

PERONEAL NERVE FUNCTION AND KNEE STABILITY AFTER RESECTION GIANT CELL TUMOUR OF PROXIMAL FIBULA, A SERIAL CASE

Warih Anggoro Mustaqim¹, Satria Pandu Persada Isma², Istan Irmansyah Irsan²

¹Orthopedic and Traumatology Specialist Programme, Brawijaya University,
Saiful Anwar General Hospital Malang

²Orthopedic Oncology Department of Brawijaya University,
Saiful Anwar General Hospital Malang

Correspondence email: mustaqim.ot@gmail.com

Abstract: Giant-cell Tumour (GCT) is a benign Tumour, locally aggressive neoplasm which is composed of sheets of neoplastic ovoid mononuclear cells uniformly distributed large, osteoclast like giant cell. Incidence GCT of proximal fibula is rare. Peroneal nerve function and stability of knee joint must be considered at the proximal fibula GCT. In 2017 we found three cases of GCT of the proximal fibula in the outpatient clinic Saiful Anwar General Hospital. All three of these patients had a confirmed GCT of proximal fibula which planned for Tumour resection, peroneal nerve presevation and LCL ligament reconstruction. This is study of three patients with GCT of proximal fibula was confirm with Clinical Pathological Confrence (CPC). All of patient had presented of lump, slowly growing pain in lateral side of knee, limping when they walk and numbness in dorsal side of foot. One patient cannot dorsoflexion of ankle. We evaluated a peroneal nerve function and stability of knee after operation and one year after resection of tumour. All patient had occurred peroneal nerve lesion with no instability of knee post operatively. Two patient had complaint with numbness in dorsal side of foot and weakness ankle dorsoflexion and after one year both of patient had improved ankle dorsoflexion but still numbness in dorsal side of foot. One patient still complaining numbness in dorsal side of foot and weakness ankle dorsoflexion post operation and one year after operation. There is no LCL ligament instability in all of patient post operation and one year after operation. The peroneal nerve function and LCL ligament stability must consider when facing benign tumours in proximal fibula such as giant cell tumour proximal fibula. These resections result in an unavoidable loss of knee stability because of resecting the lateral collateral ligament (LCL) insertion site on the fibular head. Based on the literature, the incidence rate of postoperative peroneal nerve palsy ranges from 3% to 57%. Giant cell tumour in proximal fibula is rare and require wide excision with intraarticular resection of the proximal tibiofibular join. We must consider about peroneal nerve function and LCL ligament stability during resection of GCT proximal fibula.

Keywords: Giant Cell Tumour Proximal Fibula, Peroneal Nerve function, LCL Ligament stability

INTRODUCTION

Giant-cell Tumour (GCT) is a benign tumour, locally aggressive neoplasm which is composed of sheets of neoplastic ovoid mononuclear cells uniformly distributed large, osteoclast like giant cell. Giant cell tumour is still one of the most obscure and intensively examined tumours of bone. The histogenesis is uncertain, histology of this tumours does not predict the clinical outcome and there are still many unanswered questions with regard to both its treatment and prognosis.¹

The World Health Organisation has classified GCT as “an aggressive, potentially malignant lesion”, which means that its evolution based on its histological features is unpredictable. Statistically, 80% of GCT have a benign course, with a local rate of recurrence of 20% to 50%. About 10% undergo malignant transformation at recurrence and 1% to 4% give pulmonary metastases even in cases of benign histology.²

Common sites for GCT are distal femur, the proximal tibia, the distal radius and the sacrum. Nearly 50% of cases occur in the region of the knee, but other frequent sites are the distal part of the radius, the proximal humerus, fibula, and the pelvic bones. It is usually situated in the epiphysis, grows eccentrically, and may later also affect the metaphysis. It appears most often in the second to fourth decades of life (60% to 75% of all cases) and the male : female ratio is 1 : 1.5.^{1,2,3}

Giant cell tumour in proximal of fibula is rare, *Matthew et al* reviewed of 121 tumours with histologically confirmed aggressive benign tumours of the proximal fibula, giant-cell tumour of the bone only

