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**CASE STUDY: THE USE OF VISCUM ALBUM AND INTRAVENOUS
ASCORBIC ACID IN A LYNCH SYNDROME PATIENT WITH RECURRING CANCER**

Abstract:

Lynch syndrome is the most frequent hereditary cancer syndrome accounting for 3-5 percent of all colon cancer cases¹. It is also the most frequent predisposing inherited cause of endometrial cancer and is associated with ovarian, urogenital and gastric cancers¹. This is a genetic condition caused by mutations in one of several DNA mismatch repair (MMR) genes responsible for correcting DNA damage². In this case report we examine the use of intravenous ascorbic acid (IVAA) and *Viscum album* in a female patient diagnosed Lynch syndrome at Integrated Health Clinic. The patient had a prior history of colorectal and endometrial cancer, who due to side effects was unable to continue with her standard of care treatments.

Case history

This is a case of JF, a 40 year-old female who came in on July 2010 seeking adjuvant naturopathic cancer treatments. She had a previous diagnosis of Lynch syndrome and had a long personal history of colorectal cancer with concurrent invasion of the left fallopian tube in 2004. At that time she underwent a partial colectomy and left salphingo-oophorectomy, with no adjuvant treatment being recommended. A hysterectomy and right salphingo-oophorectomy was then performed in June 2010 due to the presence of a large 525 gram uterine mass. Pathology of the uterine mass was reported as a grade 2 endometrial adenocarcinoma of the right ovary and uterine corpus. Adjuvant chemotherapy consisting of Carboplatin and Taxol was initiated. JF finished 1 cycle and experienced profound side-effects including fatigue, numbness and tingling of extremities therefore unable to continue with any further treatment. As with all our patients, JF was advised to continue care with her medical oncologist throughout her care.

Lynch syndrome is carried on her father's side, with both a paternal uncle and aunt having been diagnosed with colorectal cancer, and another aunt with uterine cancer. Her father was later diagnosed with prostate cancer in 2012. There is no presence of cancer on her maternal side. JF began naturopathic treatments in August 2010 consisting of 50 grams IVAA and mistletoe lectins (Iscador) three times weekly. Prescription and targeted supplementation was also provided (Table 1, 2).

Table 1. Prescribed Targeted Supplementation

Supplement	Dosage	Effect
Can-Arrest	2 capsules p.o. BID	Inhibit cyclooxygenase-2 (COX2) enzymes. Blocking COX 2 has been shown to decrease tumor invasiveness Inhibition of the transcription factor NF-κB to arrest tumor growth and its progression ³ . Inhibition of the transcription factor NF-κB to arrest tumor growth and its progression ⁴
Resveratrol	2 capsules p.o. BID	Suppress AP-1 activation process. Cause cell cycle arrest and induce apoptosis ⁵ . Apoptotic effect by altering mitochondrial membrane potential and permeability ⁶
Vitamin A	5,000 I.U. p.o. QID	Anti-proliferative, proapoptotic, and anti-oxidant ⁷ . Decrease tumor cell proliferation and invasion ⁸
Coriolus	2 capsules p.o. BID	Anti-tumor, immunomodulation ⁵ . Antineoplastic, slow growth of tumors, regulate tumor genes, decrease tumoral angiogenesis, and increase malignant-cell phagocytosis ⁹
Reishi	2 capsules p.o. BID	Anti-tumor, immunomodulation ⁵ . Antineoplastic, slow growth of tumors, regulate tumor genes, decrease tumoral

		angiogenesis, and increase malignant-cell phagocytosis ⁹
Melatonin	20mg p.o. QHS	Multi-disciplinary anti-cancer action reduces toxicity after chemotherapy, radiotherapy, immunohormonal therapy and cancer surgery. Adjuvant therapy for cancer ¹⁰ . Induces apoptosis ¹¹

