

Wandering in a Dementia Special Care Unit: Behavioral Aspects and the Risk of Falling

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ABSTRACT: **Background:** Wandering is a common phenomenon among patients with dementia. While traditionally considered to be a behavioral problem, it also includes fundamental aspects of motor performance (e.g., gait and falls).

Objectives: To examine the difference in motor function and behavioral symptoms between patients with severe dementia who wander and those who do not.

Methods: We conducted a retrospective study reviewing the medical records of 72 patients with severe dementia, all residents of a dementia special care unit. Motor and behavioral aspects were compared between “wanderers” and “non-wanderers.”

Results: No difference was found in motor performance including the occurrence of falls between the wanderers and non-wanderers. A significant difference was found in aggressiveness and sleep disturbances, which were more frequent among the wanderers. There was no preference to wandering at a certain period of the day among the patients with sleep disturbances who wander.

Conclusions: In a protected environment wandering is not a risk factor for falls. Sleep disturbances and wandering co-occur, but there is no circumstantial association between the two symptoms.

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KEY WORDS: wandering, dementia, falls, behavior, Alzheimer’s disease

Wandering, a complex motor, cognitive and behavioral disorder, is a common symptom among patients with dementia. A contemporary definition for wandering was suggested by Algase and colleagues [1]: “A syndrome of dementia-related locomotion behavior having a frequent, repetitive, temporally disordered, and/or spatially disoriented nature that is manifested in lapping, random, and/or pacing patterns, some of which are associated with eloping, eloping attempts, or getting lost unless accompanied.” Regardless of complex descriptions and sophisticated definitions and although multifaceted, wandering is easily identified by family members and straightforwardly diagnosed by experienced medical staff. Although patients do not seem to be disturbed by this phenomenon, the caregiver burden is high as patients

with dementia may walk around aimlessly for hours, at times through most of the day and night.

The prevalence of wandering differs across studies: 50% among community-residing elderly with dementia [2] compared to 21% of patients with moderate to severe cognitive impairment in long-term care facilities [3].

Much of the research regarding wandering deals with patients living at home [4-6]. Community-dwelling older adults with dementia who elope from home are exposed to dangerous consequences such as falls, physical trauma, fractures, dehydration and death. In nursing homes, wandering was identified as a risk for falls [7]. Not much research regarding wandering of patients with severe dementia in a dementia special care unit is available. This type of unit offers the patients a protected environment with constant supervision. In this setting elopement is almost impossible and the patients’ urge to wander around may find relief by pacing in an indoor space. However, wandering in the unit carries its own risks. In the protected unit setting, safety issues shift from elopement to the risk of falls, harmful interactions with other residents, and higher chances of exposure to environmental hazards (e.g., a wet floor). Wanderers might get injured by provoking other residents due to wandering into their “personal space” [8].

The aim of this study was to examine the difference in motor function and behavioral symptoms between patients with severe dementia, residents of a dementia special care unit, who wander and those who do not.

PATIENTS AND METHODS

The charts of 72 patients with severe dementia, all permanent residents of a dementia special care unit, were reviewed. Although these patients all have advanced brain disease, they can walk. All patients are under 24/7 supervision of the nursing staff, daily observation and treatment by physicians (including a neurologist). All patients are routinely assessed by a physiotherapist to evaluate their motor performances with a special emphasis on gait and the risk of falls.

