

## Case Series

### Meralgia Paresthetica, Cause of Diagnostic Mistake in the Vascular Clinic

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#### Abstract

Meralgia Paresthetica (MP) is a nerve entrapment which may cause pain paresthesias and sensory loss within the distribution of the lateral cutaneous nerve of the thigh. When the patients come presenting pain in the lateral or anterolateral thigh pain we must have in mind the MP in our differential diagnosis. The purpose of this report is to present our experience in the diagnosis and treatment of the primary MP and make a review of the medical literature in this pathology.

**Keywords:** Lateral femoral cutaneous nerve; Meralgia paresthetica; Nerve entrapment

#### Introduction

The leg pain is one of the commonest patient complaints encountered by practitioners of adult medicine and one which frequently presents the initial examining physician with a diagnostic conundrum. Few primary care physicians, emergency room physicians, or for that matter, medical or surgical subspecialists are thoroughly familiar with the neurologic causes of leg pain, so when they do not find a diagnosis corresponding with their specialties and see in the patient telangiectasias, varicose veins or other vascular sign, they send the patient to the clinic of vascular surgery or vascular medicine.

Without doubt the vascular origin of the leg pain together with inflammatory pathologies are the most common [1], however the differential diagnosis of leg pain comprises a lot of different diseases, some

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of them not uncommon but few know by the medical community like the neuropathic leg pain provoked by entrapment neuropathies like Meralgia Paresthetica.

The Meralgia Paresthetica (MP) (term that come from the word Greek meros = tight and algos = pain) is an entrapment neuropathy of the Lateral Femoral Cutaneous Nerve (LFCN) characterized by pain, numbness and tingling in the anterolateral aspect of the thigh [2]. The LFCN is a sensory nerve that originates from the first three lumbar nerve roots and travels along the posterolateral aspect of the psoas over the iliacus muscle to the region of the Anterosuperior Iliac Spine (ASIS) [3]. It enters the anterior region of the thigh by passing under, through or above the inguinal ligament. The nerve divides into anterior and posterior divisions at a variable distance from the ASIS. The anterior branch penetrates the fascia lata approximately 10 cm inferior to the ASIS, and supplies the skin over the anterolateral aspect of the thigh down to the knee. The smaller posterior branch innervates the skin over the greater trochanter down to the area supplied by the anterior branch [4]. MP can be classified as primary or secondary to trauma, surgical procedures or other pathologies [5].

The purpose of this paper is to show the incidence of primary or idiopathic MP referred to the vascular surgery outpatient clinic because of leg pain and present the clinical approach to realize the diagnosis of MP, since it is very common to be confused with phlebitis and other venous diseases, To review its treatment and make an update on the current medical literature.

#### Patients and Methods

In a systematic prospective review of consecutive clinical records of patients sent to our outpatient vascular clinic, with referring symptom of leg pain from September 2012 to December 2018, were selected the patients with the diagnosis of primary MP. The diagnosis and treatment of MP was according to standard algorithm from the Department of Orthopedic Surgery "B", Tel Aviv Sourasky Medical Center and Sackler Faculty of Medicine, Tel Aviv University, with some light modifications [6].

The preliminary diagnosis was based on the patient's history of symptoms (pain, burning, numbness, muscle ache, coldness, lighting pain, that may be present with prolonged standing and walking, and alleviation with sitting) in the distribution of LFCN [5,7,8]. The symptoms could have spontaneous resolutions or may have more severe pain that limits function. Beside the clinical history in order to make a correct diagnosis and assist with the differential diagnosis, we used a specific clinical tests (Pelvic Compression test, Neurodynamic testing, Tinel's sign; that are described in the discussion) during the physical examination together with other signs like reduced or increased sensitivity to pain and touch in the same distribution the LFCN [9]. Patients with a motor deficit, reflex changes, or sensory deficit not in the area of LFCN, and also patients with other neurological, urogenital and gastrointestinal symptoms and signs that do not fit the clinical picture of primary MP, were evaluated with more investigational studies to rule out other pathologies. Patients with known etiologies of secondary MP (eg. prior pelvic orthopedic surgery and pelvic trauma) were rule out.