Table 2. Prescription and Supplements specific for cancer

Prescriptions	Dose	Effect
Metformin	400mg p.o. BID	Activation of AMPK disrupts crosstalk between insulin/IGF-1 and GPCR signaling in pancreatic cancer cells ¹² Induces p53-dependent autophagy, inhibits mTOR and protein synthesis, and induces cell cycle arrest through a decrease in cyclin D1 protein level ¹³ .
Dichloroacetic Acid (DCA)	500mg p.o. BID (5days on & 2 days off)	Inhibits pyruvate dehydrogenase thereby inhibiting glycolysis. Causes favoring of aerobic respiration, which reverses the suppression of apoptotic pathways. Increase tumor apoptosis shrinks tumor size ¹⁴ Inhibits angiogenesis, alter expression of HIF, and alter pH regulators V-ATPase and MCT1 ¹⁵
Celebrex	100mg p.o. QID	Inhibit cyclooxygenase-2 (Cox 2) enzymes. Blocking Cox 2 has been shown to decrease tumor invasiveness ¹⁶

		Induce apoptosis and inhibit angiogenesis of tumor cells ¹⁷ . Thermal sensitizer and prevents thermotolerance ¹⁸
Cimetidine	400mg p.o. BID	Anti-adhesion and antiangiogenesis. Inhibit tumor cell propagation and metastasis ¹⁹ . Repurposed as an anti-cancer agent ²⁰
Supplements		
Can-Arrest Boswellia Curcumin Quercetin	Boswellia 200mg Curcumin 200mg Quercetin 100mg 2 capsules p.o. BID	Inhibition of the transcription factor NF-κB to arrest tumor growth and progression ²¹ . Anti-inflammatory and antioxidant activity causing inhibition of vascular endothelial growth factor-mediated angiogenesis in human intestinal microvascular endothelial cells ²²
Avemar	1 sachet p.o. QID	Anti-tumoral. Immune modulation. Improve quality of life ²³ . Induced apoptosis and exert significant antitumor activity ²⁴
Pectasol-C	3 scoops p.o. QID	Bind to galectins on cancer cell surface interfering with cancer cell metastatic target site interaction ²⁵ . Immunostimulatory. Activation of functional T-cytotoxic cells, B-cell and NK cells ²⁶
Fish oil	1-2 tablespoon p.o. QID	Inhibit acute phase protein response and cachexia ²⁷ . Prevent progression of APPR and cachexia in

		weight losing patients with advanced cancer ²⁸
Melatonin	20mg p.o. QHS	Immunomodulatory. Augment production of T-lymphocytes and NK cells. Oncostatic properties in melanomas and tumors of epithelial origin ²⁹ .

One month following, a CT scan showed significant interval improvement from a previous CT prior to hysterectomy. Residual disease was noted with the presence of 2.3 x 1.9 cm lesion between the posterior aspect of the bladder and rectum. A pelvic ultrasound in October 2011 found a hypoechoic structure measuring 1.5 x 1.3.1.1 cm adjacent to the right pelvic sidewall. (Fig 1)

