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Vaginismus: A clinical and neurophysiological study

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ABSTRACT. Former studies on vaginismus failed to prove any specific levator ani's muscular activity that could differentiate it from other conditions such as dyspareunia. Eighteen women, suffering from life-long, generalized vaginismus of severe degree, were examined with concentric needle electromyographic (EMG) recordings from the levator ani muscle (LA) at rest, during voluntary activation and straining. Fourteen out of 18 (77.7%) examined patients showed an increase in tonic basal activity. In 13 out of 18 patients a correct attempt of straining did not inhibit this basal activity showing, conversely, a paradoxical activation with an increased motor unit potentials firing. This is the first study documenting an abnormally increased basal tonic activity of the LA muscle associated with a lack or reduced ability to inhibit it with straining in vaginismic women.

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INTRODUCTION

Vaginismus is a controversial sexual disorder (1-3). Most of the controversy depends on its elusive nature (1), the difficulty in substantiating a common physical denominator of the disorders (1, 2), the partial overlapping with dyspareunia (1, 2, 4).

Vaginismus is the leading female cause of unconsummated marriages.

DEFINITION

The fourth edition of the Diagnostic and Statistic Manual of Mental Disorders (DSM-IV-TR) defines vaginismus as "recurrent or persistent involuntary spasm of the musculature of the vagina, which prevents sexual intercourse" (5). The first International

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Consensus Conference on Female Sexual Disorders modified the definition as "Recurrent or persistent involuntary spasm of the musculature of the outer third of the vagina that interferes with vaginal penetration"(6). In a further revision of vaginismus's definition, the "muscle spasms" part was deleted, for the lack of empirical evidence supporting it (2, 3, 7). The last published definition therefore refers to vaginismus as: "The persistent or recurrent difficulties of the woman to allow vaginal entry of a penis, a finger, and/or any object, despite the woman's expressed wish to do so. There is often (phobic) avoidance and anticipation/fear of pain. Structural or other physical abnormalities must be ruled out/addressed" (8).

THE PATHOPHYSIOLOGIC SCENARIO

Vaginismus is a sexual disorder with a spectrum of severity, clinically well described by Lamont in 1978 (9) and unfortunately omitted in the last classifications. Two characteristics contribute to the individual scenario: a) the intensity of the contraction of the levator ani ("perivaginal muscles"), at any attempt of vaginal penetration; and b) the severity of associated phobia, which may be associated to a variable increase of systemic muscular tension and neurovegetative arousal. In the more severe cases, the combination of a tight contraction of the pelvic floor's muscles, with a severe phobic attitude and a parallel systemic arousal – with all the neurovegetative signs it implies – prevents any genital touch and can make the individual vaginismus very difficult to treat. The least severe cases, where the reflex contraction is limited to the moment of the attempted penetration and the phobia is minor or absent, may allow penetration and may indeed overlap with and/or contribute to lifelong dyspareunia. The continuum of sexual pain disorders may therefore have at one end the lifelong severe vaginismus, with a

possible (neuro)myogenic component, at the opposite end the acquired transient dyspareunia of variable etiology (like short-living vaginitis, or post-partum dyspareunia which spontaneously resolves when ovulation resumes and estrogens restore vaginal lubrication).

Indeed, although there is a longstanding tradition to distinguish the female sexual pain disorders into vaginismus and (superficial) dyspareunia, recent research has demonstrated persistent problems with the sensitivity and specificity of the differential diagnosis of these two phenomena. Both complaints may comprise, to a smaller or larger extent (2, 3, 7, 8, 10):

a. problems with muscle tension (voluntary, involuntary, limited to vaginal sphincter – pubococcygeus' median fibers and bulbocavernosus superficial muscles – or extending to the whole pelvic floor, adductor muscles, back, jaws, or entire body) (9-12);

