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PATIENTS WITH DEMENTIA IN ORTHOPEDIC PRACTICE

Ilona Bidzan^(A,B,D,E,F,G), **Marcin Nowak**^(A,B,D,E,F),
Paweł Cieśla^(A,B)

St. Vincent a Paulo Hospital, Gdynia, Poland

SUMMARY

Background:

It is estimated that almost 500,000 people in Poland are suffering from dementia, the vast majority of whom are elderly. Every year, 23% of persons older than 65 (most are women) experience a fall, which, in turn, very frequently results in a fracture. Extending average life expectancy has led to an increase in the number of elderly persons in our society, which inevitably leads to an increase in the potential number of orthopedic injuries. It is essential, then, to develop standards for work with dementia patients who have suffered such an injury. The goal of this article is to present two cases, showing the particular measures that need to be taken in orthopedic practice when dealing with such patients.

Case study:

We examined cognitive and executive functions using the Mini-Mental State Examination, the Clock Drawing Test, the Knowledge, Dictionary, and Digit Repetition tests from the WAIS-R, the Łucki Verbal Fluency Test, and the FAB Test.

Conclusions:

It is essential to adjust the orthopedic approach to persons suffering from dementia, taking under consideration all the aspects of the diagnostic-therapeutic process. Only a comprehensive approach will make it possible to achieve the best treatment outcomes, enabling the patient to return to comparatively good functioning in everyday life.

Key words: falls, executive functions, vascular dementia, mixed dementia

INTRODUCTION

A number of changes in the body are associated with the aging process, the most important of which for the present purposes are the following:

- deterioration of eyesight, due to changes in the vision system;
- deterioration or loss of hearing, due to changes in the auditory apparatus;
- balance disorders and instability, due to changes in the vestibular system;
- deteriorated motor functions, mental slowing, and memory disorders, due to changes in the peripheral and central nervous system;
- changes in the musculoskeletal system, leading to a decrease in the mineral density of the bones and an increase in the susceptibility of the skeletal system to fractures (osteoporosis), lowered fitness resulting from progressive degenerative changes in the joints, and also weakening muscular strength (muscle wastage and lowered tone; Jester, Santy-Tomlinson & Rogers, 2011).

All these changes can cause the elderly to be more susceptible to orthopedic injuries. The majority of injuries of this kind are connected with a fall, at home or in the patient's immediate environment. Low-energy injuries – that is, minor injuries which in the case of healthy people are completely harmless, since the energy cannot overcome biological and mechanical bone resistance - are more likely to produce fractures in the elderly, due to their tendency to experience frequent falls and the lowered resistance of the organism. The most frequent fractures include those of the neck of the femur, spinal crush fractures, and fractures of the humerus and the epiphysis of the distal radius (Pietri & Lucarini, 2007).

An important contributing factor to the frequency of falls is dementia, one of the most serious disorders afflicting the elderly. It is estimated that approximately 10% of persons older than 65 have some degree of dementia; after age 65, this percentage increases by 1% every year, reaching the level of approximately 30-40% after age 90. These data vary, depending on the country from which the individual comes, the method of assessment, and also data for the population. As the average life expectancy goes up, so does the frequency of occurrence of dementing diseases, as well as somatic diseases that are directly or indirectly connected with decreased mental efficiency. It is predicted that over the next 30-50 years, due to this increase in average life expectancy, the number of people suffering from dementia will double; some authors estimate that the increase will be much greater, even 3-4 times greater (Magierski, Koszewska & Sobów, 2004). This will find direct reflection in an increase in the number of orthopedic problems in this group of patients.

The most frequent type of dementia is mixed dementia, when Alzheimer's disease (AD) is accompanied by vascular pathology, by or vascular risk factors. The major impact of vascular factors is often overlooked in diagnosis, so that the dementia is labeled AD or vascularAD (VaD; cf. Magierski, Koszewska & Sobów, 2004).

