

Type-D personality exerts a stable, adverse effect on vital exhaustion in PCI patients treated with paclitaxel-eluting stents

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Received 2 August 2006; received in revised form 4 December 2006; accepted 11 December 2006

Abstract

Objective: Vital exhaustion is associated with the pathogenesis of cardiovascular disease (CVD), but its prevalence after percutaneous coronary intervention (PCI) with drug-eluting stent implantation, as well as the impact of personality on exhaustion, is not known. In PCI patients, we examined (a) the prevalence of exhaustion, (b) the impact of type-D personality on exhaustion over time, and (c) the clinical significance of type-D personality compared with gender and age as predictors of exhaustion. **Methods:** Consecutive patients ($n=419$) with stable or unstable angina treated with PCI with drug-eluting stent implantation completed the Type-D Scale (DS14) at baseline and the Maastricht Questionnaire (which assesses exhaustion) at baseline and at 1 year. **Results:** Of all patients, 53% were exhausted at baseline and at 1 year, with 41% experiencing chronic symptoms. Type-D patients [$F(1, 417)=98.688$; $P<.001$] had significantly higher exhaustion levels than non type-D patients both at the time of the index PCI

and at 1 year. There was a general improvement in symptoms of exhaustion over time [$F(1, 417)=5.005$; $P=.03$], but type-D exerted a stable effect on exhaustion ($P=.06$). In multivariable analysis, type-D (OR=3.53; 95% CI=1.88–6.64) remained an independent predictor of exhaustion at 1 year, adjusting for demographic and clinical risk factors and exhaustion at baseline. The impact of type-D on exhaustion was large compared with a small effect for gender and age, as measured by Cohen's effect size index. **Conclusions:** Symptoms of exhaustion were still highly prevalent in PCI patients 1 year post-PCI despite treatment with the latest technique in interventional cardiology. Type-D exerted a large and stable effect on exhaustion compared with that of gender and age. CVD research and clinical practice may benefit by adopting a personality approach in order to identify high-risk patients.

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Keywords: Cardiovascular disease; Drug-eluting stent; Revascularization; Type-D personality; Vital exhaustion

Introduction

Vital exhaustion is a mental state characterized by unusual fatigue, demoralization, and increased irritability [1]. Exhaustion is an etiological risk factor for ischemic heart disease and all-cause mortality in healthy individuals [2] and

a prognostic risk factor for adverse health outcomes in patients following percutaneous coronary intervention (PCI) and myocardial infarction (MI) [3–6]. The risk associated with exhaustion in patients with established cardiovascular disease (CVD) ranges from two- to three-fold [3,5], making it a risk factor on par with traditional biomedical risk factors [6,7]. Of note, exhaustion is not merely a marker of subclinical CVD but a risk factor in its own right [3].

Symptoms of exhaustion have been linked to inflammation [8,9], cytomegalovirus, *Chlamydia pneumoniae* [9,10], lower levels of cortisol and adrenocorticotropic hormones [11,12], impaired fibrinolysis [13], and low vagal tone [14],

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all of which have been associated with the pathogenesis of CVD. Conceptually, exhaustion shares several features with depression, and results are conflicting as to their independence [15,16]. Hence, this is the subject of an ongoing debate. To fuel the debate, a recent study found that exhaustion and self-rated health, but not depression, were associated with increased inflammation in women with CVD [17].

The recent Exhaustion Intervention Trial (EXIT) showed that although symptoms of exhaustion were reduced by 55% following a behavioral intervention, this benefit was only seen in patients without a previous history of CVD [18]. Similarly, only patients without a previous history of CVD experienced a 60% reduction in the risk of adverse health outcomes, whereas the intervention did not lead to overall enhanced survival at 2 years follow-up [18].

Although the EXIT increases our knowledge of factors that may impede changes in exhaustion and subsequent benefits to survival, little is known about the impact of personality on exhaustion. Knowledge of the predictors of exhaustion may lead to more successful intervention trials in the future. In addition, focus on patient-centered outcomes, such as exhaustion and its determinants, may bridge the gap between research and clinical practice [19].

