

Effect of Integrated Ayurveda and Yoga Therapy (IAYT) on osteoporosis detected in breast cancer patient on remission- A single case study

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KEY WORDS

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ABSTRACT

This is a case study for invasive ductal carcinoma diagnosed in a patient aged 60 years in 2015. She went through chemotherapy and radiotherapy and was on remission in 2016. Bone density degeneration was the side effect from the breast cancer treatment. After trying the conventional treatment, she was not satisfied, she came to Union Yoga Ayurveda (UYA), Singapore. She came to clinic looking for alternative therapy to help her increase her bone density, cope up with weakness and overall mental and physical wellbeing. The patient was given holistic treatment of yoga and Ayurveda, involving *patra pinda sweda* (herbal compress) and *picchu* (herbal soaked gauze pieces). The yoga therapy involved asanas practise to increase strength, breathing and meditation for overall wellbeing. The patient was not on any other treatment/medication during the entire treatment. After uninterrupted therapy for six months there was an increase in her bone density along with increase in energy level. The patient case study is an attempt to provide yoga and Ayurveda as an alternative/supportive treatment for remission management osteoporosis from breast cancer patients.

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Introduction

Globally, around two million women are diagnosed with cancer and among the diagnosed, breast cancer being a major contributor and most common (1). A study conducted by the Hai-Rim Shu et al showed the breast cancer mortality among the western countries such as United States and UK are showing declining trends whereas among Asian women, the incidence is increasing in Singapore, being the highest as compared to others regions of the Asia (2). Treatment of breast cancer include mastectomy (3) which was used since early 19th century, with advancement of technology and knowledge of breast cancer, treatments such as chemotherapy, aromatase inhibitors, are being used and are currently in use (3). Recent days, much more advanced techniques of targeted chemotherapy and radiation therapy are also being used for the treatment of breast cancer. (3) But with these heavy treatments of chemotherapy and hormonal therapy, there is a huge toll on the other organs of the patient receiving treatment especially post-menopausal women as the prevalence of breast cancer is highest in these population (4). Considering post-menopausal women whose Bone Mineral Density (BMD) is increased, receiving these treatments would lead to bone loss with increased risk of the fractures and leading to osteoporosis (4,5).

The treatment of breast cancer, even though highly advanced, yet it leads to series of psychological and social despair among the survivors. Studies shows that majority of

patients, experience treatment-related distress, fear of recurrence, anxiety, post-traumatic stress disorder (6). Cancer, as both disease and psychological distress needs to be recognised and addressed not only to increase life span but also Quality of Life (QOL) (7).

The anxiety and post-traumatic stress impact the patient's body in various ways such as psychological, neurological and immunological imbalances. Further studies have revealed that chronic stress alters the hypothalamic-pituitary-adrenal (HPA) axis, resulting in hypercortisolism or glucocorticoid resistance. This decreases the growth hormones significantly affecting bone loss, contributing to Osteoporosis (8). To treat the patients with osteoporosis in such cases, several drugs and injections such as alendronate, zoledronic acid and ibandronate (all these drugs belong to bisphosphonate group) are available which slows down the bone remodelling process but leads to side effects like back pain, musculoskeletal pain, headache, dizziness, palpitation and more (9). A patient who has recovered from cancer will not be able to tolerate such adverse side-effects and there would be decrease in the QOL top, alternative treatment therapies such as Complementary and Alternative Medicine (CAM), which has shown in creating positive approach towards combating cancer and managing adverse effects of conventional treatments needs to be tried among the patients (10).

Yoga as a complementary therapy has proved to be beneficial tool for survivors of cancer patient to help them cope

with depression, fear, and anxiety to improve the QOL and has shown benefit with osteoporosis (10,11). Yoga is also co-effective, safe with no adverse effects. A regular practise of *asanas* provides effect to the bones increasing the BMD. A few studies have even shown reversal of condition from osteoporosis to osteopenia with yoga (11,12). The therapeutic benefit of yoga can help one to relax, slow down the breath and shift the focus from sympathetic to parasympathetic, relieving stress which is detrimental to bone development (13). Also, according to Ayurveda, osteoporosis is a condition developed due to excessive *vata* (*dosha* having properties of wind and air) and can be subdued with use of herbs. A clinical study suggests use of *Guggulu* herb in Ayurveda provide relief to joint pain, swelling and tenderness (14).

Considering the evidence and positive effects shown by CAM, we have used an Integrated Ayurveda and Yoga Therapy (IAYT) therapy for reducing stress as well as increasing BMD on a 60 year female patient with bone density degeneration due to chemotherapy and radio therapy treatment for her invasive ductal carcinoma diagnosed in 2015.

