Trajectory of posttraumatic stress disorder caused by myocardial infarction: a two-year follow-up study

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TRAJECTORY OF POSTTRAUMATIC STRESS DISORDER CAUSED BY MYOCARDIAL INFARCTION: A TWO-YEAR FOLLOW-UP STUDY

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ABSTRACT

Objective: A substantial proportion of patients develop posttraumatic stress disorder (PTSD) following myocardial infarction (MI). Previous research on the trajectory over time of PTSD in post-MI patients is scant and refers to self-rated posttraumatic symptoms. The aim of this study was to investigate the longitudinal course of an interviewer-rated diagnosis of PTSD and PTSD symptom severity following MI. Methods: Study participants were 40 patients (78% men, mean age 54 ± 8 years) who were diagnosed with PTSD using the Clinician-administered PTSD Scale (CAPS) after an average of 5 ± 4 months (range 2-16 months) following an index MI. After a mean
follow-up of 26 ± 6 months (range 12-36 months), 24 patients underwent a second diagnostic interview. 

**Results:** Two-thirds of patients (n = 16) still qualified for a diagnosis of PTSD at follow-up. In all 24 patients, total PTSD symptoms (p = 0.001), re-experiencing symptoms (p < 0.001), avoidance symptoms (p = 0.015), and, with borderline significance, hyperarousal symptoms (p < 0.06) had all decreased over time. However, in the subgroup of the 16 patients who had retained PTSD diagnostic status at follow-up, symptoms of avoidance (p = 0.23) and of hyperarousal (p = 0.48) showed no longitudinal decline. Longer duration of follow-up was associated with a greater decrease in avoidance symptoms (p = 0.029) and, with borderline significance, in re-experiencing symptoms (p < 0.07) across all patients. 

**Conclusion:** Although PTSD symptomatology waned over time and in relation to longer follow-up, two-thirds of patients still qualified for a diagnosis of PTSD 2 years after the initial diagnosis. In post-MI patients, clinical PTSD is a considerably persistent condition.

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**Key Words:** cardiovascular disease, longitudinal, psychiatry, psychological stress

**INTRODUCTION**

Patients may experience a myocardial infarction (MI) as a veritable trauma that is accompanied by loss of control and high levels of distress [1, 2]. When traumatic distress elicited by MI reaches a certain degree and lasts for at least one month, the patient might qualify for a diagnosis of posttraumatic stress disorder (PTSD) [3]. According to the Diagnostic and Statistical Manual of Mental Disorders, fourth edition (DSM-IV), the definition of PTSD requires threatened death triggered by an extreme stressor to which an individual responded with intense fear or helplessness [4]. In addition to the exposure to a life-threatening cardiac event (criterion A), the MI patient with PTSD must re-experience the MI (e.g., in form of distressing dreams during which the MI is replayed; criterion B), avoid reminders for aspects of the MI (e.g., intake of cardiac drugs; criterion C), and have symptoms of heightened physiological arousal such as perturbed sleep (criterion D) [3, 4]. The mean prevalence of PTSD was 15% (range 0-25%) in a previous review on 13 studies that totally included 827 post-MI patients [3]. A more recent study suggested that this prevalence might even be higher, reporting 72% of self-rated full and partial PTSD combined in 96 older post-MI patients [5]. Studies applying a clinical interview as opposed to self-rated questionnaires to diagnose PTSD caused by MI find slightly lower prevalence rates of about 10% on average [6-11]. Patients who developed PTSD following MI showed a higher rate of cardiovascular readmissions within the first year post-MI [12] and lower adherence to cardiovascular drug therapy [13]. Taken together, PTSD related to MI is increasingly acknowledged as a prevalent and clinically important comorbid psychiatric disorder in MI patients [3, 14, 15].
Several studies find symptoms of acute stress disorder and general psychological distress at hospital admission or in the first days after MI predict PTSD [16-18]. However, longitudinal studies assessing PTSD following MI at several points in time are scarce, did not assess the course of PTSD beyond 18 months after MI, and also did not assess PTSD using structured clinical interviews [3]. One study found a non-significant decrease of 40% in self-rated PTSD between 4-6 weeks and 9 months in 102 post-MI patients [19]. In 213 and 179 patients, respectively, with an acute coronary syndrome, self-reported PTSD was found in 12% 1 year after the cardiac event and in 13% at the 3-year follow-up; among patients with a classic ST-elevation MI, the prevalence of PTSD was 10% 1-year post-MI but not reported for the 3-year follow-up [20].

