CARDIOLOGY CARE DELIVERED TO CANCER PATIENTS

A SURVEY OF THE COUNCIL OF CARDIO-ONCOLOGY AND OF THE COUNCIL FOR CARDIOLOGY PRACTICE OF THE EUROPEAN SOCIETY OF CARDIOLOGY

Background

Survival rate of patients suffering from cancer significantly increased thanks to the progress achieved in the chemotherapy, radiotherapy and other kind of treatments, but one of the most common side-effects, that is a major cause of morbidity and lethal outcome in these patients, is a cardiovascular disease.

Identification of a previous cardiac condition that may potentially affect the management of cancer therapy leading to dangerous conditions needs to be carefully sought before and during the administration of this treatment.

The prevalence of patients surviving cancer in next years will dramatically increase and the large majority of them will have more than 70 years of age. The probability to develop a cardiovascular disease will then be very high, with the need of specialized careful follow-up.

These two essential tasks during the 'acute' administration phase and during the long-term follow-up are in charge of a new kind of specialist: the cardio-oncologists.

However, especially during the latter long-term phase, theoretically every physician and every cardiologist may have to face with a cardio-oncologic problem.

The aims of this survey is to understand the current knowledge, service structure and the activity of cardiologists looking after cancer patients referred to them with cardiovascular health problems. We are particularly interested in the experience of managing cardiovascular problems caused by cancer treatments (chemotherapy, radiotherapy, targeted molecular cancer therapies (e.g. trastuzumab), hormonal suppressing therapy) in Europe and beyond.

Methodology

The survey is based on a questionnaire composed of two sessions.

A scientific session where respondents were asked to rate their knowledge and skills of managing several cardiovascular conditions that can be complicate cancer therapy (namely, Ventricular Dysfunction, Arterial Hypertension, Atrial Fibrillation and Valvular Heart Disease). There was also a question on whether respondents had read or commented on the 2016 ESC Position Paper on cancer treatments and cardiovascular toxicities. A final question asked about the gap of knowledge of the general cardiologists concerning cardio-oncology.

The second session analyse the demographic characteristics of the respondents.

All the questions are shown in table 1.

Table 1: Questionnaire of the survey

Questions used to analyse the professional activities regarding cardiovascular diseases in cancer patients:	
1.	How many patients with a possible CV complication of cancer treatment did you see in the last 12 months?
2.	In your professional environment where are ambulatory cancer patients with cardiovascular health problems reviewed?

3. How do you rate your knowledge and skills about management of patients with Left Ventricular Dysfunction complicating cancer therapy?
4. How do you rate your knowledge and skills about management of patients with Arterial Hypertension complicating cancer therapy treatment?
5. How do you rate your knowledge and skills about management and anticoagulation of patients with Atrial Fibrillation complicating cancer treatment?
6. How do you rate your knowledge and skills about management of patients with Valvular Heart Disease following cancer radiotherapy?
7. In your specific clinical environment do you receive referrals from GPs or other specialists to evaluate a patient with cardiac problems who has received previous cancer therapy?
8. Do you regularly review patients with a known history of cancer treatment for CV diseases?
9. Did you read and apply the suggestions of the 2016 ESC Position Paper on cancer treatments and cardiovascular toxicities?
10. What do you think about the gap of knowledge of the general cardiologists concerning cardio-oncology?
Demographics questions:
11. Gender
12. Age
13. Activity
14. Country
15. Geographic area
16. Place of work

The questionnaire was distributed electronically via the European Society of Cardiology to approximately 45 000 cardiologists via an advert in the E-journal of Cardiology Practice and/or electronic Newsletter of the Council of Cardiology Practice, with a link to the website hosting the questionnaire (Monkey Survey).

Data collection was open from 3 December 2018 to 8 March 2019.

Data Analysis

Descriptive analyses were undertaken with results represented as numbers and percentages and when possible, a statistical analysis (namely chi-squared) was applied.

Data were matched by groups according to gender, age (below and over 45 years), geographical location (comparing Europe vs. Rest of the world and comparing Northern and Southern Europe) and finally to the place of work (hospital vs general cardiologist) to verify possible differences among the answers by these groups and the possible statistical differences.

Data were collected anonymously and within the EU General Data Protection Regulation policy.

Results

A total of 592 responses were received with 8 surveys missing of demographic data. This represents 1.3% of the population receiving the questionnaire, slightly inferior to that of previous surveys of the Council for Cardiology Practice, but however consistent with questionnaires delivered with the same method. (Table 2).

Demographic Data

The majority of respondents were between 45 and 60 years (n=248, 42.5%) with all ages represented. Males were more represented than females (342 vs. 242) and geographically, the majority of respondents were based in Europe (n=428, 73.3%) with the majority from southern Europe, predominantly Spain and Italy (n= 144, data from individual

countries not shown). Just under half of respondents reported working in an academic university hospital (45%) while a quarter works in cardiology practice (26.7%) and over a fifth in community public health (n=132, 22.6%).

