Post-Operative Physiotherapy Rehabilitation Program for a Patient with Tibial Osteosarcoma: A Case Report

ABSTRACT

Tumour or bone tumour can occur in any bone and called it as a Osteosarcoma. It is more prone in the long bones of the body especially at metaphyseal growth plate of the bone. Femur, Tibia and Humours are the most common bone for the osteosarcoma and in some research Pelvis bone and Skull or Jaw bone also involved. There are many factors which cause the sarcoma might be due lack of physical activity. The Chondroblastoma as Giant Cell Tumour of the Humours of Epiphysial Chondromatous in nature. Proximal humerus and Knee are the most common and most affected bone by the Chondroblastomas at the level of epiphyses of the longer bone. 62% cases show the thinning of the Subchondral structure and 33% cases shows the collapse and chondral breach Mostly (90%) it is found in the age group of 5 to 25 years of age with the male and female ratio is of 2:1. Psychological and physical improvement is seen in the patient of sarcoma and enhance participation in the exercise with great enthusiasm and help in the reduction the impact of symptoms of diseases. Physical therapy exercise protocol starts from low to moderate intensity which involved resistance exercise, aerobic exercise and combination of both exercises. Quality of life of cancer patient is enhancing by the physical therapy. Multidisciplinary approach is more important while treating the patient.

Keywords: Osteosarcoma, Oncology Rehabilitation, Blastosarcoma, Chondroblastoma, Giant Cell Tumour Rehabilitation

INTRODUCTION

In 1928, Codman said about The Chondroblastoma as Giant Cell Tumour of the Humours of Epiphysial Chondromatous in nature. Proximal humerus and Knee are the most common and most affected bone by the Chondroblastomas at the level of epiphyses of the longer bone. 62% cases show the thinning of the Subchondral structure and 33% cases shows the collapse and chondral breach Mostly (90%) it is found in the age group of 5 to 25 years of age with the male and female ratio is of 2:1. Pain during activity or at rest, tenderness at local place with effusion and decrease in the ROM of the affected limb are the common symptoms which present in it. (1)The exact aetiology to include the genetics and environmental factors and genetics are the two factor for the presenting the neoplasm in the patient and few abnormalities at different chromosomes are mention in few researchers that predispose patients to the formation of these neoplasms is not well understood. (2) Surgical Excision is the best procedure for the neoplasm because during the procedure complete neoplasm is removed and prevent relapse and dysfunction of joint.(3) An intensive procedure or curettage is suggested for lesions, which could compromise an open forum for the epiphysis and result in the growth and development of the limb being shortened and deformed.(4) Before the operative procedure , conventional radiology is used as a first line of investigation in the patient with tumours.(5) Telangiectatic, osteoblastic, fibroblastic, chondroblastic, parosteal, multifocal and periosteal types are the different conventional type for the osteosarcoma. (6) The treatment of osteosarcoma requires a multidisciplinary approach involving the family physician, orthopaedic oncologist, medical oncologist, radiologist and pathologist. In children

and adolescents, it is 3rd most common condition. Localized diseases are presents with patients. Scelrotic and lytic lesion are seen in the radiographic investigation in Metaphyseal region of the bone. Amputation used to carried out before 1970 for the treatment of osteosarcoma which caused more death rate (80%). (7)

PATIENT INFORMATION

Patient came to OPD with Complaint of pain and instability over right knee for 12 months. Patient gives alleged history of fall while riding bicycle 12 months ago. Pain was sudden in onset, gradually progressive in nature and dull aching type which gets aggravated by walking, movement and gets relieved by taking rest and medication. Pain was associated with swelling for 2 months. The swelling was firm in consistency, hard to touch with local temperature raised. Patient previously went to private hospital where he was managed conservatively and after which he was referred to this hospital. On local examination patient examined in lying down position with both ASIS at same level. On Inspection Right Knee overlying skin normal diffuse swelling present over knee. No limb length discrepancy seen. On Palpation Right Knee Local temperature raised over medial condyle of tibia. Tenderness presents over medial condyle of tibia, Quadricep and Calf. On USG guided biopsy was done and sample was sent for Histopathological examination which was suggestive of Chondroma of Medial Condyle Proximal Tibia Right Side. Then patient was managed with Tumour Excision and reconstruction with Bone Grafting for Chondroma of Medial Condyle proximal tibia right side under Spinal Anaesthesia. Bone graft was harvested from ASIS by giving 5cm incision and bone wax was applied. After Operative Procedure, patient shifted to Physiotherapy Department for further management. On Assessment at Physiotherapy OPD.

