Vascular Dementia Versus Dementia of Alzheimer’s Type: Do They Have Differential Effects on Caregivers’ Burden?

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Objectives. We investigated homecare patients with dementia of Alzheimer’s type (DAT; n = 36) or vascular dementia (VD; n = 36) and their care-providing relatives regarding clinical and psychosocial variables to determine whether DAT and VD impose different burdens on caregivers.

Method. All patients were diagnosed according to ICD-10 criteria. The diagnoses were confirmed by internal medical, clinical-neurological, and psychiatric parameters. The severity of the dementias was graded according to the Global Deterioration Scale (GDS). Caregiving relatives responded to the Behavioral Pathology in Alzheimer’s Disease Rating Scale (BAD), the Blessed Dementia Scale (BDS), and the Screen for Caregiver Burden (SCB).

Results. Analyses revealed that caregivers’ burden (SCB), disease symptoms and personality changes of patients (BAD), and the patients’ inability to cope with everyday tasks (BDS) were sharply higher for DAT than for VD patients in the group with severe dementia. Concerning patients with mild or moderately severe disease, scores in the DAT group were similar or lower than those in the VD group.

Conclusion. In early stages, VD patients impose a greater burden on relatives than do patients with DAT. In severe stages this relationship undergoes a reversal, with relatives of DAT patients experiencing the burden more adversely than those of VD patients. The differences in the onset and course characteristics, as well as the specific differences between these two types of dementia with respect to caregiver burden factors, call for their diagnostic separation and the development of specific home-care support systems for family caregivers.

Dementia of Alzheimer’s type (DAT) is the most common type of dementia, accounting for 50%–75% of all cases. Vascular dementia (VD) is probably the next most common type, although its prevalence is unknown. The onset of VD declines after age 75, while the incidence of DAT continues to rise. While DAT typically has an insidious onset and gradual but steady decline, VD is characterized by a more abrupt onset and tends to a stepwise progression (APA, 1997). However, it is well known that in both DAT and VD the caregivers’ burden increases with severity of illness (Eagles, Craig, Rawlinson, Restall, Beattie, & Besson, 1987; O’Connor, Pollitt, Roth, Brook, & Reiss, 1990; Vetter et al., 1998; Vetter et al., in press). In all stages of severity, the highest correlations with the perceived caregiver burden occur in the areas of loss of control (cf. Morris, Morris, & Britton, 1988; Pagel, Becker, & Coppel, 1985) and diminished or lost communication (cf. Morris & Britton 1988; Pagel et al., 1985) and, to a lesser degree, extra workload (cf. Donaldson, Terrier, & Burns, 1997; Stephens, Kinney, & Ogrocki, 1991) and patient aggression (Greene, Smith, Gardiner, & Timburg, 1982). To our knowledge, however, research on the impact of dementia symptoms on family caregivers has not systematically considered the differential burden imposed by DAT versus VD. Although empirical evidence is lacking, it is usually assumed that caregivers of both dementia types experience the same burden. To test this assumption we systematically compared both types of dementia with respect to several aspects of caregivers’ burden.

Method

A total of 72 homecare patients with DAT (n = 36) or VD (n = 36) and their care-providing relatives (n = 36 and n = 36, respectively) were recruited by the University Center for Nervous Diseases, Christian Albrechts University in Kiel, Germany, from physicians in private practice, advisory centers, and day care nursing facilities. In view of the frequent coexistence of DAT and VD, mixed cases were excluded. Inclusion in the category VD was based on the NINDS-AIREN criteria (Roman et al., 1993). Early DAT exhibits no typical lesions in computed tomography and magnetic resonance tomography (Bauer, 1994), with typical changes occurring only later in the hippocampal area (O’Brien, 1995). Vascular involvement was examined by measuring the pulsatility index of extra- and intracranial vessels (Caamaño, Gómez, Vinagre, Franco-Maside & Cacabelos, 1994). A total of 8 out of 80 cases (10%) which could not be classified definitively as either VD or DAT were designated mixed cases. Comparing clinical and pathological
DAT diagnoses, Pearl (1977) found 7% mixed cases. The true epidemiological prevalence of mixed cases is unknown, which is also true of VD and DAT (Gilleard, Kellett, Coles, Millard, Honavar, & Lantos, 1993).

