



## Contribution of ultrasound in the assessment of patients with suspect idiopathic pudendal nerve disease



Alberto Tagliafico<sup>a,\*</sup>, Bianca Bignotti<sup>b</sup>, Maribel Miguel Perez<sup>c</sup>, Lizia Reni<sup>d</sup>, Gerd Bodner<sup>e</sup>, Carlo Martinoli<sup>b</sup>

<sup>a</sup> Institute of Anatomy, Department of Experimental Medicine, University of Genoa, Via de Toni 14, 16132 Genoa, Italy

<sup>b</sup> Radiology Department, DISSAL, Università di Genova, Largo Rosanna Benzi 8, 16138 Genoa, Italy

<sup>c</sup> Unit of Human Anatomy and Embryology, Department of Pathology and Experimental Therapy, Faculty of Medicine (C Bellvitge), University of Barcelona, Barcelona, Spain

<sup>d</sup> Neurology Department, AOU San Martino-IST, Largo Rosanna Benzi 8, 16138 Genoa, Italy

<sup>e</sup> Division of Neuroradiology and Musculoskeletal Radiology, Department of Radiology, Medical University of Vienna, Austria

See Editorial, pages 1079–1080

### ARTICLE INFO

#### Article history:

Available online 7 December 2013

#### Keywords:

Pudendal nerve

Ultrasound

Anatomy

Perineal nerves

Pathology

Entrapment

Magnetic resonance imaging

### HIGHLIGHTS

- Diagnosis of pudendal neuralgia is difficult and classical diagnostic criteria are not sufficient for all clinical situations.
- High-resolution ultrasound (US) is able to evaluate normal and pathological pudendal nerves.
- In patients with suspected idiopathic pudendal nerve disease, ultrasound allowed the identification of morphological alterations to the nerve in 80% of cases.

### ABSTRACT

**Objective:** To assess if Ultrasound (US) is contributive in patients suspected of having idiopathic pudendal neuralgia.

**Methods:** Between July 2012 and April 2013, 10 consecutive female patients with suspected idiopathic pudendal neuralgia (mean age:  $47 \pm 14$  years; mean BMI:  $24 \pm 3$ ) were included. Two radiologists blinded to the clinical and neurophysiological data performed pudendal nerve evaluation with broadband linear array transducers (12–7 MHz, and 17–5 MHz). MRI was added to confirm US data. A third independent clinician, who did not perform electrodiagnosis and US, reviewed the data and scored US as “contributive” or “non-contributive”: if US confirmed the clinical and neurophysiological diagnosis or if US findings were not useful.

**Results:** Ultrasound identified alterations to the pudendal nerve in 7/10 of cases (70%). In seven cases US revealed the presence of a diffusely or focally enlarged pudendal nerve confirmed by MRI. In these cases neurophysiological findings were suspicious for pudendal neuralgia in 5/7 cases, whereas in 2/7 cases they were inconclusive.

**Conclusion:** High-resolution ultrasound (US) may demonstrate alterations to the pudendal nerve in patients with pudendal neuralgia.

**Significance:** US is useful in patients with suspected idiopathic pudendal nerve disease.

© 2013 International Federation of Clinical Neurophysiology. Published by Elsevier Ireland Ltd. All rights reserved.

### 1. Introduction

In the presence of typical perineal pain, the diagnosis of pudendal neuralgia is possible if defined criteria are present. These criteria are known among clinicians as “Nantes Criteria” and are divided into four diagnostic domains (essential, complementary,

\* Corresponding author. Address: Department of Experimental Medicine, DIMES, Università di Genova, Via de Toni 14, 16132 Genoa, Italy. Tel.: +39 3479745122; fax: +39 0103537885.

E-mail address: [albertotagliafico@gmail.com](mailto:albertotagliafico@gmail.com) (A. Tagliafico).

exclusion criteria and associated signs not excluding the diagnosis) (Labat et al., 2008). However, diagnostic criteria for pudendal neuralgia by pudendal nerve entrapment are not sufficient for all clinical situations (Labat et al., 2008). Perineal pain is typically variable, complex and often associated with functional symptoms. In this area, clinical neurophysiology has been considerably improved with complex and accurate tests. It has a very high clinical utility as said by Podnar in 2007, but it has also some practical limitations (Podnar, 2007). Clinical neurophysiology tests may be uncomfortable, localization is difficult in patients with multifocal lesions and with proximal peripheral sacral lesions, optimal timing of the investigation is limited (sensitivity of EMG studies is highest 3 weeks to several months after the onset of the lesions), and tests may not correlate well with function (Podnar, 2007).

Clinical neurophysiology should therefore be considered as a complementary investigation and it can never be used to formally confirm or exclude the diagnosis of pudendal neuralgia (Labat et al., 2008).

