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Assessment of anxiety in patients after cardiac surgery: validation study of Visual Analogue Scale

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Anxiety after cardiac surgery

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Conflict of interest

None declared.
Introduction

Recently, American Heart Associations and Society of Thoracic Surgeons experts recommended assessment of Patient Reported Outcomes (PROs) which is becoming obligatory in cardiovascular clinical trials and daily clinical practice [1,2]. Among PROs, the emphasis nowadays is more towards assessing patients' psychological state which is sometimes ignored, despite the existing evidence that it constitutes important determinant of health and well-being [3-6]. Anxiety may constitute a natural reaction to stress related to a disease itself [7]. In numerous patients anxiety can be a transient state, however a significant group of patients may suffer from prolonged, alleviated level of anxiety [3,7,8]. Research has shown that the prevalence of anxiety disorders among patients after cardiac surgery may reach up to 45% [4,7]. Anxiety among patients with cardiovascular diseases is associated with diminished psychological functioning, suicidal ideation, higher risk of readmission due to cardiac events, morbidity, and mortality [8-10]. Given the above links, routine screening and follow-up assessment of anxiety is recommended [4,5-7,11].

Screening method should be valid, reliable, short to complete, and easy to interpret by clinician. Visual Analogue Scale is widely used to assess wide range of symptoms [12]. The aim of our study was to provide outpatient cardiology caregivers with a short valid method useful for quick identification of patients at risk of anxiety disorder.

Methods

224 consecutive patients attending follow-up visit 3 month after cardiac surgery were asked to fulfill Hospital Anxiety and Depression Scale (HADS) and Visual Analogue Scale-Anxiety (VAS-Anxiety). HADS contains 14 items assessing separately anxiety and depressive symptoms. Score above 7 points is considered cut-off point for anxiety/depression cases [12]. VAS-Anxiety comprised of 100 mm line with the following anchors: 0 – ‘No anxiety’, 10 – ‘The worse possible anxiety’. Clinical and socio-demographic data were gathered using
medical files review and tailor-made questionnaire (Table S1). The study was approved by Independent Bioethics Commission for Research of Medical University of Gdańsk. Written informed consent was obtained from all the patients. From 224 eligible patients, 10 patients (4.46%) did not fulfill VAS scale, 14 (6.25%) HADS questionnaires were incomplete. Thus results from 200 patients were included in the final analysis.

**Statistical analysis**

Results were presented with mean values, standard deviations or absolute values and percentage. Spearman’s correlation coefficient, receiver operator characteristic (ROC) curves with area under the curve (AUC) and Youden index were plotted according to recommendation of tests reliability analysis [13]. A level of significance α ≤ 0.05 was used.

Statistica 12 by StatSoft was used for all analyses.

**Results**

The HADS and VAS-Anxiety scores observed in the study sample are presented in Table S2. 51 patients (25.5%) obtained results indicating clinically significant anxiety level (“Anxiety cases”).

Criterion validity was determined with the use of HADS. Significant positive correlations were observed between VAS-Anxiety scores and HADS subscales (Table S3). As it is shown in Figure 1 the optimal cut-off score for VAS-Anxiety determined against HADS-Anxiety subscale (score >7 points was considered “Anxiety case”) was 2 points (Youden index – 0.53; sensitivity 96.1%, specificity 57.0%; AUC=0.83). Detailed results of ROC analysis with AUC and Youden index are presented in Figure 1 and Table S4.

Figure 1. INSERT HERE

**Discussion**

The value of objective clinical parameters in assessing treatment outcomes is unquestionable. However, it seems that complete and accurate picture of patients’ health and well-being may
be obtained by combining objective clinical and somatic and psychological factors assessed from the patients’ perspective. Thus, PROs receive growing attention. As a consequence, the need for development and validation studies of Patient Reported Outcomes Measures (PROMs) is also stressed out [1,2].

The choice of VAS was dictated by the fact that it is short, easy to complete and interpret. Thus, it seems to have desirable characteristics of PROMs and to satisfy the requirements for screening test. Although there are some standardized scales available to assess anxiety, these instruments are quite long and may cause difficulties for elder patients [12]. Moreover, some scales assessing anxiety contain questions regarding somatic symptoms [5]. Using them may result in high false positive results. In addition, diagnosis of anxiety disorders may be hindered because of possible overlap between anxiety symptoms and somatic symptoms related to cardiovascular disease.

Results from previous studies proved that VAS-Anxiety is a reliable tool to assess preoperative anxiety [12]. In the current study VAS-Anxiety was proved to be reliable tool also for postoperative anxiety evaluation. VAS-Anxiety was validated against HADS, which is one the most frequently used scale measuring anxiety [6]. The cut-off point determined using HADS at 2 points should be considered “red flag” for significant anxiety level. The determined cut-off point seems to be low. However, it should be stressed that in case of screening test the most important factor is its diagnostic sensitivity which refers to the ability of the test to indicate a person with a particular condition. Additionally, the obtained value of Youden index as well as AUC value proved this cut-off to constitute an optimal solution [13]. Since the main aim is to identify patients who may demand further diagnostic or therapeutic intervention, higher sensitivity of the test seems a highly desirable test attribute.

Our study revealed that 25% of patients presented symptoms reflecting alleviated level of anxiety. Taking into account that the overall number of cardiac surgeries performed in Poland
was 20,000, it can be estimated that about 5,000 of patients may suffer from increased anxiety after cardiac surgery. This conclusion should be treated with caution. However, it may constitute an illustration of the possible scale of the problem.

Our results concerning the prevalence of alleviated anxiety are in accord with data from literature [9,12,14]. In one study similar to ours, Rymaszewska et al. [15] assessed psychological status 3 months after CABG and observed medium level of anxiety in about 25% of patients and high anxiety level in additional 7.6%. The noted differences in anxiety rate between studies are probably related to the use of different methods assessing anxiety.

In summary, assessing postoperative anxiety seems vital taking its links to adverse events and cardiovascular morbidity. Identification of patients who may require intervention is one the key element in terms of intervention planning and setting targets of therapy [5,10,14]. VAS-Anxiety fulfills the role of screening test and meets PROMs requirements. Additional advantage of VAS-Anxiety identified in our study was its simplicity and high acceptability.

One potential limitation of our study should be noted. Patients participating in our study were those who attended our clinic 3 months after surgery. Data from patients who did not visit us for follow-up assessment are not involved.

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**Conflict of interest**

None declared.
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Figure 1. Receiver operator characteristic curve of the Visual Analogue Scale-Anxiety with the optimal cut-off value.

Figure legend: AUC - area under curve.