ABHAY K. DAS[1,*], ASHRAF AHMED[2], OLIVER J. CORRADO[3], ROBERT M. WEST[4]
[1]*Consultant Physician in Elderly Medicine, Pontefract General Infirmary, Friarwood Lane, Pontefract, West Yorkshire WF8 1PL, UK*
Email: abhaylopa@yahoo.co.uk
[2]*Specialist Registrar in Elderly Medicine, Yorkshire Deanery, Willow Terrace Road, University of Leeds, Leeds LS1 9JT, UK*
[3]*Consultant Physician in Elderly Medicine, Director of West Yorkshire Foundation School, Leeds General Infirmary, UK*
[4]*Reader in Health Statistics, Centre for Epidemiology and Biostatistics, University of Leeds, UK*
**To whom correspondence should be addressed*

References

1. Marini C, De Santis F, Sacco S *et al.* Contribution of atrial fibrillation to incidence and outcome of ischaemic stroke: results from a population based study. Stroke 2005; 35: 1115–9.
2. Feinberg WM, Blackshear JL, Laupacis A, Kronmal R, Hart RG. Prevalence, age distribution, and gender of patients with atrial fibrillation. Arch Intern Med 1995; 155: 469–73.
3. Hart RG, Benavente O, McBride R, Pearce LA. Antithrombotic therapy to prevent stroke in patients with atrial fibrillation: a meta-analysis. Ann Intern Med 1999; 131: 492–501.
4. Hart RG, Pearce LA, Koudstaal PJ. Transient ischaemic attacks in patients with atrial fibrillation: implications for secondary prevention: the European Atrial Fibrillation Trial and Stroke Prevention in Atrial Fibrillation III Trial. Stroke 2004; 35: 948–51.
5. O'Donnell M, Oczkowski W, Fang J *et al.* Influence of pre-admission antithrombotic therapy on stroke severity in patients with atrial fibrillation: an observational study. Lancet Neurol 2006; 5: 749–54.
6. Albers GW, Dalen JE, Laupacis A *et al.* Antithrombotic therapy in atrial fibrillation. Chest 2001; 119(Suppl): 194s–206s.
7. Gage BF, Waterman AD, Shannon W *et al.* Validation of clinical classification schemes for predicting stroke. Results from the national registry of atrial fibrillation. JAMA 2001; 285: 2864–70.
8. Wheeldon NM, Taylor DI, Anagnostou E, Cook D, Wales C, Oakley GDG. Screening for atrial fibrillation in primary care. Heart 1998; 79: 50–5.
9. The Atrial Fibrillation Follow-up Investigation of Rhythm Management (AFFIRM) Investigators. A comparison of the rate control and rhythm control in patients with atrial fibrillation. N Engl J Med 2002; 347: 1834–40.
10. Sudlow M, Thomson R, Thwaites B, Rodgers H, Kenny RA. Prevalence of atrial fibrillation and eligibility for anticoagulants in the community. Lancet 1998; 352: 1167–71.
11. McCrory DC, Matchar DB, Samsa G, Sanders LL, Pritchett ELC. Physician attitude s about anticoagulation for non-valvular atrial fibrillation in the elderly. Arch Intern Med 1995; 155: 277–81.
12. Mant J, Hobbs FD, Fletcher K *et al.* BAFTA investigators; Midlands Research Practices Network (MidRec). Warfarin versus aspirin for stroke prevention in an elderly community population with atrial fibrillation (the Birmingham Atrial Fibrillation Treatment of the Aged Study, BAFTA): a randomised controlled trial. Lancet 2007; 370: 493–503.
13. Devereaux PJ, Anderson DR, Gardner MJ *et al.* Differences between perspectives of physicians and patients on anticoagulation in patients with atrial fibrillation: observational study. BMJ 2001; 323: 1218–22.
14. Dorian P, Paquette M, Newman D, Green MS, Talajic M, Roy D. Quality of life improves following treatment in Canadian Trial of Atrial Fibrillation. Circulation (Suppl I) 1999; 100: I–502.
15. Das AK, Willcoxson PD, Corrado OJ, West RM. The impact of long-term warfarin on the quality of life of elderly people with atrial fibrillation. Age Ageing 2007; 36: 95–7.
16. Ware JE, Sherbourne CD. The MOS 36-item short form health survey. Conceptual framework and item selection. Med Care 1992; 30: 473–81.
17. Hayes V, Morris J, Wolfe C *et al.* The SF-36 health survey questionnaire: is it suitable for use with older adults? Age Ageing 1995; 24: 120–5.
18. Ware JE, Kosinski M, Turner-Bowker DM *et al.* How to score version 2 of the SF-12 health survey. ISBN: 1-891810-10-3, pp 88–91.
19. Hamilton LC. STATA statistics version 10. Cengage 2009, ISBN: 9780495557869.
20. Lancaster TR, Singer DE, Sheehan MA *et al.* The impact of long-term warfarin therapy on quality of life- the Boston Area Anticoagulation Trial for Atrial Fibrillation Investigation. Arch Intern Med 1991; 15: 1944–49.
21. Perera V, Bajorek BV, Matthews S *et al.* The impact of frailty on the utilisation of antithrombotic therapy in older patients with atrial fibrillation. Age Ageing 2009; 38: 156–62.

