



Assessment of Cardiovascular Disease Risk Factor Control in Triple Negative Breast Cancer Patients

Saad Awan, Teja Poosarla MD, Natalie Gassman PhD, G. Mustafa Awan MD, Bassam Omar MD, PhD, and Christopher Malozzi DO

Department of Cardiology, University of South Alabama, Mobile, Alabama, United States, 36617



Background

Cancer and heart disease are leading causes of death in the U.S. and this has remained unchanged for many years.¹ As a result of advancements in cancer screening and rapidly developing cancer treatments, the number of cancer survivors or those living with cancer has increased steadily over the past few decades.² Patients are now living longer which allows for the development of other comorbidities like hypertension, diabetes mellitus, and obesity. These traditional risk factors, among others, increase the risk of cardiovascular disease (CVD). In addition, some cancer treatments are invariably cardiotoxic or are known to lead to the development of cardiac risk factors. It has also been demonstrated that those patients treated for cancer who also develop CVD have decreased probability of long-term survival.³ This may be especially true in the triple negative breast cancer (TNBC) population. These patients have a more aggressive form of breast cancer which is often diagnosed at advanced stages and in younger age women. These patients also are likely to receive larger cumulative amounts of potentially cardiotoxic chemotherapy due to the advanced and aggressive nature of TNBC.⁴ As a result, this patient population is at increased risk of cardiovascular toxicity and worse outcomes compared to other breast cancer patients. This study aims to evaluate the presence and control of CVD risk factors in patients treated in our cancer center for TNBC.

Objective

Assess the presence of CVD risk factors, specifically, hypertension (HTN), diabetes mellitus, hyperlipidemia, tobacco use, and obesity in this specific cancer population. This project will also assess the adequacy of risk factor control and provide focused insight into treatment and educational opportunities for patients in hopes of improving outcomes in our patients.

Study Design

121 eligible patients were those with a diagnosis of TNBC seen at the USA Mitchell Cancer Institute in Mobile, AL. Additionally, the patients were required to have charts available in the Cerner database at USA Health University Hospital. Retrospective chart review of 121 patients was performed to gather data for systolic blood pressure (SBP), diastolic blood pressure (DBP), body mass index (BMI), hemoglobin A1C (HbA1C), low-density lipoprotein (LDL), and smoking status. In some cases, HbA1C and LDL measurements were not available as the patients' primary care provider was not affiliated with USA Health. In such instances, only the available SBP, DBP, and BMI values along with smoking history were used. Pulse pressure (PP) was calculated using averaged SBP and DBP data. The mean SBP, DBP, PP, and BMI values from each patient were compared across race and age using an independent t-test and ANOVA test.

Results

Independent T-test					
Group	Age	N	Mean (mmHg)	SD (mmHg)	p
SBP in Patients	<55	59	133.9	13.2	0.024
	≥55	62	140.6	18.4	
DBP in Patients	<55	59	83.3	10.5	0.026
	≥55	62	79.1	9.9	
PP in Patients	<55	59	50.5	10.3	<0.0001
	≥55	62	61.4	16.1	
BMI in Patients	<55	59	32.1	7.1	0.463
	≥55	62	31.0	8.5	

ANOVA Test					
Group	Age	N	Mean (mmHg)	SD (mmHg)	p
SBP in Patients	<50	42	133	13.9	0.0912
	50-65	58	140.2	14.6	
	>65	21	137.7	23.3	
DBP in Patients	<50	42	83	11	0.0112
	50-65	58	82.1	10.1	
	>65	21	75.1	8.1	
PP in Patients	<50	42	50	10.98	0.0013
	50-65	58	58.2	12.63	
	>65	21	62.7	20.82	
BMI in Patients	<50	42	31.8	8.1	0.6058
	50-65	58	31.9	7.3	
	>65	21	30	9	

Risk Factor Analysis			
Risk Factor		N	Percent of Sample
HTN	SBP>130	77	63.6%
	DBP>80	64	52.9%
BMI	Obese (BMI>30)	49	40.5%
	Morbidly Obese (BMI>40)	16	13.3%
Smoking	Never	79	65.3%
	Former	28	23.1%
	Active	14	11.6%

Racial Analysis				
Risk Factor	Race	Mean	SD	p
Age	Black	52.2	10	0.041
	White	56.4	12	
SBP	Black	140	15.9	0.044
	White	134	16.6	
BMI	Black	34.3	8.1	0.0002
	White	29	6.67	

Table 1. Summary of means and p-values obtained using independent t-test and ANOVA test for SBP, DBP, PP, and BMI in different age groups, races, as well as presence of risk factors in TNBC patients.