INITIAL EXAMINATION FINDINGS: -

Table 1: PRE-RANGE OF MOTION

Pre-Physiotherapy Assessment Day 1:				
Joint	**Right**		**Left**	
	Active	**Passive**	**Active**	**Passive**
Hip Flexion	0-70(assisted)	0-72	0-112	0-115
Hip Extension	0-18(assisted)	0-22	0-30	0-32
Hip Abduction	0-16(assisted)	0-20	0-40	0-45
Hip Adduction	0-12(assisted)	0-14	0-27	0-29
Knee Flexion	0-90(assisted)	0-91	0-140	0-144
Knee Extension	80-0(assisted)	82-0	140-0	144-0
Ankle Planter Flexion	0-45	0-46	0-50	0-50
Dorsiflexion	0-8	0-10	0-10	0-10

Table 2: PRE-MANUAL MUSCLE TESTING

Pre-Physiotherapy Assessment Day 1:			
		Right	**Left**
Hip	Abductor	3/5	5/5

	Adductor	3/5	5/5
	Flexors	3/5	5/5
	Extensors	3/5	5/5
	Internal Rotators	3/5	5/5
	External Rotators	3/5	5/5
Knee	Extensors	3/5	5/5
	Flexors	3/5	5/5
Ankle	Plantar Flexors	4/5	5/5
	Dorsi Flexors	4/5	5/5

Pain Assessment Day 1: - On NPRS at rest 6/10 and on slight movement 9/10.

Berg balance scale: -4 / 56

Dynamic Gait index: -0 / 24

INTERVENTION

Week 1:- Maximum Protection

Ice Pack is used for the reduction of the inflammation at the site of incision and it was given for 10-15min.Exerciseswhich are active assisted in nature are started with the right hip, right knee and Right Ankle Toe movements given to increase the range of motion and 5 repetition twice a day. Resistance exercise must be given to the left lower limb and both upper limbs with the weights. Statics or Isometric Contraction exercises are main to increase the strength of the muscle so it must be given to the Quadriceps, Hamstrings and Gluteus with the hold of 5 sec with 5 repetitions twice a day. Along with these exercise, the patient must be counsel for the Important of Exercise and advantages of exercise.

Week 2 to 6-Progression in strengthening and ROM

For the control of inflammation use of ice pack is continued. For the prevention of the knee deformity, flexion and extension was carried out and which helped from formation of contracture. Uninvolved limbs was continued with resistance exercise and intensity should be increase and repetitions also be increase. Dynamic quadriceps exercise help to increase the strength of the Right limb in pain free range of motion. With the help of walker, partial weight bearing exercise was continued and improvement in functional task must be observed. Every exercise must be done twice a day.

Week 6 to 8:- Strengthening and proprioceptive phase

Passive Manual training was given to increase the range of motion of knee joint. Heel Slides with help of towel pulling and or with help of opposite lower limb by assisting. In functional Training, Surge Faradic Current is used for the stimulation to the Quadriceps and Hamstrings Muscles. Training for balance and training for equilibrium was given with 3 repetitions. Now the gait training must be start with the help of walker with touching the lower limb by taking the weight over the planter surface with 50-75 percent and progression must be after every 1week. Parallel bars are used for the gait training.

Week 8 to 10:- Advanced strengthening and balance regime

For the improvement of the Proprioception, all the above exercise must be carried out in proper manner with progression level. Right lower limb was continued with strengthen exercise so it will not get fatigue early. Progression of the weight on affected limb must be

increased in proper training program. 100% weight bearing can be done after contacted with Orthopadic surgeon and Radiographic Examination must be carried out for the complete recovery of the patient. After Gait training, treadmill should be start in slow manner. 30 minutes session per day for 3-4 days per week must be done. Heart rate and other vitals must be observed. Endurance protocol should be start at the time of Treadmill Exercise.

