Case Report

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Physiotherapy Section

A Holistic Physiotherapeutic Approach to Manage a Patient of Hemangiopericytoma Followed by Amputation

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ABSTRACT

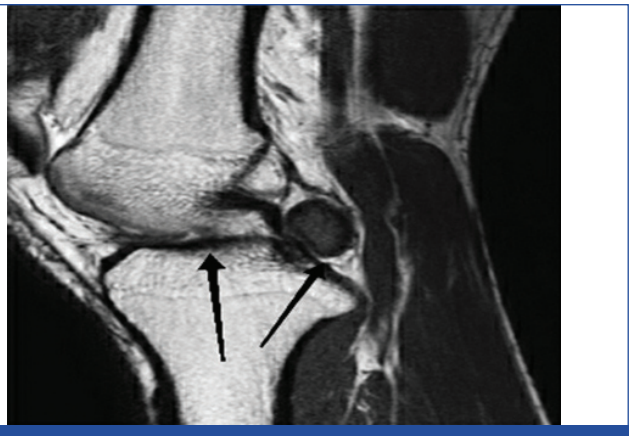
Hemangiopericytomas are atypical malignancies that arise from the pericytes that surround blood arteries. Mechanical injuries, severe traumatic injuries, infective illnesses, vascular diseases, peripheral neuropathy, cancers, and hereditary diseases are all major reasons for amputation. It is also used to get rid of ulcerated, ischaemic, or necrotic tissue. In amputation certain body parts tends to be removed to save individuals' life. This was the case of a 35-year-old male who presented with the history of oedema in the posterior portion of his right knee. He was eventually diagnosed with a tumour following diagnostic tests, and the patient under went an above-knee amputation of the right-side. The outcome measures were used to evaluate patients' recovery before and after rehabilitation. A robust therapeutic regimen was planned which included appropriate stump caring, enhanced strength and flexibility, quality enhancement, equilibrium, balance, co-ordination, and optimal locomotor training. Gait rehabilitation benefited the patient in maintaining a normal gait cycle, and weight transfer. Upper limb strength is vital for crutch walking, which allowed him to participate in every day activities and enhance overall well-being.

Keywords: Above-knee amputation, Amputee mobility score, Functional independent measure, Gait training

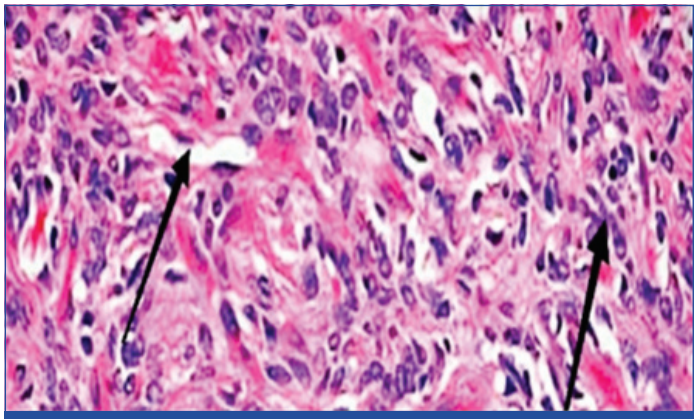
CASE REPORT

A 35-year-old male patient presented to the Department of Surgery with the complaint of swelling in the posterior aspect of his right knee for the past two months and a history of fever for two days. He noticed insidious swelling in his right popliteal fossa which was gradually progressive in nature. The patient was known to have an arteriovenous malformation in the right back of the thigh and he was operated for prophylactic tumour embolisation.

Magnetic Resonance Imaging (MRI) of the right knee joint showed effusion with fluid distending the medial and lateral recess of the suprapatellar bursa [Table/Fig-1]. Tibial spiking and small femoral osteophytes were indicative of early degenerative osteoarthritis. A defined lobulated solid lesion was seen in the posterior aspect of the knee joint, in the intermuscular plane, deep into the medial and lateral gastrocnemius muscles, and along the popliteal vessels. He was diagnosed with hemangiopericytoma, and the patient underwent right-side above-knee amputation under the supervision of an orthopaedic surgeon. A 12 cm above the knee, an incision mark was made on the femoral shaft. The quadriceps and hamstring muscles were divided two fingers breadth distal to the femur shaft, and the vastus lateralis and adductor muscles are divided at the level of the femur shaft. A tumour in the popliteal fossa was resected with a 2 cm margin. The femur shaft was cut with a Gigli saw, the femoral artery and vein were identified, and the sciatic nerve was sharply divided under tension. The fascial edges of the muscles over the femur shaft were closed, and after achieving haemodynamic stability. Histopathological examination of the resected sections was suggestive of hemangiopericytoma [Table/Fig-2]. The patient was shifted to the Male Surgical Ward and referred to the Department of Physiotherapy.



[Table/Fig-1]: Magnetic resonance imaging of right knee joint showing small femoral osteophytes, indicative of early degenerative osteoarthritis. A defined lobulated solid lesion is seen in the posterior aspect of the knee joint (black arrow).



[Table/Fig-2]: Histopathology of tissue piece from the popliteal region (stat 6 immunostain). The dilated ectatic vessels are indicated by the left arrow mark. The right arrow shows cellularity, the spindle cells are arranged in a haphazard pattern and the pink area show the hypocellular sclerotic zones.

Prior to the beginning of the assessment, the patient's oral consent was obtained. On admission, the patient was observed in the supine lying and prone lying positions. The patient's right leg was amputated above the knee and bandaged. He reported burning pain similar to an electric shock in a missing body part, which was of Numerical Pain Rating Scale (NPRS) grade 2. On manual muscle testing, the patient's strength ofall upper limb muscle groups was 4/5 and for amputated limb hip flexors 3/5, extensor 3/5, adductor 2/5, abductor 2/5, and left lower limb muscle groups 4/5. The range of motion was assessed. The superficial sensation of the left lower leg had been altered, but the deep sensation remained intact.

