metade dos pacientes avaliados nesse estudo (57,7%), utilizavam alguma prótese removível, sendo que 86,5% dessas apresentavam-se mal adaptadas, com algum tipo de defeito, principalmente nos idosos Institucionalizados (p= 0.034). Verificou-se, também, diferença estatística na presença de estomatite protética, entre os grupos demência e grupo controle (p= 0.0213).

Conclusão
Idosos portadores de Doença Alzheimer e Doença Parkinson tem deficiente saúde bucal, assim como aqueles sem as doenças neurodegenerativas. No entanto, apresentam mais imperfeições e patologias associadas ao uso de próteses removíveis.

Termos de indexação: Doença de Alzheimer. Odontologia. Geriatria. Doença de Parkinson.

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INTRODUCTION

Dementia syndromes are often degenerative and progressive comorbidities involving great mental, physical and psychological disorders. Deficits of cognitive function are commonly accompanied, and occasionally preceded by a deterioration of emotional control, social behavior or motivation. The most common cause of dementia is Alzheimer's Disease (AD) accounting for 60% to 70% of cases, followed by vascular dementia, dementia with Lewy bodies, and frontotemporal dementia[1-2]. According to Burlá et al.[3], the Brazilian average prevalence of this disease is higher than the one in the world. Projections for the Brazilian population indicate a slight increase in the prevalence of dementia in the population aged 65 or over, from 7.6% to 7.9% between 2010 and 2020, that is, 55.000 new cases per year.

In April 2012, WHO published the document "Dementia: a Public Health Priority", showing concern for this problem which affects the quality of life of older people, especially in developing countries. It is estimated at 35.6 million the number of people with dementia in 2010, projecting a doubling of this number every 20 years, that is, 65.7 million in 2030 and 115.4 million in 2050[4].

Alzheimer`s disease is characterized by progressive decline in cognition, learning ability and memory, in addition to apraxia, such as difficulty in language and carrying out daily tasks. In the progressive stage of disease, Alzheimer causes loss of motor function, leading to starvation and immobility, which may be fatal[5]. It has idiopathic origin, although genetic alterations might be involved in increasing its risk[6-7].

Parkinson's disease (PD) is one of the most common and intriguing neurological diseases today. The etiology of the disease is still unclear and controversial, and it is characterized by the degeneration of neurons. Such degeneration results in reduced production of dopamine, an essential neurotransmitter in the control of movement, leading to disturbances in tone, adoption of abnormal posture and involuntary movements[8-9]. Dementia is a common manifestation of PD generally associated with rigidity, bradykinesia and tremor, classic signs of the disease[10-11].

Due to old age, AD and PD carriers usually present several systemic complications such as visual and hearing impairment, oral problems, hypertension, diabetes, hypothyroidism, arthropathy and depression[12].

Several side effects such as dry mouth and symptomatic ulcers are related to the main drugs (levodopa, parkidopa) used in treating those diseases. Increased spasms of the masticatory muscles can lead to temporomandibular disorders and difficulty in adapting prostheses. Infections caused by *Candida spp.* can also be found, resulting in stomatitis of various causes, in addition to gingivitis, periodontitis, tooth decay and premature loss of teeth units[13-14].

This study aims to evaluate the clinical and oral condition in patients with Alzheimer's and Parkinson's disease, providing the establishment of epidemiological data of oral conditions. This knowledge will enable the effective treatment of these patients' real dental needs.

METHODS

It is a cross-sectional descriptive study with a sample of 90 elderly of both sexes, which included residents of Lar Torres de Melo Institute, and volunteers who attend the Care Center for the Elderly at Walter Cantídio University Hospital (HUWC), both located in the city of Fortaleza, Ceará. The test group consisted of 70 elderly and the control group, 20. Prior to the study, all subjects of the test group were diagnosed with neurodegenerative disease such as Alzheimer's and/or Parkinson's by a neuropsychiatrist by means of the Mini Mental State Examination (MMSE).

The subjects in the control group had an average age of 68.80 ± 5:45 (13 women and 7 men). In the test groups, the average age of subjects comprised 74.18 ± 5:59 years, with the youngest aged 57 and the oldest, 91 (38 men and 32 women) in different stages of neurodegenerative diseases.

