

# Speech disturbances in Alzheimer's disease

## Zaburzenia mowy w chorobie Alzheimera

Tadeusz Paweł Wasilewski<sup>1,2</sup>, Hanna Kachaniuk<sup>1,2</sup>

<sup>1</sup>Uniwersytet Medyczny w Lublinie

<sup>2</sup>Państwowa Wyższa Szkoła Zawodowa w Krośnie

Neuropsychiatria i Neuropsychologia 2016; 11, 3: 93–98

### Adres do korespondencji:

dr Tadeusz Paweł Wasilewski  
Uniwersytet Medyczny w Lublinie  
ul. Szkolna 18, 20-950 Lublin  
e-mail: tpwasil67.lublin@wp.pl

### Abstract

Alzheimer's disease (AD) is the most frequent cause of dementia affecting older people. It is estimated that the illness constitutes about 60-70% of all dementing disorders. It is considered to be a degeneration of the nervous system whose causes and mechanism are still unclear. The disease affects 5-10% of people above the age of 60 and nearly 50% of those above 85.

Despite its defined clinical and neuropathological criteria, the aetiology and pathogenesis of the disease remain unclear. In terms of mechanisms that cause the disease to develop, a significant role is played by pathological processes triggered by genetic and environmental factors. The factors which contribute to AD development include old age, female gender, poor education, diabetes, and having a relative who has been diagnosed with the disease. Also, the patients show impaired communicative competence, the occurrence of logomania or reticence, perseveration, vocal paraphrases and finally a decline in reading and writing competence. It should be emphasised that no matter how long the process occurs, it results in a gradual loss of productive and receptive skills.

The present article describes the disturbances of language communication and articulatory problems, which are progressive and co-exist with disorders of other higher mental functions.

**Key words:** communication, Alzheimer disease, speech disorders.

### Cognitive deficits in Alzheimer's disease

At the end of the 20<sup>th</sup> century, the literature on the subject was yet to precisely define the term "dementia". The term has its origin in Latin (*dementia*) and means "madness", "insanity",

### Streszczenie

Choroba Alzheimera jest najczęstszą przyczyną otępienia u osób w wieku starszym. Szacuje się, że stanowi 60–70% wszystkich zaburzeń otępiennych. Jest chorobą zwyrodnieniową układu nerwowego o nie do końca poznanej przyczynie i mechanizmach powstawania i dotyczy 5–10% osób powyżej 60. roku życia i ok. 50% osób powyżej 85. roku życia.

Choroba Alzheimera jest zaburzeniem neurodegeneracyjnym o stosunkowo szybkim przebiegu, związanym z nieodwracalną utratą neuronów w różnych obszarach mózgu. Powoduje postępujące zmiany w zakresie czynności psychicznych i funkcji neurologicznych, prowadząc w ciągu kilku lat do inwalidztwa psychofizycznego i śmierci pacjenta.

Liczbę osób cierpiących na chorobę Alzheimera na świecie ocenia się na 15–21 mln. Szacuje się, że w Polsce otępienie typu Alzheimera dotyka 250 tys. osób, a porównywalna liczba pacjentów cierpi na inne postaci otępienia. We Francji liczba ta obecnie wynosi ok. 850 tys. pacjentów, a do 2020 r. wzrośnie do 1,2 mln. Obok wysuwających się na plan pierwszy deficytów pamięci typowych dla procesów otępiennych, pacjenci charakteryzują zaburzenia sfery językowej w postaci anomii, trudności z wykorzystaniem właściwych słów, używanie słów o znaczeniu ogólnym, nadmierne używanie zaimków, neologizmów, obniżenie sprawności leksykalnej i fluencji słownej.

W artykule omówiono zaburzenia komunikacji językowej oraz problemy artykulacyjne, które mają charakter progresywny i współwystępują z zaburzeniami innych wyższych funkcji psychicznych.

**Słowa kluczowe:** komunikacja, choroba Alzheimera, zaburzenia mowy.

"being out of one's mind", derived from "*demens*" (*dementia*), meaning senseless, mad (Szepietowska and Daniluk 2000).

