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Depression in Age-Related Macular Degeneration

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Abstract

Age-related macular degeneration (AMD) is a major cause of disability in the elderly, substantially degrades the quality of their lives, and is a risk factor for depression. Rates of depression in AMD are substantially greater than those found in the general population of older people, and are on par with those of other chronic and disabling diseases. This article discusses the effect of depression on vision-related disability in patients with AMD, suggests methods for screening for depression, and summarizes interventions for preventing depression in this high-risk group.

Visual impairment (both blindness and low vision) is one of the leading causes of disability in old age (Alliance for Aging Research, 1999), and the number of people who are visually impaired will increase considerably as the population ages. Most cases of late-onset vision loss are attributable to age-related macular degeneration (AMD), which afflicts nearly 10 million people (Eye Diseases Prevalence Research Group, 2004; Klein, Klein, Jensen, & Meuer, 1997). AMD is a major cause of disability in elderly people, sub-stantially degrades the quality of their lives, and is a risk factor for depression. Depression is a frequent and serious complication of AMD that is itself disabling. Thus, finding ways to detect, treat, and prevent depression among individuals with AMD is extremely important. The following discussion summarizes the extent of depression among AMD patients, discusses the effect of depression on vision-related disability, and provides suggestions for treating and preventing depression.

Prevalence of depression

A diagnosis of major depression is based on a specific set of criteria whereby a sad mood or an inability to experience pleasure (anhedonia), in addition to at least four other symptoms (e.g., sleep or appetite disturbance, trouble concentrating, and feelings of guilt and hopelessness), must be present for at least two weeks, according to the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) (American Psychiatric Association, 1994). Subthreshold depression (sometimes referred to as subsyndromal depression) is characterized by clinically significant depressive symptoms that do not meet the DSM-IV criteria for a depressive disorder. Both types of depression are common in AMD.

Rates of depression among people with AMD are alarmingly high. Two studies reported that nearly one-third of AMD patients were depressed (Brody et al., 2001; Rovner, Casten, & Tasman, 2002). In an epidemiological study of nearly 10,000 elderly people, Crews and Campbell (2004) found that compared to people who had no sensory impairments, those with impaired vision were twice as likely to report being depressed. Bandello, Lafuma, and Berdeaux's (2007) study of the public health impact of AMD estimated that persons with AMD

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whose visual acuity was worse than 20/200 had a 15% probability of developing depression. Augustin et al. (2007) found that the prevalence of depression increased as visual impairment became more severe. Rates ranged from 14.3% for those with minimal vision loss to 25% for those with severe vision loss. The prevalence of depression was also high among older adults who sought low vision rehabilitation services (Horowitz, Reinhardt, & Boerner, 2005).

These consistently high rates of depression are substantially greater than the rate found in the general population of older adults (approximately 4% for major depression) (Substance Abuse and Mental Health Services Administration, SAMSA, 1999) and are comparable to rates (for both major and subthreshold depression) reported in those with other chronic diseases (such as cardiovascular disease, 15% to 25%; stroke, 22% to 50%; cancer, 6% to 39%; and diabetes, 24% to 22%) (CIGNA Behavioral, 2007). These figures are especially troublesome because the suicide rate among older adults is almost twice that of the national average (SAMSA, 1999). Moreover, Waern et al. (2002) found that visual impairment in elderly people is a risk factor for suicide.

Depression and visual function

What are the pathways by which AMD leads to depression? The vision loss resulting from AMD and its concomitant impact on daily function appreciably lowers a person's quality of life. Some studies have suggested that the quality of life of persons with AMD is worse than that of those with other chronic diseases, such as obstructive pulmonary disease and AIDS (Williams, Brody, Thomas, Kaplan, & Brown, 1999). Compared to elderly people who are sighted, those with AMD are much more likely to have trouble with instrumental activities of daily living and daily functioning (Soubrane et al., 2007).

The functional losses that result from visual impairment can bring about a loss of independence and feelings of the lack of control over one's life, of inadequacy, and of helplessness. Social isolation can arise from restrictions on mobility (such as difficulty driving and limited walking because of the fear of falling), embarrassment about one's loss of vision, and impairments in processing visual stimuli (like reading nonverbal facial cues). Moreover, visual impairment can lead to a diminution or cessation of activities and pastimes that give life meaning and richness. For example, Rovner and Casten (2002) followed 51 AMD patients for six months and found that AMD led to depression to the extent that it resulted in the loss of important life activities, such as hobbies and socializing. Rovner, Casten, Hegel, Hauck, and Tasman's (2007) study of 206 persons with AMD who were initially not depressed observed that those who were dissatisfied with their performance of an important vision-related task (such as engaging in a hobby) were 2.5 times more likely to become depressed.