doi: 10.1093/ageing/afp158
Published electronically 26 August 2009

Improving pain management in elderly patients with dementia: validation of the Doloshort observational pain assessment scale

SIR—More than half of older adults report pain affecting their quality of life [1]. Self-assessment cannot be implemented in patients with limited communication abilities due to severe dementia [2, 3]. To address this issue, standardised observational pain scales have been designed but they may be relatively lengthy and their validity has not always been verified. A very brief validated tool could greatly enhance pain evaluation in busy clinical practices and could also help shorten more comprehensive geriatric and oncological assessments of such patients.

In a prior study, we demonstrated that Doloplus-2 correlated with self-assessment and had adequate internal consistency and test–retest reliability. We constructed a short version of Doloplus-2, Doloshort, which includes the five items that were significantly associated with the visual analogue scale (VAS) score in a multiple regression model [4, 5]. We conducted the present prospective study to examine the validity of Doloshort and confirm its ease of use.

Table 1. Patient's characteristics

	CDR = 0 No dementia 38 cases	CDR = 1 Mild dementia 23 cases	CDR = 2 Moderate dementia 33 cases	CDR = 3 Severe dementia 21 cases	Total 115 cases	*P*
Age (mean, SD)	79.0 ± 9.4	81.2 ± 7.6	82.8 ± 6.9	85.0 ± 6.7	81.6 ± 8.1	0.226†
Gender (men/women)	14/24	13/10	19/14	8/13	54/61	0.992‡
Type of dementia: (*n*, %)						0.000‡
Alzheimer disease		10	13	8	31	
Mixed dementia		11	15	6	32	
Vascular dementia		2	5	4	11	
Other causes		0	0	3	3	
Mini-Mental Status Examination (mean, SD)	28.3 ± 1.6	22.4 ± 2.7	10.5 ± 2.3	3.2 ± 1.8	16.3 ± 7.8	0.000†
Number of co-morbidities (mean, SD)	1.4 ± 1.5	1.8 ± 0.9	1.5 ± 1.1	1.2 ± 1.0	1.5 ± 1.1	0.316§
Number of patients reporting pain (*n*, %)	29 (76)	18 (78)	28 (85)	20 (95)	95 (83)	0.351‡
Aetiology of pain: (*n*, %)						0.120‡
Osteoarthritis of joints	10 (34)	11 (61)	17 (61)	11 (55)	49 (52)	
Back pain (osteoporosis or ostheoarthritis)	7 (24)	6 (33)	8 (29)	5 (25)	26 (27)	
Skin lesion	4 (14)	1 (6)	1 (3)	3 (15)	9 (9)	
Other causes	8 (28)	0 (0)	2 (7)	1 (5)	11 (12)	

†Chi-square test.
‡Fisher exact test.
§One-way ANOVA.

Methods

Hundred and fifteen consecutively hospitalised French-speaking patients over the age of 65 years followed by the pain consultation (*n*: 81) or admitted to a specialised dementia unit (*n*: 34) were included. Exclusion criteria were delirium, acute psychiatric symptoms, end of life care and severe sensory impairment. Mini-Mental Status Examination, and the dementia rating scale (CDR), was used in all cases to rate cognitive status. The CDR assigns cognitive function to five levels defined as no dementia (CDR = 0), questionable dementia (CDR = 0.5), mild dementia (CDR = 1), moderate dementia (CDR = 2) and severe dementia (CDR = 3). The patients underwent a complete neuropsychological evaluation and appropriate laboratory testing including neuroimaging.