In clinical practice, "dementia" is synonymous with "senility". The current definition provided by the World Health Organisation (WHO) describes "dementia" as a syndrome –

usually of a chronic or progressive nature – in which there is deterioration in the higher cortical functions, such as memory, thinking, orientation, calculation, learning capacity, language, and judgement. The impairment of cognitive function is commonly accompanied, and occasionally preceded, by deterioration in emotional control, social behaviour, or motivation (Bassil and Grossberg 2009a, 2009b; Meilán *et al.* 2014).

The term “dementia” describes progressive cognitive deterioration which inevitably makes the patient more and more dependent on other people, and causes the loss of intellectual/emotional, professional and social skills. The correct identification of the dementia processes has become an important objective of efforts undertaken across a number of scientific disciplines, such as medicine, psychology, sociology, etc., to provide patients with adequate living and treatment conditions.

According to the newest diagnostic criteria contained in DSM-5 and used for qualifying the above-mentioned problems, one uses the term ‘neurocognitive disturbances’. The diagnostic criteria for various impediments depend on the definitions of the specific cognitive functions. Also, being properly defined together with guidelines for a level of intensification during which the symptoms become clinically significant, the functions contribute to establishing a diagnosis of neurocognitive impediments with their force and form.

The diagnostic criteria defining the ways of a clinical procedure for patients in DSM-5 distinguish between severe and mild neurocognitive disturbances. Serious disturbances are ascertained when the patient’s cognitive functions are significantly deteriorated compared with the initial level in at least one of the regions such as complex attention, performing functions, cognition and memory, perception, kinetic and social functions. Moreover, it happens when cognitive impediments influence the independence of a person in regular functioning and force them to reach for help in complicated everyday functions. Mild neurocognitive impediments appearing in patients are characterized by a small weakening of the efficiency of cognitive functions in relation to the initial level in at least one of the above-mentioned regions and the neurocognitive disturbances do not have any impact on the patient’s freedom in regular functioning (Gałecki and Święcicki 2015).

Scholars investigating Alzheimer’s disease have identified three stages of the dementia processes, which vary in terms of the nature

and severity of the symptoms (Kaczmarek *et al.* 2008; Laforce 2013).

Mild (or early) dementia symptoms involve difficulty remembering new information, and attention deficits. Loss of memory affects mainly working (short-term) memory, i.e. memory of recent events. Problems concentrating, on the other hand, significantly affect the already impaired durability of engrams, which makes patients forget where they have left certain items and ask the same questions over and over again, without remembering that they have just been provided with the answer. At this stage, patients show mood swings and personality changes. Many patients develop full-blown depression, and personality changes prompt them to withdraw from social life, to limit their interactions with other people, to behave in socially inappropriate ways, to develop witzelsucht, or to become irritable. Despite their independence in the majority of everyday activities, at this stage of Alzheimer’s disease, patients only need to be provided with assistance from their closest carers from time to time (Daniluk and Borkowska 2008).

Moderate (or middle) dementia is characterised by growing memory problems and other cognitive dysfunctions, such as orientation disorders or speech impediment. Moreover, they might develop behavioural disorders and psychotic symptoms. It has been shown that patients first start to get lost in places they are unfamiliar with, and, as the disease progresses, also in those locations which are very well known to them. Patients experience difficulty finding their way home and tend to be mistaken about the floor their apartment is on. After some time, this deterioration in memory and orientation leads to difficulty recognising the faces of their immediate family members. Behavioural disorders associated with the disease manifest themselves in aggressive behaviour, irritability, apathy, and sleep- and wake-pattern disorders. Psychotic symptoms, such as hallucinations and paranoid delusions or delusions of infidelity, have also been observed. At the middle dementia stage, patients require constant assistance from their closest carers (Bang *et al.* 2015).

Severe (or late) dementia prevents patients from performing all everyday activities, such as dressing, preparing meals, using cutlery, and communicating with others. At this stage, patients do not distinguish between the people around them, or between day and night. Physical dysfunctions involving forward-leaning posture and difficulty walking increase the chances of falling, and gait disorders eventually lead to

patients' spending most of their time in bed. Finally, urinary or faecal incontinence and difficulty swallowing have devastating effects on the body (Kaczmarek *et al.* 2008; Laforce 2013).

### Communication and speech impediments in Alzheimer's disease

Extensive degenerative processes in the brain severely affect communication and speech performance in AD patients.