The entire patient with the clinical diagnosis of a MP a diagnostic nerve block test was made at the first visit. The technique used for nerve block was described by Tagliafico et al., [10]. All examinations were performed by using a commercially available scanner with a 7-14 MHz linear transducer. The perineural injection technique involved the following: First, the block area was sterilized with Chlorhexidine. Under rigorous aseptic conditions, the transducer was inserted into a sterile bag, and sterile gel was applied to it. Patient lies supine the Anterior Superior Iliac Spine (ASIS) is palpated and visualized with the ultrasound probe as a hyperechoic structure with posterior acoustic shadowing, and the transducer was placed over it. Then the probe is moved in medial and caudal direction until the nerve is encountered. The lateral end of the probe was placed on the anterior superior iliac spine, and the medial end extended medially in an anatomic transverse plane. After confirming the location of the LFCN, the needle is advanced under direct ultrasound visualization, in a longitudinal view. When the tip of the needle was in a proper position, and rule out blood vessel, 5-10 ml of 1% lidocaine HCL solution was injected and the operators see the perineurial spread [10-14]. The test was considered positive if there was prompt relief of symptoms lasting for at least 30-40 min. Patients who did not respond were re-tested 2 weeks later. The diagnosis of MP was considered unlikely in patients who failed to respond to the second nerve block test.

After the initial treatment the patients were reevaluated and the patients that still present an important complain (moderate or severe according with the Visual analog score) and how the complaints interfere in a diary's routines, were treated with local infiltration of corticosteroid (1 mL suspension containing 5 mg betamethasone as dipropionate, 2 mg betamethasone as sodium phosphate) and 4 ml of bupivacaine 2%, to the same site as that infiltrated in the local anesthetic test. Up to 3 successive corticosteroid injections were administered every 4-6 weeks, as required by the patient's clinical course. Along with the medical nerve block the patient received gabapentin (75mg/d).

Surgical intervention was reserved for patients with intractable symptoms who responded to the nerve block test but had no long-term relief following 3 corticosteroid injections.

## Results

From 2012 through 2017, 652 consecutive patients referred to our outpatient vascular clinic with leg pain were evaluated, from these 83 patients (13%) were diagnosed with symptoms consistent with primary MP and verified the diagnosis with a positive LFCN block test and treated in accordance with the aforementioned algorithm. Demographic, clinical and risk factors characteristics are summarized in table 1.

There were 68 females (82%) and 15 males, the patient's mean age was 36 years, ranging from 21-63 years. The mean duration of symptoms was 5 (3-25) months. Sensory finding was located to the anterior lateral aspect of the thigh without involving the medial aspect of the thigh or the knee (the distribution of the anterior division of the LFCN) in the 96% of the patients and the rest the sensory symptoms extended to the proximal aspect of the thigh (the distribution of the posterior division of the LFCN). All the patients present just unilateral symptoms and the 92% were localized in the right side. The positive LFCN block test was positive the first time in 78 patients, the rest

was positive in the second time; there were no complications during the test.

<b>Number of patients</b>		83 (%)
<b>Age</b>	Mean (years)	36
	Range	21-63
<b>Gender</b>	Male	15 (18)
	Female	68 (82)
	Family history	4 (5)
	Obesity	33 (39)
	Diabetes Mellitus	21 (25)
	Fast weight loss*	12 (14)
	Hypothyroidism	2 (3)
	Tight clothes**	-25
<b>Risk factors</b>	Sports***	8 (10)
<b>Duration of</b>	Mean (months)	5
<b>Symptoms</b>	Range	25-Mar
	Right side	-92
	Left side	-8
<b>Localization</b>	Bilateral	0
<b>LFCN</b>	Anterior division	-96
	Posterior division	-4
<b>Treatment</b>	Medical tx	28(35)
	Nerve block	55(75)

**Table 1:** Demographic, clinical and risk factors characteristics.

\* more than 10 kgs

\*\* Heavy objects in pockets, use of beepers or cellular phones strapped on wide belts

\*\*\* Practice a sports or have a profession that predispose to MP

The potential risk factors for the development of MP were: 39% of the patients with obesity, 25% presented with diabetes mellitus, 22% commented to use tight clothing, heavy objects in pockets, use of beepers or cellular phones strapped on wide belts, 14% initiated their complains after an important weight loss (> 10Kg), 9% practice a sports or have a profession that predispose to MP, hypothyroidism 2% and just 3% had a familiar history of MP.

After the initial treatment and management, 28 (35%) patients improved their symptom and just followed with the initial treatment for two weeks and with the indication to come back in case that the complaints return.

The others 55 (75%) patients received the medical nerve block, from these 20 patients were relieved in 15 days with a single injection, 16 patients need two sessions, 14 patients from these group were completely pain free and 2 patients remain having mild pain. The group of patients that need three sessions were 19, and all obtained relieved from their pain. No adverse effects resulting from the medical nerve block procedure were observed. During the follow-up period, symptoms consistent with MP recur in just three patients.

## Discussion

Meralgia Paresthetica is a nerve entrapment resulting in pain, paresthesias, and sensory loss in the distribution of the LFCN [7]. Meralgia Paresthetica was first described by Bernhardt in 1878 [15], and in 1885 Hager described hip pain secondary to lateral cutaneous nerve injury following trauma [16]. In 1895 both Bernhardt and Roth published independent articles on MP [17,18]. The syndrome was initially known as Bernhardt-Roth syndrome.