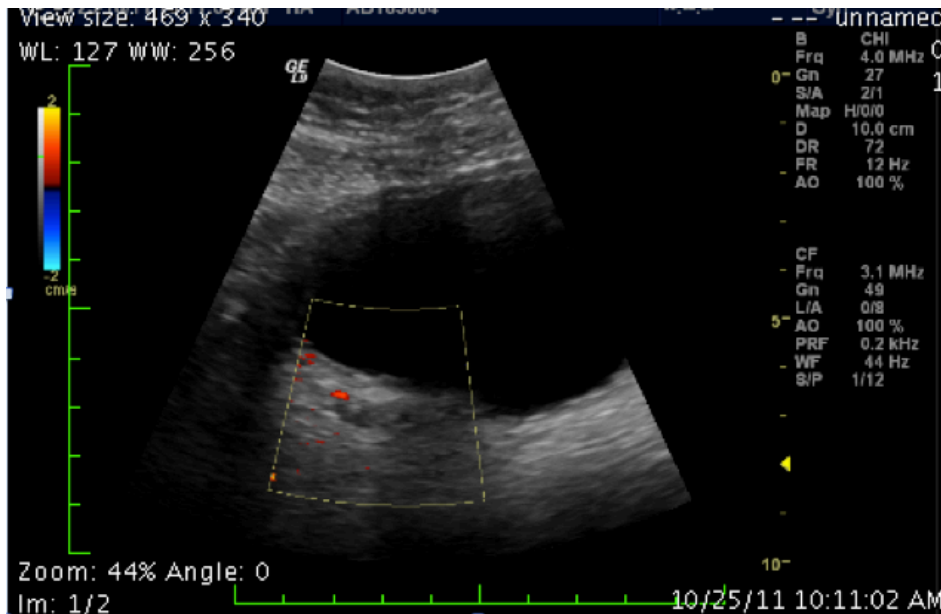


Figure 1. - abdominal ultrasound – October 25, 2011

JF continued to have regular follows up at IHC, she was asymptomatic and had no expected cancer-related systemic, abdominal or pelvic complaints. She had continued to follow all prescribed dietary and supplementary recommendations. IVAA was reduced beginning in October 2011 to twice weekly. A follow up abdominal ultrasound in January 2012 reported no remnants of the structure and the rest of the scan was clear (Figure 2).

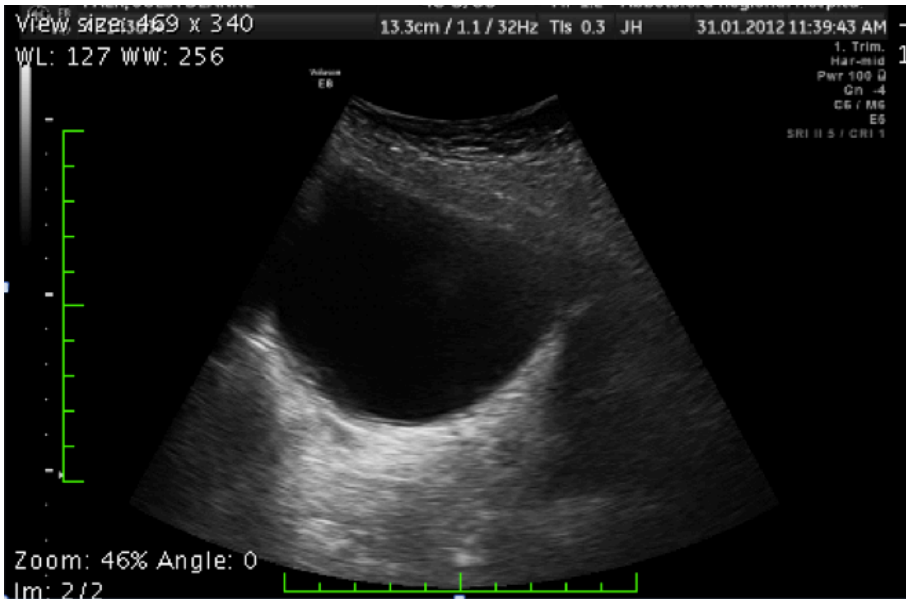


Figure 2. - abdominal ultrasound - January 31, 2012

JF continued her naturopathic treatments, which she tolerated well and without side effects. She takes her supplements regularly and continues with her twice-weekly Iscador injections. She is now on a maintenance dose of IVAA 50grams bimonthly, and she remains in a complete remission, with no evidence of disease. CA-125 results have shown a continually slowly declining trend, and the CEA tumor marker results remain generally stable, and within normal limits (Figure 3).