Long-term neuropsychological and neuro-linguistic studies show that the associated linguistic deficits, although considered secondary symptoms of dementia, can foreshadow it. It has been argued that the mechanisms underlying the characteristics and structure of linguistic impediment in AD might be different from the linguistic-impediment mechanisms at work in aphasia (Leyton *et al.* 2014; Sitek *et al.* 2015).

Three hypotheses have been formulated to explain the development of speech issues in the Alzheimer's form of dementia. The first hypothesis posits that speech problems in the Alzheimer's form of dementia depend on the presence of degenerative lesions in Broca's area in the left hemisphere of the brain. The second hypothesis suggests that the impediment is the result of underlying multifocal neuropathological lesions, with the lesions not being as severe as in the case of focal brain damage, which leads to aphasia. The third hypothesis argues that speech impediment in dementia constitutes a more severe form of the linguistic impediment associated with the physiological ageing of the body (Leyton *et al.* 2014).

The literature on the subject includes a number of comparative studies on the linguistic impediment in patients with slowly progressive aphasia without generalised dementia and the speech deficits found in Alzheimer's disease, and in post-stroke aphasic patients. On the basis of the above-mentioned studies, we have identified the characteristics of the speech impediments typically found in dementia processes. These characteristics include considerably reduced fluency of speech, hearing comprehension deficits, and the reduced ability to maintain spontaneous speech, grammar, intonation, and pronunciation, and ability to repeat. AD patients show increasing difficulty in reading, naming and defining. Moreover, they tend to have problems with word choice, and their utterances become "bizarre" and devoid of content (Boye *et al.* 2014; Macoir *et al.* 2014; Meilán *et al.* 2014; Stensrud *et al.* 2012).

From the logopaedic point of view, it needs to be borne in mind that the situation of Alzheimer's patients is very difficult when it comes to their communication problems. Indeed, in this group, speech problems affect people who have previously mastered a linguistic system and achieved full communicative (social, situational and pragmatic) competence (Grabias and Kurkowski 2012; Meilán *et al.* 2014).

At first, the speech of Alzheimer's patients is only slightly affected, and, as the neurodegenerative processes progress, speech impediment gradually increases, ultimately leading to complete loss of speech and comprehension abilities. In the late stage of the disease, communication between patients and other people becomes virtually impossible.

The early stage of communication impediment is extremely important for the patient and medical professionals, as it allows treatment to be administered early on. Health professionals often report the need for training in communication to improve the effectiveness of the care provided to such patients (Stensrud *et al.* 2012).

The first noticeable speech disorder is the difficulty in finding the right word (i.e., reduced word retrieval, having the word "on the tip of one's tongue") and persistent repetition of the same statement, e.g., asking the same question over and over again. Patients typically use substitutions, which involve the use of synonyms and words related semantically to the word the individual has in mind, e.g., part – whole. When it comes to vocabulary, patients tend to use low-frequency words, which usually indicates problems in the case of less severe disorders (Boye *et al.* 2014; Leyton *et al.* 2014; Meilán *et al.* 2014).

A number of authors who deal with speech issues in patients with Alzheimer's disease have proven that in the mild form of the disease, when patients are still living at their homes, possibly relying to some extent on the assistance of other people, their communication with other people is only slightly impaired. In terms of phonology and syntax, their speech remains unaffected. In respect of semantics, they tend to skip words within sentences and have problems recalling them, with their vocabulary becoming increasingly limited. In the mild forms of the disease, patients tend to stray from the subject of the conversation, have problems with forming sentence sequences, i.e., constructing longer utterances, and have difficulty learning and internalising new information. In terms of pragmatics, patients tend to generate excessively long utterances on a given subject, avoid meeting

new people and have problems in understanding humour and sarcasm (Boye *et al.* 2014; Meilán *et al.* 2014; Sitek *et al.* 2015).

