Multi-dimensional intervention to improve the quality of life in an osteoporotic male- A Case Report

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Abstract

Background: Osteoporosis in males is a severe condition undiagnosed, undertreated and sometimes aggravated by fractures of fragility and their associated morbidity and mortality. Male osteoporosis is mostly secondary, with the most likely causes including the use of corticosteroids, excessive alcohol consumption and hypo-gonadism, androgen suppression therapy used for treatment for prostate cancer.

Method: A 31- year old man reported three month period of aggravating lower back pain. System analysis was noteworthy for significantly delayed puberty and found that he has undergone testosterone injections which begin at the age of 16 years. On examination, he was a very well nourished man with apparent discomfort at the assessment due to pain at the lower thoracic and lumbar spine region. Later he was diagnosed as osteoporotic after serum calcium analysis. This study was conducted to assess the improvement in patient after the physiotherapy intervention along with calcium and vitamin D3 supplements. Physiotherapy intervention was given for successive 16 weeks period for 3-4 days per week whereas calcium supplements were given.

Result: The primary outcome quality of life was measured by short film-36 questionnaire and fall risk was measured with functional reach test. Functional capacity and endurance was assessed using 6 minute walk test. This study showed significant improvement in quality of life, strength and functional capacity; mobility after physiotherapy intervention along with calcium and vitamin D3 supplementation.

Discussion: This study will strengthen the improvement in condition of osteoporotic male with the delivery of physiotherapy intervention comprises of postural taping, exercises such as partial weight bearing, progressive resistive exercises and low velocity mobilisation.

Conclusion: Male Osteoporotic patient taking calcium along with physiotherapy showed an improvement in the total quality of life. ,

Keywords: Male osteoporosis; physiotherapy; mobility; quality of life

1. Introduction

Osteoporosis in males is a severe condition undiagnosed, undertreated and sometimes aggravated by fractures of fragility and their associated morbidity and mortality. About 40% of all osteoporotic fractures in individuals over 50 years of age occur in men worldwide. Mortality rates after a hip fracture are 37 percent higher than in women. Male osteoporosis is mostly secondary, with the most likely causes including the use of corticosteroids, excessive alcohol consumption, hypo-gonadism and androgen suppression therapy used for treatment of prostate cancer. It may also occur because of high altitudes, less exposure to ultraviolet rays and

poor eating habits or socio-economic status(Radi & Karaplis, 2017) . To expand the knowledge of male osteoporosis condition and the symptoms of its presentation, the case of 31- year old man who had a back pain and poor quality of life is mentioned in this study. Physiotherapy provides a range of treatment methods including exercise protocol and hands on treatment such as mobilisation and strengthening exercises to prevent the risk of vertebral and hip fracture.

2. Case Report

A 31- year old man reported three month history of aggravating lower back pain to our physiotherapy OPD in General hospital on December 2019. There was no past history of fall and accident. He was employed and was staying with his parents. He never consumed narcotics or nutritional supplements from past 10 years. He reported that neither he smokes nor drink excessive alcohol. History of patient didn't reveal intake of corticosteroids for any medical emergency or any other illicit drugs. He had no prior history of fractures. Family history of gonadal, endocrine or bone disorders was negative. System analysis was noteworthy for significantly delayed puberty and it was identified that he had undergone testosterone injections which begin at the age of 16 years. After few years, the consulting physician discontinued testosterone replacement therapy since that he progressed in terms of physical growth and improvement of secondary features such as growth of body hairs including underarms, abdominal, face, chest and pubic hair along with enlargement of larynx leading to deepening of voice. For many years he noticed diminished libido and lack of morning erections. On examination, he was a very well nourished man with apparent discomfort at the assessment due to pain at the lower thoracic and lumbar spine region for three months. Patient complained of severe stiffness in lower back after 10 minutes of sitting. Patient was assessed for quality of life and risk of fall by using short film -36 and functional reach test and reported a marked decrease in both the values. The degree of skin elasticity was normal with moist mucous membrane. Examination of abdominal, cardiovascular, respiratory systems was done. Reports were within normal limits. The extremities had no oedema and neurological examination revealed no abnormalities. Blood samples were taken to analyse the serum calcium. On serum biochemistry, Calcium value was calculated as 5.2 mg/dl which is extremely less than the normal values. Radiographic analysis of the spine showed diffuse osteopenia with mild wedging of many upper lumbar vertebrae but there was no fracture seen in thoracic and lumbar vertebrae.

