

CASE REPORT

Meralgia Paresthetica - Importance of Anatomical Knowledge in Diagnosis

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ABSTRAK

Penekanan saraf lateral kutaneus femoral merupakan punca kepada penyakit meralgia parestetika. Gejala penyakit ini ialah kesakitan dan perubahan sensori pada bahagian lateral paha. Namun, gejala penyakit ini seakan menyerupai gejala penyakit lain seperti radikulopati lumbar, penyempitan ruang femoro-acetabular, bursitis trokanterik dan beberapa contoh lain. Meralgia parestetika merupakan diagnosis secara pengecualian setelah penyebab kepada kesakitan pada bahagian lateral paha tidak dapat dibuktikan melalui hasil penyiasatan yang terperinci. Pengetahuan anatomi tentang saraf yang mensarafi bahagian paha adalah amat penting untuk mengenalpasti punca kesakitan yang dialami. Kami ingin melaporkan satu kes yang melibatkan seorang pesakit lelaki berumur 46 tahun, telah didiagnos menghidap kencing manis, darah tinggi, masalah jantung yang telah datang ke Jabatan Kecemasan dan Trauma dengan aduan kesakitan akut pada bahagian lateral paha kanan. Kesakitan yang dialami digambarkan sebagai rasa seperti terbakar, dicucuk dan disertai dengan rasa kebas. Selain itu, terdapat pengurangan sensasi rasa pada bahagian paha yang sakit. Tiada aduan berkaitan sakit pada rangsangan ringan (allodinia) atau sakit yang berlebihan pada rangsangan kuat (hiperalgesia). Bacaan gula darah kapilari ialah 8.4 mmol/l dan keputusan HbA1c ialah 7%. Diagnosis meralgia parestetika telah disahkan setelah semua kemungkinan diagnosis lain tidak dapat dibuktikan melalui pemeriksaan fizikal, ujian makmal dan radiologi (x-ray, ultrasound dan MRI). Keadaan pesakit bertambah baik selepas diberikan rawatan ubat secara oral dan menjalani sesi fisioterapi.

Kata kunci: anatomi, meralgia parestetika, saraf lateral kutaneus femoral

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ABSTRACT

Lateral femoral cutaneous nerve entrapment is a common pathophysiology causing Meralgia Paresthetica (MP). It can be characterized by pain and dysesthesia over lateral thigh. Patient with MP classically presents with numbness, paresthesia or dysesthesia of anterolateral aspect of the thigh. However, the symptoms may be similar with other conditions including lumbar radiculopathy, femoro-acetabular impingement, trochanteric bursitis and others. It serves as a diagnosis of exclusion for unexplained anterolateral thigh pain after rigorous investigations. Anatomical knowledge on the nerves which supply the femoral area is essential in suspecting and ruling out the causes of pain. We report a case of a 46-year-old male, with known case of diabetes mellitus, hypertension, ischaemic heart disease, presented to Emergency and Trauma Department with complaint of acute right lateral thigh pain. The pain was described as burning and pricking in nature, and associated with numbness. There was also reduced sensation over the affected area. There was no allodynia or hyperalgesia. The capillary blood sugar was 8.4 mmol/l and HbA1c result was 7%. The diagnosis of MP was established after excluding other possible differential diagnoses in view of negative findings from the physical examination, laboratory result and radiological investigations (X-ray, ultrasound and magnetic resonance imaging). Patient's condition improved after the treatment with oral neuropathic agents and physiotherapy.

Keywords: anatomy, lateral femoral cutaneous nerve, meralgia paresthetica

INTRODUCTION

Meralgia paresthetica (MP) is a painful localised neuropathy, particularly involves lateral femoral cutaneous nerve (LFCN). The pain is due to the entrapment of LFCN after it exits from the pelvis and passes through the inguinal ligament (Woo & Byung 2018). Its predilections are among those with age between 40 to 60 years and males (Wei et al. 2017). Nevertheless, studies reported that children and athletes also suffer from this disorder (Scott et al. 2013; Bishnu et al. 2018). In addition, obesity, pregnancy, pelvic mass or tumor, external compression

to the nerve and tight clothing, such as belt, can potentially entrap LFCN causing MP. It was also found that post laparoscopic surgery and orthopaedic procedures involving the pelvis can iatrogenically cause MP (Seong-il et al. 2017; Wei et al. 2017).

