SHORT COMMUNICATION

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

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

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

Methods A total of 224 consecutive patients attending a follow-up visit 3 months after a cardiac surgery were asked to fulfill the Hospital Anxiety and Depression Scale (HADS) and the VAS for Anxiety (VAS-Anxiety). The HADS contains 14 items assessing separately anxiety and depressive symptoms. A score above 7 points is considered a cutoff value for anxiety or depression cases.[12] The VAS-Anxiety consists of a 100-mm line with the following anchors: 0, "No anxiety", and 10, "The worse possible anxiety." Clinical and sociodemographic data were collected by reviewing medical records and using a tailor-made questionnaire (Supplementary material, *Table S1*).

The study was approved by the Independent Bioethics Commission for Research of the Medical University of Gdańsk (Gdańsk, Poland). Written informed consent was obtained from all participants. Of the 224 eligible patients, 10 patients (4.46%) did not complete the VAS-Anxiety scale and 14 patients (6.25%) did not complete the HADS questionnaire. Thus, the results from 200 patients were included in the final analysis.

Statistical analysis Data were presented as mean (SD) or absolute values and percentages. The Spearman correlation coefficient and receiver operator characteristic (ROC) curves with area under the curve (AUC) and the Youden index were used according to the recommendations of test reliability analysis.[13] An α level of 0.05 or lower was considered significant. The Statistica 12 software (StatSoft, Oklahoma, Tulsa, United States) was used for all analyses.

Results The HADS and VAS-Anxiety scores are presented in Supplementary material, *Table S2*.

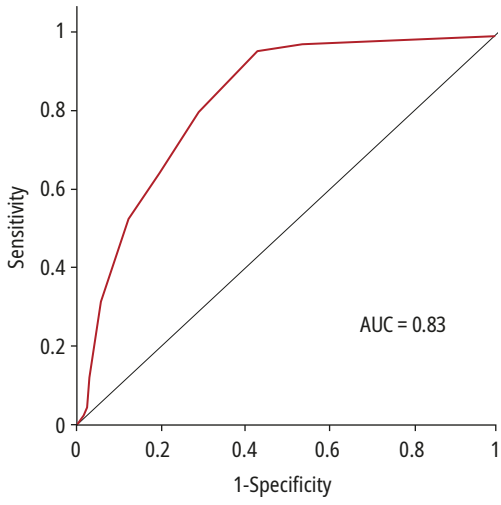

FIGURE 1 Receiver operator characteristic curve of the Visual Analogue Scale-Anxiety with the optimal cutoff value

Abbreviations: AUC, area under curve

Results indicating a clinically significant anxiety level were reported for 51 patients (25.5%) considered as "anxiety cases."

Criterion validity was determined with the use of the HADS. Significant positive correlations were observed between the VAS-Anxiety scores and HADS subscales (Supplementary material, *Table S3*). The optimal cutoff value for the VAS-Anxiety determined against the HADS-Anxiety subscale (score >7 points was considered an "anxiety case") was 2 points (Youden index, 0.53; sensitivity, 96.1%; specificity, 57.0%; AUC, 0.83). Detailed results of the ROC analysis with the AUC and Youden index are presented in FIGURE 1 and Supplementary material, *Table S4*.

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 with psychological factors assessed from the patients' perspective. Thus, PROs have received a growing attention. As a consequence, the need for development and validation of PRO measures (PROMs) is also emphasized.[1,2]

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

Previous studies have shown that the VAS-Anxiety is a reliable tool for assessing preoperative anxiety.[12] In the current study, the scale was proved to be useful and reliable also for evaluation of postoperative anxiety. The scale was validated against the HADS, which is one of the most frequently used scores for measuring anxiety.[6] The cutoff value of 2 points determined using the HADS should be considered a "red flag" denoting a significant anxiety level. Although the determined cutoff point seems to be low, it should be stressed that in the case of a 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 Youden index and AUC results confirmed this cutoff to be an optimal value.[13] Since the general aim of a screening is to identify patients who may require further diagnostic or therapeutic intervention, higher sensitivity of the test seemed to be a highly desirable feature.

Our study revealed that 25% of patients presented symptoms reflecting an elevated level of anxiety. Considering that the overall number of cardiac surgeries performed in Poland was 20 000, it can be estimated that about 5000 patients may suffer from increased anxiety after cardiac surgery. Although this conclusion should be treated with caution, it may illustrate the possible scale of the problem.

Our results concerning the prevalence of elevated anxiety are in line with available literature data.[9,12,14] In a similar study, Rymaszewska et al[15] assessed the psychological status 3 months after coronary artery bypass grafting and observed a medium level of anxiety in about 25% of patients and high anxiety level in 7.6%. The noted differences in anxiety rates between studies are probably related to the use of different methods for anxiety assessment.

In summary, evaluation of postoperative anxiety seems vital considering its association with adverse events and cardiovascular morbidity. Identification of patients who may require an intervention is one of the key elements in management planning and prediction of treatment outcomes.[5,10,14] The VAS-Anxiety fulfills the role of a screening test and meets PROM requirements. Its additional advantage, as shown in our study, is its simplicity and high acceptability.

One potential limitation of our study should be noted. Our participants attended the clinic 3 months after the surgery, and the study did not include data from patients who did not present for a follow-up assessment.

SUPPLEMENTARY MATERIAL

Supplementary material is available at www.mp.pl/kardiologiapolska.

ARTICLE INFORMATION

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CONFLICT OF INTEREST None declared.

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