

Depressive symptoms and myocardial disease

To the editor We read with interest the article by Piwoński et al,¹ published in the current issue of *Polish Archives of Internal Medicine* (*Pol Arch Intern Med*), regarding their study including 20 514 Polish patients from 3 cross-sectional surveys who completed a Beck Depression Inventory questionnaire. The aim of the authors was to assess the prevalence of depression in association with cardiovascular diseases and various demographic features. In the original cross-sectional surveys, patients were reported as having coronary artery disease (CAD) if they had been previously hospitalized for acute coronary syndrome, had undergone a percutaneous coronary intervention, or even if they had been treated for CAD in outpatient settings. In this large group of patients, the frequency of CAD, hypertension, and diabetes was higher in men compared with women, regardless of age. The conclusion of this study was that depressive symptoms were common in the general Polish population, albeit they were more severe in a subset of Polish individuals with cardiovascular disease, irrespective of other concomitant diseases, age, education, and marital status.

In our recent study, based on a completely different concept and design, we obtained similar results to the ones achieved by Piwoński et al;¹ namely, that the incidence of depression was higher among patients with myocardial disease. We evaluated the role of depression and anxiety in 80 patients who underwent a single-photon emission computed tomography myocardial perfusion imaging (SPECT MPI) to assess their myocardial status. Our patient cohort completed the Zung Self-Rating Depression Scale (ZDS) and the Hamilton Anxiety Rating Scale (HAMA). Overall, 65% of patients had abnormal MPI findings due to myocardial impairment. Over half of patients with myocardial disease (53.8%) had depression, anxiety, or both. Among the remaining patients with normal SPECT MPI evaluation, only 35.7% demonstrated abnormal psychological status.² In addition, we found that women had higher anxiety levels compared with men; this finding was similar to the one from the study by Piwoński et al,¹ in which there were more women than men with depressive symptoms.

However, there were some minor differences between the findings of the two studies, which were probably due to different study populations and designs. In our analysis, we observed

an additional association between myocardial dysfunction and obesity and inherited cardiac conditions, whereas Piwoński et al¹ found a correlation between CAD and diabetes mellitus and hypertension, as was to be expected as a general rule.

Although in most cases the etiology of abnormal SPECT MPI findings is linked to CAD, recent evidence suggests that patients with depression and anxiety may exhibit coronary artery spasm without coronary artery stenosis.³ In fact, coronary vasospasm may represent an alternative mechanism in patients who show myocardial ischemia without coronary artery stenosis.⁴ Thus, depression may represent an additional risk factor for myocardial ischemia, even in the absence of CAD.

In summary, patients with depression have high rates of myocardial ischemia or CAD and are at increased risk for future cardiovascular events.^{1,2} Such patients should be closely monitored and screened for early diagnosis and proper management of their myocardial condition or CAD. It should also be emphasized that SPECT MPI, an imaging modality available in any nuclear medicine laboratory, is a reliable tool that provides information about the myocardial status in both symptomatic and asymptomatic patients, including those without CAD.^{4,5}

ARTICLE INFORMATION

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CONFLICT OF INTEREST None declared.

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HOW TO CITE Dogoritis A, Asimakopoulos A, Ragos V, Sioka C. Depressive symptoms and myocardial disease. *Pol Arch Intern Med*. 2021; 131: 592-593. doi:10.20452/pamw.16044

REFERENCES

- 1 Piwoński J, Piwońska AM, Zdrojewski T, et al. Association between cardiovascular diseases and depressive symptoms in adults. A pooled analysis of population-based surveys WOBASZ, NATPOL 2011, and WOBASZ II. *Pol Arch Intern Med*. 2021; 131: 503-511. [↗](#)

- 2 Fotopoulos A, Petrikis P, Iakovou I, et al. The impact of depression and anxiety in prognosis of patients undergoing myocardial perfusion imaging with 99mTc tetrofosmin SPECT for evaluation of possible myocardial ischemia. *Nucl Med Rev Cent East Eur*. 2020; 23: 58-62. [↗](#)
- 3 Hung MY, Mao CT, Hung MJ, et al. Coronary artery spasm as related to anxiety and depression: a nationwide population-based study. *Psychosom Med*. 2019; 81: 237-245. [↗](#)
- 4 Kotsalou I, Georgoulas P, Karydas I, et al. A rare case of myocardial infarction and ischemia in a cannabis-addicted patient. *Clin Nucl Med*. 2007; 32: 130-131. [↗](#)
- 5 Sioka C, Exarchopoulos T, Tasiou I, et al. Myocardial perfusion imaging with (99 m)Tc-tetrofosmin SPECT in breast cancer patients that received postoperative radiotherapy: a case-control study. *Radiat Oncol*. 2011; 6: 151. [↗](#)

Authors' reply We would like to thank Dogoritis and colleagues for their interest in and comments on our recent paper on the association between cardiovascular diseases and depressive symptoms.