The pain is usually associated with a burning sensation and numbness. Coldness, lightning pain and buzzing sensation can worsen the situation. Patient may complaint of variety levels of pain from mild to severe which can limit their productivity (Scott et al. 2013). Nevertheless, more than 90% of patients are responsive to conservative management. MP is

reversible after the release of the LFCN from the entrapment. Subsequent referral for surgical intervention is only warranted for non-responsive patients. Considerable options include neurolysis or transection of LFCN (Anthony 2010).

The differential diagnosis for MP can be neuropathic pain. However, the pathophysiology of neuropathic pain is different from MP in which neuropathic pain is caused by a distortion on somatosensory nerves disturbing the transmission and processing functions of the spinal cord and the brain (Luana et al. 2017). The distribution of peripheral neuropathic pain can be either generalized or focal. Patient with generalized peripheral neuropathy usually present with symmetrical pain which is commonly associated with other pre-existing systemic diseases such as diabetes mellitus, pre-diabetes, infectious diseases (HIV infection and leprosy), immune disorder (example, Guillain-Barre syndrome), inflammatory disorders or sometimes can be due to the side effect of chemotherapy. Focal peripheral neuropathy involves one or more peripheral nerves or nerve roots, and the possible causes include post-herpetic neuralgia, post-traumatic neuropathy, postsurgical neuropathy or cervical and lumbar poly radiculopathies (Luana et al. 2017). Unlike focal peripheral neuropathic pain, MP does not present as a consequence of prior prodromal disease.

In neuropathic pain, patient will complain of pain in the distal limbs, namely 'glove and stocking'

distribution which prominently affects the foot, calves, hands and forearms. The pain rarely involves proximal extremities, unless when the disease involves the sensory ganglia (Luana et al. 2017). Typical presentations would be burning sensation, electric shock-like sensations, and pain resulting from non-painful stimulations or allodynia. Persistent symptoms will lead to chronic pain and hence less responsive to pain killers (Luana et al. 2017; Rodica et al. 2017). This case study serves as a medium of discussion for types of acute pain and the importance of anatomical knowledge in making the diagnosis. The diagnosis of MP was established in our patient after excluding other possible differential diagnoses.

CASE REPORT

A 49-year-old obese male, known case of diabetes mellitus, hypertension, ischaemic heart disease and obstructive sleep apnea, presented to Emergency and Trauma Department with a complaint of on and off right lateral thigh pain and numbness for three days. It was his first episode of pain, described as a burning pain, pricking in nature and it was getting worse over a period of time. His pain score was 10 (severe). The pain was associated with cramp sensation over the right thigh. He admitted that the pain was not triggered by light stimulus (allodynia) or exaggerated by painful stimulus (hyperalgesia). On further history, he denied any history of fever, previous back pain, trauma, fall, or animal bites around the affected area. He was able to ambulate as usual. His



Figure 1: Ultrasound comparing the right and left thigh. Ultrasound showed muscles at lateral aspect of right thigh are heterogeneously hyperechoic. No collection seen at subcutaneous tissue or intramuscularly.

bowel and urinary habits were normal.

His vital signs were unremarkable with blood pressure of 147/85 mmHg, pulse rate of 83 beats/minute and respiratory rate of 18 breaths/minute. The capillary blood sugar was 8.4 mmol/l. Physical examination revealed tenderness and numbness over the right lateral thigh with no overlying skin changes or signs of inflammation. However, the needle-prick and soft-touch sensation were reduced over the right lateral thigh. Active motion of the right hip was maintained and no neurological deficit detected. Straight leg raise test was negative. Complete full blood count, renal profile, erythrocyte sedimentation rate and serum calcium were unremarkable. HbA1c result was 7%.

