Table. Appropriateness of Duration of Antimicrobial Therapy According to Sex and Complicating Condition Status Among 225 Veterans With Suspected Urinary Tract Infection[a]

Complicating Condition(s)	Veterans (N=225)	Duration of Therapy			
		Appropriate[b]	Inappropriate		
			Too Long or Too Short	Too Long	Too Short
Men					
Present	152 (68)	103 (68)	49 (32)	0	49 (32)
Absent	51 (23)	14 (27)	37 (73)	25 (49)	12 (24)
Present or absent	203 (90)	117 (58)	86 (42)	25 (12)	61 (30)
Women					
Present	3 (1)	2 (67)	1 (33)	0	1 (33)
Absent	19 (8)	9 (47)	10 (53)	10 (53)	0
Present or absent	22 (10)	11 (50)	11 (50)	10 (45)	1 (5)
Either					
Present	155 (69)	105 (68)	50 (32)	0	50 (32)
Absent	70 (31)	23 (33)	47 (67)	35 (50)	12 (17)
Present or absent	225 (100)	128 (57)	97 (43)	35 (16)	62 (28)

[a] Data are given as number (percentage) of veterans. A sensitivity analysis also was performed using an alternate definition of appropriate duration, as described in the "Methods" section.
[b] Appropriate duration was defined as 3 days (women without complicating conditions), 7 days (women with complicating conditions and men without such conditions), and 10 to 14 days (men with complicating conditions).

may feel uncomfortable ignoring bacteriuria and/or pyuria, despite an absence of relevant clinical manifestations. Although many health care providers realize that excessive antimicrobial use can be harmful and should be avoided, some clearly need to be reminded about the complete absence of evidence supporting antimicrobial therapy for abnormal urinalysis findings in patients who lack genitourinary symptoms and of the importance of adjusting treatment duration for symptomatic UTI according to host factors. Our findings suggest that management of UTI among veterans offers abundant opportunities for improving efficacy, reducing unnecessary antimicrobial use, and limiting harms.

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Continuous Deep Sedation Until Death in Belgium: A Nationwide Survey

In recent years much debate has focused on the practice of continuous deep sedation until death and its acceptability on an ethical level. While many view its performance as part of normal medical practice, provided that particular safeguards are met, it is also believed to be a covert form of euthanasia in some cases and thus

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morally equivalent to euthanasia.[1] As a result, several guidelines have been issued worldwide relating to the conditions and modalities of its use.[1-3] First, sedation should not be aimed at hastening death. The patient should be

expected to die "imminently" (ie, within no more than 2 weeks) and have refractory symptoms. The continued administration of artificial nutrition or hydration is not encouraged unless the benefits outweigh the harm. Also, the use of benzodiazepines rather than opioids is recommended because the latter are known to have uncertain sedative effects and considerable adverse effects. This decision should be made with the patient or, in case of incompetence, with the family. With the exception of the Dutch national guideline issued by the Royal Dutch Medical Association in 2005 and revised in 2009,[2] all guidelines are unofficial expert recommendations.

Continuous deep sedation until death is becoming an ever more prevalent practice at the end of life, as was shown in several studies in (among others) the Netherlands and the United Kingdom.[4,5] The present study reports on the evolution of the prevalence of continuous deep sedation until death in Flanders, Belgium, between 2001 and 2007. Furthermore, we investigated clinical aspects relevant to the ethical debate surrounding the practice.

Methods. In 2007, we repeated a large-scale death certificate study in Flanders, Belgium (approximately 55 000 deaths per year), last conducted in 2001.[6] Questionnaires were sent to the reporting physicians of a representative sample of death certificates received by the Flemish Agency for Care and Health between June 1 and November 30, 2007. Details of the study design have been published elsewhere.[7] The questionnaire asked about the performance of various end-of-life practices. The following question, identical to the one in the 2001 study, was posed regarding continuous deep sedation: "Was the patient continuously and deeply sedated until death by the use of one or more drugs?" We used a description of the practice (continuous deep sedation until death) rather than a term (*palliative* or *terminal sedation*) to avoid interpretation differences among respondents. Additional questions, not posed in 2001, inquired about the drugs used, the duration of sedation, administration of artificial nutrition or hydration, decision making with patient and family, possible alternatives to sedation for the treatment of symptoms, and the physician's life-shortening intentions in the performance of sedation.

