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INTEGRATED CANCER CARE

If your oncologist, pharmacist, or other members of your oncology team advises you to stop taking "antioxidants" during chemotherapy and radiation, then please show them this review article.

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Antioxidants along with Chemotherapy & Radiation - Do Prescription & Over-The-Counter Drugs Interfere?

There is a common view especially in the field of oncology that “antioxidants” typically consist of dietary supplements, vitamins & minerals, and natural health products. Good quality foods such as fruits and vegetables are also included in this area. There are also some antioxidant-type medications known as “protectants” also used in oncology but are incorporated carefully or conservatively in some protocols.

There has been an ongoing discussion for more than 15 years on whether antioxidants should be used along with chemotherapy and radiation for fears that it may interfere with such treatments. Consequently you will find the majority of the oncology community to advise patients to discontinue such antioxidant-type ingredients and which may also include intakes of fruits and vegetables that are used in higher quantities than the typical recommended diet (i.e. juicing, blending, smoothies, etc.).

Interestingly outside the area of oncology there is a growing amount of evidence demonstrating that common and well-known medications used for, example, treating high-blood pressure, diabetes, high cholesterol, asthma, inflammation & swelling, mood disturbances, poor sleep quality, upset stomach, allergy, and pain, are also antioxidants. For example, the blood pressure medications Coreg and Captopril are noteworthy antioxidants along with Statin medications which lower cholesterol. **Table 1** lists some common pharmaceuticals which have demonstrated antioxidant properties.

Such medications may also have comparable effects to dietary supplements, natural health products, and the same protectants used in standard oncology. We have not observed the oncology community to advise patients to discontinue such medications or even consult pharmacists or the physicians involved in the prescriptions to see if any changes should be made during chemotherapy and radiation.

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Table 1. Common Medications with Antioxidant Properties

Medication		Medication	
ACE Inhibitors (Lisinopril, Captopril)		Phenothiazines (Chlorpromazine, Prochlorperazine)	
Analgesics (Morphine, Tylenol, Advil, Aspirin, Celebrex, Diclofenac, Indomethacin, Naproxen)		Metoclopramide/ Maxeran	
Anti-Diabetics (Metformin, Glyburide)		Zopiclone, Ambien	
Anti-Epileptics (Keppra)		Viagra, Cialis	
Anti-Psychotics (Seroquel, Zyprexa)		Proton Pump Inhibitors/ Stomach Protectant (Nexium, Prevacid)	
Beta-Blockers (Coreg)		Effexor	
Bone Building (Clodronate, Pamidronate, Actonel)		SSRI Antidepressants (Prozac, Zoloft)	
Diuretics (Thiazides) / “water-pills”		Statins (Simvastatin, Atorvastatin)	
Benadryl		Trazodone, Mirtazapine	
H2 Blockers/Stomach Protectant (Tagamet, Zantac, Pepcid)		TCA Antidepressants (Amitryptiline, Desipramine, Imipramine)	
Corticosteroids (Betamethasone, Dexamethasone, Hydrocortisone, Prednisone)		Allopurinol	

Within the oncology area there are medications which are directly prescribed as a direct consequence of a persons diagnosis and continued care. For example, because nausea may be an issue for some chemotherapy protocols, select medications are given to assist in this area and can be given just before, during, and after treatment. Ironically, these pharmaceuticals may also possess antioxidant properties and again have comparable effects to dietary antioxidant supplements as well. In addition, some contain good evidence for having negative interactions together with chemotherapy and radiation (i.e. they can interfere and protect the cancer).

We have not observed the oncology community to mention this subject with patients which includes those with advanced disease or challenging cancers who are not responding well to treatment.

If this area is such an important concern for oncologists, pharmacists, and the other healthcare providers involved in standard oncology care, why has there been such an emphasis placed on more natural medicines & foods and not on the standard and commonly used pharmaceuticals that possess antioxidant properties?

It is for the above reasons which had prompted a general review on this subject area looking at a much broader platform and looking at "all" types of antioxidants.

It has become clear that there exists the potential for harm in this area with pharmaceuticals and more attention and research is required. For example, the wide spread use of the steroid medication dexamethasone in oncology is especially concerning as it is the strongest antioxidant that I am aware of and of which also contains the largest bulk of negative research on its use together with chemotherapy and radiation.

Table 2 lists various chemotherapy agents and radiation which have not worked well when used with dexamethasone in different cancer types. In one paper, 89% of 157 tumour samples analyzed where protected by this steroid. In fact, some research suggests the cancer can be protected from chemotherapy up to three weeks following just a single dose of dexamethasone.

In humans, steroids have been correlated with increased metastasis in breast cancer treatment and worse survival using more than 4 mg of dexamethasone in glioblastoma multiforme (GBM) at the end of radiation (along with temozolomide). Only one paper reported that there was no evidence that steroid treatment had a negative effect on outcome in patients with ovarian cancer from 2004 (receiving cisplatin, epirubicin, and cyclophosphamide) and this is all we had found on the subject. Again, the oncology community questions the use of natural medicines with antioxidant capabilities and yet a drug that has significant negative data and commonly used during treatment is somehow missed from the discussion.

Table 2. The Protective Effect of Dexamethasone On Human Cancers

Cancer Type	Chemotherapy/ Radiation	Cancer Type	Chemotherapy/ Radiation
Cervical Cancer	radiation, cytarabine, cisplatin, gemcitabine, 5-FU, methotrexate, paclitaxel, etoposide	**Pancreatic Cancer**	cisplatin, gemcitabine
Lung Cancer	cisplatin, gemcitabine	**Melanoma**	cisplatin
Glioma, glioblastoma, astrocytoma, medulloblastoma	cisplatin, gemcitabine, temozolomide	**Colorectal Cancer**	5-FU
Breast, Ovarian Cancer	paclitaxel, cisplatin, 5-FU, gemcitabine, epirubicin, cyclophosphamide	**Neuroblastoma**	cisplatin, 5-FU
Prostate, Urological Cancer	radiation, paclitaxel, cisplatin, 5-FU, gemcitabine	**Osteosarcoma**	cisplatin
Hepatocellular Carcinoma	cisplatin		

It would be unfortunate if it were eventually proven that commonly used supportive medications in cancer treatment or those used to assist in treating high blood pressure, for example, impede an optimal treatment response in the oncology patient while attempting to reach improved life quality and/or enhanced overall survival.

Medications that are new, missed from this review, or have not been evaluated for antioxidant capabilities should be regarded as a potential antioxidants unless proven otherwise.

Ultimately, unless clear evidence is available that the benefits of such medications outweigh the potential risk, prescription and over-the-counter medications with established or suspected antioxidant properties should be used with caution and especially if this area continues to be a point of contention by the oncology community. If and when possible considerations which include dose reductions, creative cyclical breaks, or even complete avoidance may be appropriate steps to explore with antioxidant medications used alongside chemotherapy and radiation.

Reference:

Lemmo, W. Potential interactions of prescription and over-the-counter medications having antioxidant capabilities with radiation and chemotherapy. Int. J. Cancer 2014, Sep 25. doi: 10.1002/ijc.29208. Published Online and Open Access.