Although MP can occur in any age group, it is most common in 30-40-year old, with an incidence rate of 4.3 cases per 10,000 patient years in general population and 247 cases per 100,000 patient years in patients with diabetes mellitus [19-21]. Some cases reports indicate the incidence of MP in various physical activities or sports [22-27].

There is no consensus whether there is sex predominance but in one study that include 150 cases of MP, there was a higher incidence in men [28]; and another series has evaluated a family with MP in four generations, suggesting an autosomal dominant trait [29].

In our study the patient's median age (36) correspond with the report in the medical literature, and the ratio females / males (4.5/1) was very different to other studies, that mentioned predilection in males, also we found three female patients with a family history of MP so suggest an autosomal dominant trait.

Grossman et al classified MP as being idiopathic or iatrogenic with a sub classification of idiopathic as mechanical or metabolic [5]. We preferred to classify MP as primary and secondary. And in these discussions, we just describe the primary MP.

Primary MP causes includes mechanical factors than result in compression of the LCNT along its anatomical course. MP has been related to the following factors: obesity (BMI  $\geq$  30) [30,8], wearing a tight garment such as belts, corset, trouser, jeans [6], military armor and police uniforms [31], seat belts [32], direct trauma [33], pregnancy [8], leg length changes [34], scoliosis, and muscle spasms among others. Metabolic factors reported include diabetes mellitus, alcoholism, hypothyroidism and lead poisoning [30].

The most common mechanical and metabolic factors in our study were obesity, diabetes mellitus, and the professional activities like truck driver and from our males' cases the rate of 79% (11/15) had more than one risk factors for MP. The female's patient most common risk factor was obesity and rapid weight loss and the use tight clothing with a rate of 61% (42/68).

The clinical presentation of patients with MP consist of paresthesia or dysesthesia, patients typically describe a pain, burning, numbness, muscle aches, coldness, lightning pain, or buzzing in the upper and lateral thigh, (the distribution of the LFCN) [5,7]. The symptoms could be mild and resolve spontaneously or may have more severe pain that limits function. The aggravating factors of the pain may be erect posture, prolonged standing and walking and alleviation with sitting but on occasions symptoms aggravated by sitting have been reported (theoretically, sitting may reduce or change the tension in the LFCN or inguinal ligament, thus reducing symptoms) [5,10]. Some patients note that paresthesias in the thigh can be initiated by tapping on the inguinal ligament; extending the thigh posteriorly, which stretches the nerve. Each patient will have their own unique clinical presentation and distribution of symptoms. Other neurological, urogenital, and gastrointestinal symptoms that do not fit the picture of MP should indicate to the attending physician that the leg pain is due to another condition. In most instances, the condition is unilateral; however, 20% of patients present with bilateral complaints. Seror and Seror [35,36] documented their experience with diagnosing 120 cases of MP (69 men, 51 women, and age range 15-81 years, duration of symptoms 2 weeks to 20 years) using neurophysiological studies, they found that the lateral thigh was solely involved in 88 (73%) cases and the anterolateral thigh was involved in 32 (26%) cases. The right

thigh was involved in 62 (51.6%) cases and the left in 58 (48.3%) cases. In our cases series is very similar to the report of Seror that give emphasis that the majority cases of MP are unilateral, the right side and the lateral aspect of the thigh are the most common areas involved.

Before considering MP as a cause of the patient's symptoms, clinicians must to first rule out common pathologies that MP can mimic, such as lumbar stenosis, disc herniation, and nerve root radiculopathy [29,37-41].

Physical examination usually reveals tenderness over the lateral inguinal ligament at the point where the nerve crosses the inguinal ligament. Patients may also have an area of hair loss on the anterior thigh due to constant rubbing of the region by the patient, and this is an important diagnostic marker. Within the physical examination process, there are specific clinical test that can be conducted in order to assist with the differential diagnosis. A complete description of the hip examination is beyond the scope of this section. The reader is referred to the work by Byrd [42] which provides a description of the hip examination process but here we describe some clinical test that help us to make a correct diagnosis like the Pelvic compression test, Tinel's sign and Neurodynamic testing.

The pelvic compression test was described by Nouraei et al., [43]. During this test the patient is positioned in side lying with their symptomatic side facing up, the examiner applies a downward compression force to the pelvis and maintains pressure for 45 seconds. If the patients report an alleviation of symptoms the test is considered positive. The test is based upon the idea that the LFCN is compressed by the inguinal ligament and a downward force will relax the ligament and temporarily alleviate the patient's symptoms. In their study Nouraei et al. reported that the test had a sensitivity of 95% and specificity of 93.3% but despite the favorable results, no other clinical trials have been performed to confirm these results.