In the Care Center for the Elderly, volunteers were randomly selected according to demand having a total of 46 seniors. It was filled out a clinical form containing medical history, personal data and possible changes seen during the oral exam. The data were collected with the help of caregivers and the elderly themselves when possible.

At Lar Torres de Melo Institute, 44 seniors were selected from consultations to archived medical records, which were also used to fill out the clinical form, with subsequent oral exam. From 240 elderly living in this institution, only 34 had been diagnosed with Alzheimer's and/or Parkinson's.

On clinical examination, material as a probe, mouth retractors, mouth mirror and flashlight were used to evaluate the mucous membranes (lips, cheeks, floor of the mouth), alveolar mucosa (ventral surface of the tongue, vestibule and soft palate), mastication (hard

palate and gingiva) and specialized (back of the tongue). Structures such as teeth and dentures of each subject and the presence of oral diseases, as ulceration and denture stomatitis, were checked as well. This research is based on the study of Ericson et al.[15] which suggested four oral categories to be investigated in people with dementia, such as the ability to chew and eat, oral problems, hygiene independence and dental conditions. The results were analyzed using Fisher's exact test, with statistical power of 80% and 5% significance level.

Dentures and removable partial dentures were analyzed inside and outside the mouth. The evaluation was recorded for stability, occlusal retention, vertical height and defects.

The study was submitted to the Ethics Committee of the Federal University of Ceará and was approved under number 301/09. It was also obtained the approval of the Research Council of Lar Torres de Melo Institute. Caregivers of the elderly or the elderly themselves signed an Informed Consent Form for the research, in cases where the elderly could not or did not sign their fingerprint was collected.

RESULTS

It was evaluated 90 elderly, 70 of them were part of the test group, 35 patients with AD and PD 35 (06 patients had both diseases). The remaining 20 corresponded to the control group, who were randomly evaluated in the two institutions.

Among the systemic diseases associated with AD, it was observed that hypertension, stroke, diabetes and infarction had a higher incidence in the two evaluated centers (Table 1). It has also been observed lower incidence of pathologies such as seizures, pulmonary emphysema and cancer. In PD the most associated systemic diseases were hypertension, stroke and depression in both geriatric centers. It was also registered infarction, pulmonary emphysema, epilepsy and renal dysfunction. In the control group the most prevalent disease was hypertension, followed by diabetes and cancer. There were no statistical differences between the analysed centers, in relation to the systemic disease in patients with dementia and control group (p> 0.05).

Table 1. Systemic diseases identified in both evaluated centers in subjects carriers of AD, PD and Control Group. (n = 90), p > 0.05 . Fortaleza, 2013.

	Control (n=20)	AD (n=35)	PD (n=35)
Average age (min- max)	68.80 (61–78)	74.2 (65-91)	71.3 (57-87)
Hipertension (%)	11 (55.0)	18 (51.4)	6 (17.1)
Diabetes (%)	8 (40.0)	4 (11.4)	0 (0.0)
Depression (%)	0 (0.0)	0 (0.0)	4 (11.4)
Renal dysfunction (%)	3 (15.0)	0 (0.0)	1 (2.8)
Epilepsy (%)	2 (10.0)	0 (0.0)	2 (5.7)
Infarction (%)	5 (25.0)	6 (17.1)	1 (2.8)
Cancer (%)	7 (35.0)	6 (17.1)	0 (0.0)
Pulmonary Emphysema (%)	0 (0.0)	2 (5.7)	2 (5.7)
Stroke (%)	2 (10.0)	4 (11.4)	4 (11.4)

Note: AD, Alzheimer Disease; max, maximum; min, minimum; PD, Parkinson Disease

As for the oral manifestations, it was observed a higher incidence of periodontal disease (periodontitis) and caries in both neurodegenerative diseases (AD and PD) and control group in both evaluated geriatric centers (p> 0.05). Other changes were identified as angular cheilitis, abscesses, presence of residual roots and crown fractures, besides fibrous hyperplasia and bruxism (Table 2).

Table 2. Oral characteristics identified in both evaluated centers in subjects carriers of AD, PD and Control Group. (n = 90), p > 0.05. Fortaleza, 2013.