Relatively few orthopedists are familiar with the issues involved in geriatrics and psychogeriatrics, nor is the knowledge of problems connected with orthopedic procedures widespread among psychogeriatricians. There is an increasing need, then, for research showing the particular nature of the orthopedic approach

in the case of an older patient suffering from dementia. The goal of our research was to study the specific nature of the measures that needed to be taken in the course of orthopedic treatment of 2 female patients with mixed dementia who had incurred orthopedic injuries, with due regard for their social situation.

CASE STUDY 1

Female patient LK, age 80, widowed, has a vocational education. She was hospitalized for a pertrochanteric fracture of the femur, along with a crush fracture of the body of the L1 vertebra, suffered after a fall at home. Prior to the injury, she had been using elbow crutches to walk. Because of the specific nature of the fracture and the impossibility of surgery on the day following her admission to hospital, it was decided that skeletal sliding traction would be used behind the tuberosity of the tibia. The procedure was conducted under local anesthesia. During surgery, the patient maintained self-control, and there were no problems. At admission, logical contact was maintained; however, the patient showed signs of confusion concerning place and time. She was noticeably neglected in appearance, failed to provide herself with a sufficient amount of clothing, and during her hospital stay borrowed clothes from a fellow patient hospitalized in the same room. LK's financial situation is difficult (both because of a low private pension, and because of dementia, which results in her mismanagement of financial means), and she is in danger of being evicted due to her failure to pay rent. However, it is difficult to determine to what degree this results from her being unable to use her private pension reasonably, and to what degree it is the result of being deprived of support in this respect. Since the death of her husband, she has been living with a grandson, who assists her in all daily activities. The grandson (who is intellectually disabled to a moderate degree) is currently the only individual close to the patient. He visits her in hospital, provides care for her (as much as he can), helps in caring, does the shopping and prepares meals. LK is very much attached to her grandson, and his visits make her cheerful; she feels very anxious that something bad might happen to him. During her hospital stay, she was observed to suffer from visual hallucinations, including one in which she sees her grandson entering the room.

Data obtained in the medical history indicate that her cognitive problems intensified after the death of her daughter 7 years before. Until that moment, the patient had been a gentle, quiet and kind individual. After that event, changes occurred in her emotional life, in that she became tearful and hyperactive. She had not revealed disorders of cognition. In the course of the several years that had passed since the death of her daughter, the family noticed that LK was having problems with episodic memory, which were gradually becoming worse and worse (problems with cognitive functions were significantly influenced by vascular factors as well). She began to forget where she had put various items. For example, she left for the kitchen, but before she arrived she had already forgotten why she had come.

During her stay in hospital, LK underwent diagnosis of her cognitive functions, as well as executive functions. On the Mini-Mental State Examination (MMSE)

she obtained 13 points out of 30, indicating a moderate degree of dementia. We also used:

- the Łucki Test;
- the Clock Drawing Test;
- the Knowledge, Dictionary, and Digit Repetition subtests of the WAIS-R;
- the Verbal Fluency Test;
- the FAB Test.

During the examination, the patient seemed to be motivated to perform the tasks, and displayed a positive attitude towards the individual conducting the examination. Due to psychomotor retardation and distractibility, she needed more time to perform the tasks. She remained conscious of her illness.

As a result of these examinations, it was ascertained that LK suffered from memory disorders, with the dominant deficits occurring in the domains of episodic memory, operational memory, and semantic memory. LK also showed signs of attention concentration disorders, especially in respect to selectivity and set-shifting. Moreover, the patient was observed to suffer from confusion in time, and also some difficulties in respect to place. No deficits in the domain of visual gnosis were observed, including confrontation recognition, whereas in the domain of visuo-spatial functions there were deficits that may have resulted from the attention and operational memory disorders. As far as executive functions were concerned, deficits were found in planning and organization, abstract thinking (and also notional thinking), as well as understanding complex utterances.

These changes point to a progressive dementing process.