Seventy-seven (67%) patients met DSMIV criteria for dementia [6].

Age, gender distribution, pain prevalence and pain aetiology were not significantly different in individuals with and without dementia (Table 1).

Doloshort is an observational pain scale reflecting pain during usual care; it is completed by the nurse in charge of the patient after appropriate discussion with other involved team members (see Appendix 1 in the supplementary data on *Age and Ageing* online) [4, 5]. Self-assessment was completed with one study investigator in a quiet room. Patients were asked whether they experienced pain at the time of the assessment and to indicate the level of pain they were currently experiencing with the visual analogue scale (VAS). The patients were considered to have understood the VAS if they were able to explain its use and could correctly indicate which position corresponded to no pain at all and which position to the most severe pain. Study investigators and the nursing staff were blinded to each other's assessments.

Convergent validity: bivariate correlational analysis using Kendall's tau statistic was used to assess the strength of the association between pain intensities measured by Doloshort and completed VAS scales. Convergent validity was said to be present, if there was at least a strong correlation (Kendall's tau >0.5 or <-0.5) [7].

Internal consistency: the Cronbach alpha was calculated to examine the homogeneity of Doloshort.

Discriminant validity was established with two subsamples of patients. Divergent validity was said to be present if there was less than minor correlation between two measures (Kendall's tau <0.3 or >-0.3) [7]. In 15 patients without dementia, the Doloshort score was compared to measures of anxiety, depression and appetite derived from the Edmonton Symptom Assessment System (ESAS) completed the same day by the patient. The ESAS consists of nine visual analogue scales measuring common symptoms in palliative care [8]. Furthermore, in 20 patients with moderate to severe dementia, the Doloshort score was compared to the Pittsburgh Agitation Scale (PAS) score determined by the team in charge of the patient [9]. The PAS assesses agitation in patients with dementia.

Sensitivity to change of Doloshort was evaluated in a subsample of 34 patients with moderate to severe chronic pain. The first assessment was completed the day before the introduction of opioids (Day 1). The second was completed 3 days after their introduction (Day 4). After converting all scales to percent scores (no pain = 0% and maximum pain = 100%), the Wilcoxon matched-pairs signed-ranks test was used to evaluate whether both assessments were statistically different.

All analyses were performed with the Stata 9.2 statistical package. The study protocol was approved by the local ethics committee, and all study participants or appropriate surrogates gave their informed consent. Scores in text represent mean (± standard deviation) unless stated otherwise.

Table 2. Pain intensity measured by visual analogue scale (VAS) and Doloshort

	CDR = 0 No dementia 38 cases	CDR = 1 Mild dementia 23 cases	CDR = 2 Moderate dementia 33 cases	CDR = 3 Severe dementia 21 cases	Total 115 cases
Patients that demonstrated good comprehension of VAS (*n*, %)	38 (100)	23 (100)	29 (88)	7 (33)	97 (84)
Patients demonstrating good comprehension of VAS who were in pain (*n* (%))	29 (76)	18 (78)	28 (85)	3 (14)	78 (68)
VAS intensity of pain (median (interquartile range))[a]	4 (4)	4 (3)	5 (3)	6 (2)	5 (3)
Doloshort intensity (median (interquartile range))	3 (4)	8 (4)	5.5 (4.1)	6 (2)	4.5 (4)

[a]Only patients that demonstrated good comprehension of VAS are included.

Results

Fifty-nine (77%) patients with dementia demonstrated good comprehension of the VAS. The administration of the Doloshort was possible in all 115 patients and took 5.0 minutes (±0.9) (see Table 2).

Convergent validity: Among patients demonstrating good comprehension of the VAS, convergent validity was established between pain intensity on the VAS and the Doloshort score. Kendall's tau-b was 0.523 with an asymptotic standard error (ASE) = 0.052. The strength of the correlation was similar in patients with (0.548 (ASE: 0.067)) and without dementia (0.445 (ASE: 0.112)).

Internal consistency was adequate for all items (Cronbach alpha: 0.73) and similar in cognitively intact (0.68) and dementia patients (0.71).

