# Improved Prognosis and Quality of Life in a 66-year-old Female Patient with Metastatic Pancreatic Adenocarcinoma Treated with Gemcitabine, and Adjunctive Orthomolecular and Botanical Interventions

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**Abstract** *Metastatic pancreatic cancer is one of the most aggressive cancers with a relatively poor 5-year survival rate compared to other cancers. Orthomolecular and botanical interventions have demonstrated efficacy in clinical practice, although it is not well documented in current literature. A case report is presented of a 66-year-old female patient diagnosed with metastatic pancreatic adenocarcinoma currently undergoing gemcitabine chemotherapy. The patient was interested in complementary treatment options in order to improve the efficacy of gemcitabine, improve quality of life outcomes, and overall prognosis. The patient was prescribed weekly intravenous infusions of ascorbic acid, twice weekly subcutaneous mistletoe injections, and orthomolecular interventions. The patient was never delayed treatment with gemcitabine due to neutropenia or leukopenia. The most common side effect was mild nausea and anorexia that lasted for 48 hours post gemcitabine infusion. The patient lived with an excellent quality of life for 19-months, surpassing her expected prognosis by 13 months. Orthomolecular and botanical interventions may provide a significant therapeutic effect among some patients with metastatic pancreatic adenocarcinoma. Further research is recommended on the application of intravenous ascorbic acid, subcutaneous mistletoe injections and orthomolecular interventions.*

## Introduction

Pancreatic cancer continues to be one of the most aggressive cancers with a five-year relative survival rate of 8%.[1] In 2012, approximately 4,600 Canadians were diagnosed with pancreatic cancer, while 4,300 died due to the disease.[2] Further research on conventional and complementary therapies is required in order to improve survival and prognosis rates in patients diagnosed with pancreatic cancer, while also focusing on improving quality of life outcomes.

This case report highlights research of complementary treatment options provided to a 66-year-old female patient diagnosed with advanced pancreatic adenocarcinoma undergoing gemcitabine chemotherapy–namely vitamin D, melatonin, coriolus mushroom, intravenous ascorbic acid and mistletoe subcutaneous injections.

## Case Presentation

The case involves a 66-year-old female who presented to clinic in March 2014 with a recent diagnosis of pancreatic adenocarcinoma with liver metastasis. The patient was interested in adjunctive naturopathic support as she was told to expect a prognosis of four to six months with gemcitabine chemotherapy. At the time of the first visit, gemcitabine had considerable research demonstrating its effects in metastatic pancreatic cancer in patients who had a relatively lower functional status.[3-5] The patient had several comorbidities including type II diabetes, hypertension, and hypercholesterolemia. The patient was also overweight and had a lengthy history of gastroesophageal reflux disease. The patient was medicated with metformin, atorvastatin, pantoprazole, and extra strength acetaminophen.

The patient was recommended a comprehensive adjunctive treatment plan that included the following orthomolecular and botanical treatments: 5,000 IU of vitamin $D_3$, 20 mg melatonin, 2,000 mg coriolus mushroom extract, subcutaneous injections of mistletoe (2-3x/week) and 25 g of intravenous ascorbic acid (2x/week).

A summary of the patients CT scans is as follows:

-March 2014: main lesion in pancreas was 4.5cm at largest diameter. Liver metastases consisted of five nodules with the largest being 3.5cm.

-July 2014: metastatic liver lesions improved in size (largest now 2.4cm). Reduction in size of main pancreatic lesion, now 2.9cm.

-September 2014: Improvement in size of all liver metastases, stable pancreatic tumour size.

-January 2015: Minimal (<0.5cm) increase in liver metastases, stable pancreatic tumour.

-May 2015: Minimal (<0.5cm) increase pancreatic tumour, stable liver metastases.

Importantly, the patient tolerated all of her chemotherapy infusions very well and never missed a session due to neutropenia or thrombocytopenia (see **Table 1**, below). Side effects from treatment were very limited and mostly involved nausea and anorexia that lasted for forty-eight hours after treatment.

After the CT scan results in May 2015, the patient decided to stop chemotherapy treatment and continue only with the orthomolecular and botanical interventions. The patient had already surpassed her prognosis and continued to live with an excellent quality of life until she passed away peacefully on October 15th, 2015 – nineteen months after her diagnosis. Per the patient's report, the oncologists were surprised with the results she had, and the relatively good quality of life she experienced throughout treatment.

