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diagnosed most common cancers in Poland. Preliminary data from the CONNECT-POL
registry**

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Article type: Short communication

Received: May 21, 2024

Accepted: July 19, 2024

Early publication date: July 22, 2024

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Cardiovascular risk factors and cardiovascular diseases in patients with newly diagnosed most common cancers in Poland. Preliminary data from the CONNECT-POL registry

Short title: Preliminary data from the CONNECT-POL registry.

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Introduction

Cancer and cardiovascular diseases (CVD) share many common risk factors. CVD are the second, after malignancy itself, leading cause of mortality in cancer patients [1]. Therefore, knowledge of the CVD burden in various types of cancer is important for appropriate risk

stratification before initiating often cardiotoxic oncological therapy, which may also worsen CV risk, as well as for appropriate patient control during anticancer treatment. Some epidemiological studies [2, 3] and reports [4] have provided data on the prevalence of cardiovascular risk factors (CVRF) and CVD in the general population in Poland, however, surprisingly, there is a paucity of research on this topic in the cancer population, in which the burden of CVD is of great importance in determining the choice of oncologic therapy and the prognosis of patients.

The purpose of this registry was to determine the prevalence of CVRF and CVD in patients with the four most common cancers in Poland: breast, lung, colorectal, and prostate cancer.

Methods

CONNECT-POL is a nationwide multicenter one-year-lasting observational registry that was started in October 2023 under the patronage of the Polish Cardiac Society, which is still ongoing, with active recruitment in six centres. Inclusion criteria are adult age and newly diagnosed breast, lung, colorectal, or prostate cancer before starting systemic therapy. Patients are prospectively enrolled after giving informed consent. There are no exclusion criteria, patients disqualified from oncological treatment are also included. Patients are included in the registry during a cardiology consultation, during which the occurrence of CVRF (arterial hypertension, dyslipidemia, diabetes, obesity, active smoking) and CVD (coronary disease, heart failure, previous stroke, peripheral arterial disease, venous thromboembolism) is recorded. Data on the occurrence of CVRF and CVD assessed in the general population in Poland were obtained from previous studies [2–4]. The study is conducted in accordance with the Declaration of Helsinki. The registry protocol was approved by the Bioethics Committee of the University of Rzeszow (approval no. 2023/06/0040).

Statistical analysis

Standard descriptive statistics, such as sample mean, standard deviation, frequencies, and percentages, have been used to generally characterise the data from the registry. Differences in cardiac risk factors between primary cancer sites were tested using the chi-square test for independence while comparing qualitative variables, and one-way analysis of variance for quantitative variables. Due to the mostly informative character of the paper, only one-dimensional analyses have been done. The P value <0.05 was considered statistically significant. Calculations were performed with STATISTICA 13.1 software.

Results and Discussion

Preliminary data concern 509 patients (69% females): 284 breast (55.8%), 102 lung (20.0%), 68 colorectal (13.4%) and 55 prostate (10.8%) cancer patients recruited during the first 6 months of the registry. The mean age was 60.2 (13.2) in the breast, 69.2 (9.9) in the lung, 69.3 (9.9) in colorectal cancer, and 70.3 (7.9) years in patients with prostate cancer patients ($P < 0.0001$). Data on the presence of CVRF and CVD according to the cancer site are shown in Figure 1.

Generally, we have observed a high prevalence of CVRF and CVD in cancer patients, as expected by looking at data from the general population. The CV burden in patients with breast cancer (98.9% were females) differed significantly from lung, colorectal and prostate cancers, probably due to the younger age of the breast cancer patients. This is probably why dyslipidemia was much less frequently diagnosed in breast cancer compared to lung, colorectal, and prostate cancer. The most frequent CVRF was arterial hypertension in all cancers, and its prevalence reached 85% in colorectal cancer and about 70% in lung and prostate cancer [Figure 1]. Obesity was diagnosed most frequently in breast cancer, but comparisons with other cancers were not statistically significant. Obesity in breast cancer seems to have a rate comparable to that of the general population in epidemiological studies [3], however, it should be remembered that weight loss frequently precedes cancer diagnosis. The CVRF profile in breast cancer patients was in agreement with data from the small ONCOECHO study [5], which included mainly breast cancer patients, with the exception of hypertension, which was found less frequently in the ONCOECHO study, with a frequency similar to that of the general population. Another very important finding of our analysis is the fact that after cancer diagnosis, which should stimulate positive lifestyle changes, about a third of patients are still actively smoking [Figure 1].

In the case of CVD, it should be noted that they occur less frequently in breast cancer compared to other cancers, which was also found in other studies [6, 7]. The most noteworthy is the frequent occurrence of heart failure in prostate cancer, as well as in lung and colon cancer [Figure 1]. According to our registry, almost every second patient with prostate cancer is diagnosed with heart failure, which cannot be explained solely by the older age of this group of patients. In the latest report on heart failure in the Polish population [4], the incidence of heart failure among people aged 70 to 90 years is approximately 30%, which is lower than in prostate cancer in our registry (45.5%). This should focus our attention on this

population, which is men, characterised by frequent multimorbidities. The difference between breast and lung, prostate, colon cancer with a higher CVD burden in the latter is likely to be driven by age, gender, but also by risk factors shared by CVD and malignancies- especially lung cancer, which in the majority is tobacco-dependent. The frequency of venous thromboembolism recognised before starting systemic anticancer treatment was also high, especially in lung cancer (6.9%). This is already a known fact, which is a result of the prothrombotic effect of cancer, with lung cancer being particularly thrombogenic.

Overall, in our registry, only 16.6% of the patients had no CVRF and no overt CVD was found in 50.5% of the patients. At least 3 CVRFs were recognised in 30.4% of patients and at least 3 concomitant CVDs were diagnosed in 12.6% of patients.