EVALUATION

The data collected related to the patients’ demographics as well as medical condition (e.g., dementia etiology and severity). In

order to assess motor and behavioral problems, the physicians, nurses and physiotherapists reports were reviewed. A patient was diagnosed as a “wanderer” if he or she paces aimlessly on a daily basis. Diagnosis was reached by consensus of a neurologist and the unit head nurse, according to their acquaintance with the patient in conjunction with the medical records. Motor performance parameters included the following: getting up from a chair, walking difficulties, and falls. Difficulty getting up from a chair was evaluated in relation to recurrent attempts to get up or the need for assistance. Details on walking included the need for observation or support during walking and the use of an aiding device (walking cane or walker). Data regarding falls (occurrence and frequency) were collected. Documentation on falls is complete and thorough for all patients. Nurses are instructed to record each fall; and, after every fall, regardless of severity or apparent consequences, the patient is examined by a physician. Cognitive assessment was based on the patient’s score in the Mini Mental State Examination. Data regarding behavioral and affective problems – agitation, aggression, depression, hallucinations, delusions – were collected from follow-up reports as well as from the Cohen-Mansfield Behavioral questionnaire with which the patients are routinely assessed.

STATISTICAL ANALYSIS

All statistical analyses were conducted using the JMP software [9]. Differences between mean age of wanderers compared to those who do not wander (non-wanderers) were subjected to one-way analysis of variance (ANOVA). The distribution of the various phenotypes among wanderers and not-wanderers were compared with a chi-square test.

RESULTS

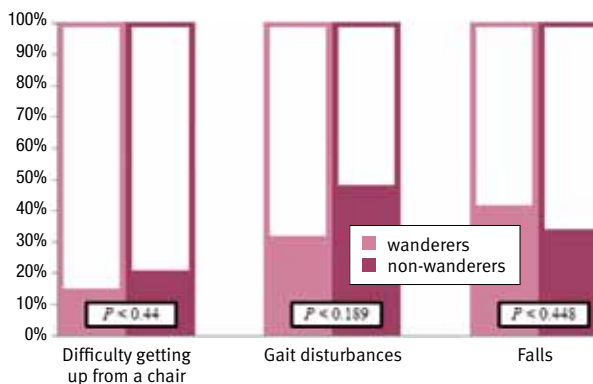
The medical charts of 72 patients with severe dementia were reviewed. Relevant demographic data are shown in Table 1. The patients mean age was 81.1 ± 1.94 years. We found that 40% of the patients (29/72) wander regularly. Female patients tend to wander less than male patients. Most of the wanderers had a tendency to wander before admission, at the prior location (home, nursing home). Table 1 also presents the distribution of patients according to their diagnosis. Most of the patients carried the diagnosis of Alzheimer’s disease, mixed dementia or “pure” vascular dementia.

All patients were able to walk. No significant difference was found in different aspects of locomotion between wanderers and non-wanderers [Figure 1]. There was no significant difference in difficulty getting up from a chair or gait difficulties (the use of a walking aid device or the need for observation or occasional support while walking). No difference was found between the groups in the frequency of falls [Figure 2].

Table 1. Demographic data, diagnosis and cognitive status of the study population

Characteristics of study population (n=72)			
	All patients	Wanderers	Non-wanderers
Age (yr)	81.1 ± 1.94	80.69 ± 3.07	81.37 ± 2.52 (P < 0.73)
Female	43/72	45%	70%
Male	29/72	55%	30%
Mini Mental State Examination	12.88 ± 1.91	9.22 ± 2.87	15.16 ± 2.26 (P < 0.002)
Wandering in previous location		82%	9%
Diagnosis: wanderers vs. non-wanderers			
	Alzheimer’s disease/Mixed dementia (%)	Vascular dementia (%)	Other (%)
Wanderers	79	14	7
Non-wanderers	65	7	28

Figure 1. No significant difference was found in motor performances: Difficulty getting up from a chair, gait disturbances, or occurrence of falls between the “wanderers” and those who do not wander



A significant difference was found in aggressiveness (P < 0.085) and sleep disturbances (P < 0.001), which were more frequent among the wanderers. No difference was found in depression or the presence of psychotic symptoms (delusions and hallucinations) between the two groups [Figure 3].

Most (84%) of the wanderers had no preference for wandering at a certain period of the day or night. Only 3% wandered exclusively at night time.