In the moderate form of Alzheimer's disease, there is increasingly serious impairment of communication, but phonology remains intact. When it comes to syntax, patients tend to formulate incomplete, broken and grammatically incorrect sentences. They generate fragmentary utterances and have problems with understanding complex sentences. The semantics of patients' utterances reflects their problems with categorisation and naming. Conversations with such patients are characterised by their forgetting words as they speak and using stereotypical utterances and limited vocabulary. In terms of content, patients tend to repeat information, get sidetracked, and talk about events from the past and trivial matters. Patients' utterances at this stage of the disease carry little informational value. In respect of pragmatics, patients tend to ignore greetings and have problems with using polite forms of address. Interactions between patients and their interlocutors are characterised by the formers' insensitivity to the latter (Boye *et al.* 2014; Domagała and Gustaw 2006; Domagała 2012; Meilán *et al.* 2014).

In the late form of Alzheimer's disease, interpersonal communication, whether verbal or non-verbal, is severely impaired. Phonological phenomena are generally unaffected, but they too might be impaired. In terms of syntax, patients use fragmentary utterances, commonly make grammatical mistakes and show poor understanding of many grammatical forms. Their semantics indicate considerable problems with finding the right word, limited vocabulary, poor understanding of word meanings and the use of neologisms. The contents of patients' utterances are characterised by their inability to express themselves, making meaningless statements and talking mainly about events from the past. Patients have problems maintaining eye contact and are unable to speak, showing signs of mutism (Catricalà *et al.* 2015; Domagała 2012).

Domagała (2012) argues that studies on the determinants of the speech impediments associated with the Alzheimer's form of dementia, including other areas of patients' cognitive functioning, as well as in-depth studies on the changes in patients' functioning, are able to identify specific dementia-related impediments in relation to traditionally defined aphasia. She further reports that in respect of communication impediment examined in terms of utterance progressiveness, it is important to consider the

impediment of the constitutive aspects of interaction, i.e., linguistic, social and situational prowess, as well as logical and content-related speech impediment, and linguistic-system mastery impediment.

### The impediment of the constitutive aspects of interaction

The impediment of the constitutive aspects of interaction is associated with communication disorders involving the compromised ability to interact with a specific interlocutor. Patients behave in a way based on their incorrect identification of the individual with whom they might be interacting. Conversations held as part of different patient-addressee (incorrectly identified) or patient-addressee (unidentified) interactions produce an incoherent picture of patients' behaviour in relation to other people. Some patients might show behaviour neutralisation and more or less consciously withdraw from social interactions due to their difficulties in identifying people (Domagała 2012).

In the case of "talking with someone" or "talking to someone", emphasis can shift to talking itself. Therefore, when affected by particularly severe disorders, patients might talk to people they watch on TV or to their or other people's reflections in the mirror.

It has been reported that linguistic interactions with patients are often disrupted by the inconsistency of perspectives taken by the interlocutors about the specific communication situation (their inability to find common ground). Consequently, when patients misinterpret the utterances of their interlocutors, they can experience negative emotions or cause misunderstandings. It needs to be noted that in AD patients there is a breakdown in the relation between the produced speech and the time of conversation. As a result, the linguistic behaviour of AD patients shows poor correlation with time as an objective dimension of reality (Boye *et al.* 2014; Domagała 2012).

To sum up, it needs to be noted that one of the reasons for the abnormal speech progressiveness in patients with dementia is the breakdown in the correlation between their speech and the actual communicational situation.

### Abnormalities in the logical/content-related structure of speech

At a certain point, AD patients who make conversations with their interlocutors lose track



of their own and their interlocutors' previous utterances. Consequently, their subsequent linguistic behaviour might not be connected with what has been said before. During communication, patients often exhibit behaviour which is structurally and substantially appropriate to the interlocutor, but not consistent with the course of the conversation. Paradigmatic (vertical) correlations are also subject to breakdown, which is attributable to the memory, attention and thinking disorders found in dementia. The progressiveness of patients' speech is disturbed by repetitions and perseverations (Boye *et al.* 2014; Domagała 2003).

Based on her research, Domagała (2003) identified three types of perseverations. The first type includes compulsive, inappropriate and involuntary repetitions occurring when the activity is performed continuously for a number of times – for instance, a patient is asked to stick out their tongue and they stick it out and put it back in their mouth for up to a few minutes. This activity stops when a new stimulus, or instruction, is provided. Another type involves the inability to transition when the activity performed in response to a specific stimulus is continued, even when a new stimulus is introduced which requires a different response. The third type is ideational perseveration, which involves the spontaneous repetition of words or phrases. Perseveration, as persistent behaviour, blocks the natural development of dialogue, as it involves the repetition of certain parts of utterances and going back to what has already been said during the conversation (initiation or response). On the one hand, these can appear within speech spontaneously and disrupt the previous order by bringing about a change in the subject. On the other, though, they are destructive in nature, due to their recurrence within the conversation, which shows that they are not controllable.