We received questionnaires for 3623 of the 6927 initial cases. From nonresponse analyses, we found that for 725 cases response was not possible owing to issues of access to the patient's medical file or patient identification. These cases were removed from the sample, and the response rate was 58.4%. Cases were weighted to be representative of all deaths in Flanders in 2007. The response rate in 2001 was 58.9%.

Results. The overall prevalence of continuous deep sedation until death increased significantly between 2001 and 2007 from 8.2% to 14.5%, and this increase occurred in all care settings, among both sexes, in all age groups, and in patients with various causes of death (**Table 1**). Opioids were used for sedation in 83%, often as the sole drug, especially in care homes. Sedation rarely lasted longer than 1 week. Artificial nutrition or hydration was withheld in most cases at home and in care homes, while 63% of sedated hospital patients received artificial nutrition and hydration until death. In one-fifth of all sedated patients (and 27% of sedated hospital patients), neither patient nor family had given consent for sedation. The patient had requested or consented to sedation in 53% of sedation cases at home, while the family had at least given consent in 78% of cases in care homes. There was a (co)intention to hasten death in 17% of cases, and the physician indicated the lack of alternatives to sedation in 82% (**Table 2**).

Table 1. Prevalence of Continuous Deep Sedation Between 2001 and 2007[a]

	2001		2007	
Variable	**No.**	**% (95% CI)**	**No.**	**% (95% CI)**
Overall	238	8.2 (7.1-9.4)	561	14.5 (13.1-15.9)
Place of death[b]				
At home	52	3.7 (2.7-5.0)	190	9.8 (8.3-11.6)
Hospital	160	13.2 (11.3-15.4)	270	19.5 (17.2-22.0)
Care home	21	2.9 (1.8-4.7)	88	9.4 (7.4-11.8)
Sex				
Male	133	9.3 (7.7-11.1)	278	13.5 (11.8-15.6)
Female	105	7.1 (5.8-8.7)	283	15.4 (13.5-17.6)
Age, y				
1-64	67	11.4 (8.8-14.8)	152	19.3 (16.0-23.0)
65-79	113	11.6 (9.5-14.0)	220	17.1 (14.7-19.9)
≥80	58	4.7 (3.6-6.2)	189	11.1 (9.4-13.0)
Cause of death				
Cardiovascular disease	48	7.5 (5.7-9.8)	56	10.8 (8.4-13.9)
Malignancy	125	10.0 (8.4-11.9)	353	18.8 (17.0-20.9)
Respiratory disease	25	8.8 (6.6-12.7)	41	14.1 (10.5-18.6)
Disease of the nervous system	4	6.3 (2.3-16.2)	22	17.3 (11.4-25.4)
Other diseases	36	7.3 (5.2-10.1)	89	14.3 (11.5-17.7)

Abbreviation: CI, confidence interval.
[a] Figures are unweighted number of cases and weighted percentages of all deaths (95% CIs).
[b] Other place of death was not included in the table (5 cases in 2001 and 13 cases in 2007).

Comment. The increase of continuous deep sedation across all care settings and patient groups indicates its generally rising acceptance as a medical end-of-life practice. This is likely related to recent developments in the implementation and organization of palliative care in Belgium, partly instigated by a law on palliative care in 2002.[8] Still, the increase in Flanders is striking and raises further questions. Other factors presumably influenced the increase. Although euthanasia is legal in Belgium since 2002, it is possible that some physicians and patients view continuous deep sedation as a psychologically and medically preferable alternative to euthanasia. The effects of institutional policy can also be taken into account, since many Belgian hospitals introduced additional safeguards to the legal requirements for euthanasia,[9] possibly causing continuous deep sedation to be favored above euthanasia as a last resort decision. Or perhaps physicians are now simply more willing to report the performance of deep sedation because of the legalization of euthanasia. Lastly, it could also be that physicians prefer to sedate a patient until death rather than deal with a multitude of persistent but nonetheless

