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Case Report

A New Zealand case study: The use of ozone therapy as an adjunctive support treatment with radiation therapy in prostate cancer. Case report.

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Keywords

Abstract

Ozone therapy has been shown to be an effective adjunctive therapy with radiation therapy (RT). The aim of this case report is to discuss the benefits of using ozone therapy (OT) as a complementary tool in a patient with prostate cancer who was referred to have RT therapy after a nodal oligo-recurrenceoligo-recurrence of prostate adenocarcinoma cancer was detected after having robotic prostatectomy April 2021.

The patient initially faced twenty-three sessions of radiation therapy (RT) over 5 weeks and chose to also use Goserelin, a novel anti-androgen, with Zytiga (abiraterone) and prednisone. He was concerned about the side effects of RT, short-term and long-side effects such as fatigue, burns, and incontinence.

There is an increase in patients reaching out for different forms of treatment modalities and there is a greater need for physicians to understand about these options. However, the terms associated with adjunctive and alternative therapy has meant confusion and limitations. The use of the umbrella term 'CAM' (complementary and alternative therapies) is discussed and how this is used within New Zealand's legal and medical system with the view it could be more clearly defined, which may result better doctor-patient communication.

We have concluded the use of OT (ozonated saline IV [03SS]), together with minor autohemotherapy [MiAH]) as the primary adjunctive therapy, in this case study proved to be both safe and effective when used in combination with conventional treatment. Fifteen months after RT treatment, the patient is healthy with no side-effects from RT, but the patient had experienced side-effects from the drug therapy which was part of the conventional treatment plan. At the time of this report, the drug therapy still has another six months to conclude..

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Introduction

This paper reviews a case history of a male patient in New Zealand with prostate cancer who combined conventional medical care with complementary therapies after robotic prostatectomy for a nodal oligo-recurrence of prostate adenocarcinoma (without lymphatic removal) cancer in April 2021. Further diagnosis of metastasized lymph involvement was discovered made in October 2021. The patient was initially facing three high intensity sessions of 55Gy plus twenty sessions of radiation therapy (RT) over 4 weeks. He also elected to undergo Goserelin treatment, and novel anti-androgen Zytiga® (aberttone) treatment, along with prednisone, while combining ozone therapy, dietary changes, and nutritional supplements as his treatment plan.

The document summarizes the relevant studies and the practical aspects of ozone around this choice for this patient.

When diagnosed with a serious illness, such as cancer, many individuals can feel helpless, and often land in the current conventional medical system where they are swept on a predetermined path with various specialists and pre-set protocols with minimal discussion about other options. Their journey may include surgery, chemotherapy, radiation treatment mixed with various pharmacological approaches. Numerous patients seek 'CAM' (Complementary and alternative) therapies to regain some sense of control, or reassurance to feel they are contributing to their healthcare programme while others are concerned about how the conventional side effects such as fatigue, hair loss, nausea and vomiting, to their physical well-being and quality of life while undergoing treatment, as well the long-term side effects that may arise months or years after these treatments.

The aim with the addition of OT for this patient was to help support energy levels, minimize possible side effects that are commonly associated with RT and contribute positivity to his healthcare journey. The two parts of the OT therapy involved, firstly an intravenous ozonated saline solution at a dose between 0.35µg/NmL up to 0.75µg/NmL was administered, then minor autohaemotherapy (MiAH), 0.25 µg/NmL up to 0.75 µg/NmL oxygen/ozone mix, was initially given twice a week after RT and slowly decreased to monthly sessions. 15 months from the RT treatment the patient has remained clear of cancer and has no noticeable side effects from RT.

This article defined what are complementary therapies and what are alternative therapies. It also reviewed the mechanism of OT as safe and effective adjunctive treatment for those patients undergoing RT.

Prostate cancer is one of the most diagnosed male cancers in New Zealand. In a population of 4.9 million people,[1] each year in New Zealand approximately 3,100 men are diagnosed with prostate cancer, 42,000 men living with prostate cancer and approximately 650 men die from the disease per year. [2]

The prostate has been described a walnut-sized gland that sits below the bladder surrounding the urethra. Its role is to produce seminal fluid that nourishes and transports sperm. As men age the prostate can grow and this increases the risk of cancer. Prostate cancer is detected by testing for prostate-specific antigen (PSA) levels in a man's blood or/and a digital rectal exam (DRE) and confirmed with a biopsy.[3]

Prostate cancer generally metastasizes to the lymph nodes and bone first, but can travel to the lungs, liver, brain, or other organs. When caught early it has a high survival rate, but current allopathic treatment can result in both short-term and long-term side effects that can significantly affect quality of life.