19 % from all proximal fibula tumours. Peroneal nerve function and stability of knee must be considered in management of proximal fibula tumours.³

Resection is usually performed in GCT found in the proximal fibula, radius, distal ulna or in the wing of the ilium. To achieve a wide resection a MRI scan is an essential step in assessing resectability of the tumour. The relationship between the adjacent neurovascular structures and the tibia is especially important.³

In 2017 we found three cases of GCT of the proximal fibula in the outpatient clinic Saiful Anwar General Hospital. All three of these patients had a confirmed GCT of proximal fibula from Clinical Pathological Conference (CPC) which planned for tumour resection, peroneal nerve presevation and LCL ligament reconstruction.

RESEARCH METHODS

This is study of three patients with GCT of proximal fibula was confirm with Clinical Pathological Conference (CPC). All patient had presented of lump, slowly growing pain in lateral side of knee, limping when they walk and numbness in dorsal side of foot. Two patients were female 16 and 25 years old had that problem in one year previously and can walk with normal gait. In plain x-rays showed lytic lesion with soap bubble appearance in proximal fibula. In MRI of knee showed the Tumours has infiltration in soft tissue surrounding proximal fibula with vessel and nerve still good. From radiological we measured size of both tumour, there are 8 x 5 cm and 8 x 6 cm (Figure 1).

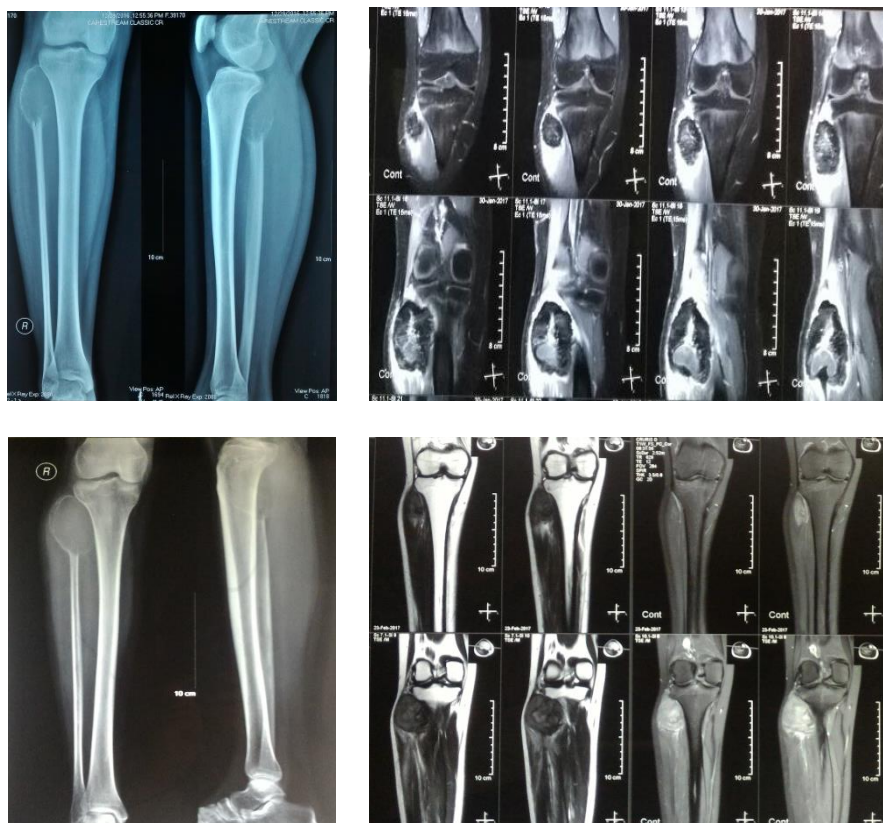


Figure 1. Soap bubble appearance in plain x rays and MRI of Knee showed infiltration Tumour of soft tissue

One patient is male 33 years old had problem on his knee in two year previously, he not able to ankle dorsiflexion and walk with steppage gait. From x-rays showed lytic lesion in

proximal fibula, MRI showed the tumour has infiltration in soft tissue involving nerve and vessel surrounding proximal fibula. From radiological assessment the size of Tumours is 15 x 10 cm (Figure 2).