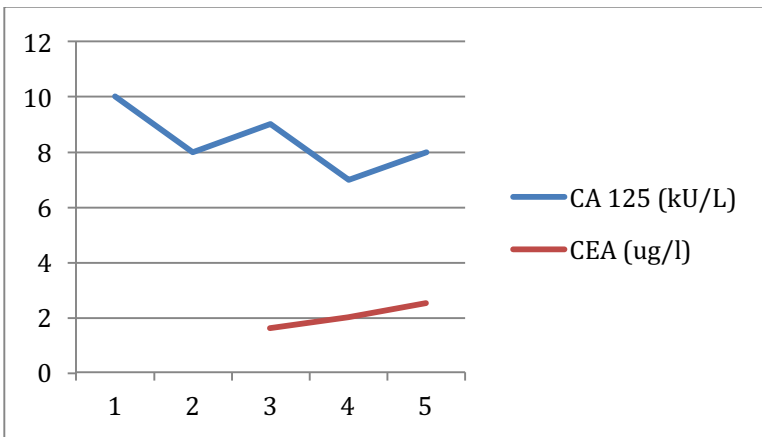


Figure 3. - CA 125 and CEA

Discussion

The overall lifetime risk of developing cancer is approximately 54% in patients who carry defective MMR genes³⁰. The risk of developing colorectal and uterine cancer is also staggeringly high at approximately 52% and 65% respectively depending on which DNA alleles are involved^{17,31}. Five-year survival rates in affected family

members when treated are on average better than sporadic cancers³². Reasons for improved survival are not known but it is speculated that the biology and fundamental nature of the cancer may be different¹⁹. IVAA as an adjuvant cancer therapy, has demonstrated anti-tumour and chemosensitization effects as well as overall improvement in quality of life³³⁻²². At serum milli-molar concentrations, ascorbic acid generates hydrogen peroxide, a cytotoxic reactive oxygen species³⁴. In healthy cells hydrogen peroxide is catabolized to water and oxygen via catalase. Tumour cells lack catalase enzymes leaving malignant cells vulnerable to the cytotoxic effects of hydrogen peroxide²¹. Tumour cells also take up more vitamin C than do healthy cells through the upregulation of glucose transports as a means to adapt to increased metabolic demand²¹. IVAA has also shown to reduce angiogenesis and inflammation through the suppression of COX-2 and NFκβ^{20,22}. *Viscum album* (mistletoe) is a plant that grows on the branches of a variety deciduous and coniferous trees²². The stems and leaves contain biologically active agents including mistletoe lectins, viscotoxins, flavonoids, and polysaccharides known to have immunomodulating and cytotoxic effects²⁴. Most research has focused on mistletoe lectins (ML) as these substances inhibit protein synthesis and induce apoptosis in cancer cells²⁴. Studied in vitro and vivo, ML induces an immune cascade increasing concentrations of various cytokines (interleukin-5, interleukin 12, interferon gamma and TNF-α) and immune cells including natural killer cells, neutrophils, and lymphocytes²⁴. Taken together, investigations have led to the belief that mistletoe up-regulate immunologic responses leading improved immunosurveillance and tumour killing. Human studies examining the application of mistletoe in uterine cancers are limited. In *vitro* and *vivo* studies have either shown no response or cytotoxic effects and growth inhibition when uterine cell lines are exposed to mistletoe extracts²⁵. Human research has documented improved overall survival rates with the use of mistletoe in conjunction with conventional cancer treatment when compared to cohorts using standard medical therapies alone²⁵. Furthermore, significant improvements in psychological well-being and quality of life have been noted with the use of mistletoe in uterine cancers²⁶. Reported side effects were minimal with local allergic reaction at the injection site and fever being most common²⁶. This case report examines the use of alternative treatments including IVAA and mistletoe extracts as either an adjunct to conventional cancer therapies or used alone if patients are unable to tolerate side effects of mainstream oncologic treatments. The particular patient, who could not continue with chemotherapy due to side-effects shows positive responses to ongoing use of IVAA and mistletoe lectins with no apparent side effects.

Conclusion:

This case report shows that naturopathic integrative oncology treatment is safe and apparently effective for the management of Lynch syndrome with recurring carcinoma. In this case, naturopathic treatments have been better tolerated than standard of care, and without any reported side effects. The use of *Viscum album* and

intravenous ascorbic acid, alongside targeted supplementation and the use of repurposed drugs, played an important role in the patient's wellness and quality of life.

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