Radiograph of the right hip and femur did not show any fracture or other pathologies. Ultrasound of the right thigh (Figure 1) showed no collection at the subcutaneous tissue or intramuscular area. There was no spinal cord compression or herniated

disc in the magnetic resonance imaging (MRI) (Figure 2 & 3).

A diagnosis of MP was concluded after considering the anatomical distribution and nature of his pain and review of all negative findings from the investigations done. The patient was then admitted to the ward for pain control. He was prescribed with a neuropathic agent, Gabapentin tablet 300 mg, twice per day was given and the patient was sent for physiotherapy. He was followed-up for the pain progress for subsequent three months, where positive feedback was noted as the pain score reduced from 10 to 3. His pain improved with thermal heat therapy and his daily activity were restored back to normal.

DISCUSSION

Making the diagnosis of MP is strongly associated with the knowledge on anatomy of the nerves that exit from the spinal nerve downwards via the lumbar plexus. The lumbar plexus,

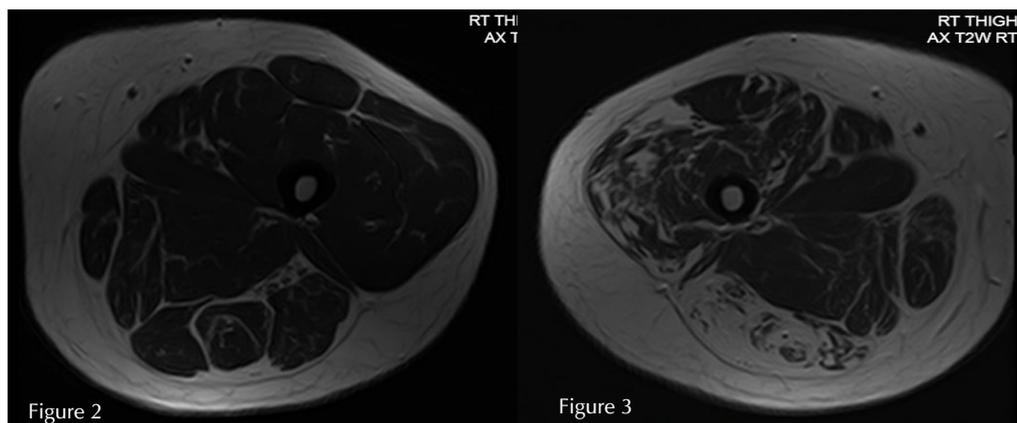


Figure 2 & 3: MRI of the patient's right thigh. Features are suggestive of right thigh muscle disuse atrophy. No abscess or collection is seen.

located within the psoas major muscle and anteriorly to the transverse processes of the lumbar vertebrae in the lumbar region, is an intricate branch of nerve fibres that innervate the lower extremities, especially the skin and muscles (Kusum et al. 2013; Kristen 2017). It consists of thoracic spinal nerve 12 and anterior divisions of the lumbar spinal nerves L1, L2, L3 and L4. Intervertebral foramina of the vertebral bodies are the inevitable passage of the paired spinal nerves at all levels (Kusum et al. 2013).

The lumbar plexus is the 6th major peripheral nerves network. It originates from the anterior branches of L1-L4 of the spinal roots which subsequently divide into several cords. All the nerves travel downwards to the posterior abdominal wall to reach the lower extremities, innervating the target muscles and skin. The main branches which pass through the lateral border of the psoas major muscle consist of iliohypogastric (L1), ilioinguinal (L2), lateral femoral cutaneous (L2-3 dorsal), and the femoral nerve (L2-4 dorsal). The

genitofemoral nerve (L1-2) appears on the anterior surface and the obturator nerve (L2-4 ventral) pierces along the medial border of the muscle (Kusum et al. 2013; Kristen 2017). The lateral femoral cutaneous nerve pierces the thigh laterally to the inguinal ligament, where it innervates the skin of anterior and lateral thigh down to the knee level. This nerve has a pure sensory function. Obturator nerve innervates the skin over the medial thigh while femoral nerve innervates the skin on the anterior thigh and the medial leg for the sensory functions (Kristen 2017).