Analysis revealed that 63.6% of patients had a SBP >130 mmHg and 52.9% of them had a DBP >80 mmHg. The mean SBP in all patients was 137.3 mmHg, while the mean DBP was 81.2 mmHg. There were statistically significant differences (p< 0.05) in SBP, DBP, and PP between patients <55 years old (yo) and patients ≥55 yo. SBP and PP were found to be higher in patients ≥55 yo while DBP was found to be higher in patients <55 yo. Similar trends were seen when SBP, DBP, and PP were compared across three different age groups: <50 yo, 50-65 yo, and >65 yo. Of the sample, 40.5% of the total patients were obese (BMI >30) and 13.3% were considered morbidly obese (BMI >40). Data was also analyzed by race. Black women with TNBC were significantly younger than white women (mean age 52.2 yo vs. 56.4 yo; p=0.041). Black women were also more likely to have HTN (SBP 140 mmHg compared to 134 mmHg; p= 0.044). Lastly, black women were also more obese (BMI 34.3 compared to 29; p=0.0002). Current or prior tobacco use was noted in 34.7% of the population. Data was insufficient to adequately assess presence of hyperlipidemia or diabetes.

Conclusions

Our study suggests that cardiac risk factors are largely prevalent in TNBC patients, exposing them to preventable non-cancer morbidity and mortality. HTN, obesity and tobacco use were common in this population. More than half of the patients had blood pressure recordings above the goal of 130/80 mmHg. Presence of prior or current tobacco use was also noted in more than one third of the patients studied. Unfortunately, the data was not sufficient to assess for trends in hyperlipidemia or diabetes mellitus. Interestingly, our study suggests that younger, black women with TNBC are more likely to have HTN and obesity. It is well documented that obesity is associated with the development of many cancer types. It has also been proposed as a risk factor for developing TNBC.⁵ HTN and obesity also places these patients at higher risk of cardiotoxicity from their chemotherapy. This identifies a specific subset of patients at particular risk. This provides insight into actionable opportunities for these patients. Emphasis on cardiac risk factor modification education could be considered in conjunction with breast cancer screening education. The data also highlights possible racial healthcare disparities in this group. These patients may have limited access to appropriate medical care including CVD prevention and cancer screening. The CVD risk factors studied here are largely preventable with education and non-pharmacological lifestyle changes. Interventions such as weight loss, increased physical activity, healthy diet, and dietary sodium reduction are effective in preventing HTN and avoiding obesity.⁶ Weight loss not only can lead to lower BP but could in turn possibly reduce a woman's risk of developing this aggressive and difficult to treat type of breast cancer. Comprehensive care is essential to improve quality of care and quality of life in cancer patients. This study highlights an area for improvement in patient education regarding a heart healthy lifestyle and prevention of CVD risk factors. It also highlights the need for more in-depth assessments of health and racial disparities in cancer patients to improve outcomes as well as reduce CVD mortality in oncology patients.

References

- Kochanek KD, Xu JQ, Arias E. Mortality in the United States, 2019. NCHS Data Brief, no 395. Hyattsville, MD: National Center for Health Statistics. 2020.
- Miller KD, Siegel RL, Lin CC, et al. Cancer treatment and survivorship statistics, 2016. CA Cancer J Clin 2016;66:271-89.
- Moslehi J. The cardiovascular perils of cancer survivorship. N Engl J Med 2013;368:1055-6.
- Wahba, H. A., & El-Hadaad, H. A. (2015). Current approaches in treatment of triple-negative breast cancer. Cancer Biology & Medicine, 12(2), 106-116. <https://doi.org/10.7497/j.issn.2095-3941.2015.0030>.
- Pierobon, M., Frankenfeld, C.L. Obesity as a risk factor for triple-negative breast cancers: a systematic review and meta-analysis. *Breast Cancer Res Treat* 137, 307-314 (2013). <https://doi.org/10.1007/s10549-012-2339-3>.
- Arnett DK, Blumenthal RS, Albert MA, et al. 2019 ACC/AHA Guideline on the Primary Prevention of Cardiovascular Disease. Circulation 2019; CIR0000000000000678.

Disclosure

Presenting Author: Saad Awan (no relevant financial disclosures)
Lead Investigator: Dr. Christopher Malozzi DO (no relevant financial disclosures)