The communication of AD patients has also been observed to show a lack of accumulation in information as utterances accumulate. The above-mentioned difficulties show a loss of knowledge in a specific area and reveal the problem faced by the patient. If patients do not show substitute behaviour (by providing false information to hide their ignorance), the coherence of their speech is maintained. However, the progressiveness of the patient's speech is disturbed, which causes certain topics to be blocked. When this happens, patients either tend to admit to their lack of knowledge or

difficulties with internalising new information, or trivialise the problem.

The progressiveness of speech in the Alzheimer's type of dementia is impeded when the patient provides contradictory information. Patients tend to use confabulation in their speech. In consequence, their participation in the conversation and elaboration on the subjects discussed with patients become illusory. Their participation in the dialogue is now called into question in fundamental terms associated with the need to have relatively constant knowledge, which is the precondition for reaching common ground during the interaction. While following what patients say and receiving mutually exclusive information from them, their interlocutors are unable to arrive at a consistent depiction of reality (Boye *et al.* 2014; Domagała 2003).

### Linguistic-system-mastery impediment

In AD patients, speech production performance and the interpretation of phonic elements in their segmental and supra-segmental aspects are not significantly impaired. In their attempts at communication, patients retain a considerable freedom of linguistic behaviour and construct their speech within the limits of their ability (Boye *et al.* 2014; Catricalà *et al.* 2015; Meilán *et al.* 2014).

One of the dominant symptoms of speech impediment in respect of systemic mastery is lexical semantic impairment. What is crucial for colloquial speech is that patients face lexical problems, which are the main factors that impede the progressiveness of their speech (Domagała 2003).

The most common manifestation of this type of impediment is quasi-nominalisation with the use of pronouns. When patients look for the right word, they tend to rely on pronouns – a process sometimes referred to as substitution. Personal pronouns, which account for a major part of patients' speech, signal the communicational helplessness of patients. They are usually used instead of nouns and verbs. The erroneous use of names by patients is usually provisional in nature, as no permanent link has been observed between the name and the new meaning. Changes in the formal structure of words are extremely rare. Lexical problems can cause patients to break off, get sidetracked, or only seemingly elaborate on a given subject. It is noteworthy that some consequences of the lexical problems experienced by patients might be com-

pletely imperceptible to their interlocutors. The reduction in systemic mastery, as a significant symptom of problems faced by patients in their speech, and the associated impediment, indicate changes in the patients' cognitive functioning which are difficult to assess (Boye *et al.* 2014; Domagała 2012).

## Conclusions

The efforts being made by health professionals to improve interpersonal communication in patients suffering from the Alzheimer's type of dementia is a very important area of therapeutic procedures, and show concern for such patients. Due to the fact that the duration of the disease varies, as it might last from a few to over a dozen years, it seems necessary for health professionals and the closest carers of patients to undertake measures to maintain the best contact possible. What have proven helpful in this respect are various strategies for improving communication, which include close contact with patients, awareness of their communicational situation, control of the course of discussions and the use of different forms of communication, overcoming failure in verbal communication, control over the construction of speech, involvement in social interactions, and clear messages used by carers (Domagała and Gustaw 2006).

Therapeutic interventions undertaken in relation to patients with dementia must take into account their capacity in terms of linguistic, intellectual and social functioning, and their cognitive, emotional and social needs. In their efforts, health professionals should not focus on completing the relevant programmes and exercises at any cost if they can see that patients are not interested in specific activities. What is recommended during such interventions is to follow the patient and adjust their lifestyle accordingly to have them regularly do various exercises they wish to do and to encourage them to get involved in social life.