FOLLOW UP

AFTER EXERCISE EXAMINATION FINDINGS: -

Table 3 POST-RANGE OF MOTION

Post-Physiotherapy Assessment				
Joint	**Right**		**Left**	
	Active	**Passive**	**Active**	**Passive**
Hip Flexion	0-90(assisted)	0-94	0-112	0-115
Hip Extension	0-22(assisted)	0-24	0-30	0-32
Hip Abduction	0-18(assisted)	0-20	0-40	0-45
Hip Adduction	0-14(assisted)	0-16	0-27	0-29
Knee Flexion	0-110(assisted)	0-112	0-140	0-144
Knee Extension	110-0(assisted)	112-0	140-0	144-0
Ankle Planter Flexion	0-46	0-47	0-50	0-50
Dorsiflexion	0-10	0-11	0-10	0-10

Table 4: POST-MANUAL MUSCLE TESTING

Post-Physiotherapy Assessment			
		Right	**Left**
Hip	Abductor	4/5	5/5
	Adductor	4/5	5/5
	Flexors	4/5	5/5
	Extensors	4/5	5/5
	Internal Rotators	4/5	5/5
	External Rotators	4/5	5/5
Knee	Extensors	4/5	5/5
	Flexors	4/5	5/5
Ankle	Plantar Flexors	4/5	5/5
	Dorsi Flexors	4/5	5/5

PAIN ASSESSMENT

Pre-rehabilitation: NPRS 6/10 at rest, 9/10 on slight movement.

Post-rehabilitation: NPRS 2/10 at rest, 4/10 on activity.

SWELLING: MID PATELLAR GIRTH

Pre-rehabilitation: Left=27cm and Right=33cm

Post-rehabilitation: Left=27cm and Right=33cm.

BERG BALANCE SCORE

Pre-rehabilitation:4/56

Post-rehabilitation:48/56

DYNAMIC GAIT INDEX

Pre-rehabilitation:0/24

Post-rehabilitation:19/24

DISCUSSION

Profession which belong to health care and deal with function and movement is a Physical Therapy Profession. Physiotherapist diagnose and treat all individuals from Neonates to Old Age persons as the have medical issue or any medical problem or any other condition which limit or decrease the ability of the work or movement get hampered and cause difficulty in carry out daily activity. Musculoskeletal, Cardiopulmonary, Neuromuscular, and Integumentary are the various departments who have big role in the treatment of Oncology Setting. (8) Hawley C. Almstedt and his team explained in his project combined aerobic and resistance training improves bone health of female cancer survivors and concluded that osteoporosis risk can be reduce by doing exercise and maintaining the bone strength.(9) Exercise improves quality of life in patients with cancer is the study done by Jasper K W Gerritsen, Arnaud J P E Vincent and explained about different exercise which directly and indirectly help to improve the quality of life of the patient.(10) Compliance and satisfaction with intensive physiotherapy treatment during chemotherapy in patients with bone tumours and evaluation of related prognostic factors: An observational study done by Mattia Morri suggested it is a feasible treatment for bone tumour patients who have shown they can positively adhere to it. (11,12) Wiebke Jensen and team said in their research that physical exercise and therapy in terminally ill cancer patients will get help from physical exercises, relaxation therapy, and breathing training and these were the most commonly used modalities and it is more feasibility and acceptability.(13,14) Radiotherapy may cause malignant transformation so it is contraindicated in the management of the chondroblastoma.(15,16) Cryotherapy and analgesic help to reduce the pain and swelling in the osteochondroma patient.(17,20). Dr. Paramanadam and his team concluded in his study that Physical rehabilitation is the most important and key for the good outcomes for the functional group and if the early rehabilitation is not done then there will be decrease in the quality of life of the patient.(21,24).

CONCLUSION

In our study it is concluded that Physiotherapy is found to be effective in post-operative osteosarcoma patient. Physiotherapy helps the patient to relax from mental stress and physical stress. Improvement of function by managing health care and goal setting achieved the goal in the proper time period. Post-surgery complications are prevented by taking proper care.

PHOTOGRAPHS

Image:-1-Pre-

Image:-2-Post-operative Xray

Image:-3-Post-operative attitude of limb with scar

Image:-4-Minimal weight bearing over the affected limb at the end of third

Image:-5-Bone graft taken from ASIS

COMPETING INTERESTS DISCLAIMER:

Authors have declared that no competing interests exist. The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

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