Case presentation

Eligibility Criteria

Patients discharged from hospital and have been physically and mentally fit for yoga and physical therapies. Patient was considered clinically fit from approved medical hospital to do physical intervention.

Design

Single-case pre-post data and long term follow up of six months. Patient aged in 60's diagnosed with invasive ductal carcinoma in 2015, underwent chemotherapy and Radiotherapy. Bone density degeneration was diagnosed at the recovery stage as the side effect of the treatment. She went for conventional treatment of chemotherapy and radiotherapy for osteoporosis which helped her with very unsatisfied minimal improvement. Patient was on calcium and glucose supplements.

Finally, in early 2018, she decided to look for complementary therapy. Patient came to the clinic with osteoarthritis condition and complaints of body ache, joint pain, giddiness, and weakness due to chemotherapy sessions. The IAYT intervention began in April of 2018 after screening and consultation by the doctor in Union Yoga Ayurveda (UAY) clinic, Singapore. Therapy was conducted twice a week and data was taken after six-month of uninterrupted therapy, showing improvement in T-score.

Intervention

The IAYT therapy was introduced to the patient in the form of Ayurveda herbs and oil, yoga *asanas*, breathing and meditation. After consultation with the Ayurveda doctor the patient started with therapy sessions. She came to the clinic for the sessions on regular basis for six months. The sessions were

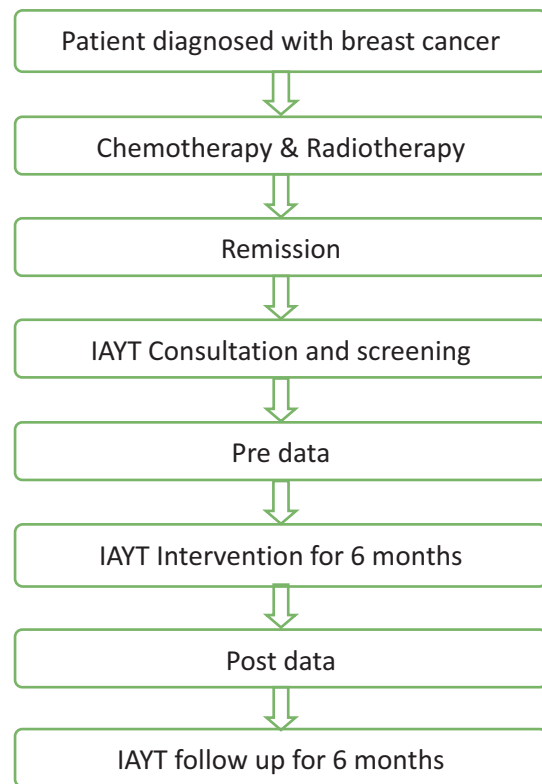


Fig. 1: Design of the Intervention.

conducted and administered by senior therapist. The intervention design is mentioned in the Figure 1.

Yoga and Ayurveda therapy sessions were held two times/week; 60-90 min each (Ayurveda therapy, *yoga asanas*, *pranayama*, meditation) by a specialist. Patient was made to lie down on the bed with complete relaxation and Ayurveda therapy of *Picchu* and *Patra Pinda Sweda* (PPS) were done. After Ayurveda session and few minutes of relaxation, yoga *asanas* were done as mentioned below (Table 1). A series of yoga *asanas* were done with deep and slow breathing, focusing on the hip and spine area. Considering the patient age and condition, all the *asanas* were done in slow pace using yoga strap and bolster for support and with proper guidance of breathing and focus more inwards. *Pranic* Energisation Technique (PET) and MSRT (Mind Sound Resonance Technique) was done as a part of meditation.

A feedback was taken after every fourth session and the patient was asked to mark the pain level using Visual Analogue Scale (VAS) and the results of pain level were analysed after 16 sessions.

Ayurveda therapy of *Picchu* is piece of cotton soaked in medicated oil and PPS, medicated herbs tied in a bolus were part of therapy at hip and spine (15,16). PPS treatment helps to relieve pain, reduce swelling and stiffness of joints caused by osteoarthritis (17). A series of standing *asanas* were carried out to give positive stress to the bones. Seated, supine, prone *asanas* were more for creating opening and strength

Table 1: Integrated Approach of Yoga Therapy (IAYT) Module for Osteoporosis and Cancer

