



Nutritional implications for quality of life in bladder cancer survivors

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Bladder cancer can be aggressive and develop resistance to currently available cancer therapies. An estimated 81,190 new cases of bladder cancer will be diagnosed in 2018 and 18,810 deaths from bladder cancer will occur in 2018 in the US (1). Both the absolute numbers of cases and deaths from bladder cancer have increased by 45% and 35%, respectively, since 2002 (2,3). Bladder cancer ranks as the 4th most common cancer in men affecting males 4 times the rate as females and in the top 10 common cause of cancer deaths in men and women in the US (1). In addition, bladder cancer has a high rate of recurrence compared to other tumor types (4), thus it an ideal population for health promotion efforts.

At the center of our health promotion efforts is our diet. Dietary patterns in the general US population is noted to be high in meat (specifically red meat) and saturated fat and low in fiber, vegetables and fruits. Furthermore, caloric intake among Americans remains high. Thus, the average American diet 'needs improvement' according to the HEI2010, not only in terms of quality but in terms of quantity (5). These dietary patterns along with a more sedentary lifestyle is in part responsible for the obesity epidemic engulfing the US and the world. Approximately one-third of adults and one-fifth of children and adolescents in the U.S. are noted to be obese (6), thus obesity affects all segments of the U.S. population. Obesity has been linked to many diseases in children and has been associated with cancers in adult. Furthermore, obesity can adversely affect health-related quality of life (HRQoL) in cancer survivors (7,8).

As society and medicine place greater emphasis on cancer survivorship, we must critically review the current dietary patterns of cancer patients to determine if and how changes need to be made, which could lead to a better HRQoL. Gopalakrishna *et al.* recently reported a fascinating large cross-sectional cohort study from Duke University determining the baseline dietary characteristics of bladder cancer survivors and demonstrate its relationship to HRQoL (9). Briefly, 953 bladder cancer survivors were mailed Diet History Questionnaire II and Functional Assessment of Cancer Therapy-Bladder Cancer. Using the Diet History Questionnaire II, the quality of the diet was assessed with the Healthy Eating Index 2010 scores. Four hundred and fifty-nine patients (48%) returned their completed questionnaires. Mean age of responder was 74 years, 81% were men and 28% had undergone a cystectomy. It was felt that diet quantity and quality in the study population was comparable to the general US population of this age range and did not differ between responders with more advanced disease who underwent cystectomy compared to responders with lower stage disease managed conservatively. The study population was reported to have a low intake of whole grains and fat-soluble vitamin particularly vitamin D. Diet quality was noted to correlate with HRQoL. High comorbidity index correlated with reduced HRQoL (9).

More data support the concept that diet may influence outcomes following a cancer diagnosis. For example, breast cancer survivors who have better overall diet quality

also noted improved HRQoL (10). Overall the study by Gopalakrishna *et al.* confirm the results that eating healthier is better for bladder cancer survivors (9). Limitations of these studies include (I) select population being evaluated, (II) limited follow-up and (III) multifactorial nature of HRQoL.

Furthermore, a meta-analysis of three studies with an aggregate of 9,966 subjects suggested that a diet low in saturated fat can reduce the risk of breast cancer recurrence by nearly 25% as well as reduce all-cause mortality by approximately 20% (11). In another meta-analysis of four studies with an aggregate of 3,675 subjects, researchers noted that a diet high in saturated fats increased breast cancer-specific mortality (12). A meta-analysis of 56 observational studies with an aggregate of 1,784,404 cancer survivors with different tumor types noted that a greater adherence to a healthy diet comprised of nuts, beans, fruits, vegetables, cereal grains, olive oil and fish was associated with lower all-cause cancer mortality for gastric, prostate, liver, head and neck, breast, prostate, colorectal, pancreatic and respiratory cancers (13). Subjects with a history of colorectal cancer who consumed a Western diet (i.e., high intake of meat, fat, refined grains and desserts) demonstrated elevated risk of tumor recurrence as well as overall mortality compared to those with a more prudent diet comprised of vegetables, fruit, fish and poultry in a prospective study of 1,009 subjects (14). Two other prospective cohort studies in subjects with a history of breast cancer reported similar findings (10,15). Thus, dietary changes may have the potential to improve survival rates in our cancer patients.

American Cancer Society published guidelines for cancer survivors that recommend increased whole grain, vegetable and fruit consumption and reduction in consumption of red and processed meats (16). Prior epidemiologic studies of diet have identified improved survival after cancer with increased intake of vegetables and fruits (17,18), while a plant-based diet has been shown to decrease systemic inflammation in newly diagnosed cancer patients (19). High levels of non-adherence to healthy diet patterns have been found across all ethnic groups in cancer survivors (20,21). Thus, a more concerted effort is needed within our survivorship clinics to assess current diets and to implement and monitor a plan to foster healthy eating habits.

As one could image, the HRQoL of our bladder cancer patients may be affected by factors other than dietary habits. Two key components to this multifactorial of HRQoL include smoking cessation and physical exercise.

As noted in the Institution of Medicine (IOM) report (22), over 30% of all cancers are caused by smoking, thus there is a very good chance that a cancer survivor is a current smoker. Etiology of bladder cancer has been linked to exogenous and environmental risk factors. The best-known risk factors in Western societies being tobacco use. In fact, the majority of epidemiologic investigations of bladder cancer etiology has focused on cigarette smoking and has demonstrated a 3-fold increase in risk associated with cigarette smoking as well as evidence of a clear cigarette dose-response relationship (23-26). Moreover, if cigarette smokers quit, their risk of developing bladder cancer declines dramatically to 30% after 1-4 years and then decline over 60% after 25 years (24). Persistent tobacco-use after diagnosis and treatment has been associated with suboptimal outcomes such as, increased treatment complications, progressive disease, new secondary tumors and increased comorbidity (27,28). Therefore, smoking cessation counseling and treatment planning should play a substantial role for cancer survivors to enable them to quit smoking (29).

The current dogma is that regular physical activity is advantageous for cardiovascular health by lowering systolic and diastolic blood pressure, improving sensitivity to insulin, and producing a more favorable serum lipid profile (30). However, these same benefits can improve cancer survivors' outcomes. For example, Courneya *et al.* examined the effects of aerobic exercise *vs.* resistance exercise *vs.* usual physical fitness care on HRQoL and other psychosocial parameters in a study of 242 breast cancer survivors immediately prior to beginning adjuvant chemotherapy. They noted favorable outcomes when aerobic or resistance exercise training was performed (i.e., improved HRQoL and completion of greater cycles of chemotherapy) in comparison to usual care (31). In a previous article describing their large cross-sectional cohort study conducted at Duke University, Gopalakrishna *et al.* reported bladder cancer survivors who noted "high" physical activity had markedly higher HRQoL compared to those who noted "low" physical activity. Physical activity had a positive correlation to HRQoL (32). Thus, our survivorship clinics should increase attention on the role of exercise interventions as an adjunct activity for cancer survivors during therapy and after the completion of therapy.

As global cancer survival rates continue to improve, there is an increased unmet need to identify and address modifiable lifestyle factors among cancer survivors in order to improve long-term outcomes. Thus, failure to

meet guidelines for healthy lifestyle may adversely affect HRQoL. Maintaining a healthy lifestyle by ensuring a better overall diet quality, tobacco cessation and exercise interventions may correlate with an improved HRQoL in bladder cancer patients, and more broadly all cancer patients. Thus, greater attention to these factors must be stressed in our survivorship clinics.

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Footnote

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