The use of CAM varies from country to country. It has been estimated that (complementary and alternative) therapies' popularity is growing and in recent years in New Zealand grew from 20 % [4] to 25%. This trend likely to rise in coming years.[5]

CASE HISTORY

At the age of 57 years old, in April 2021 the patient was diagnosed with prostate adenocarcinoma initially treated with robotic prostatectomy without lymph node removal. The tumour had a Gleason report of 4+3 and had been fully encapsulated within the prostate. No lymph node cancer involvement was noted at the time of surgery.

Before the detection of prostate cancer, the patient was otherwise healthy apart from occasional asthma and (herpes simplex type 1) cold-sores and was not taking any prescription medication. There was a family history of prostate cancer with an older brother and father having been diagnosed, hence the patient was vigilant with yearly PSA testing.

After the prostatectomy the patient started a gluten and sugar free diet with daily supplements of vitamin D3 1000 iu, vitamin C, zinc 15 mg, NAC 600 mg, resveratrol 250 mg, magnesium 400 mg, Salvesterol® platinum*[6] curcumin 40 mg, omega 3 oil 1000 mg, and drinking green tea. Supplements were adjusted throughout treatment and were on hold during RT.

In October 2021 PSA (Prostate-Specific Antigen) test result had increased from 0.18 to 0.39 (doubling within three months). In November 2021 following PET-Scan results the urologist/surgeon ordered an MRI, and an external iliac node metastasis was confirmed with a PET-scan.

The initial treatment was three sessions of targeted RT of 55GY to the prostatectomy fossa and the PSMA avid left pelvic region, then followed up with synchronous 45 GY in twenty fractions to the whole pelvis. RT has the advantage of delivering the optimum dosage of radiation on tumours while leaving healthy tissues and organs intact. However, like chemotherapy, radiation therapy has its own set of side-effects, which include lymphedema (swelling of lymph nodes), dry, itchy, painful, and burnt type skin reactions, as well as excessive fatigue. This was a major concern to the patient.

Other treatment included:

A novel anti-androgen therapy was recommended by his oncologist and radiologist. This started with a low dose of Goserelin before RT treatment. Goserelin is often used in combination with radiation therapy and other medications to treat localized prostate cancer and is used alone to treat the symptoms associated with advanced prostate cancer. It stops the production of testosterone which may stimulate the growth of cancer cells.

Goserelin was implanted with a syringe subcutaneously. An implant with 3.6 mg of Goserelin was inserted for the first four weeks. The dose increased to then 10.8 mg of Goserelin twelve weeks which was 2-year treatment plan. This treatment at time of writing is still ongoing.

Zytiga® (abiraterone acetate) 250 mg with prednisone 2.5 mg blocks the production of cortisol from the adrenal glands. Zytiga is a common prescription medicine together with prednisone to treat men with prostate cancer that has spread to other parts of the body.

There are several well-known side effects with these drugs, and they can include which the patient experienced. Side effects of these medications include:

Goserelin [7]

- hot flushes and increased sweating
- loss of appetite
- decreased sexual desire or ability.
- difficulty falling asleep or staying asleep.
- pain, itching, swelling, or redness at the place where the implant was inserted.
- Hair loss
- Muscle weakness and loss of muscle tone

Zytiga (abiraterone acetate) /Prednisone[8,9, 10]

- Headache
- Fatigue
- Change in appetite and weight gain.
- Insomnia
- Increased susceptibility to infections
- Sweating
- Feeling jittery
- Joint pain
- Hot flushes
- Headaches
- Diarrhoea
- Osteoporosis
- Hypertension
- Constipation

The patient was extremely concerned about the side effects of RT, especially with possibility of bladder and bowel damage or pain. Hence ozone therapy as a primary adjunctive was openly brought up with his radiologist who was supportive for its use throughout his treatment, having had patients use OT in Europe where he had trained.

During OT treatment ozone is started at low doses and scaled up slowly and cautiously to higher doses with the goal being to “start low and go slow.’ Medical grade oxygen was used, and the two practitioners were trained and qualified ozone therapists.