CASE STUDY 2

Female patient SM is 95, widowed, with a secondary education. She was hospitalized for a fracture of the cervix of the femur, which she suffered as a result of a fall. During admission logical contact was maintained, but confusion was observed in place and time. The patient was unaware of the injury and its consequences for her health. During the first day of her hospital stay, she made several attempts to get out of bed in order to go to the toilet. She failed to pay attention to the pain that accompanied the movement of the fractured limb. Many times, she declared that she was leaving hospital because she did not know why she had been admitted.

The patient underwent implantation of a bipolar endoprosthesis of the hip joint. Directly after surgery, she was behaving anxiously; she was trying to attract attention, reported pain, and displayed obvious problems with understanding her current situation. She reacted with disbelief when told that she had undergone a surgical procedure.

History taken from an interview with her son indicated that the patient has been suffering from deterioration of cognitive processes for approximately 10 years. Most likely, reactive depression (related to her husband's death more than 10 years earlier) gradually resulted in chronic and progressive dementia. For about a month, SM had been living at her son's home, because not only had she begun to experience difficulties with performing daily activities, but also it began

to be dangerous to leave her without care; for example, she would leave an oven with the gas turned on. Before this, she had been self-sufficient; she coped well with various roles in her life, and did not want to move in to stay at her son's home. SM's son described her as a stubborn individual, who likes to have things her own way, and has always tried to impose her opinions on other people. She had been working in a managerial position. According to her son, she had displayed no deterioration of autobiographical memory, or other forms of long-term memory.

During her stay in hospital, SM was diagnosed in respect to her cognitive and executive functions, using the MMSE, in which she obtained 8 points out of 30, an indication of advanced dementia. Due to problems with eyesight and the lack of corrective eyeglasses, she was not examined with the remaining neuropsychological methods used in the case of the first patient described here. During the examination, the patient was motivated to perform tasks. Due to psychomotor retardation and distractibility, she needed more time to perform tasks. As a result of our examinations, dominant deficits were ascertained respect to episodic memory (memorizing current events), semantic memory (retrieval of knowledge acquired thus far), and operational memory (performing intellectual operations). She suffers from attention disorders, especially in respect to selectivity and set-shifting. Moreover, it was observed that SM suffered from disorientation in both time and (to a lesser extent) place. In testing of executive functions, deficits were observed in planning and organizing, abstract thinking (also notional thinking), understanding complex utterances (during the Digit Repetition Test, SM failed to understand a complex utterance, and repeated digits after the individual conducting the examination), and constructive praxis. These cognitive deficits influenced the daily functioning of the patient (she needed help in performing complex tasks and activities).

DISCUSSION

In case of the patients described here, the underlying cause of dementia would seem to be AD, with a significant component of vascular disorders, so that both patients could be diagnosed with mixed dementia (Bidzan et al. 2008,2009). Both patients were elderly women who had suffered an injury of the femur resulting from a fall, necessitating orthopedic surgery (in the case of LK, fixation of the fracture with a DHS plate, and in the case of SM, implantation of an endoprosthesis of the hip joint). The disordered cognitive functions of these patients, together with the orthopedic problems, have had a major impact on their functioning. Very frequently, patients suffering from dementia require devices which assist in walking, including crutches, canes, and walking frames. The disorders of mental efficiency cause the patients to forget or neglect devices of this kind, which results in a greater risk of a fall, and, as a consequence, of injuries to the musculoskeletal system. The most frequent fracture resulting from a fall is a fracture of femoral cervix. It is estimated that a primary fracture of this area causes a significant increase in the risk of a subsequent fracture, and 1 out of 11 patients (approximately 9%) will experience another one in the other joint within 2 years after the first fracture (Berry, Samelson & Hannan, 2007). The most important risk factors for a subsequent frac-

ture, apart from the primary fracture, include old age, osteoporosis, dementia, and a tendency to fall (Friedman, Clark, Nicholas & Bukata, 2013).

