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Palliative care for people with neurological disease

Abstract

Palliative care is developing for people with neurological disease. This may be integrated early in the disease progression, and may have a variable input over time. The careful assessment and management of all issues — physical, psychological, social and spiritual — provides the patient and family the opportunity to maximise quality of life. This requires a multidisciplinary approach and close collaboration with other services.

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Key words: neurology, palliative care, multidisciplinary care, ethical issues

Introduction

Palliative care is primarily associated with the care of patients with advanced cancer but there has been increasing pressure for services to be involved with patients with other progressive diseases. Neurological disease, including stroke, accounts for over 12% of all deaths worldwide and is thus an area for importance for palliative care [1].

The principles of palliative care should be the same for any disease process, although there are specific differences according to different diagnoses. In neurological disease there is a wide variation in prevalence and prognosis — amyotrophic lateral sclerosis (ALS) has a prevalence of 7/100,000 and an average prognosis of two to three years; Parkinson's disease (PD) has an overall prevalence of 180/100,00 but for people over 80 years the prevalence increases to 1750/100,000, and the mean prognosis is 14 years but many people live 20 to 30 years; the dementias have prevalence of 700/100,000 and the mean prognosis is 8 to 10 years but many may live longer. There is also great variability not only between disease groups but within disease progression — although the average prognosis of ALS is 2 to 3 years 25% are alive at 5 years and 10% at 10 years [2].

The role of palliative care

There is increasing awareness of the need for palliative care in neurology and in 2016 the European Academy of Neurology (EAN) and the European Association for Palliative Care (EAPC) produced a joint Consensus review on the care of people with chronic and progressive neurological disease [3]. This has suggested that "palliative care should be considered early in the disease progression, depending on the underlying prognosis". Moreover, it has suggested that there are several areas that should be addressed:

- Early integration of palliative care;
- Multidisciplinary care approach;
- Communication, including advance care planning;
- Symptom management;
- Carer support;
- End of life care;
- Training and education of both neurologists in palliative care and palliative care specialists in neurology [3].

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Thus the role of palliative care for neurological patients is becoming clearer and will continue to develop. As defined by the World Health Organisation this will include the various aspects of care:

- Physical — symptoms, mobility issues, practical issues of disease progression;
- Psychological — the fears and concerns of patients about the disease, and often overshadowed by cognitive change or loss;
- Social — the issues for care givers and families, coping with progressive physical, and often cognitive, loss;
- Spiritual — the deeper issues and fear of patients [4].

All these aspects need to be considered and addressed, with specific issues becoming more pronounced for some diseases — for instance in PD the mobility, communication and often cognitive changes may predominate, whereas in Huntington's disease (HD) there are physical issues associated with chorea, but cognitive change and dementia become more pronounced as the disease progresses.

The effectiveness of palliative care in neurology

There has been increasing evidence of the effectiveness for palliative care generally — with studies showing increased quality of life and survival with early palliative care in lung cancer [5] and increased deaths at home with specialist palliative home care [6]. The evidence for neurological palliative care is limited but increasing.

A study in London of a short term input palliative care for people with multiple sclerosis (MS) showed not only an improvement in symptoms in the group receiving palliative care, whereas there was deterioration in the control group, but there was an improvement of caregiver burden [7] and this care was also cost effective [8]. A similar study conducted in Turin with the involvement of the wider multidisciplinary palliative care team with a broader group of neurological diseases showed improvement in symptoms – pain, breathlessness, sleep disturbance and bowel symptoms — and quality of life, but no significant changes in caregiver burden [9]. A further study on short term input in MS showed that extra training in palliative care and support of specialist nurses showed reduced symptom burden but no effect on quality of life or other outcomes [10].

Thus there is some evidence that palliative care is helpful in the care of neurological patients but further research is needed.

Multidisciplinary team approach

The Consensus paper recommends a multidisciplinary approach to care, including at least three different professions — physician, nurse and social worker/counsellor/psychologist [3]. This team approach is very helpful in allowing each member to contribute their expertise and collaborate together. For neurological patients this may also include the physiotherapist, occupational therapist, dietitian and speech and language therapist. There is the need to collaborate with other teams — for instance for a patient with ALS there may be the need to collaborate with gastroenterology if a gastrostomy is inserted or respiratory medicine if ventilatory support is needed. This can be a challenge, as teams may act in different ways, with a different ethos and working methods. It is important to ensure that there is close collaboration and understanding so that the patient and family receive a truly co-ordinated approach [11].

