



Case study

Risk factor analysis for meralgia paresthetica: A hospital-based study in Taiwan

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ABSTRACT

Recognizing the cause is essential for the management of meralgia paresthetica (MP), also known as lateral femoral cutaneous neuropathy. The aim of this study was to investigate the etiologies of MP and their influence on each other. This retrospective study enrolled referral patients with electromyographic studies who fulfilled the clinical and electrodiagnostic criteria of MP from January 2003 to December 2013. Data including age, gender, body weight, body height, occupation, and relevant medical history were collected. The etiological analysis was based on age and gender. A total of 50 patients (30 males and 20 females) were enrolled. The average age (\pm standard deviation) at diagnosis was 49.8 ± 12.8 years. Risk factors were identified in 29 cases (58.0%). More patients younger than 50 years of age were male (73.1%, $p = 0.049$). Peaks of age occurred between 41–50 years in men and 51–60 years in women. More males had a body mass index ≥ 24 kg/m² (69.2% vs. 31.6%, $p = 0.012$) and ≥ 27 kg/m² (34.6% vs. 0.0%, $p = 0.006$). Overweight and obese patients were more vulnerable to occupational factors (50.0% vs. 19.0%, $p = 0.030$). Only one case had diabetes mellitus (2%). Male middle-aged patients with a higher body mass index and certain occupations had an increased risk of MP. In contrast to the peak age distribution of the male patients, the frequency of developing MP was relatively even among the women at all ages. The cause was often obscure.

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1. Introduction

Meralgia paresthetica (MP) is a focal entrapment neuropathy of the lateral femoral cutaneous nerve resulting in pain, paresthesia, or sensory loss over the anteriolateral thigh. The lateral femoral cutaneous nerve is a pure sensory nerve which originates from L1 to L3 nerve roots and is a part of the lumbar plexus. It travels along the posteriolateral aspect of the iliopsoas muscle and enters the anterior region of the thigh. It has been suggested that entrapment occurs when the nerve runs below the inguinal ligament just beneath the anterior superior iliac spine [1]. The diagnosis is usually made by clinical symptoms, signs, and electromyographic findings. Imaging studies can exclude radiculopathy, plexopathy, or other secondary causes. The management is usually conservative, although surgical intervention may be needed if intractable.

Although several mechanical and metabolic predisposing factors have been associated with MP, the exact cause in some instances remains unclear [2]. The reported factors cause direct

compression or increase susceptibility to entrapment along the nerve route, and include obesity, increased body mass index (BMI), tight clothing, seat belt, pregnancy, increased intra-abdominal pressure, some surgical procedures, and diabetes mellitus (DM). These factors vary substantially according to different populations and lifestyles. For example, the distribution of BMI is different between Asian and Western populations. Recognizing the cause of MP is important for proper management. The aim of this study was to analyze the risk factors associated with MP and their influence on each other.

2. Patients and methods

2.1. Patient selection and data collection

From January 2003 to December 2013, patients who consecutively received electrodiagnostic studies and were diagnosed with lateral femoral cutaneous neuropathy were collected. Abnormal nerve conduction studies of the lateral femoral cutaneous nerve were defined as an amplitude less than 3 μ V or a side-to-side amplitude ratio greater than 2 [3–5]. We retrospectively reviewed the clinical history, neurological examinations, images, and

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electrodiagnostic tests of these patients. Patients were enrolled in this study if both clinical and electrodiagnostic results were compatible with the diagnosis of MP, and those with an uncertain diagnosis were excluded. This study was approved by the Chang Gung Memorial Hospital Human Studies Institutional Review Board.

We used non-invasive antidromic method for lateral femoral cutaneous nerve evaluation in our laboratory. Skin temperature was maintained above 28 °C. The stimulating site was at the groin, 4–6 cm below the anterior superior iliac spine. The recording site was 12–15 cm distal to the stimulation site. The stimulating and recording sites would be repositioned to obtain the best responses. The normal side was evaluated first, then the symptomatic side. Each patient had a complete electromyographic examination with motor nerve conduction and F-wave study of both peroneal and tibial nerves, sensory nerve conduction study of sural nerves, and H-flexes study. At least one muscle per myotome from L3 to S1 root innervation had needle examination to exclude a radiculopathy.

Data possibly relating to the occurrence of MP including age, gender, occupation, medical history, body height, weight, and BMI were obtained from medical records at the time of diagnosis. The cutoff points of BMI (kg/m^2) in adults were based on the definition of the Ministry of Health and Welfare in Taiwan and classified as being underweight ($\text{BMI} < 18.5$), normal ($18.5 \leq \text{BMI} < 24.0$), overweight ($24.0 \leq \text{BMI} < 27.0$), and obese ($\text{BMI} \geq 27.0$). Occupations associated with using a seatbelt, tight clothing, or standing for long periods of time were considered to be risk factors. The patients were defined as having DM if it occurred before or at the time of the diagnosis of MP. Alcoholism was defined as physical or psychosocial dysfunction due to alcohol abuse. Surgery and chemotherapy were considered to be relevant if the symptoms of MP began immediately after these events. In order to identify specific risk factors among different subgroups, the patients were divided by age and gender for further analysis.