In a previous study conducted in the pre-drug-eluting stent era, we identified type-D personality as a predictor of exhaustion in a mixed group of cardiac patients pre- and post-treatment with PCI, coronary artery bypass graft (CABG) surgery, or conservative treatment [20]. Type-D is defined as the tendency to experience increased negative emotions paired with the non-expression of these emotions in social interactions [21]. Type-D is an emerging risk factor in CVD that has been associated with an increased risk of adverse prognosis [22–26]. However, given that the use of drug-eluting stents has been associated with a significant decrease in the risk of restenosis and the need for repeat revascularization [27] and that exhaustion plays a role in the etiology of restenosis post-PCI, it is not clear whether exhaustion remains a problem in the drug-eluting stent era.

The current study was conducted in a series of consecutive PCI patients treated with the paclitaxel-eluting stent (PES) as the default stent. The aims were to (a) evaluate the prevalence of symptoms of exhaustion, (b) examine the impact of type-D personality on exhaustion at the time of the index PCI and at 1 year, and (c) compare the clinical significance of type-D personality with gender and age as predictors of exhaustion.

Materials and methods

Study design and participants

Consecutive patients with stable or unstable angina, treated with PCI at the Erasmus Medical Center Rotterdam using PES as the default strategy between July 1, 2003, and

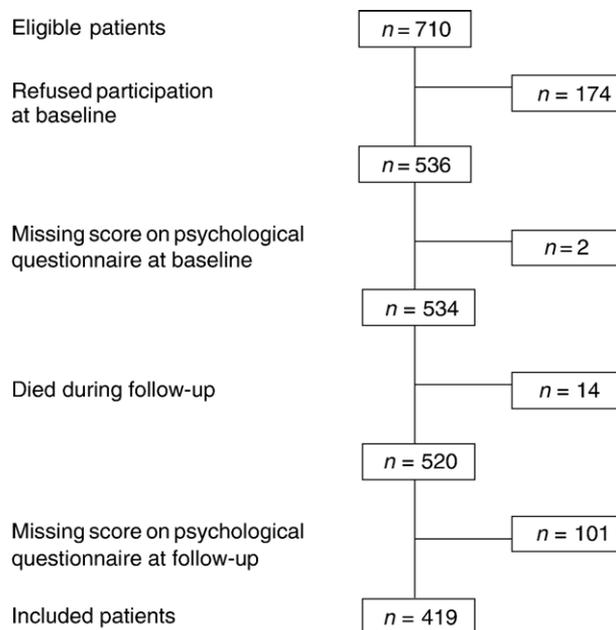


Fig. 1. Flowchart of patient selection.

July 1, 2004, qualified for inclusion in the current study. Of the 845 patients treated during this period, 19 patients died within the first month and 116 were excluded due to insufficient knowledge of the Dutch language. The remaining 710 patients were approached and asked to complete a number of psychological questionnaires 4 weeks post-PCI, of whom 536 (75%) agreed. In the remainder of the article, we will refer to this assessment as baseline. Although assessment at 4 weeks was adapted for logistic reasons, preliminary evidence suggests that psychological assessment at the time of PCI may be less optimal than 1 month post-procedure [28].

Given that we used a prospective design, analyses are based on 419 patients, who had a score on the relevant psychological questionnaires both at baseline and at follow-up. See Fig. 1 for a flowchart of the patient selection for the current study.

The study was approved by the local medical ethics committee and conducted in accordance with the Helsinki Declaration. Written informed consent was provided by all patients.

Materials

Socio-demographic and clinical variables

Socio-demographic variables included gender and age. Information on clinical variables, that is, indication for PCI (stable or unstable angina), stent type (PES, sirolimus-eluting stent, or other), multivessel disease, previous cardiac history (i.e., MI, PCI, or CABG prior to the index PCI), hypertension, dyslipidemia, diabetes mellitus, smoking, and cardiac medication (aspirin, beta-blockers, diuretics, ACE inhibitors, and statins), was obtained from the patients' medical records.

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