In order to avoid confusing the patients, examinations were conducted in surroundings familiar to them (Kurz, Haupt, Müller-Stein, Romero, Zimmer, & Lauter, 1991). All patients were diagnosed according to the tenth Revision of the International Classification of Diseases (ICD-10; WHO, 1991). The diagnosis was confirmed by internal medical parameters (differential blood picture, folic acid levels, vitamin B12, T3/T4, blood pressure, electrocardiography), clinical-neurological and psychiatric examinations, Doppler ultrasounds of cervical vessels, electroencephalograms, and neurological imaging of the head by computed tomography and/or magnetic resonance tomography.

Applying the seventh-level Global Deterioration Scale (GDS; Reisberg, Ferris, de Leon, & Crook, 1982), an external assessment scale for estimating severity of cognitive impairment in dementia, the patients were divided into three groups according to severity of illness: low-grade dementia (GDS levels 3/4; group 1), moderate dementia (level 5; group 2), and severe dementia (levels 6/7; group 3). This grouping, however, conforms to the more commonly used three-stage medical model of early, middle, and late stages. The cognitive ability of the patients was evaluated by the Mini-Mental State Examination (MMSE; Folstein, Folstein, & McHugh, 1975).

The Blessed Dementia Scale (BDS; Blessed, Tomlinson, & Roth, 1968) was used to assess the dementia's effect on the patient's intellectual performance and ability to cope with the tasks of daily living, from the point of view of the care providing relatives. Disease symptoms, personality changes, and the overall severity of the disease were examined using the Behavioral Pathology in Alzheimer's Disease Rating Scale (BAD; Reisberg, Boreinstein, Salob, Ferris, Franssen, & Georgotis, 1987), which contains 25 items for the description of dementia symptoms, also from the point of view of caregiving relatives.

To determine the burden of caregiving, the patient's relatives were questioned according to the Screen for Caregiver Burden (SCB; Vitaliano, Russo, Young, Becker, & Maiuro, 1991), which registers 25 items, graded from 0 to 4. Here the sum of all individual scores measures the total care-related burden. In addition, the SCB items were divided into six subscales: activity disturbances (SCB items 1, 13, 17, 20, 22), loss of communication (items 4, 6, 8, 11, 24), aggressiveness (items 12, 15, 18, 19), workload (items 5, 7, 14, 16, 19, 21), financial problems (items 9, 10), and loss of control (items 2, 3, 25; cf. Vitaliano et al., 1991).

RESULTS
The VD group was composed of 18 men and 18 women (mean age = 78.5 years), and the DAT group comprised 19 men and 17 women (mean age = 71.0 years). The age difference between the two groups was significant (t[70] = 3.26; p < .01). The age of the family caregivers of VD patients, 79% of whom were women, ranged from 25 to 94 years (M = 63.2, SD = 17.6). Fifty-seven percent of caregivers were spouses, 5% siblings, and 38% children. A total of 64% of the caregivers lived with the patient in a common household. Care-providing relatives of DAT patients had a mean age of 61.7 years; 69% were women and 31% were men. Fifty-three percent were spouses, 8% siblings, and 39% children. Eighty-five percent shared a common household with the patient. None of these caregiver characteristics differed significantly between the two groups.

Table 1 shows the means and (in parentheses) standard deviations for the different variables broken down according to patient group and severity of illness. Multivariate two-way analyses of variance (MANOVAs) were conducted to test whether the mean differences were significant. In case of significant effects, additional univariate analyses of variance (ANOVA) were carried out. The MANOVA revealed a significant main effect “severity of illness” (Wilk’s Λ = 1 - F[34,100] = 2.93, p < .001), and a slightly significant main effect “type of dementia” (Wilk’s Λ = .63, F[17.50] = 1.76, p < .07). Furthermore, the interaction effect was reliable (Wilk’s Λ = .37, F[34,100] = 1.73, p < .05). The results of the following ANOVAs are presented in Table 1.

As expected, except for two variables (BAD: Affective Disturbances and SCB: Financial Burden), the symptoms and caregivers' burden for both groups increased with severity of illness. Significant differences were found between DAT and VD patients. Caregivers of VD patients reported more changes in habits, more diurnal rhythm disturbances, and a greater financial burden than caregivers of DAT patients. Caregivers of DAT patients, on the other hand, noted more severe affective disturbances in patients.