The present study aimed to extend the current knowledge on PTSD attributable to MI by several novel aspects. Specifically, we investigated the trajectory of MI-related PTSD as diagnosed by a standardized clinical interview beyond an observation period of 1 year. Our previous review suggested an inverse although not significant relationship between the time elapsed since MI and prevalence of PTSD [3]. However, most studies diagnosed PTSD within the first half year after MI which period might be too short for evident waning of PTSD symptoms [3]. Longitudinal research on war veterans and accident victims indeed suggests that self-rated PTSD symptoms often persist at high levels over many years [21-23]. Moreover, in severely injured accident victims the prevalence of an interviewer-rated diagnosis of PTSD (full and subthreshold PTSD combined) was 12% after 1 year and 13% after 3 years [24]. Of 16 Holocaust survivors with the diagnosis of an interviewer-assessed PTSD, only three had remitted 10 years later [25].

Because PTSD is a chronic condition by definition, sufficiently long observation periods may be required to see a significant decline in its prevalence and severity. Therefore, we hypothesized that PTSD would show considerable persistence such that only a portion of post-MI patients would remit from PTSD over time on one hand, but that PTSD symptom severity would decrease in relation to the duration of follow-up on the other.

METHODS

Study Participants and Recruitment

All patients provided written informed consent to the study protocol, which was approved by the ethics committee of the State of Bern, Switzerland, as part of the ongoing longitudinal Swiss Heart and Mind Study. The flowchart of recruitment is outlined in Figure 1. Recruitment has previously been detailed as concerns the identification of the 40 patients with diagnostic PTSD following MI [10, 11] who were followed-up for the present study.
Figure 1. The flowchart illustrates the recruitment procedure for the 24 patients with diagnostic posttraumatic stress disorder (PTSD) following myocardial infarction (MI) undergoing the clinician-administered PTSD (CAPS) interview after a mean follow-up of 2 years.
In brief, 951 consecutive patients referred to the Department of Cardiology, University of Bern, Switzerland, were approached between 01/2005 and 04/2007, if they had a verified ST-elevation or non-ST-elevation MI according to previous guidelines [26]. Further eligibility criteria were living within a 90-min ride by car or by train from the University Hospital and to speak German sufficiently. Demographic (sex, age) and cardiac variables were abstracted from hospital charts. The latter were index MI, type of index MI (first-time vs. recurrent MI), left ventricular ejection fraction (LVEF) as measured by ventriculography during coronary angiography, the number of coronary occlusions (1- vs. 2- or 3-vessel disease), and highest level of total serum creatinine kinase (CK).

On average 3 months after the index MI, all 951 patients were mailed home the German version of the posttraumatic diagnostic scale (PDS) [27] and a three-item questionnaire to retrospectively rate on a Likert scale (0-10) perceived fear of dying, helplessness, and pain during the index MI. The PDS focuses on the 17 posttraumatic stress symptoms according to DSM-IV criteria [28]; each item is rated on a Likert scale (0-3) yielding a maximum PTSD symptom score of 51. The German version of the PDS shows good internal consistency for the total scale (Cronbach’s α = .94) and for each of the three PTSD symptom clusters (Cronbach’s α = .88-.90) [29]. Patients who scored at least 15 points on the PDS [30] were invited to undergo a structured interview applying the Clinician-administered PTSD Scale (CAPS) (cf. below). We previously reported that 40 patients (10.2%) of the 394 patients screened with the PDS qualified for a DSM-IV diagnosis of either full or subthreshold PTSD based on the first CAPS interview [11]. In contrast the 12-month prevalence of subthreshold PTSD was 1.3% and that for full PTSD was 0% in a representative community-based cohort in Switzerland [31]; these low rates guided us to not screen for PTSD symptoms prior to MI condition. Moreover, the PDS and CAPS interview specifically asked for MI being the potentially traumatic event. We particularly replaced the term “event” with the term “heart attack” in the PDS questionnaire as previously reported [10, 32]. Therefore, the observed prevalence of PTSD in our sample is unlikely diluted by traumatic experiences other than MI.