Theoretically, there are variations in the formation and anatomical location of lumbosacral plexus. Knowledge on these variations is important especially when dealing with various surgical procedures such as lumbar plexus block for hip and knee arthroplasties, inguinal herniorrhaphy and hernioplasty, obstetrics and gynaecology surgeries, appendectomy, femoral artery angiography and pelvic surgeries, as it can result in MP if not well-handled (Kusum et al. 2013). Nevertheless,

a study showed that there was no relationship between the course of lateral femoral cutaneous nerve with age, sex, height or weight (Majkrzak et al. 2010).

In this case study, a thorough history of the symptoms was elicited to provide clues on the origin of the pain. The patient had denied any weakness, numbness or symptoms associated with the region innervated by nerve root L4 to S1. With few manoeuvres such as straight leg raise and Lasegue test, we were able to exclude spinal cord compression in the first place. His pain was noted purely over the lateral thigh which is innervated by the lateral femoral cutaneous nerve. Furthermore, no other symptoms related to motor function was obtained from him. We eventually made a diagnosis of MP after reviewing all the negative findings from the radiological investigations.

Unlike our patient, some patients with MP can present with a wide spectrum of clinical presentations due to the several variations in the branching pattern of the LFCN and surgical procedures are needed to release the entrapment. Certain hospitals are equipped with various modalities and facilities for the investigation to confirm the case of MP and the variation involved. The modalities available are sensory nerve conduction test, electromyography, high-resolution ultrasound, nerve block and others (Thomas et al. 2013; Bishnu et al. 2018). However, our hospital has limited laboratory tests and imaging facilities to diagnose MP. In view of that, we need to rely on the detail history taking and physical examination to diagnose

MP in this patient. Basic ultrasound was done to rule out an underlying infection and inflammation while MRI was done to rule out any spinal cord compression. However, we did not proceed with nerve conduction study and electromyography since it would delay the treatment as referral was needed to other center as an appointment basis. In this scenario, the basic knowledge on the anatomy of the nerve innervations and the capability to relate the anatomical and clinical findings are vital in making the diagnosis of MP after exclusion of other differential diagnosis.

It is important to exclude the diagnosis of diabetic neuropathy in this patient as he has an underlying type 2 diabetes mellitus. Symptoms of diabetic neuropathy can be divided into either typical or atypical forms. Typical form of diabetic neuropathy comprises diffuse neuropathy such as distal systemic polyneuropathy and autonomic polyneuropathy (involvement of organ systems such as cardiovascular, gastrointestinal and others) whereas atypical diabetic neuropathy comprise mononeuropathy or mononeuritis multiplex when it involves isolated cranial or peripheral nerve and radiculopathy or polyradiculopathy such as lumbosacral polyradiculopathy (Lidia et al. 2017; Rodica et al. 2017).

Diabetic neuropathy pain is usually described as hot, burning, tingling, or shooting (electric-like), mainly involves the distal limbs, associated with paraesthesia and worsens during the night. Sometimes there would be an exaggerated response to painful stimulus (hyperalgesia) or pain resulting

from soft, light contact, e.g., with socks, shoes, and clothes (allodynia) (Rodica et al. 2017). However, diabetic neuropathy can be asymptomatic in 50% of the diabetic patients. In this patient, we confidentially excluded the diagnosis of diabetic neuropathy as the cause of pain in view of the good glycemic control. In addition, he denied any exaggerated hyperalgesia or allodynia, thus entrapment neuropathy as MP is a better consideration for diagnosis.