Figure 2. X-ray and MRI of Knee showed enlarge of Tumours involve soft tissue

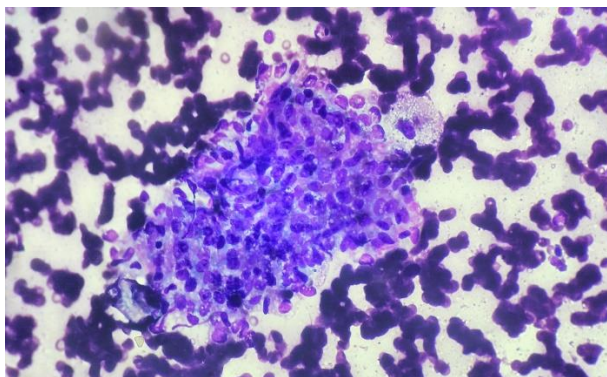


Figure 3. Histopathology of Giant Cell Tumour

Chest x rays from this three patient are clear and no metastasis process. The biopsy result showed sheets of neoplastic ovoid mononuclear cells uniformly distributed large with osteoclast like giant cell apperance. Based on clinical, radiological and pathological all patients we diagnose with Giant Cell Tumour of Proximal Fibula and confirmed at Clinical Pathological Confrence (CPC) of musculoskeletal tumours in Saiful Anwar General Hospital.

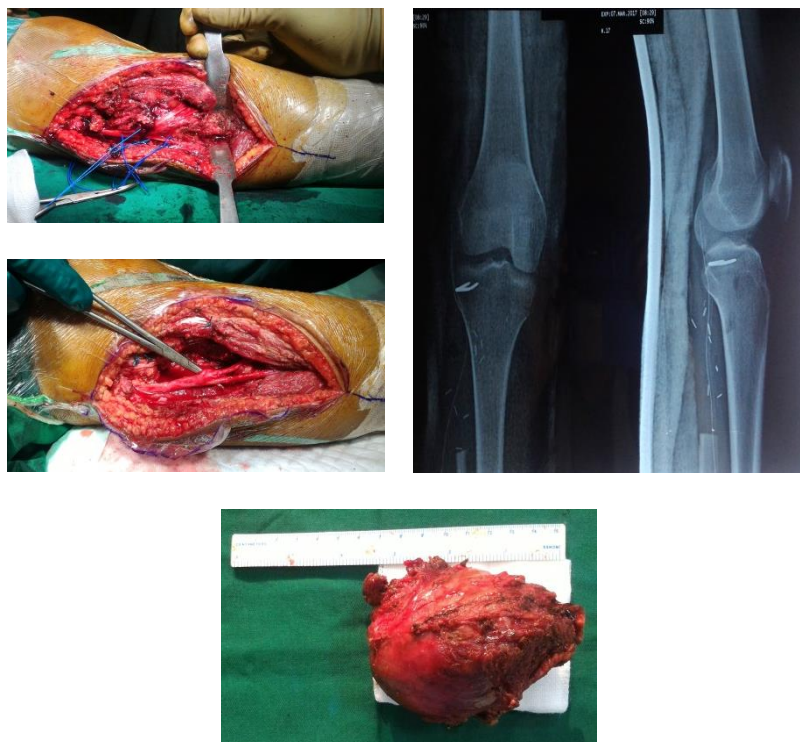


Figure 3. Resection Tumour, preservation peroneal nerve and post operative x rays

All patients performed tumour resection with peroneal nerve preservation and LCL ligament reconstruction. Two patients whom had small size Tumours underwent surgery successfully, tumours can be resected without excessive muscle excision, peroneal nerve can be preserved, and LCL ligament can be reattachment in proximal tibia with bone stapler. One patients with larger tumour sizes, when resection appears that the tumour has infiltrated some part of anterior tibialis muscle and vascular, requiring partial excision of anterior tibialis muscle

and repair of vascular. Peroneal nerve still can be preserved and LCL ligament can be reattachment in proximal tibia. After operation we evaluated a peroneal nerve function and stability of knee and one year post operation from physical examination.