Discriminant validity: A score above 3 on the anxiety, depression and appetite sub-scores of the ESAS was present in respectively 7, 7 and 11 of the 15 patients without dementia. The mean scores were, respectively, 2.3 (±2.1), 3.3 (±2.4) and 5.3 (±2.8); Kendall's tau-b (ASE) between these scores and the Doloshort were: 0.031 (0.258), 0.248 (0.219) and 0.207 (0.252).

Twelve of the 20 patients with dementia had a PAS greater than 0 (mean 2.7 ± 2.5). Kendall's tau-b between Doloshort and PAS was 0.139 (ASE = 0.155).

Sensitivity to change was established in a sub-sample of 34 patients with moderate to severe chronic pain in whom opioid therapy was initiated. The intensity of pain measured by the Doloshort was 6.4 ± 2.6 on Day 1 and 3.3 ± 2.3 on Day 4 ($P < 0.001$).

A score ≥3 on Doloshort had a sensitivity of 81.5% and a specificity of 70.5% for the detection of pain, with an area under the ROC curve of 0.76; this threshold correctly classified 76 of 100 patients.

Discussion

The Doloshort was easy to use, very quick to complete, correlated well with self-assessment and reached desired internal consistency levels for a new scale [10].

A strength of our study was the use of a self-assessment pain scale as a gold standard for patients that could still communicate. Although use of the VAS in dementia is controversial, we previously demonstrated its reliability in our population using standardised simplified instructions designed for use with cognitively impaired patients [11–14].

Although Doloshort has fewer items, its sensitivity and specificity were comparable to the longer Doloplus-2. Doloshort was also able to measure changes in pain intensity and discriminate pain from behavioural symptoms, anxiety and depression. Importantly, Doloshort scores decreased after treatment with opioid analgesics confirming its validity for pain evaluation.

However, several limitations of our study should be kept in mind. Doloshort could only be compared to self-assessment in patients who understood the VAS, and it is possible that Doloshort performances may be different in patients who cannot communicate anymore. Unfortunately, in such cases there is no available gold standard [15–17]. Also, Doloshort was completed by nurses in charge of the patient who were not blinded to treatment status; this could have affected pain rating in patients receiving analgesics (placebo use was ruled out for ethical reasons and filming a patient during an entire shift was not possible).Finally, the study was performed in a hospitalised older population with a high prevalence of pain; Doloshort's performance may be different in other settings. Further studies are needed to confirm the generalisability of our findings and to compare Doloshort to other observational pain scales in multiple populations.

Key points

- What is known: older patients with dementia commonly experience pain but often cannot communicate it. A brief, observation-based, validated tool would greatly enhance pain control in this rapidly growing population.
- What this study adds: the Doloshort is a concise and reliable clinical pain assessment tool that is easy to use in patients with dementia and may be particularly useful in daily care.

Conflicts of interest

None. All authors were involved in the manuscript preparation and approved the final submitted version.

Supplementary data

Supplementary data are available at *Age and Ageing* online.

SOPHIE PAUTEX[1,*], FRANÇOIS R. HERRMANN[2], PAULETTE LE LOUS[3], GABRIEL GOLD[4]
[1]*Division of palliative medicine, Department of Rehabilitation and Geriatrics, Geneva University Hospital (HUG), Ch. De la Savonnière 11, CH-1245 Collonge-Bellerive, Switzerland*
Email: sophie.pautex@hcuge.ch
[2]*Division of Geriatrics Department of Rehabilitation and Geriatrics, HUG, 3.ch Pont-Bochet, CH-1226 Thônex, Switzerland*
Email: francois.herrmann@hcuge.ch
[3]*Division of General Medical Rehabilitation, Department of Rehabilitation and Geriatrics HUG, 1211 Geneva 14, Switzerland*
Email: paulette.lelous@hcuge.ch
[4]*Division of internal medicine and rehabilitation, Department of Rehabilitation and Geriatrics, HUG, 3.ch Pont-Bochet, CH-1226 Thônex, Switzerland*
Email: Gabriel.gold@hcuge.ch
[*]*To whom correspondence should be addressed*