3. Methods and methodology

The data collection method was prepared to gather the patient information. The patient was given informed consent to get an approval for voluntarily participating in the study. Despite this, for better understanding of the disease and physiotherapy treatment protocol, manual was given in both English and Punjabi language to the patient. The first recording is known to be at baseline (0 month) and second assessment was taken at last visit (4^{th} month). The patient was counselled every time after the last session of the week for 16 week protocol. SF-36 questionnaire was used to measure the quality of life of patient. The SF-36 test the 8 domains of health status and each domain has scores ranging from 0 to 100 in which 0 represents the worst possible health and 100 represents the best possible health(Morris & Masud, 2001). Patient was explained about the SF-36 Questionnaire and scored were calculated during the baseline assessment. Functional reach test was performed and distance was measures as 16 cm beyond the arm length. Whereas with 6 minutes walk test,

patient covered 510 meters of distance with rest in between. Log sheet was maintained during the end of each session to find the changes.

4. Outcome measures

4.1 The Functional Reach Test- It is a therapeutic outcome assessment and evaluation method for evaluating dynamic balance and stability in one specific step. It is the maximum distance that a person can reach in front beyond the length of an arm and keeping the base of support stable. Patients who are unable to reach more than 15-18 cm are at high fall risk. Therefore, it will be used to specifically evaluate standing balance and to act as a predictor of falls risk(Barker K.L. et al., 2015).

4.2 Six-Minute Walk Test- Six minutes of walk at self-selected speed over a 30 metre course will be used to measure exercise endurance; an important parameter of functional, community mobility(Barker K.L. et al., 2015).

4.3 Short Form-36 Questionnaire- This questionnaire is used to check the quality of life of patient. It comprises of 8 domains and each domain is having scores ranging from 0 to 100. Zero represents maximum disability and 100 represents no disability. Scores towards 100 depicts less disability in a patient. This questionnaire is helpful to assess the individual level health status including vitality, physical functioning, pain, general health perception, physical, socio- economic and mental health status(Morris & Masud, 2001).

5. Intervention

Patient was provided with physiotherapy protocol including postural taping and progressive strength training together with calcium (500mg/day) and vitamin D (2000 IU/day) supplements(Anand Vijaya Kumar, Joseph, Gokul, Alex, & Naveena, 2016). Supplements were given for 20 days followed by discontinuation for another 10 days and so on. Patient was treated by the same physiotherapist throughout the 16 week session from A0 to A4 month. Four month period of treatment was decided to provide adequate time for the bone mineralisation and to check the efficacy of treatment to gain strength and mobility. Session was given for 60 minutes per day, three to four times in a week considering ability of a person to perform in a week. Duration of 60 minutes was comprised of 15 minute walk along with postural taping; 10 minutes of mild stretches; 10 minutes of low- velocity spinal mobilisation; 15 minutes of balance and strengthening exercises and 10 minutes of weight bearing exercises. Postural taping is used to provide proprioceptive input on postural alignment, to enhance thoracic length, to minimize discomfort and to promote postural muscle activity and balance (Anand Vijaya Kumar et al., 2016). Patient was treated with postural taping to prevent the thoracic kyphosis for four months. Addition to this, patient was treated with very-low velocity mobilisation techniques to keep his spine functional and mobile [5]. Evidences showed that combination of balance and progressive resistive training showed the best positive results in maintaining limb strength, coordination and body mass density. Strengthening exercises such as sit to stand was incorporated to promote gluteus strengthening. Stretches facilitates spinal extension and flexion; hip extension and dorsiflexion of ankles along with upper limb stretches(Barker K.L. et al., 2015).

6. Result

Result suggested significant changes in various domains of SF- 36 Questionnaire in osteoporotic patients. There was a noteworthy increase in the scores after 2 month and 4 month of therapy when compared with

baseline scores. The effect of calcium & physiotherapy showed improvement in particular domains like pain and mobility. Reduction in pain was induced by strengthening of the muscles and decrease of spasm, therefore relieved pain and enhanced mobility. Partial weight bearing results in boosting of bone mineralization. This was the other reason for the betterment of patient condition. Although other six domains showed slight changes compared with baseline results, but overall quality of life and functional capacity was improved after the physiotherapy intervention. Functional reach test scores were calculated as 19 cm and six minute walk test scores were calculated as 577 meters distance after the intervention. Following the intervention, result showed an improvement in mobility and functional capacity.