Table 2. Characteristics of Performing Continuous Deep Sedation (CDS) Until Death in 2007 by Place of Death[a]

Characteristic	No.	Total CDS (n=561)	Home (n=190)	Hospital (n=270)	Care Home (n=88)	*P* Value[b]
Drugs administered						
Only benzodiazepines	73	11	17	9	14	.13
Benzodiazepines and opioids	207	38	45	38	29	.21
Benzodiazepines and other drugs	6	1	2	0	NR	.53
Benzodiazepines, opioids, and other drugs	39	8	8	8	8	>.99
Only opioids	167	31	**25**	**28**	**48**	.003
Opioids and other drugs	26	7	**3**	**10**	**1**	.001
Only other drugs	17	5	**1**	**7**	NR	.001
Duration of sedation						
0-48 h	300	56	58	57	54	.75
2-7 d	174	35	33	33	40	.36
1-2 wk	30	6	8	7	4	.74
>2 wk	12	3	1	3	2	.76
Artificial nutrition and hydration						
Administered until death	159	43	**2**	**63**	**1**	<.001
Withdrawn during sedation	43	9	4	11	9	.12
Withheld	347	48	**95**	**26**	**89**	<.001
Request or consent						
Request by patient	71	10	**19**	**8**	**5**	.005
Not by request, but with consent of patient	135	20	**34**	**18**	**13**	.003
Not by request or with consent of patient, but request by family	78	12	**16**	**6**	**28**	<.001
Not by request or with consent of patient, but with consent of family	191	39	**27**	**40**	**50**	.008
Not by request or consent of patient or family	74	20	**4**	**27**	**4**	<.001
Intention of hastening death						
No intention	124	32	**14**	**40**	**21**	<.001
Taking into account possible hastening of death	280	51	**61**	**46**	**66**	.03
Co-intention	77	13	22	11	12	.09
Explicit intention	18	4	3	4	1	.42
Other alternatives, according to physician						
None	424	82	**71**	**87**	**76**	.002
Symptom control without CDS	38	6	**11**	**3**	**12**	.002
Life-ending acts	70	10	18	8	9	.054
Other	8	2	NR	2	3	.39

Abbreviation: NR, no cases reported in category.

[a] Figures are weighted column percentages. Percentages may not always amount to 100% because of rounding. Values in bold denote statistically significant differences between home, hospital, and care home settings. Other place of death was not included in the table (13 cases). Missing cases included the following: drugs administered (n=26), duration of sedation (n=45), artificial nutrition and hydration (n=12), request or consent (n=12), intention of hastening death (n=62), other alternatives (n=21).

[b] *P* values were calculated with Fisher exact test (in StatXact version 6; Cytel Inc, Cambridge, Massachusetts).

nonrefractory symptoms.[10] Further (qualitative) research is needed to investigate these hypotheses.

Clinical characteristics of continuous deep sedation differ between settings and show aberrations from internationally proposed guidelines and recommendations: opioids are frequently used as the sole drug (especially in care homes), patient or family consent is often lacking (especially in hospital), and sedation is often performed with an intention to hasten death (especially at home). Furthermore, in some cases alternatives to sedation had been possible for the treatment of symptoms. These results suggest that continuous deep sedation may sometimes be inadequately performed and ethically questionable and lead us to conclude that the formulation of an official clinical guideline is recommended for Belgium, most likely for other countries as well. The advantages of such a guideline have been demonstrated in the Netherlands, where recent research showed that the national guideline's instructions had been increasingly applied since its introduction in 2005.[11] It is, however, also clear from this research in the Netherlands that more is needed than mere implementation of a guideline to raise physicians' awareness for adequate sedation: training and knowledge dissemination—with specific focus points for each setting—are equally necessary.

In conclusion, the prevalence of continuous deep sedation increased considerably in Flanders, Belgium, between 2001 and 2007, across care settings and among various patient groups. More research is needed to assess the plausibility of the uttered explanatory hypotheses. Our findings further point to the need for the implementation of a clinical practice guideline in Belgium, since Belgian physicians do not seem to be familiar with existing international recommendations.

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