References

1. Michel JP *et al.* End-of-life care of persons with dementia. J Gerontol A Biol Sci Med Sci 2002; 57: M640–4.
2. Bernabei R *et al.* Management of pain in elderly patients with cancer. SAGE Study Group. Systematic Assessment of Geriatric Drug Use via Epidemiology. JAMA 1998; 279: 1877–82.
3. Cramer GW *et al.* A drug use evaluation of selected opioid and nonopioid analgesics in the nursing facility setting. J Am Geriatr Soc 2000; 48: 398–404.
4. DOLOPLUS-2. Behavioral pain assessment. Available at www.doloplus.com/versiongb (accessed 4 April 2009).
5. Pautex S *et al.* Psychometric properties of the doloplus-2 observational pain assessment scale and comparison to self-assessment in hospitalized elderly. Clin J Pain, 2007; 23: 774–9.
6. Diagnostic and Statistical Manual of Mental Disorder, 4th edition. Washington, DC: American Psychiatry Association, 1994.
7. Leong IY, Chong MS, Gibson SJ. The use of a self-reported pain measure, a nurse-reported pain measure and the PAINAD in nursing home residents with moderate and severe dementia: a validation study. Age Ageing 2006; 35: 252–6.
8. Bruera E *et al.* The Edmonton Symptom Assessment System (ESAS): a simple method for the assessment of palliative care patients. J Palliat Care 1991; 7: 6–9.
9. Rosen J *et al.* The Pittsburgh Agitation Scale. Am J Geriatr Psychiatry 1994; 2: 52–9.
10. Nunnally JC, Bernstein IH. Psychometric Theory, 3rd edition. McGraw Hill Books, New York, 1994.
11. Chibnall JT, Tait RC. Pain assessment in cognitively impaired and unimpaired older adults: a comparison of four scales. Pain 2001; 92: 173–86.
12. Gagliese L *et al.* The measurement of postoperative pain: a comparison of intensity scales in younger and older surgical patients. Pain 2005; 117: 412–20.
13. Pautex S *et al.* Feasibility and reliability of four pain self-assessment scales and correlation with an observational rating scale in hospitalized elderly demented patients. J Gerontol A Biol Sci Med Sci 2005; 60: 524–9.
14. Pautex S *et al.* Pain in severe dementia: self-assessment or observational scales? J Am Geriatr Soc 2006; 54: 1040–5.
15. Abbey J *et al.* The Abbey pain scale: a 1-minute numerical indicator for people with end-stage dementia. Int J Palliat Nurs 2004; 10: 6–13.
16. Warden V, Hurley AC, Volicer L. Development and psychometric evaluation of the Pain Assessment in Advanced Dementia (PAINAD) scale. J Am Med Dir Assoc 2003; 4: 9–15.
17. Horgas AL, Elliott AF, Marsiske M. Pain assessment in persons with dementia: relationship between self-report and behavioral observation. J Am Geriatr Soc 2009; 57: 126–32.

doi: 10.1093/ageing/afp172
Published electronically 14 September 2009

Outdoor and indoor falls as predictors of mobility limitation in older women

SIR-—Falls in old age often cause physical injuries, which may lead to hospitalisation and institutionalisation [1]. However, whether falls in general have an impact on mobility decline has been little studied [2, 3]. It has been suggested that outdoor falls are more common among healthy and active older people, whereas indoor falls are often related to intrinsic risk factors, such as poor health and impaired balance [4–6]. As poor health and low functional ability are known to be risk factors for both indoor falls [4, 5] and mobility disability [7], it can be hypothesised that, compared to outdoor falls, indoor falls are more likely to be associated with mobility decline. However, to date it is not known whether indoor and outdoor falls in old age have a different impact on mobility. The objective of this study was to determine the association of outdoor and indoor falls with the incidence of mobility limitation in older women.

Methods

A total of 434 women aged 63–76 from the Finnish Twin Study on Aging [8] participated in the baseline examinations. Subsequently, falls were followed up for 1 year, and 2 years thereafter mobility limitation was re-examined. The incident mobility limitation was defined as the onset of major difficulty or inability in walking 2 km among those without difficulties at the baseline. The criteria for participation in this study were the ability to walk 2 km without major difficulties at the baseline, complete information about the occurrence and location of falls during the fall surveillance, and follow-up information on mobility limitation ($n = 376$).

At baseline, the presence of chronic conditions and use of prescribed medications were documented according to