There are several routes of OT administration; two were used together with this patient in each treatment session to provide maximum effectiveness, help the body to stimulate oxygen metabolism, modulate the immune system and support energy levels. 1)Ozonated saline solution (O3SS) given intravenously using medical grade oxygen and a medical ozone device. Ozone gas mixed with oxygen is bubbled into a sterile saline solution for 10-15 minutes prior to the IV line being inserted into the patient. The dose is based on the patient's weight and condition. Saline solution with an oxygen/ozone drip was started at 0.35µg/NmL and was increased 0.75µg/NmL over 12 sessions. 2)Minor autohaemotherapy MiAH. This a procedure where a small amount of the patient's blood is removed and mixed with ozone in a syringe and injected into a muscle (gluteal muscle). MiAH - low to low-medium levels (0.25 µg/NmL to 0.75 µg/NmL) were used over 12 sessions. On the 13th session the dosing cycle for both O3SS and MiAH was repeated.

Each treatment took about 40 minutes to an hour and was conducted on an outpatient basis in a private clinic.

RT was started on 25th January 2022 and was followed by the first OT treatment on 26th January 2022. This included (MiAH) and O3SS intravenously. Further RT was on 27th & 28th January and followed up with OT three days later.

After the first three sessions RT treatment was reviewed, and it was decided to hold off the further twenty RT sessions but monitor and test for any changes. A PET-Scan six months after the initial RT showed no further indications of cancer. OT continued twice weekly for twelve sessions until May. This was reduced to once a week, and slowly tampered off to one OT treatment per month. Slight bruising around the injection site was the only side-effect mentioned. Patient reported an increase of energy on the days he had ozone therapy.

Results

After three sessions of the targeted RT the cancerous lymph node was undetectable. No other cancer sites were found after further scans. It was decided to hold off on the broad RT treatment for six months and then review. On the days of RT treatment there was slight fatigue, otherwise the patient reported no other side effects. One OT treatment was given after the first RT and second RT treatment and a few days after the third treatment. The patient's energy remained high throughout the treatment and afterwards.

OT sessions and medication were continued. Six months after the initial RT treatments tests showed patient was in remission. No PSA tests could be conducted due to medication affecting a low hormone level.

His general health was fine, but other health issues were contracting covid-19 infection twice and fully recovered. However, incidence of asthma was low. One noticeable change the patient remarked upon was a dry scaly patch of skin on the side of the temple that he had for 4 years on the side of his temple started to diminish after the third ozone treatment and the lack of lip cold sores he experienced during this time.

Side-effects loss of body hair, loss of libido, thinning skin, sleep disturbances, hot flushes, and ongoing constipation problems where were identified as a result of the drug therapy. These side-effects were on-going at the time of writing this article.

DISCUSSION

The importance of the relationship between physician and patient underpins the practice of medicine. It should concentrate on the holistic needs of an individual but be supported by scientific and clinical evidence that makes use of all well-suited therapeutic approaches with the right healthcare professionals and modalities to bring about the best health and healing for each patient. Over the last few years there is a greater interest in 'CAM therapy,' both by health practitioners and patients, which could help improve communication between the two.

Out-dated definition

In New Zealand 'CAM' is a broad and general umbrella definition that is used to describe several health systems and modalities that are not considered part of the general conventional health system. There have been 69 recognized CAM practices, which range from traditional spiritual healing (Rongoā Māori),[11] acupuncture, osteopathy, chiropractic, herbalism, Traditional Chinese Medicine (TCM), massage, use of dietary supplements and other numerous non-mainstream health practices. [12]

Patient trends for using complementary treatment CAM therapies is on the increase. Many patients believe that it will complement existing treatments, or they have had positive experiences in the past or have considered conventional treatment was a failure. However, most patients never discuss CAM therapies with their main conventional health provider. [13]

An article from University of Pennsylvania showed that over half of people surveyed had used at least one form of complementary medicine therapy during their oncological treatment. The primary reason was “to improve the general state of health.” The percentage was higher among patients who had received only chemotherapy (65%) than among those who only received RT (35%). It was noted that 86% of patients reported satisfaction with those therapies as a cost-effective approach.[14]

The above findings are backed by a meta-analysis published in The Oncologist 2012 that revealed in twenty-one studies reporting on the use of CAM used with cancer patients can be as high as 95 percent of patients. However up to 77 percent of patients did not let their conventional doctor know what other therapies they were using. Patients expressed that they had withheld this information as they felt the doctor was not interested, never asked about added therapies, or felt the physician could disapprove of what they were doing. Other reasons included the belief that the doctor could supply little guidance for them on possible CAM choices. A group of patients also expressed the view that they considered the information irrelevant to their allopathic care.

