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REVIEW ARTICLE

Differential Etiological Diagnosis of Meralgia Paresthetica: A Concise Review

Ed Cleso Pereira de Souza Filho[1*], Emily Stefhani Keil[1], Felipe Fanine de Souza[1], Milena Luisa Schulze[1], Israel Kitzberger[1] and Marcus Vinicius Magno Gonçalves MD, PhD[2]

[1]*Medical Student, Department of Medicine, University of the Region of Joinville (UNIVILLE), Brazil*

[2]*Medical Doctor, Philosophy Doctor, and Professor of Neurology and Neurophysiology, Department of Medicine, University of the Region of Joinville (UNIVILLE), Brazil*

***Corresponding author:** *Ed Cleso Pereira de Souza Filho, Medical Student, Department of Medicine, University of the Region of Joinville, Rua Minestra Calógeras, 439, Bucarein, Joinville, Santa Catarina - 89202-207, Brazil, Tel: +55-(41)-999-203-315*

Abstract

Paresthesia meralgia (MP) is a condition in which there is compression of the lateral femoral cutaneous nerve (LFCN), with its entrapment. Clinically presents with burning pain and dysesthesia in the anterolateral region of the thigh. Due to the multiple etiological diagnoses different from MP, this review aims to show systemic and non-systemic causes and also explains some tests of the condition. This article is a non-systematic review. All articles used were researched in the public databases PubMed, Medline, ScienceDirect, SciELO and Cochrane. The process of locating these articles was done by searching for terms related to paresthesia meralgia, selecting the most relevant articles available in English or Portuguese. The presentation of MP is usually unilateral, with subacute onset (days to weeks), and may be associated with prolonged hip extension, in addition to flexion relief. There is a wide spectrum of non-systemic diseases that may be responsible for the development of paresthetic meralgia, ranging from surgical sequelae and direct mechanical nerve compression. In addition, diabetes mellitus and Covid-19 infection may be systemic causes of MP. Diabetes mellitus is associated with endothelial dysfunction and peripheral neuropathy. Covid-19 increases the inflammatory state and consequent pain of the intensive care unit patient causing neurological sequelae. In sum, the etiological diagnosis of MP is important, since the treatment varies according to the cause of this neuropathy. In addition, it helps to rationalize the process of diagnosis, investigation, treatment and follow-up of these patients.

Keywords

Meralgia paresthetica, Etiology, Mechanical compression, Diabetes mellitus, Covid-19

Abbreviations

MP: Paresthesia Meralgia; LFCN: Lateral Femoral Cutaneous Nerve; Sseps: Somatosensory-Evoked Potentials; MRI: Magnetic Resonance Neurography; DM: Diabetes Mellitus; DPN: Diabetic Peripheral Neuropathy

Introduction

Meralgia is a neurological clinical syndrome presenting with burning pain and dysesthesia in the anterolateral aspects of the thigh [1]. Symptoms occur due focal entrapment of the lateral femoral cutaneous nerve (LFCN) as it passes under inguinal ligament or more rarely as it crosses the fascia lata (Gray). Most patients underwent orthopedic surgeons or neurologist's evaluation.

MP tends to occur more frequently in women, although no significant differences exist between sex. It is more common in the fourth to fifth decade of life and has an incidence of 3 to 4 per 10,000 individuals per year [2]. Due to the multiple etiological diagnoses of MP, this review aims to demonstrate systemic and non-systemic causes and at the same time explain examinations of the condition.

Material and Methods

This respective article is a non-systematic review. All the articles used were researched in public databases

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PubMed, Medline, ScienceDirect, SciELO and Cochrane. The process of finding those articles was made by searching terms related to Meralgia paresthetica, selecting the most relevant articles available in English or Portuguese. Additional literature not present in those databases was used to complement the general understanding of neuropathies, specific classifications, previous treatments and also to illustrate historic descriptions of the disease. The authors of this article declare no conflict of interest.

Meralgia Paresthetica

The involvement that occurs in meralgia is due to compression of the lateral femoral cutaneous nerve, which when crossing towards the anterior face of the thigh, becomes more likely to be compressed. Given this, the main symptom that patients complain about is burning pain, unilateral, subacute onset and may be associated with worsening of the symptom by promoting hip extension [3]. Clinical history and physical examination are based on investigation of pathology. Thus, we can stop some strategies that possibilities increase the possibility of involvement be confirmed, such as excluding the presence of some motor deficit and changes in reflexes in the lower limbs, which are not present in the paresthetic meralgia [4].

There are tests that we can use to help diagnose this pathology, including the neurodynamic test of the femoral nerve, in addition to pelvic compression [5]. However, other diagnostic managements are used because they have greater specificity, such as evoked somatosensory potentials, high-resolution ultrasound and magnetic resonance imaging [4].

In the study conducted by Shaikh AI and colleagues [6], it was interpreted that the role of pain can be recorded related to somatosensory-evoked potentials (SSEPs) in the diagnosis of paresthesia meralgia and, in addition, show latency in the electrophysiological study [7,8]. For a better sensitivity and specificity of the test, it is necessary to carry out the test by an experienced neurologist, who present a better performance and result -gold standard- when compared to other electrophysiological methods, such as somatosensory evoked potentials and sensory nerve conduction [9].