There is limited evidence of the effectiveness of multidisciplinary team approach. However, in ALS there are now several studies suggesting that such an approach increases quality of life, helps to manage symptoms and may extend life — one study showing a survival for patients attending a specialised multidisciplinary ALS clinic having a mean survival of 19 months, compared to 11 months for those attending a neurology clinic [12].

The care of a patient with neurological disease may be by many different teams — varying from country to country and area to area. There is an overlap in the care from rehabilitation, neurology and rehabilitation [13]. There may be specific areas that each team will be most involved with — for neurology the investigation and diagnosis, rehabilitation the physical management and cognitive/communication issues and palliative care in end of life care, spiritual support, coping with loss, but all should be managing symptoms and neurology and rehabilitation managing the disease and aiming to prevent long-term complications [130]. In some areas one team will be the primary multidisciplinary team, collaborating with other teams as necessary.

Communication

The diagnosis of a neurological illness is often a great shock to patients and families and their knowledge of the disease and the implications may be low, compared the diagnosis of cancer. How the diagnosis is presented is crucial to the later care, and

may influence the end of life phase. For instance if a person with ALS is told, or reads on the Internet, that they are likely to choke to death, this may stay with them and their families and be a fear until death, even though the evidence is that choking is very rare. There is awareness in neurology that this is an area which causes stress and distress to professionals [14] and there is a need for training in communication and breaking bad news [15].

People with progressive neurological disease face increasing disability and increasing issues. Often this includes difficulties in communication, due to dysarthria or dysphasia, or cognitive change. Thus planning ahead is particularly important and advance care planning (ACP), when the person expresses their wishes while they are able to do so and these are then known when they lose capacity to express their views, due to communication or cognitive change, is very important. However patients, families and professionals all find ACP difficult, although there is evidence that patients with MS do want to discuss the future [16] and wish their views to be adhered to [17]. Careful and sensitive discussion with patients and families should allow the setting of clear goals of care and therapy, including ACP.

Symptom management

The careful assessment of all symptoms and issues — physical, psychological, social and spiritual — is the cornerstone of palliative care. There is a need for careful assessment of symptoms, in relation to the specific disease and its progression. Knowledge of the possible changes in the disease progression is important and palliative care providers may need to work collaboratively with neurology and rehabilitation services to maximise the best care for patients.

For instance breathlessness, and in particular orthopnoea and poor sleep, in ALS may be the evidence of respiratory muscle weakness and respiratory insufficiency. Consideration of non-invasive ventilation is necessary, in conjunction with other symptom management, as NIV may relieve symptoms, improve quality of life and extend life by many months [18]. The discussion is complex, as the disease will continue to progress, with increasing disability. There is also the risk of increasing dependence on NIV, as respiratory function deteriorates, and a patient may start using the NIV in the day, and for some the use becomes nearly continuous [19] and some may consider tracheostomy ventilation. It is possible for patients to ask for ventilatory support to be stopped, and usually this lead to death within a short time, usually within hours. This is ethically acceptable, and in many legislations there are no legal restrictions, but this can be a challenge for all concerned, as medication may be needed before withdrawal, to ensure that there is no distress. Studies have shown that in the UK that palliative medicine consultants find the process of withdrawal of NIV challenging ethically, emotionally and practically [20]. Careful discussion with patient, family and the whole multidisciplinary team is essential and there are now guidelines available, stressing the need for discussion, planning and support of all involved [21].

Pain is an important symptom to manage, and in neurological disease the careful assessment of the cause is essential. For instance pain may be related to the disease process itself, such as spasm and cramp in spastic limbs, related to immobility, such as skin pressure pain in ALS, or be an incidental pain due to immobility or unrelated, such as arthritic pain. It is a common symptom present in 62% in PD [22], 76% in ALS [23], and 82% in MS [24]. Careful assessment and treatment is necessary, and careful titration of analgesia may be required for pain when other treatable causes have been found. This may be more complex than in the management of pain in cancer and as neuropathic and central pain may be present, for instance in MS and stroke, and specialised management may be necessary. Opioids can be helpful, particularly in skin pressure pain [25].

