

Dr. Joshua D. Palmer: dietary intervention and future directions of cancer treatment

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Dr. Joshua D. Palmer (*Figure 1*) is a senior resident at the Sidney Kimmel Cancer Center at Thomas Jefferson University. Dr. Palmer graduated summa cum laude from the University of Minnesota with dual degrees in Biochemistry and Genetics, Cell Biology and Development. He was elected to the Alpha Omega Alpha medical honor society and graduated from the University of Miami Miller School of Medicine. He completed his internal medicine internship at NYU Langone Bellevue Medical Center and he is currently a senior resident in the Department of Radiation Oncology at Jefferson. He has received numerous clinical awards during his training in addition to a post-graduate research award from the Alpha Omega Alpha Society. He is a co-investigator on several on-going clinical trials and is a member of both national and institutional cancer committees. His research focus includes translational oncology, biomarker discovery, central nervous system, head and neck, thoracic and gastrointestinal malignancies. He is a member of the American Society for Radiation Oncology, American Society of Clinical Oncology, American Association for Cancer Research, Society of Neuro-Oncology, American College of Radiation Oncology, Pennsylvania Medical Society and Alpha Omega Alpha Honor Medical Society.

During the 2014 ASTRO meeting, Dr. Palmer shared his ideas with the Translational Lung Cancer Research about research on dietary intervention.

TLCR: Which session of this year's ASTRO meeting impressed you most?

Dr. Palmer: I think the session that impressed me most was the plenary session presented by Andrew Sharabi regarding immunotherapy because it further elucidated the relationship between immunotherapy and radiation. The implications that treating a local disease with something that unlocks the immune system, which may then actually address systemic disease, is ground-breaking, deserving of a plenary session. I look forward to Sharabi's continued work



Figure 1 Joshua D. Palmer, MD. Department of Radiation Oncology, Sidney Kimmel Medical College at Thomas Jefferson University, Philadelphia, PA, USA.

in this area and at other attempts at harnessing the immune system to attack cancer cells.

TLCR: You have published an article about whether food could be medicinal. Would you like to share your current opinions about diet intervention?

Dr. Palmer: We started our nutritional research by studying patients with primary brain tumors, particularly glioblastoma. There had been a lot of previous work in which children with seizures were safely put on the ketogenic diet (a diet with high fat content, normal protein and low carbohydrates) and we wanted to see if this could be safely implemented with glioblastoma multiforme (GBM) patients undergoing primary treatment as well. Preclinical data had been positive but human studies were sparse. In fact, a review I wrote for *Ageing Research Reviews* points to the possible role that diet plays in microRNA expression, which has numerous downstream effects on

both normal cells and cancer cells. With this possibility in mind, we studied GBM patients to determine if dietary modification is safe and if patients could maintain the diet. Our experience revealed that patients could tolerate the diet and the diet could be reliably monitored through serum ketones. We determined that the diet was reasonably safe. This finding was published in the *Journal of Neuro-Oncology*. Currently, we are developing trials on breast cancer and other cancers such as head and neck cancers, trying to use dietary interventions in combination with standard radiation to determine if it is safe and feasible. Metabolomics is a new and expanding field and we are trying to use nutrition as another therapy in our armamentarium. I am very passionate about this topic.

TLCR: Do you continue to study dietary intervention?

Dr. Palmer: Yes, we are now developing protocols for breast, brain and head and neck cancers using various dietary interventions. We are still in the early phases with these studies. First we need to determine if these diets are safe and feasible during cancer treatment. One key hurdle, we have found, is monitoring the compliance to the diet. We are attempting to use serum studies which may allow us to monitor patients' adherence.

TLCR: Will your study extend dietary intervention to the treatment of lung cancer?