**Follow-Up Investigation**

The 40 post-MI patients with an interviewer-diagnosed PTSD were mailed home a letter between 1 and 3 years after the initial PTSD diagnosis. They were asked for their willingness to volunteer in a follow-up investigation on the longitudinal course of PTSD. If a patient did not respond to the written invitation, we additionally contacted him or her by phone. At the time, the reasons for why a patient declined to participate (Figure 1) and medical events, which occurred during the follow-up period, were noted. One patient who had been diagnosed with primary Cushing’s syndrome since the first CAPS interview was excluded from the follow-up interview because cortisol has strongly been implied in the
psychopathology of PTSD [33]. Altogether, 24 patients consented to and were eligible for the follow-up investigation.

**Clinician-Administered PTSD Scale (CAPS)**

The CAPS is a structured psychometric interview, which has been developed by the National Center for PTSD to diagnose current and lifetime PTSD as defined in DSM-IV [34]. The frequency and intensity of each of the 17 PTSD symptoms are quantified on a 5-point scale ranging between “never” (0 points) to “almost always” (4 points). A particular symptom is given when rated with a frequency of ≥ 1 point and an intensity of ≥ 2 points. To meet diagnostic criteria for a particular symptom cluster, one of five symptoms must be given for criterion B (re-experiencing subscale), three of seven symptoms for criterion C (avoidance subscale), and two of five symptoms for criterion D (hyperarousal subscale). The CAPS symptom subscales provide a continuous measure of PTSD symptom severity. Overall severity of PTSD is obtained by adding up symptom scores of criteria B + C + D to a total PTSD symptom score. Patients were diagnosed with full (i.e., syndromal) PTSD if they met criteria B, C, and D altogether, and with subthreshold (i.e., subsyndromal) PTSD if they met criterion B plus either criterion C or D [35]. We applied the German version of the CAPS which shows good internal consistency for the severity score of all 17 items of PTSD (Cronbach’s α = .88-.92) and for each of the three PTSD symptom clusters (α = .73-.88) [36].

**Statistical Analysis**

Data were analyzed using the SPSS 15.0 statistical software package (SPSS Inc. Chicago, IL). Level of significance was set at \( p < 0.05 \) (two-tailed). All data are provided in original units. Because several variables were not normally distributed, we applied non-parametric statistics throughout. Specifically, we used Mann-Whitney U test and Fisher’s exact test, respectively, to test for differences in continuous and categorical data between two groups. The Spearman rank test was used to estimate the correlation between two variables.

**RESULTS**

**Patient Characteristics**

The demographic, medical, and psychometric characteristics assessed at study entry of the 24 patients who consented to the follow-up interview and the 16 patients who were not available at follow-up are given in Table 1. There were no significant differences in any of these variables between the two groups. Four patients reported to take antidepressant medication at follow-up (two had full PTSD and two had no diagnostic PTSD at follow-up). Two of these patients also
reported that they had undergone psychotherapy during follow-up (one started psychotherapy yet before the index MI). They did not mention that trauma-specific elements had been applied by the psychotherapist. During follow-up, there occurred no acute cardiovascular events requiring hospital admission. However, three patients reported to have undergone elective coronary stenting, which procedure took place 4, 14, and 32 months, respectively, after the index MI.