Data are available from national databases on the incidence of CVRF and CVD in the population of cancer patients in various countries [6–8]. However, these studies are retrospective and include both patients before oncological therapy and patients who already undergoing such treatment. This raises doubts because the influence of cardiotoxicity of some oncological therapies on the occurrence of CVD and CVRF cannot be ruled out.

One of the most relevant limitations of this registry is that the participating centres registered the CVRF and CVD occurrence based mainly on medical documentation or studies performed for other reasons (i.e. cardiologic consultation) and the study did not involve any pro-active diagnostic tests. However, the cross-sectional character of the study and the assessment of the subjects by specialised cardiologists limited the possibility of an incorrect diagnosis.

Conclusions

To our knowledge, the CONNECT-POL registry is currently the largest prospective Polish study that presents the scale and type of cardiovascular problems among newly diagnosed cancer patients. It is important not only in the context of optimal oncological treatment. Indicates the scale of the risk of cardiotoxicity in the case of some oncological therapies, which increases when CVD and/or CVRF are present. The results obtained emphasise the importance of appropriate management of patients planned for oncological therapy by identifying and determining the optimal treatment for CVD and CVRF. Such actions should be undertaken not only by cardiologists, but already at the level of primary care physicians.

Article information

Conflict of interest: The authors declare no conflict of interests.

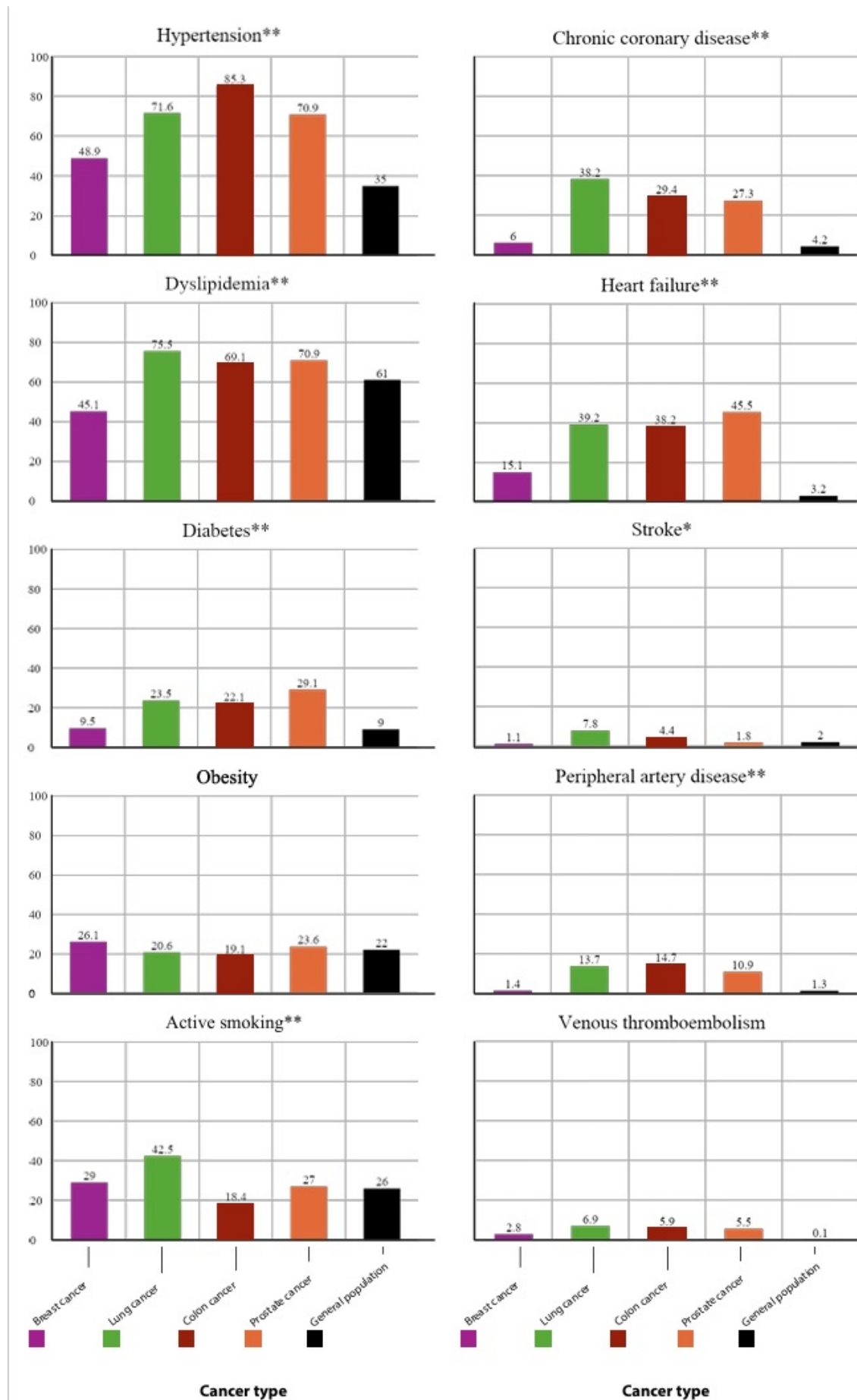
Funding: The registry was funded by the Polish Cardiac Society.

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Fig

The prevalence of cardiovascular risk factors (left panel) and cardiovascular diseases (right panel) depending on the type of cancer in the CONNECT-POL registry.

For better visualization of the problem, the data from the general Polish population are presented in black [2, 3], but they are not the subject of analysis.

Legend:

**P* < 0.01

***P* < 0.001