Ayurveda therapy in hip and spine area - 40 mins	
Picchu + Heat pack	10 mins
PPS (<i>Patra Pinda Sweda</i>)	20 mins
Yoga <i>Asanas</i> - 30 mins	
<i>Sukshmyama</i>	10 mins
<i>Trikonasana</i>	20 mins
<i>Vrikshasana</i>	
<i>Ardhakati chakrasana</i>	
<i>Pada hastasana</i>	
<i>Viparita Karani</i>	
<i>Ustrasana</i>	
<i>Sasankasana</i>	
<i>Bhujangasana</i>	
PET (<i>Pranic Energisation Technique</i>)	30 mins
MSRT (<i>Mind Sound Resonance Technique</i>)	15 mins

in spine area (as mentioned in Table 1). Several studies have shown positive effects of practising yoga *asanas* on improving the joint mobility, range of motion and flexibility of muscles and joints, thereby improving the BMD in osteoporotic condition (18). PET is a conscious movement of *prana* (vital energy) in the body which has shown considerable improvement in pain related to wounds, surgery, fracture (19) was performed. MSRT, a relaxation technique of yoga has been used to reduce stress, strengthen immune system, decrease pain, anxiety for patient suffering from Musculoskeletal issues (20) and to improve QOL (21).

Assessment

The assessment was done by measuring the BMD of the patient before and after therapy sessions. BMD measurement were conducted by an independent, nationally accredited lab in Singapore using Dual Energy X-ray Absorptiometry (DEXA) scan.

Type of outcome

Bone densitometry (T- score) by DEXA scan of-

- Neck of femur
- Hip bone and
- Lumbar vertebrae.

DEXA is a low dose X-Ray scan to measure bone density to access and diagnose condition of osteoporosis. DEXA scan is also recognised by WHO as a gold standard to measure the BMD with most examined sites as hip and lower back area (22).

VAS is a method to measure chronic and acute pain. The reading of VAS taken after every fourth session was also a part of assessment. These reading were taken and recorded in an excel sheet and the results were analysed after at the end of

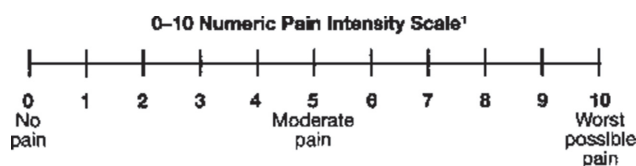
16th session. It is usually represented as a 100 mm horizontal line to represent patient pain intensity by a point between extremes of “no pain” to “worst pain”. It is the most simple, reliable and validated method to measure pain intensity or severity (23).

The result obtained after analysis of pre-post study are very encouraging. By six months of regular therapy, there have been significant improvements in all three parts of weight bearing bones. The lesser negative value of T-score shows improvement in bone density.

Lumbar vertebrae have increased density by 8.33%, left hip became 15.38% more dense and femoral neck got the best improvement of 17.64% change (Table 2).

Table 2: Bone densitometry (T-score using Dual Energy X-ray Absorptiometry (DEXA) scan) of patient done before and after 6 months of Yoga and Ayurveda sessions

Area BMD	Pre therapy (T-Score)	Post therapy (T-Score)	% Change
Lumbar	-2.4	-2.2	8.33
Left Hip	-1.3	-1.1	15.38
Femoral Neck	-1.7	-1.4	17.64

**Fig. 2:** Representing verbal numerical rating scale.

When the patient came to the clinic her intensity of pain was around seven on verbal numerical rating scale. (Figure 2) Sometimes pain lead to discomfort, resulting into disturbances in sleep cycle and feeling of low energy and stiffness during the daytime, highly impacting her QOL. After having IAYT treatment for subsequent 16 weeks' time there was a gradual decrease in her intensity of pain around 36%, which also helped her with better sleep cycle. With regular practise of yoga *asanas*, she felt better with her range of motion, her stiffness reduced by 27% and there was an encouraging increase in energy levels by 66%, with reduction in her fatigue levels (Table 3).

Table 3: Patients pain measurement using VAS (Visual Analogue scale) measuring joint pain, stiffness, tiredness

	Joint pain	Stiffness	Energy level
Session 1	7	8	2
Session 8	6	6.5	4
Session 16	4.5	5	6
Percentage (%) Improvement	36%	27%	66%

Discussion

Yoga and Ayurveda has been used to complement against adverse effect of post chemotherapy conditions of cancer (24,25). Chances of developing osteoporosis (4) is one of the common conditions for which calcium rich food, supplements along with medications like Raloxifene, Teriparatide, Denosumab and many more have been introduced for better recovery (9). Recovery needs a better support of complementary medicine and lifestyle change which can increase the absorption of calcium and can decrease the loss of electrolyte. With this clinical study we aimed to evaluate the effectiveness of an Ayurveda-Yoga medical treatment approach in osteoporosis seen as follow up condition during post cancer treatment. After 16 weeks Ayurveda-yoga integrative treatment led to a significantly greater and clinically relevant improvement of osteoporosis when correlated with complaints to pre-condition and instructions suggested by conventional guideline-based care with group differences maintained over few months.