A patient suffering from dementia finds it difficult to tolerate any and all changes in their environment, and a stay in the hospital environment, which is a natural consequence of an injury, is a situation causing extreme stress for them. This happened in the case of the patients described here, for whom a stay in hospital, deprived of the company of the persons near and dear to them, in an unknown environment, was a very stressful situation that seemed to have exacerbated the symptoms of dementia displayed prior to their hospitalization.

Patients (including LK and SM) very frequently lose auto- and allopsychic orientation, and feel lost in completely new surroundings, among persons they have never seen before. A stay in hospital, particularly when connected with the occurrence of an unpredictable event, including the necessity of orthopedic hospitalization, very frequently triggers, reveals, or exacerbates dementive disorders. Very frequently, the patient's family watches the strange and atypical behaviors of their family member with enormous anxiety; however, after a longer conversation it turns out that for some time, there have been memory disorders, short-time orientation disorders. At home (and therefore in a safe and familiar environment) these problems may not have been revealed in such an exacerbated form, as compared to the hospital, or may not have been noticed by family and relatives, who had simply gotten used to them. Not only do memory disorders make the patient fail to recognize the personnel providing care, but they also result in the patient forgetting important information concerning the state of their health and the reason for being admitted to hospital, or demanding something which has already been provided (Paçhalska & Łukaszewska 2011). Psychomotor excitement, connected with the state of permanent stress, results in the danger of worsening the injury, and becomes the source of physical and verbal aggression.

From the point of view of orthopedic care, dementia-related disorders are of great importance in planning therapeutic measures. Apart from the techniques strictly connected with a possible qualification for surgery, such a patient requires a multi-directional approach. Given the possibilities, one should take under consideration a very large number of factors, including:

- the general clinical status of the patient;
- the degree of advancement of dementia;
- the mental state of the patient;
- interest displayed by the family;
- the possibility of providing care for the patient and the adjustment of the home environment to the patient's needs.

An orthopedic patient suffering from dementia requires a specific course of action from both medical personnel and the family. A stay in hospital is extraordinarily stressful for the patient; however, it is not only the patient, but also the family and the hospital personnel that suffer an elevated level of stress. The simultaneous occurrence of many factors, in combination with the lack of appropriate collaboration between the patient and personnel, is responsible for the

fact that treatment and hospital care are frequently inappropriate, ineffective, and insufficient (Santy-Tomlinson, 2013). Understanding the essence of dementing disorders and adjusting care to the needs of the particular patient will bring the best treatment outcome achievable for a given patient.

Reviewing the situation presented above, it is possible to formulate a number of essential principles, the observance of which will increase the probability of a favorable treatment outcome. These include:

- the correct diagnosis of cognitive disorders, with a measurement of the level of their intensity;
- regular checking of the degree of the intensity of disorders, and adjusting care to the current needs of a patient;
- providing a patient with the appropriate conditions of stay, which means adjusting the immediate environment in order to provide the patient with the feeling of safety and stability;
- appropriate planning of care for the patient, including, as far as possible, providing the patient with a constant daily routine;
- close collaboration with the family of the patient and encouraging them to participate actively in providing care.

All these factors, in combination with ensuring the appropriate training of personnel providing patient care, significantly increase therapeutic possibilities (Santy-Tomlinson, 2013).

A holistic approach to the orthopedic patient suffering from dementia consists not only in treating the injuries, but also in taking preventive measures. The course of action should not consist only in limiting the results of the injury already suffered, but also in identifying the factors that increase the risk of falls. It is most frequently the elderly patients who suffer from cognitive disorders. Some very common factors increasing the risk of falls for these patients are dehydration or water intoxication, a decreased level of hemoglobin, dizziness, the presence of internal disease(s), and resultant polypharmacy (Friedman, Clark, Nicholas & Bukata, 2013). The identification of these factors and the prevention of their negative consequences are directly involved in decreasing the risk of a fall, improving the efficiency of the organism, and increasing the ability of the organism to recover (Friedman, Clark, Nicholas & Bukata, 2013).