2.2. Statistical analysis

The data were analyzed using IBM SPSS software version 19.0. The chi-squared test or Fisher's exact test was used for categorical variables including gender, obesity, occupation, DM, alcoholism, surgery, and chemotherapy. Continuous variables including age and BMI were expressed as mean \pm standard deviation and analyzed using independent *t*-tests. A *p* value < 0.05 was considered to be statistically significant.

3. Results

The sum of electromyographic tests in the laboratory during the study period was 16,205. A total of 50 patients (30 males (60%) and 20 females (40%)) were included in this study. The average age at diagnosis was 49.8 ± 12.8 years. The distribution according to age and gender is shown in Fig. 1. The mean age of the male patients was 47.3 (range 25–63) years, of whom 27 (90%) had an age ranging from 31 to 60 years. The mean age of female patients was 53.4 (range 16–85) years, of whom 15 (75%) had an age ranging from 41 to 70 years.

Risk factors were identified in 29 cases (58.0%), 16 (32%) of whom had two or three risk factors. Forty-five patients had available BMI data, of whom 15 (33.3%) were overweight and nine (20%) were obese. Fig. 2 shows the distribution of cases according to BMI. The occupational status of 46 patients was obtained, and 16 (34.8%) cases were considered to be relevant to MP including being a driver (5), vendor (5), cook (3), teacher (1), security guard (1), and builder (1). Ten (20%) patients had a relevant past medical history including DM (1), alcoholism (4), surgery (4), and chemotherapy (1). The four surgical procedures associated with MP were surgery

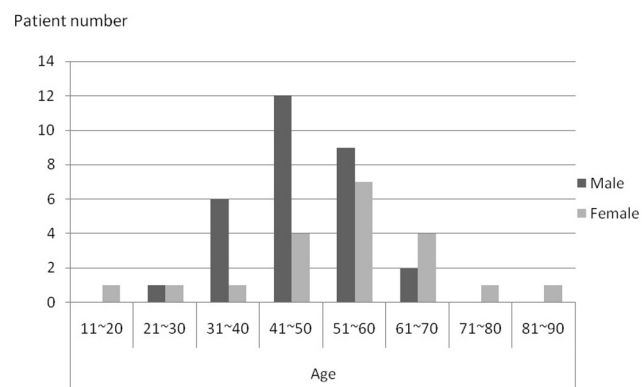


Fig. 1. Distribution of the patients with meralgia paresthetica according to age and gender.

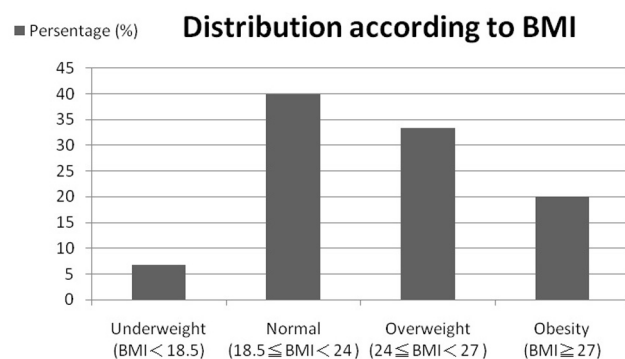


Fig. 2. Distribution of patients with meralgia paresthetica according to body mass index.

for adrenal myelolipoma, pelvic adhesion with laparoscopy, total hip replacement, and cesarean section. The relevant chemotherapy regimens were cisplatin and fluorouracil for gastric adenocarcinoma.

In subgroup analysis, more male patients were 50 years or younger ($p = 0.049$). Occupational risks were more common in the younger patients, although the statistical significance was borderline ($p = 0.063$). The mean BMI was higher in the male patients than in the female patients ($p = 0.001$), and more male patients were overweight ($p = 0.012$) and obese ($p = 0.006$) (Table 1). The overweight and obese patients had higher frequencies of occupation ($p = 0.030$) and relevant past medical history ($p = 0.078$) risk factors (Table 2).

4. Discussion

This study highlights the important characteristics of the etiology of MP. Similar to previous studies, MP is usually noted in middle age people. Mechanical factors including higher BMI and occupation-related risks were common. Both metabolic and iatrogenic causes accounted for 10% of the cases, respectively, and around half of the cases remained idiopathic. A significant finding is that susceptibility to specific etiologies depended on the patients' age and gender, and that the risk factors for MP were interlinked. The results suggest that the development of MP is multifactorial and involves the patients' physical condition and environmental factors. In contrast to previous studies, we did not find a significant correlation between DM and MP, even in the older patients.

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