This single case study is the first to evaluate the effectiveness of a complex multi-modal Ayurveda-yoga integrative medicine approach as a complementary medicine. It is a comparison of following only conventional medication with respect to adding complementary therapies with conventional medicine. The integrative treatment approach along with the conventional care were carefully designed with the aim of best practice for the patient with proper interim analysis by using VAS during treating the patient. The multi-modal integrative treatment was used as per studies which have been done for osteoarthritis and osteoporosis. Looking into the classical literature, its mentioned that *Asthidhatu* (bone tissue) is the fifth dhatu among seven dhatus. Nails & hairs are mala (biproductions) of *Asthidhatu*. It is *pitrajaghataka* which troubles in this situation (26). The increase & decrease of *Asthi* (bone) & *vata* are related to each other in such a way that when *vata* increases *Asthidhatu* decreases & vice versa (27). Hence the causative factor which increases of *vata* will cause decrease of *Asthidhatu* which further leads to *Asthikshaya*. In *Asthikshaya* there is pains, deformity in *Kesha* (hair), *Nakha* (nails), & in *Majjakshaya* (Marrow depreciation) there is *Asthisaushirya* (bone dryness and weakness), *timiradarshana* (Giddiness) (28). With the therapy, the direction of action was against *Asthidhatu kshaya* or *Asthikshaya* condition. Herbs used for PPS (Warm bolus compress) were combinations which are relevant for *Asthiposhana* (nutrition) including *Guggulu* (*Commiphora wightii*), *Aswagandha* (*Withania somnifera*), *Eranda leaf* (*Ricinus communis*).

There have been studies which shows that Ayurveda therapies like PPS and *pichu* (herbal gauze piece) has been useful for arthritis condition (17). Studies have revealed that osteoporosis can also be taken care by using Ayurveda but working on cancer patients with post cancer therapies the recovery level as per T score and Z score at all level is remarkable. DEXA scan being a gold standard method of evaluation gives clearer picture that there have been physiological and structural changes which can be well reflected in this study.

Ayurveda therapy which includes heat and smoothening system of herb can be one of the causes of improved repair mechanism by increasing the blood flow carrying nutrition to the joints (29). Stress being one of the causative factors of loss of mineral in post chemotherapy condition can be very well managed by yoga (24). Yoga composition of relaxation techniques of mind body complex Ayurveda supplements and therapy increases the nutrition absorption in the body along with relaxation of muscle from tensed condition which can decrease cramps and discomfort (15). Yoga *asanas* are very safe, comfortable and helps in increasing the BMD in the spine and hip area (30). Relaxation of mind body complex by yoga Ayurveda affects the thyroid and metabolic function which allows the electrolyte to stay with bones and get bonded by the bone structure leading to higher bone density. The hypothalamic-pituitary-adrenal (HPA) axis, thus without stress rearranges the altered system back into normal with appropriate cortisol level and less glucocorticoid resistance. Growth hormones which were contributing to osteoporosis (8) can be seen getting normalized. Ayurveda supplements as part of diet and application therapy and yoga as an instrument to work on neuroendocrine level has been the major key in many studies and same can be seen in this case (31).

Looking into all these studies and the results of VAS and DEXA gives us a vision to keep this case-report as an idol and can project for a bigger study in post cancer patients with osteoporosis.

Conclusion

This shows that IAYT as a complementary therapy can be added as a post treatment therapy for patient suffering from breast cancer and osteoporosis as underlying condition, which can significantly help building BMD as well as overall wellbeing. Further randomized controlled trials with bigger sample groups will be needed to clarify the mechanism of study and to evaluate the efficiency of the therapy.

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Author contribution

Dr Satyam Tripathi as Principal Investigator for the case lead the work from its conception to completion together with diagnosis and prescription of treatment plan with dosage and duration of therapy along with intermediate reviews. Based on contemporary research in this area, Panchal Megha studied available body of knowledge around the treatment prescribed and compared results from yoga and Ayurveda

therapy treatments. Panchal Megha is also instrumental in documenting the results and scripting the precis in this case study. Aliyas Nooraini skilled in yoga and Ayurveda therapy treatment, provided the patient with the detailed therapy and charted the observations. All authors discussed the results and contributed to the final manuscript.

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Informed consent

The informed consent was obtained from the patient.

Conflict of interest

The authors declare no conflict of interest.

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