Physiotherapeutic Rehabilitation

Postoperative physiotherapy comprised of stump care, minimising phantom limb discomfort, preventing contracture, increasing strength, improving range of motion, correct gait training, and making the patient independent to conduct activities of daily living and improving quality of life. The rehabilitation regime is explained in [Table/Fig-3-7]. Outcome measure is shown in [Table/Fig-8].

DISCUSSION

Stout defined hemangiopericytomas as uncommon neoplasms developing from capillaries pericytes surrounding blood vessels [1]. The incidence of recurrence differs byan organ in the body, with a recurrence rate of 80% for tumours in the nervous system and 50.5 % in the muscles and bones [2].

Goals	Rehabilitation protocol	Regimen
Patient education	Educate the patient about the condition and how to manage it postoperatively by emphasizing mobility, transferring, balancing on one leg, and so on.	Pre and postoperatively and follow up once a week.
To avoid chest complication	Spirometry, deep breathing exercises, pursed-lip breathing, and thoracic expansion exercises are all recommended.	This was done pre and postoperatively, spirometry progression-600-900-1200 cc. Thoracic expansion and breathing exercises 10 repetitions × 2 sets 3 times a day
To prevent postoperative complications like thrombosis, oedema in the lower limb	Gentle ankle-toe movements, toe curls, and the leg were lifted above the heart level to prevent swelling and oedema. Appropriate bandaging or compressive elastic stocking was worn to reduce stump oedema.	10 repetition three times a day was performed pre and postoperatively from day one.
To improve the strength of bilateral upper limb and nonaffected lower limb for crutch walking.	Bilateral upper limb- shoulder extensor, abductor, elbow extensors for functioning against gravity, gip strengthening (essential for crutch walking). Nonaffected lower limb- static quadriceps, static hamstring, static gluteal, straight leg raised, hip and knee bending, which advanced to resisting exercises.	10 repetitions 3 times a day. preoperatively and postoperatively
To increase the strength and maintain the range of motion of an amputated limb	Hip extensor, adductor, and abductor isometric were started which progressed to resisted exercises. Hip flexion, abduction, and extension are shown in [Table/Fig-4-6]	10 repetitions 3 times a day after that progress to 20 repetitions 3 times a day.
To prevent structural deformity	The amputated limb was parallel to the nonaffected limb and after the drain was removed progressed the patient in a prone lying position	Achieved prone lying position 3-4 times a day.
To avoid muscle tightness andcontracture	Passive stretching of quadriceps, hamstring, abductor, and piriformis. Active stretching of the hip flexor was done in prone lying	Three repetitions with 15-second hold three times a day.
To alleviate discomfort from phantom limbs	Icing, Ultrasound, Transcutaneous electrical nerve stimulation (TENS), Mirror therapy.	Every two-hourly icing, TENS on an amputated limb with continuous mode for 10 mins.
To restore functional Independence	Bedside sitting, standing with the walker, parallel bar walking with a mobility aid, and gait training with the assistance of the walker [Table/Fig-7].	Progress slowly five to eight days postoperatively
Follow-up: After the one-month patient was assessed based on outcome measures and protocol will change accordingly.		

[Table/Fig-3]: Rehabilitation regimen: The following regimen was tailored according to the patient's condition.

[Table/Fig-4]: Performing hip flexion. **[Table/Fig-5]:** Performing hip abduction. (Images from left to right).

Range of motion	Pre-physiotherapeutic Intervention (Day 1 post surgery)	Post-physiotherapeutic Intervention(Last day of physiotherapy session)
Hip Flexion	0-40°	0-110°
Hip Extension	0-15°	0-30°
Hip Abduction	0-30°	0-45°
Hip Adduction	30-0°	45-0°
Numerical Pain Rating Scale	On rest:6/10 On activity:8/10	On rest:0/10 On activity:3/10
Basic amputee mobility score	3/8	6/8
Functional Independence Measure	69/126	109/126

[Table/Fig-8]: Outcome measure.

[Table/Fig-6]: Performing hip extension in prone lying. **[Table/Fig-7]:** Gait training. (Images from left to right).

A review stated that the majority of patients report a tumour, although a few percent of patients also experienced neurological or vascular symptoms [3]. Abundant vascularity, telangiectasia, and an increase in skin temperature are some additional symptoms [3-4]. In the present case, a coordinated strategy that begins throughout the developing phases is required for a good healing approach for the individual whohad undergone above-knee amputation. The medical team member must create a close relationship with the patients and caregivers and involve them in goal planning [8].

Patients with phantom limb pain may benefit from mirror therapy, which takes leverage of the brain's preference for visual cues over somatosensory or proprioceptive signals about an extremity's position [9]. Rehabilitative measures to promote weight bearing against gravity should be focused. The approach of physical rehabilitation was according to patients' goals and activities of daily living. The literature has frequently emphasised how challenging it is to forecast a hemangiopericytoma's prognosis and clinical

behavior [4]. This therapeutic case study shows physiotherapy can assist patients with above-knee amputations regain their functional independence.

CONCLUSION(S)

This case studies' the amputation above-knee due to hemangiopericytoma and illustrated a tensile rehabilitative regimen that can assist the patient in resuming regular activities, such as adequate stump care, increased strength and mobility, performance enhancement, balance, coordination, proper gait pattern. Gait training has a considerable favourable impact on the patients by allowing them to do routine activities and enhancing their well-being.

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