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RESEARCH ARTICLE

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**Pain management with Radiotherapy and ozone with high dose vitamin C therapy in a case of bone metastasis of breast cancer patient**

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**ABSTRACT**

**BACKGROUND:** *The treatment of bone metastasis of breast cancer was a hardly topic of cancer. Coping with pain of bone metastasis can sometimes be quite difficult especially present with multiple metastasis.*

**CASE:** *In our bone metastatic breast cancer patient, disease was progressed following chemotherapy (CT). Ozone therapy was applied to left shoulder and cervical region as a local injection with rectal insufflation. One day later ascorbic acid applied via intravenously infusion. A complete palliation was obtained in pain and the analgesics were interrupted.*

**DISCUSSION:** *In our case, a full pain control was achieved with ozone and high dose vitamin C therapy initiated following the progression after CT.*

**KEYWORDS:** *Ozone therapy, high dose ascorbic acid, metastatic breast cancer*

**INTRODUCTION**

Bone metastases and related pain are a common problem of cancer. The increased vascular permeability related edema most prominent cause of pain in bone metastases. Other causes of pain are irritation of the nerves due to the tumor (1). Radiotherapy, chemotherapy, and bisphosphonate

treatments can be using therapies for bone metastasis and related pain, although often not sufficient (2, 3). Vitamin C, or ascorbic acid (AA), significantly reduced edema, inflammation related pain in clinical studies (3-5). Vitamin C also increased survival of cancer patients (5-7).

The most common site of metastasis of breast cancer was bone. The primary therapy of bone metastasis of breast cancer were hormonotherapy (HT) and palliative radiotherapy (RT). If the pain is not treated, it decreases sleeping, appetite, quality of life and performance status of patients (8). Opioids usually using for bone metastasis related severe pain despite their side effects. Cancer-related pain can be often occurring because cancer related inflammation, neuropathy or pain mediators (9).

Palliative RT was most used therapy for pain in metastatic cancer (10). In rapidly growing tumors were become oxygen-starved. The hypoxia is an important factor in radioresistance (11). Medical ozone (5% Ozone and 95% oxygen mixture) (OO) therapy which increases oxygenation on body and organs can be used for treatment of inflammation and pain palliation (12).

OO therapy can also increase the sensitivity and decrease the side effects of RT by increasing the production of interleukin-2, interferon, tumor necrosis factor (13-16).

According to The World Health Organization (WHO) guidelines (17), obtained a three stage pain management for pain of cancer. Interventional treatment planning of pain can be applicable if resistance of pain available even analgesic treatments (18). Interventional pain management are joint injections, radiofrequency ablation, nerve blocks or OO injections (18).

OO can also effective to reduce pain by decreasing to inflammation with anti-bacterial, anti-fungal and anti-viral effects (19, 20). Effectiveness of OO with or without other standard treatments shown in many studies (14, 21, 22).

Low catalase activity shown to in various cancer cell lines that contribute decreasing activity of cancer treatment agents (23). Catalase and hydrogen peroxide increased to superoxide production of cancer cells which increasing ascorbate related cyto-toxicity of cancer cells.

Pretreatment of labile iron, artemisin, ozone therapy, ketogenic diet, NADPH oxidase activation, perfloran which oxygen carrier and hyperthermia increased activity of ascorbic acid treatment (24-28); OO can increased to hydrogen peroxide and decreased to NF-kappaB which responsible for aggressive behavior and chemo-resistance in many cancers, (29).

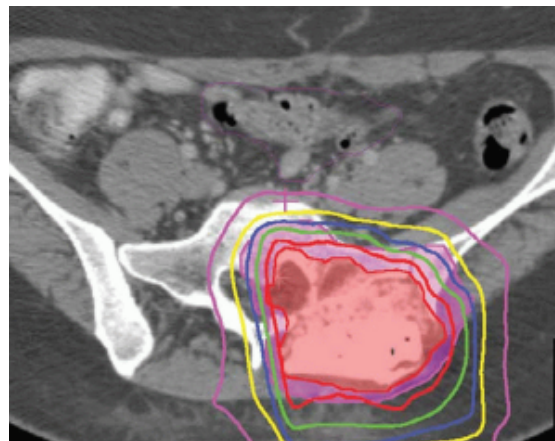
## CASE REPORT

Our case is a 57-year-old female patient who diagnosed as multiple bone metastasis of breast cancer (Figure 1).

Her disease was progressed following chemotherapy (CT). ECOG (Eastern Cooperative Oncology Group) performance scoring was 4, Visual Analog Scoring (VAS) and Verbal Pain Scoring was 100%. FDG PET CT (Positron emission tomography with fluorine 18 (18F) fluorodeoxyglucose and computed tomography) images showed

multiple metastatic focus in the cervical, toracal vertebrae and pelvis.

**Figure 1:** Radiation planning of Left sacrum metastasis



The palliative RT was planned with CT simulation, fraction of 250 cGy with dynamic IMRT once a day and five days a week to 4-7.cervical vertebrae and left sacrum regions. But after 5 fraction of RT, the pain became more severe even using analgesics. Ozone therapy was applied to left shoulder and cervical region as a local injection with rectal insufflation at deep as 0,5 cm 20mcg/ml, 2ml/dose, only two dose, be-weekly with RT. Two days later 3,5g ascorbic acid applied via intravenous with infusion of 500ml of saline serum. A complete palliation was obtained in pain and the analgesics were interrupted.

A new VAS and VPS were 0%. The patient's performance improved from ECOG 4 to ECOG 3 after OO and ascorbic acid with RT.

## DISCUSSION

In multiple bone metastasis of breast cancer, generally, a 50-75% response was reported with radiotherapy (30). OO therapy can be used for treatment of inflammation, ischemic illnesses and pain palliation because it increases oxygenation on tissues (12). Injecting of OO into a painful spot showed more faster effects than other way of OO application. This is also called chemical acupuncture (31). In our metastatic breast cancer case, disease was progressed after

CT. Injection of OO treatment was applied for resistant pain despite RT, due to multiple bone metastasis. Furthermore the patient's performance improved from ECOG 4 to ECOG 3 after RT and OO with ascorbic acid.

OO, high dose ascorbic acid with RT can help to reduce cancer related pain and other side effects and improve to overall quality of life. There is a great need for multicenter studies for OO, high dose ascorbic acid with RT treatment and pain management of bone metastasis of breast and other cancers with severe pain.

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