Swallowing problems are common in many patients, due to problems of chewing, moving food in the mouth, or swallowing, or with issues of potential aspiration due to reduced control of the airway. Careful assessment is essential and the involvement of speech and language therapy is important in the assessment. Careful feeding, of foods of the correct consistency, is helpful and many patients can continue oral feeding if there is good hand feeding by experienced carers [26]. However the use of a gastrostomy, often a percutaneous endoscopic gastrostomy, may need to be considered. This is not without risk and the benefits and risks may need to be balanced carefully. As swallowing deteriorates there is the risk of aspiration pneumonia and oral feeding may need to be assessed for risk. However, often patients may wish to continue to taste and enjoy food, at risk.

Communication is a basic need for all people but in neurological disease it may become difficult due to dysphasia, dysarthria, dementia and cognitive change or weakened respiratory effort. Speech and language therapy assessment is essential, and the use of appropriate aids important — usually a mix of low tech aids, such as a spelling board or pad and paper, with high tech aids, such as computer based systems or eye gaze control if other movement has been lost [26].

Consideration of the cognitive ability of the patient is essential, as this may reduce the effectiveness of the use of the communication aid. There is also the need to enable patients to continue communication by social media or other Internet systems.

There may be particular psychological issues to be considered in progressive neurological disease, as there are often fears of the disease, the possible deterioration and the process of dying [27]. These may be highlighted because of the information given to patients, such as the myths of choking to death in ALS, or from experience of seeing other family members deteriorate and die from the same disease, such as in Huntington's disease or increasingly seen in familial ALS. It is important to be aware of these issues and listen carefully to patients and families.

Social issues are often profound, as patients and families face continual loss as the disease progresses, for instance a patient with ALS may lose ability to walk, to move, swallow, speak, breath unaided and even cognition. These issues will impact not only on the patient but also the family, and other carers, including professionals. There is a need for proactive assessment and discussion, and enabling patients and families to express their fears and distress [27].

Spiritual issues — regarding the meaning of life, the existential issues and, on occasions, religious issues — are often very important as one faces a progressive disease and deterioration [28]. As patients face deterioration, with possible cognitive change or loss, they may experience profound concerns — feelings of hopelessness, dependency and altered sense of worth and isolation — as well as fears of the future — of their physical or mental state or dying and death itself [27]. All involved in care need to be open to hear these issues and allow discussion.

Carer support

Family members and carers for someone with a progressive neurological disease face similar issues to the person — fears of the future, coping with cognitive change and dementia, coping with increased communication problems, and living with the increased pressure of caring for a progressively disabled person. The stresses on carers may be profound and they will need their own support and opportunity to discuss their concerns and fears [27]. This burden may increase as the person deteriorates and there is the need to ensure that they have the opportunity for themselves and also the opportunity to be a family member with their loved one, rather than a carer with increased burden. As the end of life approaches extra support is necessary to allow the family to be able to be with the person as family, rather than as extended carer.

Families will also need support at the time of the death and in bereavement. They may have many mixed emotions — relief that the burden of caring has been lifted but also feeling guilty that they have these emotions when their loved one has died. Bereavement support and counselling may be helpful, although many families will show resilience and may just need support and explanation of their feelings and emotions.

Professionals will also have their own needs in coping with the progressive loss faced by patients and family carers. Professionals may feel impotent and distressed by the continual losses faced by patients and without support depression, stress or burnout may occur. This is often minimised but support, in the form of counselling, supervision and training, is helpful in reducing the risks of stress and burnout [29].

End of life care

The end of life phase — the last 6 to 12 months — should be recognised, if possible. This allows the focus of care to be adjusted – looking at the provision of comfort and the support to all involved — patient, family, carers, and professionals. The discussions about the end of life may start earlier and may occur particularly when the patient/family asks, or when new treatment is planned, especially when NIV or gastrostomy are suggested.

Triggers that may suggest the end of life phase is staring have been suggested. These are:

- swallowing problems;
- recurring infection;
- marked decline in functional status;
- first episode of aspiration pneumonia;
- cognitive difficulties;
- weight loss;
- significant complex symptoms [30].

There may be certain triggers for specific diseases, such as cognitive change and non-responsiveness to treatment for PD [30].

These triggers have been shown to increase as death approaches – with the number of triggers increasing nearer to death and aspiration pneumonia becoming increasing more frequent, particularly in the last 3 to 6 months of life [31].