Depression (both major and subthreshold) in AMD is a serous problem because it significantly compounds the disability resulting from vision loss beyond what is caused by AMD. The disablement process provides a useful framework for illustrating the impact of depression in AMD. According to this model, disease (AMD) leads to impairment (vision loss), which causes functional limitations (like difficulty reading), which, in turn, bring about disability (the inability to manage finances, for example) (Verbrugge & Jette, 1994). Disability, although certainly affected by the impairment, is also affected by psychological factors, such as depression. From this perspective, then, AMD patients with comorbid depression have two sources of disability working in synergy to magnify the disabling effects of each other.

This effect was clearly seen in Rovner and Casten's (2001) study, which demonstrated that over six months, worsening depressive symptoms predicted declining function above and beyond what was accounted for by deteriorating vision. A comparison of participants who did and did not develop depression at the six-month follow-up showed that those who did were 8.3 times more likely to experience a significant decline in function even when the effects of

visual acuity were controlled, demonstrating that disability that was initially caused by vision loss was aggravated once the participants became depressed. Other studies have reported similar findings. For example, Brody et al. (2001) found that depression was significantly related to vision-specific disability after visual acuity was controlled. In a study of 872 elderly people, Rovner and Ganguli (1998) found that among those with visual impairments, depressive symptoms significantly increased the odds of functional impairment independent of vision.

It is worth noting that subthreshold depression, which affects about 27% of persons with AMD (Horowitz, Reinhardt, & Kennedy, 2005), also has a profound effect on functioning. Horowitz et al. (2005) compared functional disability ratings among three groups of elderly patients who applied for low vision rehabilitation services: (1) those with major depression, (2) those with subthreshold depression, and (3) those with no depression. Those with subthreshold depression had levels of disability comparable to those with major depression; both depressed groups had a significantly greater disability than did those with no depression. Similar findings were reported by Rovner, Casten, Hegel, and Tasman (2006), who examined the relationships between disability and subthreshold depressive symptoms in 206 nondepressed persons with AMD. Those with subthreshold depression had significantly worse visual function than did those without depression, even when visual acuity was controlled. This finding was evident for both self-reported visual function and ratings of visual function that were based on observations of the performance of tasks (such as writing checks and pouring liquid).

Because subthreshold depression can impair visual function and is a risk factor for major depression (Cuijpers, & Smit, 2004), it is especially important that persons with AMD be screened for depression. Rovner and Casten (unpublished data) found that the following four symptoms of depression are risk factors for future depression in those with AMD: (1) sad or depressed mood (OR = 16.7), (2) hypochondria (OR = 3.3), (3) insomnia (OR = 2.5), and (4) guilt (OR = 6.7). They further found that compared to persons without subthreshold depression, those with it were 6.3 (CI: 3.2, 14.3) times more likely to develop a depressive disorder within six months ($p < .001$). Although these findings certainly need to be replicated in additional samples, they suggest the need to identify persons who are at risk for a depressive episode who may thus benefit from a preventive intervention or, at the least, careful monitoring.

In view of the fact that depression (both major and subthreshold) among elderly persons who are visually impaired can have such grave consequences (including suicide and functional impairment), there is a need for guidelines on how best to deal with depression in those with AMD. Depression in the context of AMD needs to be considered on two levels: treatment of acute episodes and the prevention of future cases.

Treatment for acute depression

The first step in dealing with acute depression is to identify it. Ophthalmologists, optometrists, rehabilitation specialists, and other eye care professionals should consider routinely screening their patients with AMD for depression (both major and subthreshold depression). Several quick and easy-to-administer depression-screening instruments are available that can alert health care professionals to the presence of depressive symptoms. Three commonly used ones are the Geriatric Depression Scale (Yesavage et al., 1983), the Center for Epidemiological Studies Depression Scale (Radloff, 1977), and the Patient Health Questionnaire (Kroenke, Spitzer, & Williams, 2001). Each instrument asks persons to rate the severity or frequency of depressive symptoms (or both) and yields quantitative scores that capture the severity of depression. Each also has established cut-points that indicate the possibility of major depression.

As per the guidelines of both the American Academy of Ophthalmology (2007) and the American Optometric Association (1994), persons with both major and subthreshold depression should be referred for mental health treatment. It is also a good idea to reassure them that their feelings are an understandable and common reaction to vision loss and that safe and effective treatments are available. Although it has been verified that low vision rehabilitation may improve depressive symptoms (Horowitz, Reinhardt, & Boerner, 2005), major depression likely requires medical or psychological intervention. Referrals should be followed up and reinforced in cases of noncompliance. In addition, notifying the person's primary care provider of possible depression is recommended by Smartsight, an initiative of the American Academy of Ophthalmology.