7. Discussion

Testosterone therapy is one of the main causes of male osteoporosis(Radi & Karaplis, 2017). An important therapeutic and research priority is to improve appropriate strategies for prevention of osteoporosis and to decrease the rate of associated vertebral and hip fractures(Bautmans, Van Arken, Van Mackelenberg, & Mets, 2010). Overall, there are research evidences that support that manual therapy and exercise interventions can be effective for such patient. However, there is a concern related to velocity of exercise prescription that will vary from individual to individual condition.(Bennell K.L. et al., 2010) Additionally, patient needs careful individual treatment session and cannot be administered at home as self- exercise regime. This study will strengthen the improvement in condition of osteoporotic male with the delivery of physiotherapy intervention comprises of postural taping, exercises such as partial weight bearing, progressive resistive exercises and low velocity mobilisation (Barker K.L. et al., 2015).

8. Conclusion

Osteoporosis in males is a rare disease that must be diagnosed in patients with hypogonadism regardless of the age and special consideration should be given to the history of anosmia. This is a condition that is easily overlooked but effectively treated with testosterone replacement therapy but at the same time it leads to osteoporosis in males. Osteoporotic males are at risk for vertebral and hip fractures (Radi & Karaplis, 2017). Early physiotherapy intervention along with calcium and vitamin D supplements are therefore much needed. Patient should be guided about the risk of having fractures and other complications. Patient treated with calcium and physiotherapy interventions including postural taping, resistive progressive exercises and weight bearing was effective in improving the quality of life of patient in context to vitality, physical functioning, bodily pain, general health perception, physical, social and mental functioning. From this osteoporotic male study, it can be concluded that physiotherapy intervention along with calcium and vitamin D may be beneficial to improve the total quality of life and functional mobility in osteoporotic patients.

Conflicts of Interest The authors declare that there are no conflicts of interest regarding the publication of this paper.

References:

1. Anand Vijaya Kumar, P. R., Joseph, A. K., Gokul, G., Alex, M. P., & Naveena, G. (2016). Clinical outcome of calcium, Vitamin D3 and physiotherapy in osteoporotic population in the Nilgiris District. *International Journal of Pharmacy and Pharmaceutical Sciences*, *8*(3), 157–160.
2. Bautmans, I., Van Arken, J., Van Mackelenberg, M., & Mets, T. (2010). Rehabilitation using manual mobilization for thoracic kyphosis in elderly postmenopausal patients with osteoporosis. *Journal of Rehabilitation Medicine*, *42*(2), 129–135. https://doi.org/10.2340/16501977-0486
3. K.L., Barker, M.K., J., M., N., C., M. L., N., S., H., C., & V., G. (2015). Physiotherapy rehabilitation for osteoporotic vertebral fracture (prove): Study protocol for an adaptive design randomised controlled trial. *Trials*, *26*(1 SUPPL. 1), S121.Retrievedfrom http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=emed13&NEWS=N&AN=71876733
4. K.L., Bennell, B., M., A., K., M., S., A., G., A., B., … Wark, J. (2010). Effects of an exercise and manual therapy program on physical impairments, function and quality-of-life in people with osteoporotic vertebral fracture: A randomised, single-blind controlled pilot trial. *BMC Musculoskeletal Disorders*, *11*, 36. Retrieved from http://gateway.proquest.com/openurl?ctx_ver=Z39.88-2004&res_id=xri:pqm&req_dat=xri:pqil:pq_clntid=48506&rft_val_fmt=ori/fmt:kev:mtx:journal&genre=article&issn=1471-2474&volume=11&issue=1&spage=36%0Ahttp://bmcmusculoskeletdisord.biomedcentral.com/articles/
5. Morris, R., & Masud, T. (2001). Measuring quality of life in osteoporosis. *Age and Ageing*, *30*(5), 371–373. https://doi.org/10.1093/ageing/30.5.371
6. Radi, S., & Karaplis, A. C. (2017). A Case of Male Osteoporosis: A 37-Year-Old Man with Multiple Vertebral Compression Fractures. *Case Reports in Endocrinology*, *2017*(181 cm), 1–7. https://doi.org/10.1155/2017/6328524