Table 2: Demographic data of respondents (n=584):

Demographic data	N (%)
Age	
< 30 years	10 (1.7%)
30-44 years	221 (37.8%)
45-60 years	248 (42.5%)
>60 years	105 (18.0%)
Gender	
Male	342 (58.6%)
Female	242 (41.4%)
Geographical area	
Europe	428 (73.3%)
- Northern Europe	- 156 (26.7%)
- Southern Europe	- 272 (46.6%)
Asia and Oceania	65 (11.1%)
Africa	21 (3.6%)
North America	10 (1.7%)
South and Central America	60 (10.3%)
Place of work	
Academic university hospital	263 (45%)
Community public health	132 (22.6%)
Cardiology practice	156 (26.7%)
Other	33 (5.7%)

Population of patients' size and place of work

In response to how many patients with possible cardiovascular complication of cancer treatment were seen in the previous 12 months, 69% of respondents (n= 410) had seen between 1-20 patients while 27% (n=160) had seen over 20 patients (Table 3). Two thirds of respondents worked in general cardiology clinic (n=389, 65.7%) with only 4% working in dedicated cardio-oncology centres in specialist cancer hospitals.

Table 3: Number of patients seen a year and location of treatment (n=592):

Q1: How many patients with a possible CV complication of cancer treatment did you see in the last 12 months?	Respondents n (%)
None	22 (3.7%)
1-5	212 (35.8%)
5-20	198 (33.4%)
>20	160 (27.0%)
Q2: In your professional environment where are ambulatory cancer patients with cardiovascular health problems reviewed	
General cardiology clinic	389 (65.7%)
A part-time single specialist Cardio-Oncology Service	85 (14.4%)
Structured Cardio-Oncology Service with one or two dedicated specialists in a community hospital	40 (6.8%)

Cardio-Oncology Centre a large tertiary hospital	55 (9.3%)
Cardio-Oncology Centre in a large Oncologist specialist hospital	23 (3.9%)

Skills and knowledge

The majority of respondents rated their knowledge as 'fair' for their management of patients with common cardiovascular conditions such as LV dysfunction and atrial fibrillation (range 57%-66%) with around 30% rating themselves as experts in managing these patients with a much smaller number rating their knowledge as 'poor' (Table 4).

Table 4: Rating skills and knowledge on management of common cardiovascular conditions in cancer treatment (n=592):

Rating knowledge and skills	**None**	**Fair**	**Expert**
How do you rate your knowledge and skills about management of patients with Left Ventricular Dysfunction complicating cancer therapy?	31 (5.2%)	393 (66.4%)	168 (28.4%)
How do you rate your knowledge and skills about management of patients with Arterial Hypertension complicating cancer therapy treatment?	60 (10.1%)	372 (62.8%)	160 (27%)
How do you rate your knowledge and skills about management and anticoagulation of patients with Atrial Fibrillation complicating cancer treatment?	63 (10.6%)	338 (57.1%)	191 (32.3%)
How do you rate your knowledge and skills about management of patients with Valvular Heart Disease following cancer radiotherapy?	97 (16.4%)	363 (61.3%)	132 (22.3%)

Kind of referrals, follow-up and application of the Position Paper of the ESC suggestions

When asked about whether respondents received referrals from General Practitioners or other specialists to evaluate cardiac problems in patients who had had cancer treatment, the overwhelming response was positive (n= 550, 92.2%) with over a third stating they receive more than 20 referrals annually (Table 5).Over half of respondents regularly reported seeing cardiovascular patients with a known history of cancer (n=339 57.3%). Encouragingly over 60% of respondents were aware of the 2016 ESC position paper (n=376, 63.5%) and less than 10% were unaware of the paper. When asked if they used the position paper in their practice, an overwhelming majority did use it (n=507, 85.6%) and a small percentage reported that general cardiologists were well trained in cardio-oncology (n=23, 3.9%).

Table 5: Questions relating to cardiovascular presentations and cancer treatment

Q: In your specific clinical environment, do you receive referrals from GPs or other specialists to evaluate a patient with cardiac problems who have received previous cancer therapy? (n=592)	Respondents n (%)
Never	42 (7.1%)
Rarely (1-5 /year)	163 (27.5%)
Sometimes (5-20 /year)	202 (34.1%)
Frequently (>20 /year)	185 (31.3%)
Do you regularly review patients with a known history of cancer treatment for CV disease?	
Never	21 (3.5%)