The progress of dementia, in combination with the injury, can significantly limit the patient's motor capacity and independence. Accordingly, it is a very important element of therapy to adjust accommodations in such a way as to make sure that care in the home after leaving hospital is safe. That objective can be achieved in several ways. First and foremost, the patient should stay in the environment with which they are most familiar. The room should be furnished practically, minimizing the risk of occurrence of subsequent injuries, but it should also be comfortable and well lit. The floor needs to be covered with an even surface, preferably one that is easy to wash; as far as possible, thresholds and floor rugs should be removed. The bed and, possibly, the chair or armchairs in which the patient spends their time should be provided with elements preventing the oc-

currence of decubitus ulcers. Next to the bed, handrails should be placed, making it easier to rise from the bed and maintain a vertical position afterwards. In order to make it easier for the patient to maintain orientation in time, it is advisable to place a clock in the room with clearly visible digits and hands, and also a calendar. From the point of view of both the patient and their family, it is very important to adjust the bathroom to individual abilities in terms of self-care. The bathroom should be equipped with handrails and handles. In the bath/shower cubicle, there should be anti-slip mats and/or a chair for the patient.

Apart from these amenities, necessary for the appropriate functioning of a patient suffering from dementia in the home environment, one should remember about providing patients with rehabilitation at an appropriate level. The correct process of rehabilitation after injuries consists not only in adjusting the program to the kind of injury and its mechanism, but also to the individual needs of the patient, to their general and mental state, taking under consideration the patient's capacity for collaboration and active participation. The comprehensive rehabilitation of a patient who has suffered an injury resulting from a fall includes not only exercises leading to restoring fitness in the limb afflicted by the injury, or the one which has been operated on, and preparing the patient to live after the fall, but also exercises safeguarding the patient against subsequent falls in the future, including balance exercises, as well as exercises increasing muscular strength (Skalska & Žak, 2007). One of the necessary elements of care is to provide the patient with orthopedic items improving stability of gait and making it easier to maintain balance, including canes, crutches, room walking frames and supports. Using these aids, apart from the role mentioned above, can compensate for the functions lost as a result of the fall, improve the coordination of movements, and increase resistance. This equipment stabilizes the patient's posture and makes it possible to move fairly safely. In every case, orthopedic rehabilitation should be combined with neuropsychological rehabilitation. In the case of moderate dementia, exercises stimulating cognitive processes are recommended, while their neglect may lead to a deterioration of the patient's clinical status.

Medical personnel should learn to communicate with patients such as LK and SM using short messages (they cannot understand complex sentences). At each and every stage of treatment, more than one sensory channel should be used for communication (for example, by saying what needs to be done, and, at the same time, writing or drawing it).

We are aware of the fact that the solutions we have presented here are, to a certain degree, idealistic, because they are not suitable for the situation of every orthopedic patient suffering from dementia. Taking under consideration the resources in the environment available to help the individuals we have described, it is possible to predict the further course of convalescence, and also the further functioning of both patients. Therefore, in the case of the first patient, LK (with a grandson suffering from intellectual disability), the assistance will most likely not be adequate (it has not been and is not now), although it is certain that the strong emotional bonds with the grandson have compensated LK's other deficits. In the

case of the second patient, SM, the assistance promised and provided by her son has been substantial, and the financial conditions are much better. Beyond any doubt, SM will be able to count on additional assistance (for example, in the form of the paid services of a nurse or therapist), should it be needed.

CONCLUSIONS

In order to be effective, the orthopedic treatment of patients suffering from dementia must be multi-directional, concentrated not only on the immediate cause of hospitalization, but also on the patient's mental condition, taking into account the conditions in the environment and the capacities of the individual. It is only such an approach to the patient that will provide an opportunity for them to function fairly normally in the future. In order to systematize these principles and implement them, it is essential to standardize the approach to such patients, and to disseminate information making it possible to conduct therapy effectively.

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Address for correspondence

Ilona Bidzan

Szpital Św. Wincentego a Paulo Sp. z o.o.

ul. Wójta Radtkego 1, 81-348 Gdynia

e-mail: bidzan.ilona@gmail.com