**Trajectory of PTSD Diagnosis**

As previously reported [11], full PTSD was present in 14 patients (35%) and subthreshold PTSD was found in 26 patients (65%) at study entry. Of the 24

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**Table 1. Characteristics of 40 Myocardial Infarction Patients with Diagnostic PTSD**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Available for follow-up interview</th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Yes (n = 24)</td>
<td>No (n = 16)</td>
<td>P</td>
</tr>
<tr>
<td>Sex (% men)</td>
<td>79</td>
<td>75</td>
<td>1.000</td>
</tr>
<tr>
<td>Age (years)</td>
<td>55.6 ± 7.1</td>
<td>51.3 ± 7.8</td>
<td>0.113</td>
</tr>
<tr>
<td>First-time myocardial infarction (%)</td>
<td>87</td>
<td>94</td>
<td>0.638</td>
</tr>
<tr>
<td>2- or 3-vessel disease (%)</td>
<td>33</td>
<td>31</td>
<td>1.000</td>
</tr>
<tr>
<td>Left ventricular ejection fraction (%)</td>
<td>52.1 ± 9.4</td>
<td>51.3 ± 10.4</td>
<td>0.754</td>
</tr>
<tr>
<td>Highest serum total creatine kinase level (U/l)</td>
<td>1326 ± 1304</td>
<td>1641 ± 1851</td>
<td>0.929</td>
</tr>
<tr>
<td>Posttraumatic diagnostic scale (score)</td>
<td>26.7 ± 8.7</td>
<td>28.6 ± 9.6</td>
<td>0.521</td>
</tr>
<tr>
<td>Fear of dying (score)</td>
<td>6.4 ± 3.0</td>
<td>7.2 ± 3.1</td>
<td>0.344</td>
</tr>
<tr>
<td>Feelings of helplessness (score)</td>
<td>6.6 ± 2.9</td>
<td>8.0 ± 2.8</td>
<td>0.070</td>
</tr>
<tr>
<td>Perceived pain (score)</td>
<td>7.3 ± 2.6</td>
<td>7.8 ± 2.6</td>
<td>0.454</td>
</tr>
<tr>
<td>CAPS interview after index infarction (months)</td>
<td>4.2 ± 3.2</td>
<td>5.0 ± 4.2</td>
<td>0.989</td>
</tr>
<tr>
<td>Total CAPS symptoms (score)</td>
<td>53.0 ± 21.6</td>
<td>50.8 ± 20.2</td>
<td>0.902</td>
</tr>
<tr>
<td>CAPS re-experiencing symptoms (score)</td>
<td>18.3 ± 7.5</td>
<td>18.1 ± 6.2</td>
<td>0.860</td>
</tr>
<tr>
<td>CAPS avoidance symptoms (score)</td>
<td>18.7 ± 9.8</td>
<td>17.9 ± 11.6</td>
<td>0.637</td>
</tr>
<tr>
<td>CAPS hyperarousal symptoms (score)</td>
<td>16.7 ± 7.6</td>
<td>14.7 ± 8.0</td>
<td>0.595</td>
</tr>
</tbody>
</table>

Values are given as means ± SD.
CAPS: clinician-administered posttraumatic stress disorder (PTSD) scale.
patients who were available for the follow-up interview, 11 (46%) and 13 (54%), respectively, had full and subthreshold PTSD at entry. The percentage of full PTSD at study entry was not different between patients participating and those not participating in the follow-up ($p = 0.101$).

On average, patients had experienced the index MI 30.4 ± 6.9 months (range 14-42 months) prior to the follow-up interview. The mean follow-up between the entry and follow-up CAPS interviews was 26.2 ± 6.5 months (range 12-36 months). At follow-up, two-thirds of patients (67%) still qualified for a diagnosis of PTSD, which was full PTSD in eight cases (at entry: five full PTSD, three subthreshold PTSD) and subthreshold PTSD in another eight cases (at entry: three full PTSD, five subthreshold PTSD). Eight patients (33%) no longer fulfilled diagnostic criteria for PTSD at follow-up (at entry: three full PTSD, five subthreshold PTSD). The change in diagnostic PTSD status from study entry (all 24 patients having PTSD) to follow-up (16 patients having PTSD) was significant ($p = 0.005$).

