

# Diagnosis of Spontaneous Cervical Artery Dissection may be Associated with Increased Prevalence of Posttraumatic Stress Disorder

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*Background:* Receiving information that one has a dissected cervical artery, which can cause a stroke at any time, is obviously traumatic, but details about the psychiatric and psychosocial sequelae are not known. We investigated the prevalence of and risk factors for posttraumatic stress disorder (PTSD) in patients with spontaneous cervical artery dissection (CD) and the impact of PTSD on their psychosocial functioning. *Methods:* Patients admitted because of CD between 2006 and 2010 were retrospectively examined using a diagnostic PTSD measure (Posttraumatic Diagnostic Scale). Patients between 2011 and 2012 were examined prospectively. To identify potential predictors for PTSD, we examined all patients' stress coping strategies (brief COPE inventory), anxiety and depression (Hospital Anxiety and Depression Scale), impairment by preventive medication, time since diagnosis and their neurologic (modified Rankin Scale) and cognitive status. To identify the psychosocial impact of PTSD, we examined quality of life (Short-Form 36). *Results:* Data of 47 retrospectively contacted patients and 15 prospectively examined patients were included. Twenty-eight patients (45.2%) met the diagnostic criteria for PTSD. A significantly reduced health-related quality of life (HRQoL) was found in 27 patients (43.5%) for mental health and in 8 patients (12.9%) for physical health. Results of logistic regression analysis revealed that the use of maladaptive coping strategies was predictive of the disorder ( $P < .0001$ ). Age, sex, mRS score, impairment caused by medication, and time since diagnosis were not predictive for PTSD. The presence of PTSD itself was the only significant predictor for reduced mental HRQoL ( $P = .0004$ ). Age, sex, mRS score, impairment caused by medication, and total Hospital Anxiety and Depression Scale score were not predictive for reduced mental HRQoL. *Conclusions:* PTSD seems to occur frequently in patients with CD and is associated with reduced mental HRQoL. Because the presence of a maladaptive coping style is correlated with PTSD, teaching patients better coping skills might be helpful. **Key Words:** Cervical artery dissection—posttraumatic stress disorder—quality of life.

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With a mean age of 43 to 45 years,<sup>1-3</sup> many individuals who experience spontaneous cervical artery dissection (CD) are at the peak of their productivity and supporting a family at the time of stroke.<sup>1,3</sup> As such, the

outcome of these patients is especially important. Fortunately, the rate of mortality after CD is low (<5%), as are the rates of recurrent dissection (<4%) and complications related to ischemia (<1%) or bleeding

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complications.<sup>1-3</sup> Most patients also experience no physical disability, with functional outcome in the majority (approximately 75%) of patients being judged as excellent with a modified Rankin Scale (mRS) score of 0 to 1.<sup>1-3</sup> Two recent studies have, however, found evidence that outcomes may be much poorer when patients themselves are asked to rate their outcome or when the proportion of patients who return to work is measured.<sup>4,5</sup> Fischer et al<sup>4</sup> for example, recruited a retrospective sample of 98 patients with spontaneous CD and followed them for approximately 4 years poststroke. According to the mRS score, only 27% of the sample was judged to have physical/functional disability (grades 2-5).<sup>4</sup> While this subgroup of patients were most likely to rate their health-related quality of life (HRQoL) as being impaired after their CD, another 35% of the larger group who were classified as having made an "excellent" functional recovery (mRS score 0-1) also rated their HRQoL as impaired compared to pre-CD levels.<sup>4</sup> Moreover, while 90 patients had been working full time before experiencing CD, only 45 CD survivors were doing so a mean of 1498 days (range 379-3455 days) poststroke.<sup>4</sup>

It is important to understand why patients' opinion of outcome is so discordant with their functional outcome. We hypothesize that this may be explained by the situation that some CD patients may be experiencing untreated psychological distress resulting from the experience of CD. CD can in principle cause a stroke, but the risk is relatively low.<sup>1</sup> In fact, a significantly increased risk is only found during the first 2 weeks after the index event.<sup>1</sup> However, this is the perspective of the medical professional. The viewpoint of the patient may differ substantially, and he or she may in fact think that their risk of suffering a stroke is permanently increased. More specifically, CD and its aftermath may be experienced as sufficiently psychological traumatic by some patients such that they develop posttraumatic stress disorder (PTSD) as a result. It is known that neurologic conditions can induce PTSD<sup>6-10</sup> and that the presence of PTSD will significantly decrease quality of life.<sup>6</sup> Fortunately, PTSD is a potentially preventable and treatable condition.<sup>11</sup> Therefore, understanding the link between PTSD and the psychosocial outcome after CD could help to improve the outcome for CD patients. To assist in contributing to this understanding, the present study aimed to explain the disparity between a good functional outcome and impaired quality of life in these patients and addresses the following questions: (1) Is the prevalence of PTSD in CD patients beyond that normally expected in the age- and gender-matched general German population? (2) Is PTSD a significant predictor of HRQoL impairment after CD after accounting for the impact of other mood disturbances, sociodemographic variables (e.g., sex and age), and physical, cognitive, and medication-related impairment? (3) Is the use of maladaptive coping strategies a good predictor of PTSD?

## Methods

The prevalence of PTSD in our retrospective and prospective sample of CD patients (mean age  $44.84 \pm 12.93$  years; men 46.8%; women 53.2%) was compared with the prevalence of PTSD in a historical control group. This control group consisted of the full sample of a recent large study (including 2510 German citizens) that assessed the prevalence of PTSD in the general German population with the same Posttraumatic Diagnostic Scale (PDS) measure that was used in this study (mean age  $48 \pm 17.8$  years; men 45.5%; women 54.5%).<sup>12</sup> An age- and sex-matched subsample of the big citizen cohort was planned but was not necessary because it was found that the large cohort was comparable in terms of sex and age with our sample.

The study was approved by the local Ethics Committee of the University of Erlangen-Nuremberg, and informed consent obtained from all participants. Internal carotid dissection (ICD) and/or vertebral artery dissection (VAD) was considered proven if the affected vessel showed an intramural hematoma on axial cervical magnetic resonance imaging (MRI) sections with T<sub>1</sub> fat suppression.<sup>13</sup>

All patients were counseled by trained neurologists who were all trained to diagnose CD and inform affected patients about the objective prognosis, treatment options, and associated risks. It is standard procedure in our hospital that patients are informed at the time of diagnosis about the low risk of an additional stroke. They are also informed that this risk is only significantly increased during the first 2 weeks after the initial index event and that this risk can be significantly reduced by treatment. It is then recommended that the patients stay in the hospital for at least 3 days, during which time they receive intravenous heparin treatment. Before discharge, these patients are switched to an oral secondary prophylactic medication. All patients in our sample followed this procedure.

### Study Population

Patients presenting with first-time spontaneous CD who were admitted to the neurology department of the University of Erlangen-Nuremberg between January 2011 and August 2012 were mailed a questionnaire to their home address 1 month after CD. Included were all patients with ICDs and/or VADs. This included both patients with local symptoms only and patients with morphologic or/and clinical signs of stroke related to CD.

Patients with a history of psychiatric illness, known physical head or neck trauma, or who presented with life-threatening somatic comorbidities were excluded.

In the retrospective arm of the study, questionnaires were mailed to all the patients who had been admitted to the hospital between January 2006 and December 2010 for treatment of CD. Of the 83 patients contacted (18 in the prospective arm and 65 in the retrospective

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