Cardiovascular Risk Stratification and Cancer

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Cancer patients receiving a potentially cardiotoxic oncologic therapy have an increased risk of cardiovascular adverse events (CVAEs), especially in presence of concomitant arterial hypertension (AH). Therefore, cancer patients should be evaluated before, during and after cardiotoxic treatments, to early identify new-onset or worsening AH or CVAEs. An expert panel of oncology networks from Piedmont and Aosta Valley (North-Western Italy) aimed to provide recommendations to support health professionals in selecting the best management strategies for patients, considering the impact on outcome and the risk–benefit ratio of diagnostic/therapeutic tools.

Keywords: Cardio-oncology 1 ; Arterial hypertension 2 ; cardiovascular adverse events ; cardiovascular prevention ; cardiotoxic treatments

1. Introduction

Arterial hypertension (AH) is one of the most important cardiovascular (CV) risk factors and its prevalence has increased in past decades due to the aging of the population. At the same time, cancer has become one of the leading causes of death and several oncologic drugs have been approved to improve the prognosis of these patients [1]. Patients with cancer have an increased risk of experiencing cardiovascular adverse events (CVAEs) while receiving potentially cardiotoxic oncologic treatment [2]. This probability is further increased in the presence of uncontrolled, concomitant AH. It is known that cancer therapy using old as well as new drugs may cause AH through different mechanisms and sometimes the increase in blood pressure (BP) may be responsible for chemotherapy withdrawal [3]. In order to prevent the occurrence of AH and CVAEs during oncologic therapy or to administer a proper antihypertensive treatment if required, every patient with clinical indication of potentially cardiotoxic treatment should be evaluated for CV risk factors [4]. Despite the evidence of several cardiotoxic effects due to cancer therapies, guidelines on the assessment of cardiac status in cancer patients are still lacking. As a consequence, oncologists may face difficulties in evaluating CV risk, giving appropriate antihypertensive therapy and preventing CV complications. With this document, we propose a useful and practical guide, easily applicable in different clinical settings, that, with a simple scoring system, could aid oncologists and general practitioners in the cardiovascular risk stratification of every patient. We aimed to provide recommendations to support health professionals in selecting the best management strategy for patients, considering the impact on outcomes and the risk–benefit ratio of diagnostic and therapeutic tools.

2. Cardiovascular Risk Stratification

An efficient management of AH related to oncological treatments is crucial in order to prevent severe CVAEs and BP rises that could lead to premature discontinuation of chemotherapy. AH is an important CV risk factor and should be managed following the current guidelines: both the ESH/ESC Guidelines for the management of arterial hypertension [5] and the ESC recommendations on management of cancer treatments and cardiovascular toxicity [6] underline the relevance of CV risk factor evaluation in order to define the profile risk of every patient. The rationale of the CV risk stratification is: prevention, early diagnosis and treatment of CV complications related to oncologic treatments, reduction of therapy discontinuation due to CVAEs and optimization of cardiovascular therapy.

The Scoring System

Patients with known AH should be stratified as low, moderate, high or very high CV risk based on blood pressure levels, concomitant CV risk factors and organ damage. The European guidelines on prevention of CV disease recommend the use of the “Systematic COronaric Risk Score” (SCORE) [7], updated in 2019 [8]. During the baseline evaluation, cancer patients with clinical indication of potentially cardiovascular toxic therapy should be divided into two main groups (based on ESC/EAS guidelines 2019) [9]:

(1) High CV risk, which includes patients:

- With high or very high CV risk: Patients with known organ damage or high probability to develop organ damage in presence of multiple risk factors or predisposing diseases;
- Previously treated with cardiovascular toxic therapy (high risk of iatrogenic AH).

Both patients affected by known cardiopathy, vascular disease or with a SCORE risk > 5% should be evaluated by a specialist in order to define the severity of the known CV disease and reveal and define the unknown organ damage (that has a high probability to be found in the presence of multiple risk factors). Similarly, patients previously treated with cardiotoxic therapy should be evaluated by a specialist in order to define the severity of organ damage.

(2) Moderate or low CV risk, in which patients could be divided into:

- With known AH: if the baseline evaluation does not reveal uncontrolled AH or subclinical organ damage. In presence of uncontrolled AH or suspected/evident subclinical organ damage at the baseline workup, second level investigations will be necessary to better define the organ damage and optimize the antihypertensive therapy.
- Without known AH: similarly to the previous subgroup, if no AH or organ damage was revealed, only first level exams are required. On the other hand, in the presence of subclinical organ damage, a deeper specialist investigation is recommended.

The oncologists should independently manage the moderate/low CV risk patients, evaluating on a case-by-case basis if a specialist consultation is required (second level examination by a cardiologist or hypertension specialist).

The assessment of cardiovascular risk before beginning a potentially cardiotoxic oncologic therapy is fundamental in order to establish the probability of experiencing CVAEs and, on this basis, start proper management, considering the impact on outcomes and the risk–benefit ratio of diagnostic and therapeutic tools.

3. Follow-Up

Patients suffering from cancer with clinical indication of cardiotoxic therapies should be re-evaluated periodically (office BP value measurements, ECG, TT echocardiogram with GLS assessment) by the oncologist. Patients eligible for cardiologic/hypertension specialist care should be evaluated at the baseline (before beginning therapy) and after 6 months. Subsequently, if the clinical–therapeutic approach is effective, they could be managed by the oncologist for overall management. These patients must be re-evaluated by the hypertension specialist in case of uncontrolled BP values, CVAEs, development of left ventricular hypertrophy, ECG abnormalities or GLS reduction during therapy (Figure 2). When an adverse effect occurs (grade 3–4), the possible relationship with the administered antineoplastic therapy should be investigated. In presence of a direct or indirect relationship with the chemotherapic agent, this must be interrupted, and the clinical case managed following the recommendation concerning the specific CV pathology (i.e., heart failure or atrial fibrillation). A therapy optimization with potential introduction of more specific antihypertensive drugs should be considered in case of AH (i.e., in presence of heart failure, introduce loop diuretics).

4. Conclusions

AH is one of the most important CV risk factors and patients with cancer receiving a potentially cardiotoxic oncologic therapy have an increased risk of uncontrolled AH and CVAEs. Sometimes, the increase in BP may be responsible for chemotherapy withdrawal. Despite the evidence of several cardiovascular toxic effects due to cancer therapies, guidelines on the assessment of cardiac status in cancer patients are still lacking. For this reason, an expert panel of oncology networks from Piedmont and Aosta Valley (North-Western Italy) have proposed an easy CV scoring system based on the European Guidelines on cardiovascular disease prevention. According to the CV risk class assigned, an appropriate follow-up is also suggested: patients with low/moderate risk could be entirely evaluated and followed by oncologists and, instead, patients with high/very high risk should be managed with cardiovascular/oncology expert specialists.

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