**Trajectory of Severity of PTSD Symptoms**

In all 24 patients, entry and follow-up scores of CAPS total symptoms ($r = 0.61$, $p = 0.002$), avoidance symptoms ($r = 0.64$, $p = 0.001$), and hyperarousal symptoms ($r = 0.43$, $p = 0.042$), but not re-experiencing symptoms ($r = 0.32$, $p = 0.13$), were significantly correlated with each other. Table 2 shows the change in total PTSD symptoms as well as in the individual PTSD symptom domains. There was no significant difference in any symptom score assessed at study entry between patients with and those without diagnostic PTSD at follow-up ($p > 0.05$). Among all 24 patients, there was a significant decrease in total symptoms, re-experiencing symptoms, and avoidance symptoms, and with borderline significance in hyperarousal symptoms, from entry to follow-up. Figure 2 depicts the trajectory of total CAPS symptoms (panel A) and of individual symptom domains (panels B-D) for each patient. In contrast to the eight patients who no longer fulfilled criteria for diagnostic PTSD at follow-up (to the right in Figure 2 A-D), symptoms of avoidance and of hyperarousal did not significantly decrease in the 16 patients who kept a diagnosis of PTSD.

**Correlates of Change in PTSD Symptoms**

Longer duration of follow-up (months between entry and follow-interviews) was significantly associated with a greater decrease over time in avoidance symptoms ($r = 0.45$, $p = 0.029$; explained variance 20%) and, with borderline significance, in re-experiencing symptoms ($r = 0.39$, $p < 0.07$; explained variance 15%). In contrast, duration of follow-up was not significantly associated with changes in total PTSD symptoms ($r = 0.31$, $p = 0.14$) and hyperarousal symptoms ($r = 0.15$, $p = 0.49$) over time. Perceived fear of dying, helplessness, and pain during the index MI were all not significantly associated with changes in total
Table 2. Change in Posttraumatic Symptoms from Entry to Follow-Up in All Patients and as Per Diagnostic PTSD Category

<table>
<thead>
<tr>
<th></th>
<th>All patients</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>(n = 24)</td>
</tr>
<tr>
<td></td>
<td>Entry</td>
</tr>
<tr>
<td>CAPS total score</td>
<td>53 ± 22</td>
</tr>
<tr>
<td>CAPS re-experiencing cluster</td>
<td>18 ± 8</td>
</tr>
<tr>
<td>CAPS avoidance cluster</td>
<td>19 ± 10</td>
</tr>
<tr>
<td>CAPS hyperarousal cluster</td>
<td>17 ± 8</td>
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<table>
<thead>
<tr>
<th></th>
<th>PTSD at follow-up</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(n = 16)</td>
</tr>
<tr>
<td></td>
<td>Entry</td>
</tr>
<tr>
<td>CAPS total score</td>
<td>58 ± 25</td>
</tr>
<tr>
<td>CAPS re-experiencing cluster</td>
<td>19 ± 9</td>
</tr>
<tr>
<td>CAPS avoidance cluster</td>
<td>21 ± 10</td>
</tr>
<tr>
<td>CAPS hyperarousal cluster</td>
<td>18 ± 8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>No PTSD at follow-up</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(n = 8)</td>
</tr>
<tr>
<td></td>
<td>Entry</td>
</tr>
<tr>
<td>CAPS total score</td>
<td>43 ± 7</td>
</tr>
<tr>
<td>CAPS re-experiencing cluster</td>
<td>17 ± 5</td>
</tr>
<tr>
<td>CAPS avoidance cluster</td>
<td>13 ± 6</td>
</tr>
<tr>
<td>CAPS hyperarousal cluster</td>
<td>13 ± 4</td>
</tr>
</tbody>
</table>

Values are given as means ± SD.
CAPS: clinician-administered posttraumatic stress disorder (PTSD) scale.
Figure 2. The panels illustrate the time course in total posttraumatic stress disorder (PTSD) symptoms (A) and individual PTSD symptom clusters (B-D) between the initial diagnosis of PTSD (entry) and the follow-up interview (follow-up) for each patient. The eight cases to the right did not anymore fulfill criteria for diagnostic PTSD at follow-up (entry data on individual symptom clusters were missing for one of these patients).
PTSD symptoms, re-experiencing symptoms, avoidance symptoms, and hyperarousal symptoms. Likewise, demographic factors (sex, age) and objective factors of cardiac disease severity (LVEF, number of diseased vessels, highest levels of CK during MI) were not significantly associated with longitudinal changes in any PTSD symptom score (data not shown).