However, this meta-analysis did reveal when adjunctive therapies where discussed there was a better patient-doctor connection and a greater sense of patient satisfaction.[15] Not surprisingly there is a lot of debate about the use of CAM therapies in New Zealand health care, and there is a growing number of patients that use them. [16] In the last 10 years research has shown a growing change towards attitudes in New Zealand around the of CAM therapies with a quarter of GP’s practising CAM modalities and over 80% referring to CAM practitioners. In the study by Liu et al they also revealed that approximately 60% of GPs and Plunket nurses* wanted to receive further education on CAM. While over 66% of GPs favoured the idea that CAM should be included in their training during medical school. [17]

(* Plunket nurses are registered nurses with post-graduated qualifications who offer support for health and wellbeing for New Zealanders from birth until five years. They provide free regular health and development checks for infants and a 24/7 parent helpline and general advice for new parents.)

There is a continual change of products and practices around CAM therapies and among conventional health practitioners, and a main concern is that not all CAM therapies have the data to show that practitioners have adequate training, the effectiveness of the modality and the possibility that the therapy could negatively interfere with conventional treatments patients are already undergoing. In contrast, allopathic medicine depends on therapies that have been scientifically trialled and tested and practiced by qualified practitioners.

CAM therapies are generally seen as more ‘natural or traditional’ but they often have limited scientific trials, and efficacy may be low or unknown. The danger with those who choose ‘alternative medicine’ is the likelihood it is not necessarily proven, and patients may also completely reject conventional treatments. This results in the patient missing the vital specialist medical care and follow-up testing required to determine how their condition is tracking.

Adjunctive or complementary therapies are those treatments that are used alongside, or work with, conventional medicinal care and are considered synergistic. These forms of modalities have been professionally researched and have clinical trials to back their efficacy.

In contrast an ‘adjunctive therapy’ has been defined by the American Cancer Institute as ‘another treatment used together with the primary treatment. Its purpose is to aid the primary treatment.’[18] while Wikipedia adds ……..’adjunctive care or augmentation therapy is a therapy that is given in addition to the primary or initial therapy to maximize its effectiveness.’[19]

Therefore, reframing the definition of CAM and its current official classification in New Zealand to a more concise definition specifically separating the two practices – complementary and alternative - would give greater scope and encouragement to both patients and health practitioners. This could lead to the rise of an integrative approach to health care which blends the allopathic with adjunctive or complimentary approaches with greater confidence.

Complementary therapies may help the patient cope with treatment by improving the patient’s quality of life, improving their general health and wellbeing, help reduce symptoms of their condition and conventional treatment side effects, and give the patient a sense of control during their treatments. [20]

In Brazil in the 1980’s Traditional, Complementary and Integrative Medicine were introduced in the public health system. In 2018, treatment with ozone became a complementary integrative practice showing several benefits. In Serra et al, review of the evidence around OT noted the various routes of application that can be used, (systemic routes, topical application, ozonated water, topical oxygen/ozone gas mixture, and topical ozonated oil) and useful for a wide range of conditions (cancer, infection, inflammation, controlling pain, wound healing, and support for quality of life). Their conclusion was that OT was an effective adjunctive option which can be offered to support medical conditions. It is also an effective and safe treatment with no adverse outcomes and has economic benefits due to its low cost.[21]

What is Ozone Therapy?

OT is considered an adjunctive or complimentary therapy, as it supports conventional treatment. It has been shown to enhance conventional medical therapy. Oxygen/ozone therapy is already a well-established complementary therapy practiced in many European countries. It is a well-regulated practise with the Madrid declaration on Ozone Therapy[22] as a guiding document outlining principles and practices of Ozone therapy. Today, ozone treatment is a commonly recognized practise in fourteen countries including Russia, China, Italy, Germany, Brazil, and Spain.

OT has been studied and in use for more than a hundred years. Ozone consists of three atoms of oxygen joined together which creates a relatively unstable molecules. Ozone therapy is a term that encompasses several different practices where a mixture of oxygen and ozone is obtained from medical oxygen by using a medical device – a medical ozone generator with medical grade oxygen - and administered by a trained ozone therapist. Its application is not limited to one field medical use but can be used: oral health, veterinary care, and in all forms of human health. Ozone administration is variable (IV, rectally, vaginally, topically, through ozonated oil, [never inhaled]) and based on its treatment goals and location of therapy.

Ozone therapy is currently not considered a mainstream therapy in New Zealand and is only available from a handful of qualified Ozone therapists in the private sector. Yet worldwide the clinical data regarding its safety and effectiveness is growing in popularity.[23] A growing number of hospitals and private health clinics around the world are now using OT to assist with a numerous health conditions.[21, 24]

How does Ozone work?