Prevention Of depression

Devoting attention to the prevention of depression in persons with AMD may avoid some of the perils that are associated with it. The prevention of psychiatric morbidity is relatively common in the field of geriatrics, in general, and has recently gained appeal as a worthwhile strategy for preserving function in AMD. Preventive interventions are categorized at three levels: primary (with the goal of decreasing the incidence of depression), secondary (with the goal of decreasing the prevalence of depression), and tertiary (with the goal of preventing a relapse or recurrence of depression) (Mrazek & Haggerty, 1994). The remainder of this section focuses on primary prevention, that is, strategies for averting the onset of a depressive episode in persons with AMD. Primary prevention is conceptualized at three levels, which are defined by the targeted population. Universal interventions are aimed at the general population—in this case, all persons who have AMD. Selected interventions target subgroups who have risk factors for depression, and indicated interventions are directed toward persons who have subthreshold symptoms. While the prevalence of depression in AMD is relatively high (about 30% for depressive disorders), universal interventions would probably not be cost effective in this population because 70% are not likely to get depressed.

Selected interventions should be guided by research that has delineated specific risk factors for depression in persons with AMD. One such risk factor that has been identified is the personality trait neuroticism (Rovner & Casten, 2001). Neuroticism is a stable trait that is defined by emotional instability, a tendency toward negative emotions, and an inclination to be easily stressed. It is also associated with the tendency to exaggerate the severity of physical symptoms (Costa & McCrae, 1987), and thus it is possible that highly neurotic people may view their vision loss in the most negative light, which may compromise their function. Furthermore, because of their tendency to feel self-conscious, highly neurotic persons with AMD may be disinclined to bring attention to their vision loss by using low vision devices in public.

Although neuroticism is thought to be a relatively stable characteristic that is not likely to be modified by an intervention, the risk of depression in highly neurotic individuals could perhaps be mitigated by teaching these persons strategies for dealing with the negative feelings and stress that they may feel in response to vision loss. A variety of psychological treatments (such as cognitive behavioral therapy, behavioral activation, and relaxation therapy) can accomplish this goal and can be incorporated into low vision rehabilitation. These short-term therapeutic modalities can help rehabilitation specialists maximize the rehabilitation potential of highly neurotic persons by refuting their negative perceptions of their vision loss. Neuroticism can be assessed with the neuroticism subscale of NEO-FFI (Costa and McCrae, 1992), a widely used self-report instrument with solid psychometric properties.

Persons with a recent decline in vision and subsequent new functional losses may also be at risk for depression and are thus a logical target for selected prevention. Rovner, Casten, Hegel, Leiby, and Tasman (2007) designed a psychosocial intervention, Problem Solving Treatment

(PST), to prevent depression in persons with this risk factor. This manualized intervention (a standardized therapeutic protocol) is based on the premise that inaccurate appraisals of problems and dysfunctional problem-solving skills contribute to the onset of depression. The authors posited that teaching persons effective problem-solving skills can foster independence, preserve function, and alleviate depressive symptoms. Indeed, problem-solving skills, which are assessed with the Social Problem Solving Inventory (D'Zurilla & Nezu, 1990) are related to adjustment to vision loss. Dreer, Elliot, Fletcher, & Swanson (2005) found that in a sample of clients who were receiving services from a low vision rehabilitation clinic, a negative problem-solving orientation was related to greater depression and emotional distress, while life satisfaction was the greatest in those with better, rational problem-solving skills.

In Rovner, Casten, Hegel, Leiby, and Tasman's study (2007), nondepressed persons with bilateral neovascular AMD and a recent vision loss were randomized to either PST or a usual-care control condition. The study tested the hypothesis that PST would reduce the incidence of depressive disorders at two months (short-term effect) and at six months (maintenance effect) compared with usual care and, secondarily, would prevent the loss of valued activities. Those who were treated with PST had six in-home sessions in which an interventionist taught them a systematic step-by-step process for dealing with seemingly overwhelming problems. The results showed that the intervention successfully prevented depression at two months. About 12% of the PST group became depressed compared to 23% of the usual-care group ($p < .05$). There was a parallel group difference in function: 23% of those who were treated with PST relinquished an important activity versus 37% of those who received usual care. The relationship between PST and the prevention of depression was mediated by whether or not an important activity was relinquished. These benefits, however, were not upheld, since rates of depression were similar in both groups at six months (21.1% of those in the PST group developed depression versus 27.4% of those in the control group).