## Discussion

The patient's treatment plan was a multifaceted approach including dietary, orthomolecular, and botanical therapies. A significant focus of the dietary recommendations was

**Table 1.** Summary of Relevant Laboratory Result

| CA | 19-9 | Hgb | Platelets | Neutrophils | ALT | ALP | LDH |
|---|---|---|---|---|---|---|---|
| Apr 2014 | 5 412 | 133 | 350 | 5.6 | 372 | 793 | 343 |
| May 2014 | 18 342 | 125 | 325 | 3.6 | | | |
| Aug 2014 | 10 988 | 130 | 300 | 4.0 | 158 | 158 | 171 |
| Dec 2014 | 1 054 | 128 | 320 | 3.3 | 42 | 154 | 224 |
| Jan 2015 | 4 157 | 110 | 280 | 2.7 | 44 | 173 | 173 |
| Mar 2015 | 1 735 | 111 | 200 | 3.1 | 43 | 128 | 125 |
| May 2015 | 1 117 | 120 | 270 | 4.0 | 29 | 121 | 121 |
| Aug 2015 | 8 000 | 115 | 290 | 3.8 | | | |

based on minimizing carbohydrates, as per the ketogenic diet guidelines. The main goal of this approach was to aid in the prevention of cancer-related cachexia.[6]

## Vitamin $D_3$

Vitamin $D_3$ is a valuable treatment for patients living with cancer for its potent anti-proliferative effects and repression of migration and invasion of pancreatic cancer cells.[7] Vitamin $D_3$ deficiency (as per *25-OH-cholecalciferol* measurements) has been found to be highly prevalent among patients with a new diagnosis of advanced pancreatic cancer.[8] The vitamin D system has also been demonstrated to be deregulated in pancreatic diseases, including adenocarcinoma which may impair the anti-proliferative effects of vitamin D.[9] Bhattacharjee et al., suggest that Vitamin D may also act as a sensitizer to gemcitabine therapy.[10]

## Melatonin

Melatonin has been demonstrated to possess potent anti-proliferative and immune-stimulatory and hormone modulating properties. Seely et al., reviewed the evidence for melatonin and included data from 21 clinical trials with melatonin and its application concurrently with chemotherapy and radiation therapy in solid tumours, concluding that melatonin may improve overall survival while reducing side effects of treatment.[11]

## Coriolus Mushroom

Coriolus contains several different polysaccharides, however, most research has focused on polysaccharide peptide (PSP) and polysaccharide krestin (PSK). A systematic review and meta-analysis was conducted to assess the efficacy of Coriolus versicolor on overall survival in patients with cancer.[12] Thirteen randomized trials were included. There was a statistically significant difference in overall survival at 5 years ($p< 0.00001$; RR = 1.14 95% CI = 1.09, 1.20). Additional *in vivo* evidence suggests an anti-proliferative effect and a reduction in aggressiveness of pancreatic adenocarcinoma cells treated with coriolus extract.[13]

## Intravenous Ascorbic Acid

Preclinical *in vitro* and *in vivo* studies have suggested a synergistic effect of pharmacologic ascorbate with gemcitabine.[14] Additional phase 1 human trials have demonstrated that there is no increased toxicity with the addition of intravenous ascorbate when added to gemcitabine treatment protocols in pancreatic cancer patients.[15] Welsh et al., studied nine subjects diagnosed with metastatic pancreatic cancer who received twice-weekly intravenous ascorbate (dosing range of 15-125 grams), with escalating doses until a post-infusion plasma level of >350mg/dl of ascorbate was achieved.[16] All subjects received concurrent gemcitabine, and the intravenous ascorbate infusion was timed to be as close to the gemcitabine treatment as possible. Adverse effects attributable to the drug combination were rare, suggesting an effect of ascorbate on reducing side effects. The mean survival of this small cohort was 13 months (+/- 2 months), again suggesting an improved survival rate with the addition of intravenous ascorbate.

## Mistletoe Subcutaneous Injections

Subcutaneous mistletoe therapy is recommended for its profound immune modulating properties, pro-apoptotic effects on cancer cells and its research on improving quality of life outcomes in patients living with advanced pancreatic cancer.[17] Additionally, Matthes et al., studied the impact of subcutaneous mistletoe injections concurrently with gemcitabine.[18] Although the study focuses on its use in surgically resected pancreatic cancers, the results demonstrate that mistletoe may act synergistically with gemcitabine chemotherapy while improving quality of life and overall prognosis.

## Conclusion

Pancreatic adenocarcinoma is the most common type of pancreatic cancer, and when diagnosed at an advanced stage has a very poor 5-year prognosis when compared to other cancers. Orthomolecular and botanical interventions can have a significant effect on improving the efficacy of conventional

therapies, while reducing side effects and improving quality of life outcomes. An integrative patient-centered approach involves the safe and appropriate incorporation of these adjunctive modalities with conventional therapies. Orthomolecular and botanical interventions to consider for patients diagnosed with metastatic pancreatic adenocarcinoma undergoing gemcitabine therapy include vitamin $D_3$, melatonin, coriolus mushroom, intravenous ascorbic acid, and mistletoe subcutaneous injections. Further research is recommended on the application of intravenous ascorbic acid, subcutaneous mistletoe injections and orthomolecular interventions.

## Competing Interests

The author declares he has no competing interests.

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