The most interesting findings, however, were the significant interactions between the two types of dementia and severity of disease. These interactions were reflected in no less than seven variables (cf. Table 1), in which the perceived severity of symptoms and the weight of caregiving burden as assessed by relatives was sharply higher for DAT than for VD patients in the group with severe dementia. Concerning patients with mild or moderately severe disease, scores of DAT patients were similar or lower than those of VD patients.

DISCUSSION
We examined whether differences exist in the burden imposed on caregiving relatives by DAT versus VD patients (SCB), whether the patients contrast with regard to changes in performance of everyday activities, personality, and interests (BDS), and various psychopathological variables (BAD).

DAT and VD patients were found to differ in changes in habits (BDS), in diurnal rhythm disturbances and affective disturbances (BAD), and especially in the financial burden imposed on family caregivers (SCB). Patients with VD were less able to take care of themselves than DAT patients. Unlike VD, DAT led to a deterioration in the basic skills of daily living only late in the disease course (cf. Haley & Pardo, 1989). Moreover, the day-night rhythm of VD patients was more severely disturbed than that of DAT patients (cf. Aharon-Peretz, Masiah, Pillar, Epstein, Tzischinsky, & Lavie, 1991). Sleep disorders are among the disturbances of dementia patients least tolerated by family care providers (Gilleard, Beltford, Gilleard, Whittick, & Gledhill, 1984; Pollak, Perlick, Linsner, Wenston, & Heieh, 1990; Sanford, 1975). VD patients also placed a greater financial burden on caregivers than did DAT patients. This finding can be explained by the frequent focal neurological signs and symptoms associated with VD (APA, 1997), and by the multimorbidity of VD patients. Conversely, affective disturbances were more pronounced in DAT patients. Depressive symptoms were found to accompany DAT in 40% of cases (cf. Lazarus,
As expected, the two diseases showed a severity-related difference in practically all subscales of BDS and BAD, and in SCB items pertaining to burden on caregiving relatives. In both types of dementia the weight of the burden imposed on caregiving relatives (SCB) increased significantly with severity of disease, regardless of the type of disturbance—a finding that accords with data in the literature (Eagles et al., 1987; O’Connor et al., 1990; Pruchno & Resch, 1989; Russo, Vitaliano, Brewer, Katon, & Becker, 1995).

Other studies showed conflicting results. The severity of symptoms in patients with VD was greater than in patients with DAT, even when the two diagnostic groups had similar degrees of cognitive impairment (Sultzzer, Levin, Mahler, High, & Cummings, 1993). Buch and Adolfsen (1983), however, found that VD patients had fewer psychopathological symptoms than DAT patients. This heterogeneity of findings may reflect the severity of dementia within each diagnostic group or differences in severity between groups.

The cognitive deterioration has been found to be rapid during middle stages and more slow during very late stages of DAT (Stern et al., 1994). Patients with severe DAT appear to level off or show a lessening of the rate of decline on the BDS (Morris et

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**Table 1. Means, Standard Deviations (in Parentheses) and Results of Two-Way ANOVAs for Several Measures of Caregiver Burden and Levels of Severity in the Different Patient Groups. Reliabilities (Cronbach’s alpha) of the Measures are Reported in Parentheses.**

<table>
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<tr>
<th>Measure</th>
<th>Patient Group</th>
<th>Severity</th>
<th>F&lt;sub&gt;AB&lt;/sub&gt;</th>
<th>F&lt;sub&gt;A&lt;/sub&gt;</th>
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<td>Blessed Dementia Scale</td>
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<td>Changes in performance of everyday activities</td>
<td>low-grade</td>
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<td>0.00</td>
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<td>(alpha = 0.84)</td>
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<td>Changes in habits (alpha = 0.72)</td>
<td>low-grade</td>
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<td>0.00</td>
<td>9.40**</td>
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<td>Changes in personality (alpha = 0.74)</td>
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<td>0.00</td>
<td>9.40**</td>
<td>5.70*</td>
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<tr>
<td>Changes in interest and drive (alpha = 0.69)</td>
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<td>0.00</td>
<td>9.40**</td>
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Newton, Cohler, Lesser, & Schweon, 1987). Depression is considered to be part of the DAT syndrome (Burke, Rubin, Morris, & Berg, 1988), and is more common in early stages of the disease (Pruchno & Resch, 1989).