Over the last few decades, a number of well-known journals have reported and supported the use of ozone therapy helping eliminate cancer cells both invitro and in vivo. Ozone has been postulated/shown to target cancer cells while leaving healthy cells unaffected.[25]Many studies have established that cancer and all chronic diseases have something in common - oxygen deprivation. Ozone brings oxygen into the system through the bloodstream and floods the cells with oxygen. In terms of a pharmacological viewpoint ozone is not classified as a drug as there are no receptor sites to trigger cellular reactions. According to Velio Bocci, an ozone researcher, he concludes that ozone's actions on the body help to tigger the body's own adaptive response and stimulating the body's natural self -healing. [26]

OT is believed to have the following effects on the body:

- Stimulates the production of white blood cells. These cells guard the body from viruses, bacteria, fungi, and cancer.
- Ozone significantly increases oxygen levels in the body after ozone administration. Regions of low oxygen (hypoxia) mean cells are less likely to trigger apoptosis (the genetically programmed event that destroys the cell), and hypoxia is a common feature of solid tumours).
- Interferon status increases.
- Stimulates the production of Tumour Necrosis Factor (TNF). TNF is produced by the body when a tumour is developing. Ozone administration stimulates the release of immune modulating factors.
- Ozone makes the antioxidant enzyme system more efficient. [27]
- Improved tissue repair through improved oxygenation and stimulation of growth factors. [28]

Ozone therapy and Radiation therapy

Unfortunately, tumour hypoxia levels could triple with RT. Hypoxic tumours decrease apoptotic potential and can result in a greater resistance to RT and chemotherapy. It was therefore suggested by Gray et al in 1953 that if there were an increased supply of oxygen to the tissues, RT would have a greater effectiveness when the tissue is well-oxygenated. [29]

OT does increase oxygen levels in the body. In a study measuring tumour oxygenation, eighteen subjects where given ozone by auto-haemotransfusion on three alternative days, resulted in increases in oxygen levels in the subjects who had the most hypoxic tumours. The results of the study indicated that RT effect may be improved with ozone therapy and would be a suitable adjunctive therapy for those undergoing CT and RT sessions.[30]

Ozonated saline solution was given in the treatment of rabbits with VX2 tumours. In the research by Ma et al in 2018, they showed it to be safe and efficacious treatment, resulting in reduced cancer growth rates among the active treatment group. They concluded increasing oxygen levels in the tissues activated the immune response to trigger antitumor effects and increase apoptosis helping decreased tumour growth rate.[31]

Research from Cuba reviewing RT toxicity and ozone use in stage T1 and T2 patients with prostate cancer revealed that the group of thirty-five men who received rectal OT had a rapid decrease in PSA levels, lower RT toxicity levels, lower dermatitis and were 51% more likely to sustain continual treatment compared 14% in the control RT group.[32] Hence the combination of OT increased the sensitivity of the tumour to RT and helped decrease PSA and reactions to RT. The inclusion of rectal insufflation with an ozone and oxygen mixture was a promising complementary multimodal treatment for patients.[33]

Research from Spain in 2015 also supported the Cuban results and they showed that OT was effective in helping reduce the RT side effects in prostate cancer. Further clinical studies from Russia in 2017 in 100 women with endometrial and uterine cancer showed OT stimulates the anti-tumour reaction in the immune system. OT has also shown in clinical research to reduce ($p<0.05$) the effects of secondary lymphoedema and improved lymphatic circulation in women with breast cancer. [34]

Routes of administration

O_3 therapy combines a mixture of oxygen (O_2) with ozone(O_3), with a diverse therapeutic range (10–80 µg/ml of gas per ml of blood). Ozone has a half-life of 40 min at 20 °C [35] therefore, must be used immediately as it cannot be stored. An ozone treatment mixture has 95%-99.95% oxygen and 0.05%-5% ozone There are several methods of administration depending upon the patient's condition.[36]

One of the primary considerations for using ozone therapy for the patient in this case study was due to the possible side effects of RT. This was a factor in the consideration of possible adjunctive treatments with the patient in this study. Clavo et al studied a small group of six men with pelvic pain after cancer treatment (RT, CT, surgery, or a combination of these treatments). All patients were taking drug treatment for pain management. This study clearly showed the usefulness of OT as and adjunctive treatment for those with chronic pelvic pain: three sessions per week slowly reducing to one per month depending upon clinical improvement over 28 week for three months of therapy. It was concluded that cancer treatment had increased inflammation, oxidative stress, and hypoxia and OT had a modulating effect on these factors, increasing antioxidative and anti-inflammatory responses that resulted in significant improvement of the pain levels.[37]

Numerous studies have proven that ozone therapy effects are consistent, and the therapy is and does not cause side effects. It has been well represented in clinical trials for numerous conditions, including chronic disease, detoxification, Lyme's disease, autoimmune disease, cardiovascular conditions, viruses, dental, and much more, and is well tolerated by patients.