Rarely Often	232 (39.2%) 339 (57.3%)
Did you read and apply the suggestions of the 2016 ESC position Paper on cancer treatments and cardiovascular disease? No I don't know this position paper I read it but I do not apply its suggestions in my practice I read it and usually apply its suggestions in my practice	 57 (9.6%) 95 (16%) 64 (10.8%) 376 (63.5%)
What do you think about the gap in knowledge of the general cardiologists concerning cardio-oncology? It is the same as in other areas The General Cardiologist is already well trained on it Cardio-Oncology is a new chapter in cardiology and much more information has to be given about it It is not an important chapter and no special education shall be given about it	 57 (9.6%) 23 (3.9%) 507 (85.6%) 5 (0.8%)

Analysis by gender, age and geographic area

When examining knowledge via gender, female respondents were statistically more likely to rate themselves as 'fair' in their knowledge of LV dysfunction compared to male respondents (71% vs. 63.5%, P=0.054) and a lower number of females rated themselves as experts in atrial fibrillation management (27.7% vs. 35.7%, p =0.042). A higher percentage of females were likely to apply the ESC position paper in practice compared to males (74.4% vs. 56.4%, p<0.001) and also proportionally more females reported cardio-oncology as a new chapter (89.7% vs. 83.6%, p=0.037).

Similar results were seen with analysis of those under and over 45 years with a higher proportion of older respondents rating themselves expert in managing all the conditions (>45 years vs < 45 years): LV dysfunction (33.1% vs 20.8%, p=0.001); arterial hypertension (32.9% vs 18.2%, p<0.001); atrial fibrillation (36.5% vs 26.0%, p0.008) and valvular heart disease (28.0% vs. 13.9%, p<0.001). No other statistical differences were observed with other questions when examining age.

Analysing the survey results according to geographical area demonstrated a higher proportion of patients with possible cardiovascular conditions seen in the previous 12 months (>20 patients) in respondents located in Europe compared to the rest of the world (n=129, 30.1% vs n=30, 19.2%, p=0.009) but this difference was not seen comparing northern and southern Europe. A similar pattern was seen in those who reported frequently receiving referrals from GPs and other specialists with statistically higher proportions in Europe (n=151, 35.3% vs n=33, 21.2%, p=0.001). In terms of the position paper, more respondents from outside Europe were unaware of the paper compared to those in Europe (n=38, 24.4% vs n=54, 12.6%, p=0.001). Also, a greater number of respondents in Europe stated that they had read and applied the suggestions in their practice (n=291, 68% vs. n=82, 52.6%, p=0.001).

Place of work

When analysing patients with possible cardiovascular conditions seen in the previous 12 months using place of work, a significantly greater proportion were seen in hospital compared to cardiology practice (31.6% vs. 16%, p<0.001). A higher number of respondents based in hospitals rated themselves as expert compared to cardiology

practice (30.6% vs. 21.2%, p=0.025). With responses on referrals, again a similar pattern was reported with hospital-based respondents seeing a higher frequency of patients with cardiac problems and previous cancer than cardiology practice (35.9% vs. 19.9%, p<0.001).

Discussion

This survey of over 500 respondents, to the best of our knowledge, is the first survey exploring cardio-oncology knowledge and skills in physicians.

Responses were collected from a wide variety of clinical settings including academic university hospitals, cardiology and community public health. The demographic data shows a relatively representative spread of ages and gender with 73% of responses coming from Europe.

In terms of clinical presentations, respondents reported seeing few to over 20 patients annually with cardiovascular conditions in those who had had cancer treatment. The location of treatment varied with two-thirds being seen in general cardiology while only 7% were seen in structured Cardio-Oncology services with one or two dedicated specialists in a community hospital. Overall a small proportion of respondents is managing patients in dedicated Cardio-Oncology centres (12%). Given that cardio-oncology is a relatively new sub-specialty, this finding is not unexpected, and this is highlighted by the majority of respondents agreeing that cardio-oncology is a relatively new chapter (86%) (11).

The complexity of managing various cardiovascular conditions in patients who have undergone cancer treatment is reflected in the number of respondents who rate themselves as having poor or fair knowledge to manage these conditions, reflecting previous literature (7, 9). The use of the position paper by the vast majority of respondents is a positive finding. And overall, respondents believe that further education on this relatively new sub-speciality is required (1,4).

Given the number of individuals who develop cancer and who have a concomitant cardiovascular condition, it is clear that physicians and allied health professionals will potentially face challenges in clinical practice with treating and managing these patients (3,5-7).

Limitations

As with any survey, there are limitations that need to be acknowledged. The survey asked respondents to estimate the frequency of cardio-oncology presentations in their practice and we did not attempt to verify this information. We relied on the recall of respondents and this has limitations. We did not define what was meant by ‘poor’, ‘fair’ or ‘expert’ in relation to knowledge and this may be mis-interpreted. However, given the overall response rate and no missing data from these questions, the method was deemed appropriate for the purpose of this survey.

Conclusion

As the number of patients with cardiac conditions who have undergone cancer treatment continues to increase, this survey offers some useful information on perceptions of cardio-oncology that can be used in the future.