This trial demonstrated that depression can be prevented in the short term but that beneficial effects are not sustainable over time. Because AMD is characterized by episodes of sudden vision loss and corresponding functional declines, ongoing efforts to prevent depression may be needed throughout the course of the disease. These efforts may involve monitoring and screening for events that may trigger depression and then administering maintenance treatment as needed. Although this approach is how depression is treated in psychiatric clinical settings, it is not widely practiced in the context of AMD.

Brody et al. (2002) also developed a psychosocial intervention to help people with AMD cope with vision loss. Their six-week intervention was led by a health professional and consisted of didactic instruction regarding basic information about AMD and rehabilitative strategies. It also contained a behavioral component that emphasized dealing with some of the challenges presented by AMD. The results showed that there was evidence of a significant improvement in mood among the intervention group six weeks after baseline and that this effect was most pronounced for those who were depressed at baseline. The intervention group also displayed improved function, and again this effect was most apparent for those who were depressed. A follow-up study at six months supported the sustained effects of the intervention; the benefits were the greatest for those who were depressed at baseline. An important finding was that the incidence of depression from baseline to six months was significantly lower in the intervention group (Brody, Roch-Levecq, Thomas, Kaplan, & Brown, 2005). Discrepancies in long-term effects between Rovner et al.'s and Brody et al.'s studies could be due to differences in sampling. Rovner et al.'s study did not include depressed persons, whereas Brody et al.'s study did, and the intervention was most advantageous for this subgroup.

To date, there have been no clinical trials to test the efficacy of the indicated preventive interventions (for persons who have subthreshold depression) to prevent major depression in

AMD, although the psychiatric literature suggests that interventions can halt the progression of depressive symptoms to a full-blown episode in the general population. For example, a recent meta-analysis indicated that psychological interventions can lower the incidence of major depression among patients with subthreshold depression, although the effect was small to moderate (Cuijpers & van Straten, 2007). Regarding AMD, subgroup analyses from Brody et al.'s (2002) study suggest that depressed patients respond particularly well to psychosocial interventions, and thus there is every reason to believe that those with subthreshold depression would benefit as well. Future studies are need to explore this issue in the context of AMD.

Practical implications

AMD is a serious public health problem, robbing patients of independence and destroying the quality of their lives. As the population ages, a greater number of Americans will be affected by this condition and subsequent depression. Thus, targeting depression, a major contributor to vision-related disability, is one strategy for maintaining independence and improving the quality of life. Moreover, because depression and function are so closely intertwined in AMD, developing interventions that incorporate the management of depression into rehabilitation may be the best course of action.

The two trials discussed here indicated that depression in AMD can be prevented to some extent. The next challenge is to find ways to incorporate mental health care into clinical practice (whether ophthalmologic, optometric, or other types of low vision rehabilitation). Although both the American Academy of Ophthalmology (2007) and the American Optometric Association (1994) recommend screening for depression, such screening has yet to become part of routine care. Along with screening efforts, mechanisms for systematic referrals and follow-ups for depressed persons are needed.

Another dilemma that clinicians face is the practicalities associated with delivering validated interventions. First, clinicians need to be trained to identify both depression and risk factors for depression, including education regarding the handling of crisis issues, such as suicidal ideation. Second, most vision care providers will likely require training in administering psychosocial interventions. Although PST, for example, can be used by non-mental health professionals, specialty training is needed. Furthermore, interventions like PST may need to be modified if they are incorporated into low vision rehabilitation. For example, a key component of PST is having the persons brainstorm possible solutions for their vision problems and then developing an associated plan of action. If PST is being delivered by a rehabilitation specialist, he or she may want to delay the initiation of PST until education about assistive devices and prescription magnifiers is dispensed to optimize this process. Third, given that providing depression-focused interventions will require more time by clinicians, new reimbursement mechanisms need to be implemented. Treating depression would also involve the designation of appropriate outcome assessments to evaluate the treatment. Fourth, it has been successfully demonstrated that depression can be prevented in persons with AMD in the short term. Longer-term prevention, however, is more uncertain. Strategies to manage the emotional consequences of vision loss over longer periods are needed.

As a final note, it is important that the progress that has been made in the past few years in psychological interventions should not get buried in the excitement of new medical treatments, such as the antivascular endothelial growth factor compounds Lu-centis and Avastin. Although these treatments help some people with AMD, many continue to have substantial vision loss, functional disability, and rehabilitative needs. If anything, recent medical interventions for AMD point to the need for fresh descriptive data so that psychological adjustment to vision loss can be observed in the context of novel eye treatments.

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