## References

- Bang J, Spina S, Miller BL. Frontotemporal dementia. *Lancet* 2015; 386: 1672-1682.
- Bassil N, Grossberg GT. Oparte na dowodach strategie zapobiegania chorobie Alzheimerera. Część I. *Psychiatria po Dyplomie* 2009a; 6: 12-17.
- Bassil N, Grossberg GT. Oparte na dowodach strategie zapobiegania chorobie Alzheimerera. Część II. *Psychiatria po Dyplomie* 2009b; 6: 22-25.
- Boye M, Grabar N, Thi Tran M. Contrastive conversational analysis of language production by Alzheimer's and control people. *e-Health – For Continuity of Care C. Lovis et al.* (eds.). 2014 European Federation for Medical Informatics and IOS Press.
- Catricalà E, Della Rosa PA, Plebani V, et al. Semantic feature degradation and naming performance. Evidence from neurodegenerative disorders. *Brain Lang* 2015; 147: 58-65.
- Daniluk J, Borkowska A. Zaburzenia funkcji poznawczych i depresja w chorobie Alzheimerera, zagadnienia neurobiologiczne. *Psychiatria* 2008; 2: 43-50.
- Domagała A. Mowa we wczesnej fazie demencji typu Alzheimerera. *Logopedia* 2003; 32: 105-126.
- Domagała A, Gustaw K. Program FOCUSED jako metoda usprawniania komunikacji w demencji typu Alzheimerera. *Logopedia* 2006; 35: 91-98.
- Domagała A. Mowa we wczesnej fazie demencji typu Alzheimerera. *Logopedia. Teoria zaburzeń mowy* (red.). Grabias S, Kurkowski M. Wydawnictwo UMCS, Lublin 2012; 625-641.
- Gałecki P, Świącicki Ł. Kryteria diagnostyczne z DSM-5. Edra Urban & Partner, Wrocław 2015.
- Grabias S, Kurkowski M. *Logopedia. Terapia zaburzeń mowy*. Wyd. UMCS, Lublin 2012.
- Grammatikopoulos AI. The Geriatric Giant: Mental Health and Well-Research Article Open Access being in Elderly. *Mental Health in Family Medicine* 2016; 12: 110-111.
- Kaczmarek M, Skrzypczak M, Szwed A, et al. Ocena stopnia zaburzeń procesów poznawczych, sprawności funkcjonowania oraz stanu emocjonalnego wśród pacjentów z chorobą Alzheimerera w odniesieniu do ich stylu życia w okresie poprzedzającym rozpoznanie choroby. *Psychiatria Polska* 2008; 3: 405-415.
- Laforce R Jr. Behavioral and language variants of frontotemporal dementia: a review of key symptoms. *Clin Neurol Neurosurg* 2013; 115: 2405-2410.
- Leyton CE, Savage S, Irish M, et al. Verbal repetition in primary progressive aphasia and Alzheimer's disease. *J Alzheimers Dis* 2014; 41: 575-585.
- Macoir J, Laforce R Jr, Monetta L, et al. Language deficits in major forms of dementia and primary progressive aphasia: an update according to new diagnostic criteria. *Geriatr Psychol Neuropsychiatr Vieil* 2014; 12: 199-208.
- Meilán JJ, Martínez-Sánchez F, Carro J, et al. Speech in Alzheimer's disease: can temporal and acoustic parameters discriminate dementia? *Dement Geriatr Cogn Disord* 2014; 37: 327-334.
- Pusey-Murray A, Miller P. 'I need help': caregivers' experiences of caring for their relatives with mental illness in Jamaica. *Mental Health Fam Med* 2013; 10: 113-121.
- Sajjadi SA, Patterson K, Nestor PJ. Logopenic, mixed, or Alzheimer-related aphasia? *Neurology* 2014; 82: 1127-1131.
- Sitek EJ, Barczak A, Kluj-Kozłowska K, et al. Is descriptive writing useful in the differential diagnosis of logopenic variant of primary progressive aphasia, Alzheimer's disease and mild cognitive impairment? *Neurol Neurochir Pol* 2015; 49: 239-244.
- Stensrud TL, Mjaaland TA, Finset A. Communication and mental health in general practice: physicians' self-perceived learning needs and self-efficacy. *Ment Health Fam Med* 2012; 9: 201-209.
- Szepietowska EM, Daniluk B. Zaburzenia językowe w demencji w ujęciu neuropsychologii klinicznej. *Audiofoniologia* 2000; 16: 117-134.