During the Neurodynamic testing described by Butler [44,45], the patient is side lying with the symptomatic side up and the bottom knee bent, the examiner stabilizes the pelvis with the cranial hand and grasp the lower extremity at the knee with the other hand, the examiner then bend the knee and adducts the in order to tension the FCNL. A positive test would be the reproduction of the patient's neurologic symptoms. The neurodynamic testing of the FCNL has not been assessed in the literature for its diagnostic ability however this should be considered when using this test as part of the clinical exam.

The Tinel's sign can be performed over the FCNL in the same way that we do this test during the diagnosis of Carpal tunnel syndrome; Parmer reported good results in his clinical experience using this test in patients with probably diagnosis of MP [46]. In our cases the most sensitive and specific test for the clinical diagnosis of MP was the pelvic compression test and the least sensitive corresponded to the Tinel's sign.

Plain X-ray of the pelvis in addition to CT of lumbar spines should be performed to eliminate disk herniations or pelvic tumors as etiologies. Ultrasound and magnetic resonance imaging can be employed to evaluate the retroperitoneal regions. On physical examination, there should be no tenderness over the sciatic notch and straight leg rising should be negative. A full blood analysis should be performed, including thyroid function testing, as MP has been associated with hypothyroidism especially in females older than fifty years old [47].

When there is doubt about the diagnosis following history and physical examination, then electrodiagnostic testing can be used. The diagnosis of MP is often obtained using neurophysiological studies such as somatosensory evoked potentials and sensory nerve conduction that have respectively 81.3% and 65.2% of sensitivity [48-50]. Despite this result there are limitations to nerve conduction studies examining the FCNL. The most common limitations is the increase adipose tissue among individuals which makes the study difficult to perform [36]. Currently Magnetic Resonance Neurography (MRN) has been utilized to capture direct images of the nerves of the body [51]. Chhabra et al., evaluated the diagnosis of MP using MRN, and they found the sensitivity  $\geq 71\%$ , specificity  $\geq 94\%$  positive predictive value, and negative predictive were  $\geq 90\%$  for both raters [52]. In our outpatient vascular clinic after we make a detailed clinical history and physical examination using all the physical test above mentioned, and if we found a great possibility of diagnose MP, we performed the nerve block test and if this test is positive we do not make more studies at least we have doubt in our diagnosis because something not fit or the MP could be secondary or iatrogenic.

The treatment of the MP could be conservative or surgical. Initial treatment for MP often may include the use of NSAIDS, analgesics, protection of the area, avoiding compression activities, and physical therapy [5,11]. Other non-surgical interventions include pulsed radiofrequency ablation and LFCN nerve block. Pulsed radiofrequency ablation uses a high frequency alternating current to treat various neuropathic disorders such as MP [53]. The heat generated from the high frequency alternating current ablates (or destroys) the nerve fibers or dysfunctional tissues without damaging the surrounding tissue. The use of pulsed radiofrequency is a good option to the treatment for MP, however currently, there are no clinical trials available, only case reports describing this intervention [54,55].

LFCN nerve blocks using a combination of Bupivacaine and corticosteroids are the election treatment for us. Taglifico et al., and other authors have found good outcome using the nerve block [10,13,56,57]. Dureja and colleagues [58] attributed their high success rate to the repetitive blocking of the FCNL which breaks an afferent efferent loop at the spinal segmental level. However, there are limitations in the study just mentioned in that it was a case series without a control group so results have to be interpreted cautiously. In addition, local steroids reduce the hyperexcitability of neurons and C fibers [58]. While the membrane stabilizing properties (prolonging recovery time of activated sodium channels) of diphenylhydantoin thus reduces neuronal firing [59]. The benefits of tricyclic antidepressants, antiarrhythmic agents, and anticonvulsants to treat the effects of neuropathic pain have been documented [3]. Capsaicin (selective excitation of C-polymodal nociceptors) has also been used to treat itch and surface hypersensitivity in MP [60]. Topical lidocaine has also been employed in resistant neuropathic pain of MP with good effect [61].

The medical treatment describe above (NSAIDS, analgesics, protection of the area, avoiding compression activities, and physical therapy) followed by a medical nerve block together with 150 mg of pregabalin a day in case of the medical treatment was no successful gave us a very good results in our cases, with just 4% of recidiva.

## Conclusion

The MP is not uncommon diagnosis in the outpatient vascular clinic and must be considered as differential diagnosis that we must

keep in mind during the examination of patients that come because thigh pain. A good clinical history and pertinent physical examination combined with the nerve block test, is essential to making the diagnosis and rule out other etiologic factors of secondary Meralgia paresthetica.

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