DISCUSSION

The patient underwent three session of targeted RT. Initially there was a plan for a further twenty sessions over a month to the whole pelvis with synchronous integrated boost of 45 Gy to the prostatectomy fossa and the PSMA avid left pelvis nodes. Ozone was not used to replace any conventional oncological treatment, rather as an adjunctive treatment. No further evidence of the disease was found in the follow up PSMA-PET Scan.

During this patient's treatment there was an integrative approach to health care blends the allopathic with adjunctive or complimentary approaches in which all specialists in the team are aware of additional therapies.

- Greater communication between adjunctive therapists and conventional physicians as some patients may be uncomfortable with their chosen adjunctive therapy. In New Zealand and around the world more patients are looking for complementary treatments. Health professionals are looking to include these treatments, but some behaviour changes are required: To advise about complementary and alternative medicine, doctors need to understand its potential benefits and limitations.
- Doctors are training in complementary and alternative medicine and report benefits both for their patients and themselves.
- Patients' safety and the effective integration of complementary medicines with and conventional medicine is influenced by the professionalism and ethics of the training available.
- Doctors need to address training in and practice of complementary medicine within their own organisations and be able to discussions options with their patients.[16]

RESULTS

The patient was concerned about the side effects of radiation therapy RT such as fatigue, nerve damage, bladder or bowel incontinence, and pain that could affect him some months or years after RT treatment.

After three sessions of 55 GY to the area of the prostatectomy and to the left pelvic nodes results were evaluated to see if any further RT was needed. As there was no further sign of cancer, the planned twenty additional sessions of RT were deferred. Six months later a PET scan showed no further signs of cancer, and the cancer was determined to be in remission.

Fifteen months after RT treatment, the patient was confirmed to be in remission.

All health practitioners were informed of the complementary therapies and a supportive Radiologist who had trained in Europe had been in a team that had previously used OT.

Psychologically, by using complementary therapies the patient felt more in control with his health care outcomes and decided to continue with monthly IV Ozone saline/Minor autohaemocratic treatment, sugar-free diet, and dietary supplements.

This patient chose to include ozone therapy as one of the primary adjunctive therapies in his recovery plan from prostate cancer and over fifteen months had twenty sessions of O3 SS intravenous and MiAH, which were initially added to help decrease possible side effects from RT therapy, but the patient felt the benefits helped his recovery extended the ozone treatment.

CONCLUSION

This patient found that ozone treatment fitted into his lifestyle and treatment plan, and combined successfully with dietary changes, nutrient support, RT, and drug therapy for prostate cancer treatment. Ozone was not intended to replace any conventional oncological treatment, rather to be an adjunctive treatment. It was pleasing to note that the patient did have a successful outcome after only three session of RT treatment, and it is deemed likely that the ozone treatment was a significant contributor to this positive outcome.

There were no discernible negative side-effects from ozone, but patient reported an uplift in energy levels after ozone treatment especially after RT treatment. However, the patient did have side effects from conventional treatment which was linked to drug therapy. Fifteen months from the RT treatment patient has remained clear of cancer has no noticeable known side effects from RT. He is still undergoing health checks and has another 6 months Goserelin treatment to complete.

Ozone therapy is not yet well known in New Zealand. However, this case study has showed how this adjunctive therapy supported a positive health outcome for this patient. He reported that it made him feel more proactive in his treatment in a time which can be very frightening and disconcerting.

Its limitation is that this is based on a single patient and certainly greater research would be helpful on RT and ozone combined in a larger group study. It is hoped that orthodox medicine support and see the validity of ozone therapy as an adjunctive option in combination with other treatments such as RT in New Zealand in the future.

The choice of adjunctive therapies such as OT and nutrient supplements is for many patients is about improving the quality of life, trying to reduce and / or alleviate the characteristic symptoms associated with of the cancer. Many also use adjunctive therapies to help counteract the side effects of conventional treatment. Therefore, is crucial current physicians have a greater understanding of these therapies and the benefits that they offer.

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