**DISCUSSION**

We performed a follow-up interview with 24 patients who had developed full or subthreshold diagnostic PTSD in response to an index MI 2 years previous. The decrease in the percentage of patients showing remission from diagnostic PTSD at follow-up (i.e., 33%) was statistically significant. Nonetheless, we found that two-thirds of patients still qualified for an interviewer-rated diagnosis of PTSD 2 years after the initial diagnosis. An equal number of full and subthreshold PTSD was found across the two assessments among the latter group. A detailed analysis revealed a change between study entry and follow-up from full to subthreshold PTSD and vice versa in three cases. This observation concurs with the course of PTSD in non-cardiac populations, in which a categorical diagnosis of PTSD showed a waxing and waning course but, at large, persisted over time. For instance, in 90 accident victims followed for 3 years, there was an increase from two cases of full PTSD at 1 year to four cases at 3 years and a decrease of one case with full PTSD to subthreshold PTSD during the same period [24]. In 28 Holocaust survivors followed for 10 years, diagnostic PTSD status changed in six subjects with 3 of 12 cases developing PTSD and with 3 of 16 cases remitting [25].

In terms of continuous measures of posttraumatic symptom severity, we found that, across all 24 subjects, levels of total PTSD symptoms, re-experiencing symptoms, and avoidance symptoms significantly decreased over time, whereas the decline in hyperarousal symptoms was of borderline significance. Interestingly enough, looking at patients who qualified for a diagnostic status of PTSD in both interviews as a separate group, it appeared to be avoidance and hyperarousal symptoms which contributed most to the maintenance of the diagnosis since these two symptom clusters did not significantly decrease over time. In contrast, the subgroup no longer qualifying for a PTSD diagnosis at follow-up had significantly decreased levels of PTSD symptoms in all three clusters. These observations partially concur with a previous study in which avoidance symptoms, but not hyperarousal symptoms, had decreased in 98 survivors of a motor vehicle accident 6 months after the event [37]. In 413 survivors of community violence, all PTSD symptom clusters decreased over time, whereby re-experiencing symptoms showed the most rapid decrease and more hyperarousal symptoms predicted lower overall improvement [38].

We found that the duration of follow-up predicted the magnitude of change in PTSD symptom severity from study entry to follow-up across all
patients. Specifically, a longer follow-up was associated with significantly less avoidance symptoms and, with a trend toward statistical significance, also with less re-experiencing symptoms explaining 20% and 15%, respectively, of the variance. However, there was little evidence for a significant decrease in hyper-arousal symptoms in relation to the duration of follow-up. We offer one possible explanation for this distinct relationship between individual PTSD symptom clusters and duration of follow-up. The long-term impact of a heart attack on the time course of posttraumatic distress might differ from that exerted by other types of trauma which do not have their onset in a person’s body. It is overly difficult to avoid the perception of the heart as an organ that is perceived through its mechanic action and through issues related to the heart disease, such as cardiac therapies and cardiology visits. Post-MI patients with PTSD are exposed to their heart virtually from one heartbeat to the next. Although this needs to be demonstrated, the inescapable confrontation of a patient with his or her heart issues might force natural desensitization toward symptoms assigned to malfunction of the heart. This effect may increase as more time elapses since the traumatizing event of a heart attack. On the contrary, hyperarousal symptoms are less specific to a traumatic experience and might overlap with physiological alterations accompanying state and trait negative affect, particularly anger, anxiety, and depression, all of which are prevalent in MI patients [39, 40]. Negative affect, particularly depression that frequently co-occurs with PTSD [41], correlates with subjective sleep complaints, including sleep-onset and sleep-maintenance insomnia [42], both being definition criteria of the PTSD hyperarousal cluster [4]. Even when PTSD-related hyperarousal decreases over time, hyperarousal symptoms as a whole might sustain because of their many non-PTSD specific contributors in post-MI patients.