The recognition of the end of life phase is important as the focus of care can be clarified and the palliative care approach becomes more appropriate. This may include discussion with patient, if possible and appropriate and family and should ensure that they all, included in the multidisciplinary team, are

aware of the changes expected. The management of symptoms may need to be reassessed and the provision of medication, which may be necessary parenterally at the end of life — analgesia, sedative medication and anticholinergic medication to reduce chest secretions — should be made available so that there is no delay in providing symptom management at home [23]. This may include consideration of the continuation of medication that is necessary for the patient — such as the medication for Parkinson's disease when stopping this could increase stiffness and cause distress. Anti-Parkinsonian treatment can be continued by using transdermal preparations (such as rotigotine patches) or apomorphine infusion [32].

There are many ethical areas that may need to be discussed at the end of life, or if possible when undertaking advance care planning. These may include:

- Cardiopulmonary resuscitation — this may be inappropriate for a person with advancing disease and discussion with the patient, if possible and appropriate, and the family is very helpful, so that all can be clear that CPR would not be attempted, allowing the person to die peacefully.
- The use of antibiotic therapy for aspiration pneumonia at the end of life is usually ineffective and inappropriate and the symptoms can be managed by the use of analgesic and anticholinergic medication, often parenterally. Earlier discussion of these issues allows all involved are aware of the patient and family wishes and can act appropriately.
- The use of gastrostomy feeding at the end of life is often difficult. For many patients it becomes apparent that the amount of feed may be reduced and replaced by water to continue hydration. If there is no gastrostomy many families may feel that artificial hydration should be started, although there is little evidence that this prolongs life [33]. Careful discussion and consideration of cultural issues is important, involving the multidisciplinary team.
- Some patients may wish to discuss hastened death — euthanasia (the deliberate use of medication to end life) or assisted dying / suicide (where the doctor will provide medication which the patient would take to end their life). The legality of these actions varies across the World and in the majority or countries (including Poland) euthanasia and assisted dying are prohibited. However, patients and families may still wish to discuss the issues. It is important that all are prepared to listen to them, and see if there are specific issues which lead to these requests — such as the fear of pain, of a distressing death. These issues may be addressed and reassurance given that symptoms will be managed and dying from a neurological disease is not necessarily distressing — several surveys have now shown that dying is usually peaceful [34, 35].

Careful discussion of psychosocial and spiritual issues is important — taking into account any cultural issues, remembering that every family has their own culture. There may be a need to discuss where the person wants to be cared for and where they would wish to die —these are often separate places [36], so that the patient's and family's views can be discussed and agreed.

Patients and families may fear of the dying process and so discussion about the reality of the management of symptoms is important. There is now increasing evidence that palliative care can reduce distress at the end of life and this should be mentioned to all involved — again this is not just patients and families but professionals as well [34, 35].

Education

Within the EAN/EAPC Consensus paper the need for education was recommended — for neurologists on palliative care and for palliative care specialists in neurology [3]. Education has been shown to improve care and mutual understanding and collaboration. This collaboration may need to be with neurology, palliative care, primary care (family care) and rehabilitation services so that the best and most appropriate care can be provided for patients and families [13].

Conclusion

Palliative care is very appropriate for the support of people with progressive neurological disease. However, there may be the need for variable involvement over the disease progression [37]. At times there is the need for involvement of specialist services, but at other times there may be fewer needs and less involvement. For instance for a person with ALS there may be particular needs at the time of diagnosis, coping with the shock of the news, at gastrostomy, at the initiation of NIV and at the end of life, and this will be over a period of 2 to 3 years for the majority of patients. For a person with MS there may be specific symptom issues at times and involvement later in the disease progression and this may be over a period of many years, with long periods when there are fewer specialist needs. This variable input, according to the patient's needs, is often a challenge to palliative care and requires a more collaborative approach with other services, such as rehabilitation, primary care and neurology [13]. However, if the most appropriate care is to be provided this collaboration and close relationships need to be developed.

With a close collaboration, keeping the patient and family at the centre of care, patients and their families may be supported and their issues addressed until they are able to die peacefully in the place of their choice.