DISCUSSION

Quality of life is a major concern at the advanced stages of dementia. For the healthy population, walking is a common and favorable leisure-time activity. Walking has both physical and social purposes and may have a relaxing effect on both

Figure 2. No significant difference was found between the groups in the frequency of falls

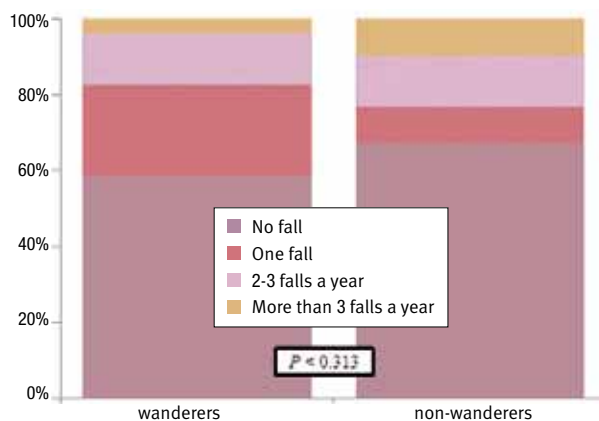
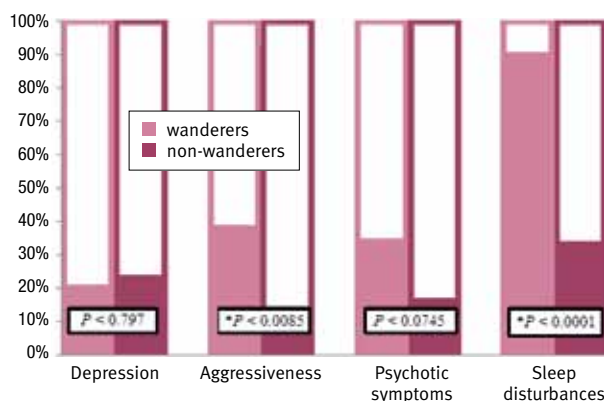


Figure 3. Significant difference was found in aggressiveness ($P < 0.05$) and sleep disturbances ($P < 0.001$), which were more frequent among the “wanderers”



healthy people and people with dementia. The physical activity may be beneficial for cardiopulmonary function, osteoporosis, muscle fitness, constipation and more. Walking may also contribute to “brain fitness” as it activates brain areas responsible for gait. However, wandering in dementia raises safety concerns. The association between wandering and falls is one such example.

In this retrospective study we compared motor and behavioral performances of patients with severe dementia who wander to those who do not wander. All subjects who participated in this study are permanent residents of a unit specialized in the treatment of patients with severe dementia. The 72 subjects enrolled were residents of this unit during the same period and therefore were exposed to similar environmental conditions and were treated by the same medical staff.

No significant difference was found in the occurrence of falls between patients in the protected unit who wander and

those who do not. Patients who wander spend a major part of the day on their feet, whereas patients who do not wander spend most of the day sitting or lying down. Therefore, we were surprised to find that there was no difference in the frequency of falls between patients who wander and those who do not.

Elderly patients with neurodegenerative diseases gradually deteriorate, both mentally and in their motor abilities. The mean Mini Mental State Examination of the patients in our study who wander was significantly lower (9.22 ± 2.87 , $P < 0.002$) than of those who do not wander (15.16 ± 2.26). This finding indicates that wandering correlates with lower cognitive function. Although these patients have a worse mental condition, they still have preserved motor competence which might be due to their constant walking. It is possible that wandering maintains physical fitness and postpones motor disability.

The two behavioral aspects found to be different between wanderers and non-wanderers are aggressiveness and sleep disturbances. Aggressive behavior is significantly more common among patients who wander. Walking around aimlessly does not necessarily and exclusively mean wandering. It may be the manifestation of restlessness, agitation, or akathisia. Wandering and physical agitation may overlap; however, these are non-equivalent phenomena [6]. There is no straightforward explanation for this association. Wanderers may confront with other patients on their route or with staff members who try to interfere with the wandering. These confrontations may lead to aggressiveness. Aggressiveness and wandering may co-occur due to other anatomical or biochemical explanations yet to be explored.