	Control (n=20)	AD (n=35)	PD (n=35)
Totally edentulous (%)	9 (45.0) A	16 (45.7) A	15 (42.8) A
Use of total dentures (%)	6 (30.0) A	12 (34.2) A	9 (25.7) A
Use of removable partial dentures (%)	5 (25.0) A	8 (22.8) A	12 (34.2) A
Caries (%)	7 (10.0) A	12 (34.2) A	8 (22.8) A

Table 2. Continued.

	Control (n=20)	AD (n=35)	PD (n=35)
Periodontal disease (%)	11 (55.0) A	19 (54.2) A	11 (31.4) A
Residual roots (%)	3 (15.0) A	6 (17.1) A	2 (5.7) A
Dental fracture (%)	0 (0.0) A	4 (11.4) A	0 (0.0) A
Angular cheilitis (%)	1 (5.0) A	0 (0.0) A	2 (5.7) A
Fibrous hyperplasia (%)	1 (5.0) A	2 (5.7) A	0 (0.0) A
Abscess (%)	0 (0.0) A	3 (8.5) A	4 (11.4) A
Variation of abnormality (%)	2 (10.0) A	6 (17.1) A	2 (5.7) A
Bruxism (%)	4 (20.0) A	4 (11.4) A	1 (2.8) A
No alteration (%)	2 (10.0) A	3 (8.5) A	6 (17.1) A

Different letters indicate statistical difference (p< 0.05)
AD, Alzheimer Disease; PD, Parkinson Disease

Data were analyzed using Fisher's exact test, which showed no statistically significant difference between the test and control groups for the presence of systemic diseases and oral manifestations, between the analysed centers (p> 0.05).

Among the studied patients, more than half of them wore some type of dental prosthesis (52 elderly). The analysis related to their conditions identified that 86.5% were ill-fitting and/or were in very poor condition, for instance, the presence of fractures, excessive calculus and foul odor when compared to those found in the control group (p = 0.0467). Lack of stability and retention, occlusal disadjustment and vertical height were analyzed between groups (p> 0.05), as well as the presence of pathology associated with the prosthesis, denture stomatitis, p = 0.0213 between dementia and control groups (Table 3).

When evaluated the presence and condition of dentures among patients treated at the Care Center for the Elderly and the ones living at Lar Torres de Melo, a greater presence of prostheses under suitable conditions was detected in the outpatient setting at HUWC (p = 0.034).

Table 3. Frequency (%) of conditions of removable dental prosthesis and presence.

	Control (n=11)	AD (n=20)	PD (n=21)	*P* value
Stability of maxillary prosthesis				
Insatisfatory	6 (54.5)	15 (75.0)	18 (85.7)	*0.0999*
Satisfatory	5 (45.4)	5 (25.0)	3 (14.2)	
Retention of maxillary prosthesis				
Insatisfatory	4 (36.3)	16 (80.0)	18 (85.7)	*0.0773*
Satisfatory	7 (63.6)	4 (36.3)	3 (14.2)	
Oclusion				
Insatisfatory	6 (54.5)	13 (65.0)	15 (71.4)	*0.0667*
Satisfatory	5 (45.4)	7 (35.0)	6 (28.5)	
Vertical healthy				
Acceptable	3 (27.2)	9 (45.0)	11 (52.3)	*0.2267*
Very low	8 (72.7)	11 (55.0)	10 (47.6)	
Defects of maxillary prosthesis				
Absent	2 (18.1)	3 (15.0)	2 (9.5)	*0.0467*
Present	9 (81.8)	17 (85.0)	19 (90.4)	
Associated oral pathology				
No	3 (27.2)	4 (20.0)	7 (33.3)	*0,0213*
Yes	8 (72.7)	16 (80.0)	14 (66.6)	

AD, Alzheimer Disease; PD, Parkinson Disease

DISCUSSION

This study evaluated the oral health of individuals with AD and PD in light, moderate and severe stages of the disease in both geriatric centers in the city of Fortaleza, Brazil. There were no statistical differences in the control group and the group of voluntary patients, carriers of AD and PD as their systemic and oral manifestations.

In a study by Paulson & Stern[8] systemic diseases such as diabetes, hypertension, convulsions, renal dysfunction were found in patients with PD, like those identified in this one. These changes were also reported to be more frequent in patients with AD in a study by Friedlander et al.[13].