As expected, the two diseases showed a severity-related difference in practically all subscales of BDS and BAD, and in SCB items pertaining to burden on caregiving relatives. In both types of dementia the weight of the burden imposed on caregiving relatives (SCB) increased significantly with severity of disease, regardless of the type of disturbance—a finding that accords with data in the literature (Eagles et al., 1987; O’Connor et al., 1990; Pruchno & Resch, 1989; Russo, Vitaliano, Brewer, Katon, & Becker, 1995).
al., 1993). On the other hand, greater unawareness of impaired independent living skills and poor patient awareness of memory deficits was associated with a higher level of caregiver stress (DeBettignies, Maharin, & Pirrozzolo, 1990; Seltzer, Vasterling, Yoder, & Thompson, 1997). Furthermore, findings by Seltzer and Buswell (1994) suggest that caregivers of DAT patients might be more negative in their assessment of psychopathology. This negatively biased rating of symptom severity could be a result of caregiver depression (Mittelman et al., 1995), which occurs in up to 50% of caregivers (Gallagher-Wrabetz, Lovett, Del Maestro, & Rose, 1989).

Of particular interest, though, were the significant interaction effects between type of dementia and severity of illness. Even in mild and moderate stages of disease, the two dementias differed significantly from one another in numerous parameters. VD patients in early stages imposed a greater burden on relatives than did patients with DAT. In severe stages, however, this relationship underwent a dramatic reversal, with relatives of DAT patients experiencing the caregiving burden much more adversely than those of VD patients.

In mild and moderate stages of disease, relatives assessed DAT patients as being less affected, especially with regard to personality changes (BDS). Only in severe stages were DAT patients adjudged to be significantly more impaired than VD patients. Changes in interests and drive (BDS) were also less marked in mild stages in DAT patients, and only significantly exceeded those of VD patients in moderate and severe stages. Anxiety states (BAD) in DAT patients with low-grade and moderate disease were less pronounced than in their VD counterparts, but worsened significantly in relation to VD patients in severe stages.

Only in severe stages of disease did the loss of control (SCB) over the dementia patients become a significantly greater burden to caregiving relatives of DAT patients versus relatives of VD patients, whereas in mild and moderate stages, the burden imposed by DAT patients was less than that imposed by VD patients. The high subjective burden experienced by family caregivers due to loss of control in all stages of severity is well documented (Kinney & Stephens, 1989; Morris et al., 1988; Pagel et al., 1985; Wright, 1991). It is also well known that only in severe stages of disease are relatives of DAT patients more burdened by patients’ aggressive behavior than relatives of VD patients (Cohen et al., 1993; Greene et al., 1982). Further, in our study, the increased workload in mild stages imposed a greater burden on relatives of VD patients than on relatives of DAT patients. Here again though, in severe stages, Alzheimer’s patients became a significantly greater burden. The burden from increased workload is also well documented (Donaldson et al., 1997; Stephens et al., 1991).

Lastly, regarding overall burden on family caregivers, the same tendency was found: DAT patients were less of a burden in mild and moderate disease stages, but became a significantly greater burden in severe stages than their VD counterparts.

Pruchno and Resch (1989) point to the increasing ability of caregivers of DAT patients to cope with certain impairments, such as cognitive disturbances. For example, once family caregivers of DAT patients learn to accept and adjust to the fact that mnesic impairments will worsen in a linear manner as the disease progresses, their care-related stress generally decreases. By contrast, the ebb and flow of specific behaviors comprising asocial and disoriented dimensions, an increasing rate of unforeseeable behavioral disturbances (e.g., fits of anger), together with their social rejection, serves only to aggravate caregiver stress.