RESULTS AND DISCUSSION

After operation all patient had occurred peroneal nerve lesion with no instability of knee. Two patient whom had small size Tumours resection, complaint with numbness in dorsal side of foot and weakness ankle dorsoflexion. The knee

after LCL ligament reconstruction still stable from valgus and varus test of knee. After one year both of patient had improved ankle dorsoflexion but still numbness in dorsal side of foot.

One patient with larger Tumour size after operation complaining about numbness in dorsal side of foot and weakness ankle dorsoflexion and no knee instability. After one year is no improve about numbness in dorsal side of foot and weakness ankle dorsoflexion. Patient walk with steppage gait and the knee is stable. All patient after one year operation had satisfied with the result of Tumour resection.

Giant cell Tumour is the most common bone tumour in the young adults aged 25 to 40. Giant cell tumour are found more commonly in women than men, and occur most often during the third decade. Giant Cell Tumour accounts for 5 to 9 percent of all primary bony tumours. Most patients present with slowly progressive pain, with or without a mass. Symptoms arise when the lesion begins to destroy the cortex and irritate the periosteum or when the weakening of the bone caused by the tTumour causes pain due to imminent pathologic fracture.^{1,4,5}

In our cases the tumour affected in female 16 and 25 years old and male 33 years old. They had presented of lump, slowly growing pain in lateral side of knee, limping when they walk and numbness in dorsal side of foot. In radiological examination showed thinning cortex of proximal fibula. From that history, physical examination and radiological finding we diagnosed with Giant Cell Tumour and we confirmed with histopathology. Giant cell tumours are usually found in the long bones, most often the distal femur, proximal tibia, and distal radius but in our cases the location of tumour in proximal fibula.^{4,5,6}

Tumours of the proximal fibula are rare with only 2.5% of all primary bone tumours occurring in the fibula. Approximately one-third of all tumours in

this anatomic location are benign. Patients with aggressive benign tumours in the proximal fibula require surgical management. Most patients are managed by intralesional or marginal excision.^{3,4,7}

The peroneal nerve function and LCL ligament stability must consider when facing benign tumours in proximal fibula such as Giant Cell Tumour Proximal Fibula. These resections result in an unavoidable loss of knee stability because of resecting the lateral collateral ligament insertion site on the fibular head. The size of tumour is related with peroneal nerve lesion and surgical strategy. Because the nerve is already tethered by fascial bands at the proximal fibula, displacement of the nerve by tumour may result in spontaneous or iatrogenic neurologic complications related to surgical interventions. Based on the literature, the incidence rate of postoperative peroneal nerve palsy ranges from 3% to 57%.^{3,5,8}

In our case, all patient underwent tumour resection, preserve peroneal nerve and LCL reconstruction. After operation all patient had nerve lesion, it is can be results from neuropraxia of nerve due to enlargement of tumour or iatrogenic injury during resection. After one year, two of patient had improve nerve function. One patient still have weakness of ankle dorsoflexion. That problem may result from excessive muscle excision of tibialis anterior muscle during operation which maked difficulties to ankle dorsoflexion. To resolve that problem, we planned to ankle arthrodesis.

The LCL likely provides the main resistance to varus rotation at the knee, whereas the biceps femoris is likely an important dynamic restraint to anterior displacement of the tibia. After the proximal part of the fibula is resected the insertions of the LCL and biceps femoris tendon should be meticulously repaired. Repair of the LCL and biceps femoris tendon to the lateral aspect of the tibia is a straightforward, reliable technique. In our cases we not found instability of knee, the

LCL ligament can be attachment in proximal tibia after one year.^{7,8,9,10}

CONCLUSIONS

Giant cell tumour in proximal fibula is rare. Most patients present with slowly progressive pain, with or without a mass. Giant Cell tumour in proximal fibula require wide excision with intraarticular resection of the proximal tibiofibular joint. We must consider about peroneal nerve function and LCL ligament stability during resection of tumour. If we can preserve peroneal nerve without excessive muscle excision and we can reconstruction LCL ligament meticulously the result is good.

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