In recent years, direct visualization with ultrasound (US) of peripheral nerves and associated pathological conditions has dramatically increased (Padua et al., 2013a). It has been demonstrated that high-resolution US is able to visualize very small nerves with a diameter less than 1 mm (Tagliafico et al., 2008) and also the normal anatomy of very difficult nerves such as the pudendal in cadavers and “in vivo” (Tagliafico et al., 2013). The use of US is contributive in evaluating a wide spectrum of diseases related to nerve pathology (Padua et al., 2012, 2013b). However the contribution of US in patients with pudendal neuralgia has not been investigated so far. Medical imaging is believed to be useful only to exclude lesions compressing the nerve or intrinsic nerve lesions (for example nerve tumors). Modern medical imaging in general is considered not to be contributive to the positive diagnosis of idiopathic pudendal neuralgia (Labat et al., 2008). However this general belief came before the advent of high-resolution US of the pudendal nerve. For this reason, the purpose of our study is to assess if US is contributive in patients suspected of having idiopathic pudendal neuralgia.

## 2. Methods

We prospectively included 12 female patients (mean age:  $47 \pm 14$  years; mean body mass index:  $24 \pm 3$ ) who were referred for high-resolution US between July 2012 and April 2013. We evaluated patients with suspected pudendal nerve disease for whom a US examination was requested by the referring clinicians on the basis of the clinical evaluation, including doubtful or inconclusive clinical neurophysiology. In our clinical practice, US examination for peripheral nerves is often required when the clinical or neurophysiological examination is doubtful or inconclusive.

From this group, we excluded patients with motor neuron disease, radiculopathy, hereditary or acquired polyneuropathy and patients with findings at a previous medical imaging suggestive of a space occupying mass compressing the pudendal nerve or pudendal nerve tumors. Moreover, patients with central neurogenic pathological conditions were not referred for US.

The remaining patients (ten) were studied with US by two radiologists (A.T. and B.B.) who developed the US technique to study the pudendal nerve “in vivo” by means of high-resolution US (Tagliafico et al., 2013). The two radiologists had 7 and 2 years, respectively of experience in peripheral nerve imaging not only related to US imaging, but also related to Computed Tomography and Magnetic Resonance Imaging, including classical and advanced techniques (Tagliafico et al., 2013).

At the time of US imaging, to avoid bias, the two radiologists were blinded with respect to the previous clinical (only the suspicion of pudendal neuralgia was known, but not the detailed report describing the Nantes criteria) and neurophysiological assessments. Doubtful cases were discussed and resolved in consensus. Concerning the assignment of the US contribution, an independent clinician (R.N.) with 7 years of experience in US imaging of peripheral nerves, who did not perform electrodiagnosis and US, reviewed the clinical, neurophysiological and US data including follow-up data to determine the role of US.

### 2.1. Electrophysiological examinations

The neurophysiological evaluation was performed in the outpatient unit using commercially available equipment by different vendors. Routine protocols were adopted as described in the literature (Podnar, 2007; Lefaucheur, 2006). The neurophysiological protocol included electrophysiological nerve conduction studies (NCS) of motor and sensory function of the pudendal nerve performed bilaterally. The contralateral side was used for comparison when necessary. The terminal motor latency measured by recording anal sphincter compound muscle action potentials of the pudendal/anal nerve near the ischial spine through the rectal wall was also assessed. Sensory nerve action potentials and sensory conduction velocities were calculated as well as values of the distal motor latencies and conduction velocities. The amplitude of evoked potentials was calculated. The values were adjusted according to the patients' age and sex. Seven of the ten patients evaluated with US tolerated the complete neurophysiological examination.

### 2.2. High-resolution US examinations

US of the pudendal nerve was performed according to the methods described to assess the normal pudendal nerve (Tagliafico et al., 2013). A commercially available US equipment (iU22; Philips, Eindhoven, The Netherlands) using broadband transducers (linear probe 12–7 MHz, and 17–5 MHz) was used.

The patients were examined in the 2 different positions (medial approach and anterior approach) that allowed good visualization of the nerve. The “classical” posterior approach was not used because this method is believed to be useful for infiltrative technique and it requires convex probes that are not reliable for quantitative evaluations of a relatively small and deep nerve such as the pudendal (Tagliafico et al., 2013).

For the medial approach, the patient was placed prone with the legs slightly opened. The probe was placed on an axial plane at the level of the ischial tuberosity, and then moved up and rotated by approximately 45°. In this position the probe and the US beam was kept as perpendicular as possible to the sacrotuberous ligament. In this position the pudendal nerve is normally oblique to the ligament. After nerve identification, the radiologists oriented the US beam as perpendicular as possible to the nerve in order to obtain reliable nerve quantitative evaluation.

For the anterior approach, the patient was placed in almost the gynecological position, and the ischial tuberosity was located by palpation with hips and knees flexed. From this position the distal branches of the nerve (dorsal nerve of the clitoris, perineal nerve, inferior rectal nerve) were sought and located. Color Doppler was used when appropriate to differentiate nerves from small vessels (Tagliafico et al., 2013).

### 2.3. Qualitative and quantitative evaluation

In addition to qualitative evaluation of the pudendal nerve, the quantitative evaluation included assessment of the mean cross-

Download English Version:

<https://daneshyari.com/en/article/6008559>

Download Persian Version:

<https://daneshyari.com/article/6008559>

[Daneshyari.com](https://daneshyari.com)