Though there were limitations in laboratory and radiological investigations, we managed to exclude underlying infections, inflammation, neuropathy or connective tissue disease in this patient. We came to the conclusion of MP as a diagnosis after relating the co-morbidities of this patient (obese and diabetic), with the proper history taking and physical examination, and exclusion of other causes through radiological examinations. The patient was responded well to the neuropathic agent and was scheduled for physiotherapy programme and followed-up in the obesity and pain clinic.

CONCLUSION

Despite the great interest of clinical physician towards modern facilities for investigations, anatomical knowledge remains as an important component in the diagnosis and management of MP. Once the diagnosis of MP is obtained, appropriate treatment can be started and the patient should be followed-up for monitoring of the

symptoms and impact of the disease to the daily activity. Limited investigation modalities should not serve as the obstacles in diagnosing patients' conditions. Nevertheless, referral to higher-level institution for further management may be required in some complicated cases.

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REFERENCES

- Anthony, S. 2010. Diagnosis and Treatment of Meralgia Paresthetica. *Emergency Nurse* 18(7): 16.
- Bishnu, P., Rosan, P.S.K., Guru, P.K. 2018. Meralgia Paresthetica-Solving the Diagnosis Dilemma. *Int J Biomed Res* 9(3): 96-101.
- Kristen, D. 2017. The Lumbar Plexus [TeachMe Anatomy]. <http://teachmeanatomy.info/lower-limb/nerves/lumbar-plexus/>. [1st July 2019]
- Kusum, R.G., Subhash, D.J., Sharda, S.J., Abu, U.S., Anjani, V.J. 2013. Lumbar Plexus and its Variation. *J Anat Soc India* 62(1): 47-51.
- Lidia, K.M.B., Dayvson, A.d.R., Eusinio, L.G.F., Nathalia, d.M.P.B., Poliana, A.B.F., Raquel, M.C., Larissa, B.P.C.d.S., Alberto, K.A. 2017. Diabetes mellitus and diabetic peripheral neuropathy. *Open Journal of Endocrine and Metabolic Disease* 7: 12-21.
- Luana, C., Taylor, L., Didier, B., Ralf, B., Anthony, H.D., David, Y., Roy, F., Andrea, T., Nadine, A., Nanna, B.F., Christopher, E., Eija, K., David, L.B., Robert, H.D., Srinivasa, N.R. 2017. Neuropathic pain. *Nat Rev Dis Primers* 3: 1-45.
- Majkrzak, A., Johnston, J., Kacey, D., Zeller, J. 2010. Variability of lateral femoral cutaneous nerve: an anatomic basis for planning safe surgical approaches. *Clin Anat* 23: 304-11.
- Rodica, P.B., Andrew, J.M.B., Eva, L.F., Vera, B., Roy, F., Rayaz, A.M., Jay, M.S., Dan, Z. 2017. Diabetic neuropathy: a position statement by the American Diabetes Association. *Diabetes Care* 40: 136-154.
- Scott, W.C., Morey, J.K., Paul, A.S. 2013. Meralgia Paresthetica: A Review of The Literature. *Int J*

Sport Phy Ther 8(6): 883-891.

- Seong-il, O., Eung, G.K., Sang, J.K. 2017. An unusual case of bilateral meralgia paresthetica following femoral cannulations. *Neurointervention* 12(2): 122-4.
- Thomas, M., Helmut, P., Dominic, B., Wolfgang, H., Doris, L., Maria, B., Eduard, A., Gerd, B. 2013. Common Anatomical variation in patients with idiopathic meralgia paresthetica: a high resolution ultrasound case control study. *Pain Physician* 16(3): 287-293.
- Wei, C.W., Yi, C.W., Wen, Y.H., Yu-Yi, C., Tsung-I, P., Chia-Lun, W. 2017. Risk factor analysis for meralgia paresthetica: a hospital-based study in Taiwan. *J Clin Neurosci* 43: 192-5.
- Woo, C.C., Byung, C.S. 2018. Delayed diagnosis of meralgia paresthetica: a case report. *The Nerve* 4(2): 82-85.

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