Magnetic resonance neurography (MRI) requires knowledge of the local anatomy and is expensive, making it less used today. In a study by Chhabra, et al. in MP using MRI, the diagnostic accuracy was about 90% and the sensitivity was only 71% [10]. In ultrasonographic study, detection of swelling of the fusiform nerve and flattening of the nerve under or within the ligament are used to make the diagnosis of MP [11].

In the chronic presentation, loss of multifocal and myelinated fibers can be observed in the LFCN biopsy, in addition to perineural thickening and subperineural edema [12].

Non-Systemic Causes of Meralgia Paresthetic

There are a wide number of non-systemic diseases that can lead to the development of paresthetic meralgia, ranging from surgical sequelae to direct mechanical nerve compression.

The direct compression of the LFCN can be caused by the use of tight pants, belts, tight seat belts or corset [13,14]. However, a tumor located near the anterosuperior iliac crest can also cause compressive symptoms, for example pelvic osteochondroma [15], osteoid sarcoma [3] or even lipoma [16].

Increased pelvic and intrabdominal pressure may cause meralgia paresthetica. This includes pregnancy, obesity and masses in the pelvic/abdominal cavity [13,17] and may be explained by the retraction of the LFCN caused by the anterior protruding abdomen [14,18]. Some masses that can cause MP are uterine fibroid disease [19] renal tumors [20], retroperitoneal lipofibrosarcoma [21], pancreatic pseudocyst [22] and iliacus hematoma [23].

Orthopedic surgeries are particularly associated with meralgia paresthetica due to nerve path. Surgeries

Table 1: Systemic and non-systemic causes and mechanisms of MP.

	Causes	Mechanism
Nos-systemic causes of meralgia paresthetica	• Sequels of surgery • Direct mechanical compression of the nerve	• **Sequels of surgery:** Orthopedist surgeries involving the pelvis may damage the nerve due to anatomical variations. • **Direct mechanical compression of the nerve:** Occurs by increased intrabdominal pressure by pregnancy, obesity and masses in the pelvic/abdominal cavity.
Systemic causes of meralgia paresthetica	• COVID-19 • Diabetes mellitus (DM) • Vasculitis	• **COVID-19:** MP developed by neurological sequels, low mobilization and also to an increased inflammatory state and the consequent pain of the ICU patient. • **Diabetes mellitus (DM):** MP occurs due to peripheral neuropathy which leads to edema and oxidant damage and imbalance in the Na/K pump. • **Vasculitis:** Related to DM and associated with endothelial dysfunction/peripheral arterial disease.

involving the pelvis may directly damage the nerve because the nerve can have anatomical variants [24].

In the study by Azuelos A and friends, the causes of femoral nerve compression were evaluated and, in a total of 30 patients, 13 had idiopathic compression, 7 were neurovascular patients and 10 were iatrogenic cases: 5 of them underwent laparoscopic hernia treatment, 3 underwent cardiac balloon catheterization and 2 underwent an intra-abdominal vascular procedure [25]. Other conditions were associated with MP disease, such as after a uterus transplant [26] and not only imprisonment that is close to the inguinal ligament that can cause the disease, but also in a more distal location of this anatomical reference, such as nerve compression in the fascia lata, at the level of the thigh, which is rare [27]. Femoral neuropathy was also identified in a tumor patient submitted to ablation [28].

Systemic Causes of Meralgia Paresthetica

COVID-19 can be a cause of MP, and in a cohort study with 51 patients with COVID-19 in ICU, 10 (33%) were diagnosed with MP, and presented pain in the lateral part of the cutaneous nerves, in both sides [29]. The study demonstrated that the reason for the emergence of this condition can be attributed to neurological sequels of COVID-19; to a low mobilization of the patients because of overcrowding in the ICU; and also to an increased inflammatory state and the consequent pain resulting from COVID-19. The study also demonstrated that 4 of 10 patients of MP had diabetes mellitus (DM) [29].

In the context of DM, the most common complication of DM is Diabetic peripheral neuropathy (DPN), and a research evaluated 381 patients with DM type 2, and 107 (28.1%) of them had DPN [30]. DPN is associated with endothelial dysfunction and arterial peripheral disease [31]. DM type 1 is also associated to peripheral neuropathy, since it slows down the nerve conduction, that can cause a reduced muscular activity, destabilize discharge frequencies and not being able to perform tasks that require repetitive contractions [32]. From the perspective of diabetic neuropathy of the LFCN, we have that it can occur in two situations: I) edema from decreased axonal transport and II) transformation of glucose into sorbitol leading to an impairment in the mechanism of the sodium-potassium pump [13]. Both factors occur by the fact that aldose reductase is converted into sorbitol, which leads to a hyperosmolarity and edema. At the same time, there is an increase in NADP+ which causes oxidizing damage and unbalances the Na/K pump [33].

Conclusion

With this piece of information in mind, it gets easier to outline the importance of differential etiological diagnosis of meralgia paresthetica since the treatment varies according to the cause of this neuropathy. Also, it aids to rationalize the process of diagnosis, investigation, treatment, and follow-up of those patients. Misdiagnosis is associated with worse prognosis, inappropriate surgeries, and higher costs in patients'care.

Conflict of Interest

All authors declared that there are no conflicts of interest.

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