Regardless of the differences concerning the study design and aims (an epidemiological pooled analysis of cross-sectional surveys based on a random sample of the general Polish population¹ vs a clinical retrospective study including patients who underwent a single-photon emission computed tomography myocardial perfusion imaging (SPECT MPI²), both discussed papers confirmed the existence of a relationship between depressive symptoms (DSs) and coronary artery disease (CAD). In our research, we used the term DSs, because clinical verification of a depression diagnosis based on the Beck Depression Inventory questionnaire was not possible. It is very important to obtain similar results in different populations and different research designs to confirm the association between the analyzed factors. Additionally, the use of SPECT MPI enables a very precise identification of persons with CAD (both symptomatic and asymptomatic), although the use of SPECT is possible only in clinical trials and not in epidemiological studies with a very large study population.

Depression is probably the most common and, at the same time, the most underdiagnosed mental health condition. The relationship between depression and chronic diseases, including cardiovascular diseases (CVDs), is bilateral. Of course, chronic diseases can cause DSs, but on the other hand, DSs are considered a risk factor for some conditions (like CVDs) due to emotional stress associated with the activation of the sympathetic nervous system and the hypothalamic-pituitary-adrenal axis, endothelial dysfunction,³ platelet activation, and production of proinflammatory cytokines⁴ and also due to the impact of depression on the lifestyle.⁵ We fully agree with Dogoritis and colleagues that depression may represent an additional risk factor for myocardial ischemia without CAD, because depressive persons can exhibit coronary artery spasm, leading to myocardial ischemia, without coronary artery stenosis.

Because of the cross-sectional design of the 3 original studies, we analyzed the associations between DSs and CVDs, but not the cause-and-effect relationship. We showed, based on a large population sample (20 514 individuals), that even borderline DSs (10–14 points in the Beck Depression

Inventory; min/max, 0/63 points) were associated with self-reported CAD, arrhythmia, and stroke, regardless of age, marital status, education, and concomitant disorders. Unlike Fotopoulos et al.² we found a lower percentage of persons with DSs among those with CAD (approximately 41% vs 53.8%), because we only analyzed DSs, not anxiety or both. We also fully agree with Dogoritis and colleagues that the rate of CAD among depressive patients is high and therefore such patients should be monitored and screened for myocardial condition, because they are at increased risk for future cardiovascular events. On the other hand, testing for DSs among individuals with chronic diseases, especially those leading to major disability, like stroke, coronary artery disease, heart failure, or chronic obstructive pulmonary disease, is also of great importance.

ARTICLE INFORMATION

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CONFLICT OF INTEREST None declared.

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HOW TO CITE Piwoński J, Piwońska AM, Zdrojewski T, et al. Depressive symptoms and myocardial disease. Authors' reply. *Pol Arch Intern Med*. 2021; 131: 593. doi:10.20452/pamw.16045

REFERENCES

- 1 Piwoński J, Piwońska AM, Zdrojewski T, et al. Association between cardiovascular diseases and depressive symptoms in adults. A pooled analysis of population-based surveys WOBASZ, NATPOL 2011, and WOBASZ II. *Pol Arch Intern Med*. 2021; 131: 503-511. [↗](#)
- 2 Fotopoulos A, Petrikis P, Iakovou I, et al. The impact of depression and anxiety in prognosis of patients undergoing myocardial perfusion imaging with 99mTc tetrofosmin SPECT for evaluation of possible myocardial ischemia. *Nucl Med Rev Cent East Eur*. 2020; 23: 58-62. [↗](#)
- 3 Golbidi S, Frisbee J, Laher I. Chronic stress impacts the cardiovascular system: animal models and clinical outcomes. *Am J Physiol Heart Circ Physiol*. 2015; 308: H1476-H1498. [↗](#)
- 4 Brydon L, Edwards S, Jia H, et al. Psychological stress activates interleukin-1 β gene expression in human mononuclear cells. *Brain Behav Immun*. 2005; 19: 540-546. [↗](#)
- 5 Piwoński J, Piwońska A, Sygnowska E. Depressive symptoms adversely affect the life style? Results of the WOBASZ study. *Kardiol Pol*. 2010; 68: 912-918.