Study by Adam & Preston[16] determined that the decrease or loss of functional motor skills is a risk factor for oral diseases. It was shown the impairment of oral health due to several changes, often resulting from loss of cognitive and motor skills, related to age or illness.

In Parkinson's disease, tremor is one of the early signs and it usually affects the hands, lips and tongue. Bradykinesia is another common factor and it often involves the facial muscles. These factors may induce orofacial pain, discomfort in the temporomandibular joint (TMJ), dental fracture, trauma of soft tissues, restoration detachment and lack of salivary control, which makes it difficult the prosthetic rehabilitation of these patients[17]. The presence of these changes, such as pain, bruxism and tooth fracture were also found in this study.

The main oral manifestations found in AD were periodontal disease, denture stomatitis and caries, data corroborated by several authors[18-19]. The use of ill-fitting and worn dentures, the presence of mucosal lesions are also extremely common and described in the literature[20-21].

According to Frenkel (2004) traumatic ulcers caused by ill-fitting dentures and fractured teeth are common in these patients, changes that were not identified in this study. As fractured teeth, roots and poorly fitting dentures were diagnosed, it is possible that the ulcers had already been healed.

Finally, it is highlighted the percentage in the use of upper and/or lower prosthetics reaching more than half of patients (57.7%), while 86.5% of the dentures were poorly adapted. The prostheses of patients attending the outpatient setting of the Care Center for the Elderly at HUWC held better hygiene conditions, perhaps by greater availability of access to specialized dental treatment, since this service is located in the health campus of university. However, most of the prostheses of the elderly living at Lar Torres de Melo had bad conditions, leading to the appearance of associated diseases.

The denture stomatitis showed was present in most patients with removable dentures, with statistical significance as it was found in the group of patients with AD or PD. Probably a result of increased cognitive and motor difficulties in relation to the cleaning of these devices, combined with factors, as mentioned before, such as drugs and systemic associated diseases[21].

In the final stages of both neurodegenerative alterations, it is questionable the use of ill-fitting and poorly sanitized prostheses are of, recommend not using them[22]. The non-use of prostheses should provide favorable oral health condition and prevent the occurrence of possible accidents such as aspiration or swallowing due to neuromuscular disorders such as spasms[23].

As well as treatment, it should also be considered the prevention of certain factors that may be correlated with the emergence or worsening of such degenerative diseases. The role of periodontitis as a risk factor for many systemic diseases is widely accepted and there is increasing evidence for an association between periodontitis and early Alzheimer's disease. Recent epidemiological, microbiological and inflammatory findings strengthen this association, indicating that periodontal pathogens are possible contributors to neural inflammation[24]. According to Kaur et al.[25], so far there is no direct evidence implying an effect of periodontitis in the pathogenesis of Parkinson's disease; therefore, it is believed the need for more studies about population-based case-control of or cohort design.

The minimum oral health condition of patients with neurodegenerative diseases should be prioritized, because, as reported, there is a relation of dental infection and its possible impact on general health as well as deaths related to aspiration pneumonia, often for lack of favourable oral health[26]. Considering that, it is essential the inclusion of dental surgeon in the preparation of the plan of prevention, treatment and maintenance of oral health condition of these patients.

CONCLUSION

The main systemic comorbidities present in the elderly in control group and test groups were cardiovascular diseases (infarction and hypertension), diabetes, stroke, depression and cancer. Also, there were no differences in the occurrence of oral diseases between the groups. Periodontal disease, tooth decay and denture stomatitis

were the most incidents, the latter presenting higher statistical incidence in patients with removable devices and some type of dementia.

Differences in the quality of dental prostheses (total or partial) were found in institutionalized patients, i.e., residents of Lar Torres de Melo and patients treated at the Care Center for the Elderly at HUWC. Fractures, maladaptation, poor hygiene conditions were identified in the analysed prostheses.

Collaborators

BMD FROTA participated in the clinical assessment of patients and writing of the article. SN HOLANDA contributed to the analysis of the results, acquisition of materials and writing of the article. FB SOUSA performed the statistical analysis and participated in writing of the article. APNN ALVES was responsible for the project and participated in the writing of the article.

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Received on: 9/6/2014
Final version resubmitted on: 11/4/2015
Approved on: 21/5/2015