Sleep disturbances were more common among patients with severe dementia who wander than among those who do not wander, but interestingly those patients who wander and suffer from sleep disturbances do not preferentially wander at night. Based on these clinical findings, we assume that although sleep disturbances and wandering co-occur there is no circumstantial association between the two symptoms.

Falls are a major problem in the geriatric population, with potential for a devastating sequel. Wandering is considered to be a risk factor for falls at home. Preventing patients from wandering using the safety argument prevents them from fulfilling their basic needs. Knowing that wandering is not associated with a higher rate of falls, at least in a dementia special care unit, supports the liberal approach of allowing patients to wander with fewer restrictions. Notions regarding “conceptualizing wandering as a natural and good thing” were suggested in the past [10]. Being such a common phenomenon makes wandering a fundamental topic in the evaluation and treatment of patients with severe dementia. A special approach should be considered for residents of dementia special care units, taking into consideration their special needs and the distinctive environmental conditions.

Why patients with dementia wander is an unresolved mystery. It may be a remnant of an evolutionary essential inner drive to move and may also carry an evolutionary advantage. Animals, as well as human beings who wander, increase their chances to acquire food, mate and find shelter. Basic knowledge on the anatomical localization of this behavior is lacking. A SPECT study showed that wanderers with the diagnosis of Alzheimer's disease had more severely reduced regional cerebral blood flow in the left parietal-temporal lobe compared to patients who do not wander [11]. However, the exact meaning of this finding is not clear and the role of other brain areas, such as brainstem, frontal lobes and the reward system, has yet to be investigated. In view of the growing numbers of patients with severe dementia, the clinical, theoretical and ethical issues regarding wandering should be addressed. We believe that our findings will contribute to the understanding and to the establishment of a clinical approach to this common yet obscure phenomenon.

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Capsule

Wolbachia invades *Anopheles stephensi* populations and induces refractoriness to Plasmodium infection

Wolbachia is a maternally transmitted symbiotic bacterium of insects that has been proposed as a potential agent for the control of insect-transmitted diseases. One of the major limitations preventing the development of Wolbachia for malaria control has been the inability to establish inherited infections of Wolbachia in anopheline mosquitoes. Bian et al. report the establishment of a stable Wolbachia infection in an important malaria vector, *Anopheles stephensi*. In *A. stephensi*, Wolbachia strain wAlbB displays both perfect

maternal transmission and the ability to induce high levels of cytoplasmic incompatibility. Seeding of naturally uninfected *A. stephensi* populations with infected females repeatedly resulted in Wolbachia invasion of laboratory mosquito populations. Furthermore, wAlbB conferred resistance in the mosquito to the human malaria parasite *Plasmodium falciparum*.

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Capsule

Compounds that interfere with KRAS localization have anticancer activity

The discovery that the mutational activation of RAS proteins drives the growth of human cancer cells catalyzed a dogged – but ultimately unsuccessful – search for drugs that inhibit RAS activity. Interest in pharmacologically targeting RAS has been revived by cancer genome studies, which revealed KRAS to be the most frequently mutated gene in the cancer types that are most common in the population and/or most refractory to therapy, such as pancreatic, lung, and colorectal cancer. Because KRAS signaling activity is dependent on the protein's localization at the cell membrane, Zimmermann and colleagues investigated whether compounds that interfere with KRAS localization have

anticancer activity. In a high-throughput screen, they identified small molecules that prevent KRAS from binding to PDE-δ, a protein that facilitates KRAS trafficking to the membrane. An optimized compound, deltarasin, was found to inhibit KRAS signaling and growth of KRAS-mutant human pancreatic cancer cells in vitro and in mice. Although these results are promising, the bar for deltarasin and its derivatives will be high, because previous drugs designed to disrupt KRAS membrane localization in a different way proved to be ineffective in clinical trials.

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