References

1. World Health Organisation. Global burden of neurological disorders: estimates and projections in Neurological disorders – public health challenges. Switzerland, 2006.
2. Shaw C, Quinn A, Daniel E. Amyotrophic lateral sclerosis/ /motor neurone disease. In: Oliver, D, Borasio, G & Johnston W. [eds]. Palliative Care in Amyotrophic Lateral Sclerosis – From Diagnosis to Bereavement. Oxford University Press, Oxford 2014.
3. Oliver DJ, Borasio GD, Caraceni A, et al. A consensus review on the development of palliative care for patients with chronic and progressive neurological disease. Eur J Neurol. 2016; 23(1): 30–38, doi: 10.1111/ene.12889, indexed in Pubmed: 26423203.
4. World Health Organization. Palliative care 2002. www.who.int/cancer/palliative/definition/en/ (2002).
5. Temel JS, Greer JA, Muzikansky A, et al. Early palliative care for patients with metastatic non-small-cell lung cancer. N Engl J Med. 2010; 363(8): 733–742, doi: 10.1056/NEJMoa1000678, indexed in Pubmed: 20818875.
6. Youens D, Moorin R. The Impact of Community-Based Palliative Care on Utilization and Cost of Acute Care Hospital Services in the Last Year of Life. J Palliat Med. 2017; 20(7): 736–744, doi: 10.1089/jpm.2016.0417, indexed in Pubmed: 28437201.
7. Edmonds P, Hart S, Vivat B, et al. Palliative care for people severely affected by multiple sclerosis: evaluation of a novel palliative care service. Mult Scler. 2010; 16(5): 627–636, doi: 10.1177/1352458510364632, indexed in Pubmed: 20305044.
8. Higginson IJ, McCrone P, Hart SR, et al. Is short-term palliative care cost-effective in multiple sclerosis? A randomized phase II trial. J Pain Symptom Manage. 2009; 38(6): 816–826, doi: 10.1016/j.jpainsymman.2009.07.002, indexed in Pubmed: 19833477.
9. Veronese S, Gallo G, Valle A, et al. Specialist palliative care improves the quality of life in advanced neurodegenerative disorders: NE-PAL, a pilot randomised controlled study. BMJ Support Palliat Care. 2017; 7(2): 164–172, doi: 10.1136/bmjspcare-2014-000788, indexed in Pubmed: 26182947.
10. Solari A, Giordano A, Patti F, et al. PeNSAMI Project. Randomized controlled trial of a home-based palliative approach for people with severe multiple sclerosis. Mult Scler. 2017 [Epub ahead of print]: 1352458517704078, doi: 10.1177/1352458517704078, indexed in Pubmed: 28381133.
11. Oliver D, Watson S. Multidisciplinary Care. In . (Editor): End of Life Care in Neurological Disease. London. Springer 2012, pp. : 113–127.
12. Aridegbe T, Kandler R, Walters SJ, et al. The natural history of motor neuron disease: assessing the impact of specialist care. Amyotroph Lateral Scler Frontotemporal Degener. 2013; 14(1): 13–19, doi: 10.3109/17482968.2012.690419, indexed in Pubmed: 22642305.
13. Turner-Stokes L, Sykes N, Silber E, et al. From diagnosis to death: exploring the interface between neurology, rehabilitation and palliative care in managing people with long-term neurological conditions. Clin Med (Lond). 2007; 7(2): 129–136, doi: 10.7861/clinmedicine.7-2-129, indexed in Pubmed: 17491500.
14. Aoun SM, Breen LJ, Howting D, et al. Receiving the news of a diagnosis of motor neuron disease: What does it take to make it better? Amyotroph Lateral Scler Frontotemporal Degener. 2016; 17(3-4): 168–178, doi: 10.3109/21678421.2015.1111907, indexed in Pubmed: 26609553.
15. Aoun SM, Breen LJ, Edis R, et al. Breaking the news of a diagnosis of motor neurone disease: A national survey of neurologists' perspectives. J Neurol Sci. 2016; 367: 368–374, doi: 10.1016/j.jns.2016.06.033, indexed in Pubmed: 27423623.
16. Buecken R, Galushko M, Golla H, et al. Patients feeling severely affected by multiple sclerosis: how do patients want to communicate about end-of-life issues? Patient Educ Couns. 2012; 88(2): 318–324, doi: 10.1016/j.pec.2012.03.010, indexed in Pubmed: 22480629.
17. Jox RJ, Krebs M, Bickhardt J, et al. How strictly should advance decisions be followed? The patients' opinion. Palliat Med. 2008; 22(5): 675–676, doi: 10.1177/0269216308089303, indexed in Pubmed: 18612037.
18. Bourke SC, Tomlinson M, Williams TL, et al. Effects of non-invasive ventilation on survival and quality of life in patients with amyotrophic lateral sclerosis: a randomised controlled trial. Lancet Neurol. 2006; 5(2): 140–147, doi: 10.1016/S1474-4422(05)70326-4, indexed in Pubmed: 16426990.
19. Oliver D, Faull C. Non-invasive ventilation in amyotrophic lateral sclerosis/motor neuron disease. Minerva Pneumologica. 2013; 52: 27–38.
20. Faull C, Rowe Haynes C, Oliver D. Issues for palliative medicine doctors surrounding the withdrawal of non-invasive ventilation at the request of a patient with motor neurone disease: a scoping study. BMJ Support Palliat Care. 2014; 4(1): 43–49, doi: 10.1136/bmjspcare-2013-000470, indexed in Pubmed: 24644770.
21. Faull C, Oliver D. Withdrawal of ventilation at the request of a patient with motor neurone disease: guidance for professionals. BMJ Support Palliat Care. 2016; 6(2): 144–146, doi: 10.1136/bmjspcare-2016-001139, indexed in Pubmed: 27197864.
22. Lee M, Walker R, Hildreth T, et al. A Survey of Pain in Idiopathic Parkinson's Disease. J Pain Symptom Manage. 2006; 32(5): 462–469, doi: 10.1016/j.jpainsymman.2006.05.020.
23. Oliver D. The quality of care and symptom control--the effects on the terminal phase of ALS/MND. J Neurol Sci. 1996; 139 Suppl: 134–136, doi: 10.1016/0022-510x(96)00087-1, indexed in Pubmed: 8899674.
24. Higginson IJ, Hart S, Silber E, et al. Symptom prevalence and severity in people severely affected by multiple sclerosis. J Palliat Care. 2006; 22(3): 158–165, indexed in Pubmed: 17058754.
25. Oliver D. Opioid medication in the palliative care of motor neurone disease. Palliat Med. 1998; 12(2): 113–115, doi: 10.1191/026921698677326556, indexed in Pubmed: 9616447.
26. Scott A, McPhee M. Multidisciplinary care: speech and language therapy. In: Oliver D, Borasio GD, Johnston W. Palliative care in amyotrophic lateral sclerosis- from diagnosis to brereavement. 3rd edition. Oxford University Press 2014: 215–232.
27. Smith S, Wasner M. Psychosocial care. In: Oliver D, Borasio GD, Johnston W. Palliative care in amyotrophic lateral sclerosis – from diagnosis to brereavement. 3rd edition. Oxford University Press 2014: 145–170.
28. Lambert R. Spiritual care In: Oliver D, Borasio GD, Johnston W. Palliative care in amyotrophic lateral sclerosis- from diagnosis to brereavement. 3rd edition. Oxford University Press 2014: 171–186.