A particular strength of our study is that we used a standard psychiatric interview to define PTSD, in comparison with most studies that have used self-reported questionnaires [3]. Moreover, the course of PTSD symptomatology caused by MI and acute coronary syndromes, respectively, has been assessed in only two previous studies, which, however, did not apply a standardized clinical interview and also did not extend the observation period beyond 18 months [17, 18]. Nonetheless, the interpretations and implications of our findings need to be discussed within the limitations of the study design, particularly the sample size. We initially screened 951 MI patients, of whom 41% had relevant screenings. Of these, our final sample included the 40 (10.2%) patients who met DSM-IV diagnostic criteria for PTSD. Moreover, of these 40 patients, 24 participated in the second interview to assess the course of post-MI PTSD. Clearly, this loss to follow-up further reduced both the percentage of incidence in diagnostic course and sustained diagnosis. On the other hand, these 24 patients did not differ in their characteristics from the 16 patients with PTSD who were not available for the follow-up investigation (Table 1). The rate of patients consenting to the initial screening for PTSD symptomatology was comparable to
similar previous surveys also mailing PTSD symptom questionnaires to patients and showing response rates of about 60% [18, 43]. Nonetheless, we acknowledge that the low response rate in the first wave of assessment, yielding 40 patients with PTSD, and the further attrition in the second wave, eventually yielding 24 respondents, raises the concern of a biased sample and questions the generalizability of findings.

We did not assess previously identified predictors of PTSD trajectories over time, such as co-morbid depression [44], cognitive factors [45], and concurrent life stress [46]. Focusing solely on PTSD symptomatology in post-MI patients does only provide a narrow snapshot of clinical reality. Subjective perception of the MI, as well as demographic and cardiac variables, showed no relationship with the longitudinal course of PTSD symptoms in our patients. However, it was not the focus of our study to identify significant predictors of a longitudinal change in PTSD diagnosis and symptoms because statistical power was clearly too low for this purpose. Therefore, we feel it premature to discount the potential clinical importance of any covariates in predicting trajectories of a PTSD diagnosis and PTSD symptom severity in post-MI patients. Our design allowed us to solely investigate change in diagnostic PTSD status in patients who already had PTSD at study entry. Some patients scoring above the cut-off for PTSD symptoms at screening, but who did not have PTSD based on the first interview, might have developed late onset PTSD during follow-up that escaped our investigation. Therefore, the study may underestimate the “true” long-term prevalence of PTSD. Our findings refer to an average follow-up period of 2 years. Therefore, it remains unresolved whether the proportion of diagnostic PTSD and the severity of PTSD would further decline over time and, if so, whether such a decrease is linear and levels off after a certain period.

The trajectory in PTSD observed in our post-MI patients cannot be deemed to reflect the natural course of the disorder, since four patients had antidepressant medication and two of these had also undergone psychotherapy. These treatments might have improved PTSD symptomatology [47]. However, our patients received non-trauma focused psychotherapy which is not as effective as trauma-focused psychological treatments in reducing PTSD symptoms [48].

To sum up, we found that two-thirds of post-MI patients previously diagnosed with clinical PTSD had maintained their diagnosis after a time course of 2 years. Of the individual PTSD symptom clusters, it was hyperarousal that showed most resistance to change over time. Even though the number of patients with a diagnosis of full or subthreshold PTSD and the severity of PTSD symptoms decreased over time, diagnostic PTSD seems to be a considerably persistent condition in post-MI patients. Given that PTSD is not only distressing for cardiac patients but has an impact on prognosis, the findings are important clinically and may thus advocate for routine screening for PTSD in post-MI patients.
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