Especially burdensome for relatives was the need to adjust to mild and moderate levels of symptoms (cf. Pruchno & Resch, 1989), particularly when symptoms associated with mild impairment do not conform to expectations and become stressful (cf. Morycz, 1980; Morris et al., 1988) until escalation of the symptoms makes it clear that the behavioral changes are due to dementia. The findings of Pruchno and Resch (1989) and Morycz (1980) help to explain why relatives of VD patients with mild and moderate illness experience the disease much more adversely than relatives of DAT patients, whereas the converse was true in more severe stages. Whereas relatives of DAT patients perceived a steady disease-related decline, 76% of relatives of VD patients experienced the course of fluctuating, with phases of marked confusion followed by partial improvement that stopped short of the previous level of functioning, a finding similar to that of Reisberg and colleagues (1986). This ebb and flow of symptoms may well be the reason why in low-grade and moderate stages of disease severity the burden to caregiving relatives of VD patients is dominated by loss of control, aggressive behavioral disturbances, and increased workload. The literature shows these items to be especially burdensome to caregivers (Cohen et al., 1993; Deimling & Bass, 1986; Greene et al., 1982; Kinney & Stephens, 1989).

An additional factor affecting burden to caregivers of VD patients may be the fact that for a mean 2½ years prior to diagnosis of VD, 29% to 45% of VD patients in our study had been under a physician’s care for somatic illnesses such as hypertension, cardiac insufficiency, stroke, or diabetes mellitus, whereas prior somatic illnesses played a numerically minor role in DAT patients.

DAT patients are on average 7.5 years older than VD patients (cf. APA, 1997), a fact that might contribute to the difference in caregiver burden. In DAT patients, advancing age was associated with an increasing delay between onset of dementia symptoms and the first visit to a physician. In over 90% of DAT patients, the most common initial symptom is mnesic disturbances (La Rue, Watson, & Plotkin, 1993), which relatives tend to regard as an expression of the normal aging process (Deimling & Bass, 1986; Pollitt, O’Connor, & Anderson, 1989). Even after the diagnosis of DAT is made, relatives perceive cognitive disturbances as less burdensome than disruptive behavior (Deimling & Bass, 1986). Added to this is the unwillingness on the part of relatives to comprehend that the DAT patient suffers from an incurable disease (Grafström, Norberg, & Winblad, 1993). The predictability of linearly increasing forgetful behavior and cognitive symptoms during the course of DAT, and the fact that relatives become accustomed to these symptoms (Brashares & Catanzaro, 1994; Pruchno & Resch, 1989; Russo et al., 1995) explains why these symptoms are initially experienced as imposing only a slight burden. The rapid change in symptom severity that occurs in the middle or late stages of DAT (BDS: changes in interests and personality) and the associated burden on relatives may also be a function of the age difference. The already much older DAT patients were generally in extreme old age by the late phases of disease and were accordingly more fragile and subject to multiple other general medical problems associated with advanced age, which when compounded with the DAT led to a much greater degree of disability for a given level of dementia (APA, 1997). It is also conceivable that the increase in burden on family caregivers in the moderate...
and severe stages of VD is connected with the frequent psychosomatic symptoms and the patients’ tendency to develop incontinence, gait, and motor disturbances, and, eventually, to become mute and bedridden. Threats, combativeness, and physical violence are more likely to occur later in the illness, posing particular problems for home caregivers (APA, 1997). The differences in burden imposed by the two forms of dementia may also be due in part to the fact that early treatment of VD may prevent further progression, whereas DAT is generally resistant to treatment.

This study, however, has a cross-sectional design. The differences between VD and DAT patients of different severity stages should therefore be replicated in future longitudinal studies.

CONCLUSIONS

The differences in the onset and course characteristics between VD and DAT, as well as the specific differences between the two diseases with respect to caregiver burden factors, call for the diagnostic separation of these two major forms of dementia and the development of specific homecare support systems for family caregivers of VD and DAT patients. Based on our results and the literature, relatives of VD patients should be provided homecare support earlier in the course of the disease than relatives of DAT patients. On the other hand, relatives of DAT patients must be counseled regarding the particularly heavy burden associated with the final phase of this disease. Interventions should focus on the dementia-specific and severity-dependent burden factors, aggressiveness and personality changes on the part of the patients, and loss of control and increased workload on the part of the relatives. Such interventions must aim at reducing the specific levels of burden on caregivers and at delaying/preventing institutionalization of DAT and VD sufferers (Donaldson et al., 1997) by optimal use of the available homecare supports (Vetter et al., in press). Timely and effective intervention can help to keep down costs to the health care system (Mortimer, Ebbitt, Sung-Pyo, & Finch, 1992).

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