Dr. Palmer: Yes, we are thinking about using some of the current nutritional data and applying it to lung cancer patients. To my knowledge, I don't believe anyone is currently running a ketogenic diet or calorie restricted diet trial in lung cancer patients. If you do use the ketogenic diet and nutritional calorie restrictions diet, it is best to use it concurrently with cancer therapy to sensitize radiation. There is a major obstacle to using diets in lung cancer: patients may lose weight during therapy. We have seen that patients who have difficulty tolerating food by mouth, due to radiation side-effects, are more at risk of losing too much weight during the diet. For head and neck patients, this is overcome by inserting a gastrostomy tube that allows for calorie supplementation. This is not routinely performed in lung cancer patients. One of the major prognostic factors in lung cancer is weight loss, so some people may not want to sign on to trials because of the possibility the diet may cause too much weight loss and this would have a detrimental effect on a patient. This does not preclude the use of dietary interventions in lung cancer; it

just makes the application more challenging.

TLCR: In some countries the use of stereotactic body radiotherapy (SBRT) for early stage lung cancer is controversial. What is your opinion?

Dr. Palmer: Yes. It is really a controversial issue. For medically inoperable patients, SBRT has become an alternative standard of care. The Radiation Therapy Oncology Group (RTOG) and Dr. Timmerman from the University of Texas Southwestern have published numerous reports that demonstrate that excellent local control of this therapy sometimes rivals surgery in this cohort of patients. Attempting to retrospectively compare surgery and SBRT has so many inherent biases that it is difficult to interpret the results. Only prospective comparisons will answer this question, and to date, no prospective trial has been able to accrue, although several have been attempted. I believe any trial in the US that randomizes patients between radiation and surgery will always be difficult, as patients usually have their own bias towards which treatment they want. And trying to explain outcomes to patients who may or may not undergo surgery is often a difficult conversation. Trials of this sort have been successfully run in laryngeal cancer through the Veterans Affairs hospital System (VA), and I believe the VA system is planning to run a lung cancer trial. This will likely be our best hope to accrue patients so we can answer this important question.

TLCR: What advance in radiation technology has effected treatment of lung cancer most so far?

Dr. Palmer: I think the radiation technology that affects the outcomes of lung cancer most are positron emission tomography (PET)/CT scans. We have seen that as PET/CT has been adopted as a standard part of the work-up, that there is a significant portion of patients who are up-staged, likely revealing stage migration. This "Will Rogers" phenomenon is probably due to the improved classification of early stage patients, not to actually improving survival rates. We also have begun using PET data in treatment planning, which makes field delineation much easier. A second technology that has greatly affected practice is the 4DCT and the 4D cone beam CT, or more broadly, the use of image-guided therapy for both early stage patients getting SBRT and for locally advanced patients. This has allowed better definition of the tumor during the breathing cycle, and in some cases, decreases the amount of normal

lung exposed to therapeutic doses of radiation.

TLCR: *Multidisciplinary treatment (MDT) is increasingly getting doctors' attention in recent years. What role do you think the radiation oncologists play in MDT?*

Dr. Palmer: Radiation oncologists play a big role in MDT, as can be seen in the increased development of multidisciplinary teams and tumor boards over the past 5 to 10 years in the US. Medical professionals are transitioning from working in their own small doctor/patient world with a focus on particular indications to functioning as a team and focusing on the entire patient. With MDT, the patient's treatment plan and questions that are addressed by a team allow a more personal approach to the patient, which wastes less patient and practitioner time. Patients don't need to make several appointments and an entire treatment plan may be reached by the various team members working together with an engaged patient.

TLCR: *Do you think the MDT will be a trend for other medical institutes?*

Dr. Palmer: Yes, I think any institution can benefit from

functioning as a team of various experts. This approach allows improved communication and shared learning. No one can function alone. Today, it really takes a team with vast clinical knowledge to care for a patient. Indeed, some health care centers have their own social workers, nutritionists, dental experts, and physical therapists who sit on multidisciplinary teams that see and analyze patients. This kind of team effort further improves patient care. This allows a team to address not only the treatment-related information but psychosocial, cost of care, and other factors that effect a patient's experiences during cancer treatment. With a team, it is less likely that paperwork will be lost or that details will be missed things that could negatively affects the patient's outcome.

TLCR: *Thank you very much for taking time to answer our questions.*

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