29. Pereira SM, Fonseca AM, Carvalho AS. Burnout in palliative care: a systematic review. Nurs Ethics. 2011; 18(3): 317–326, doi: 10.1177/0969733011398092, indexed in Pubmed: 21558108.
30. End of life care in long term neurological conditions: a framework for implementation. National End of Life Care Programme 2010.
31. Hussain J, Adams D, Allgar V, et al. Triggers in advanced neurological conditions: prediction and management of the terminal phase. BMJ Support Palliat Care. 2014; 4(1): 30–37, doi: 10.1136/bmjspcare-2012-000389, indexed in Pubmed: 24644768.
32. Campbell CW, Jones EJS, Merrills J. Palliative and end-of-life care in advanced Parkinson's disease and multiple sclerosis. Clin Med (Lond). 2010; 10(3): 290–292, indexed in Pubmed: 20726466.
33. National Institute for Health and Care Excellence. Care of dying patients in the last days of life NG31. National Institute for Health and Care Excellence 2016. www.nice.org.uk/guidance/ng31 (2016).
34. O'Brien T, Kelly M, Saunders C. Motor neurone disease: a hospice perspective. BMJ. 1992; 304(6825): 471–473, doi: 10.1136/bmj.304.6825.471, indexed in Pubmed: 1547416.
35. Neudert C, Oliver D, Wasner M, et al. The course of the terminal phase in patients with amyotrophic lateral sclerosis. J Neurol. 2001; 248(7): 612–616, doi: 10.1007/s004150170140, indexed in Pubmed: 11518004.
36. Agar M, Currow DC, Shelby-James TM, et al. Preference for place of care and place of death in palliative care: are these different questions? Palliat Med. 2008; 22(7): 787–795, doi: 10.1177/0269216308092287, indexed in Pubmed: 18755830.
37. O'Brannagain D. An integrated framework of early intervention palliative care in motor neurone disease as a model to progressive neurodegenerative disease. 2009, Turin.