b. pain upon genital touching, which may be superficially located at the vaginal entry, the vulvar vestibulum and/or the perineum; either event-related to the duration of genital touching/pressure, or more chronic, lasting for minutes/hours/days after termination of touching and/or ranging from unique association with genital touching during sexual activity to more general association with all types of vulvar/vaginal/pelvic pressure (e.g., sitting, riding horse or bicycle, wearing tight trousers) (1-4, 7-12);

c. fear of sexual pain (either specifically associated with genital touching/intercourse or more generalized fear of pain, or fear of sex) (1-4, 7-12);

d. propensity for behavioral avoidance of intercourse, that shows a full spectrum of attitudes, from the maximal avoidance at the extreme end of severe vaginismus to the acceptance of intercourse in spite of coital pain in dyspareunia;

e. co-morbidity with lower urinary tract symptoms (most in dyspareunia) (Graziottin,

this issue) and constipation (more frequent in severe vaginismus), the common pathophysiology being a tighten contraction of the anterior or posterior portion of the pelvic floor.

The only difference that would maintain the separation between the two clinical entities, although in a continuum of clinical presentations, would be the evidence of a spontaneous hyperactivity of the pelvic floor muscles in vaginismus, which was clinically described but previously never substantiated in empirical studies.

AIM OF THE STUDY

Objective of the study was the neurophysiological evaluation of the pelvic floor muscles in lifelong vaginismic women, with a generalized, severe disorder, aiming at documenting the muscular pattern of contraction of their levator ani.

PATIENTS AND METHODS

Eighteen young women were studied at the Department of Neurology, University of Verona, Italy from January 11th 2004 to April 30, 2004. Age ranged from 19 to 47, (mean 32.9±2 DS). They were selected among vaginismic women attending the private office of the first Author (AG), a referral center for dyspareunia, vaginismus and unconsummated marriages. They accepted to undergo this examination, with an informed consent, to test the hypothesis that their vaginismus could be not only "psychogenic" but could have as well a primary muscular component.

Inclusion criteria were the lifelong nature of their vaginismus, its persistence with any partner and in any situation (inclusive of vaginal examination), i.e. a generalized disorder, its severity (4th degree, according to Lamont) and their informed consent to undergo an invasive exam. Other etiologies other than vaginismus, that could have prevented penetration, were excluded. They all

reported unconsummated relationship, 14/18 (77.7%) were married, 4/18 (22.2%) living common law. Duration of the relationship ranged from 2 to 15 years (mean 7±2 DS). No penetration of any kind had ever been accepted. Five patients, fulfilling the above mentioned criteria of severity, were excluded: 2 because their fear of needles would have prevented the neurophysiological exam, 3 because the idea of an invasive exam was unacceptable.

At the clinical history, 15/18 (83.3%) reported comorbidity with constipation (less than 4 evacuation per week). 6/18 (33.3%) comorbidity with lower urinary tract symptoms (LUTS), urgency, frequency, and/or recurrent cystitis (3/18). 2/18 had sexual harassment (genital foreplay) during childhood with no attempts of penetration. 12/18 had already experienced previous psychotherapies of variable duration (from two months to five years, average two years), which failed at curing their symptom. They were all extremely motivated to resolve their problem, mostly for desire of motherhood (14/18). Five preliminary sessions were scheduled, both to initiate a pharmacologic treatment to reduce their phobic response (10) and make them comfortable with commanding the pelvic floor and accepting the contact of the examining hand.

A neurophysiological examination was then scheduled. Concentric needle electromyographic (EMG) recordings from the levator ani muscle (LA), midway between the vaginal fourchette and the anal opening was performed at rest, during voluntary activation and straining in all patients. Unlike peripheral skeletal muscles, the majority of pelvic floor muscles show an involuntary activity at rest in order to maintain a certain tonus. Recruited involuntary motor units fire at low rate and frequency varying with subject changing position. The normal basal tonus is typically inhibited during attempted defecation and then tonus inhibition could be elec-

tromyographically tested by asking patient to strain. Muscle contraction, either voluntarily or reflexively, is characterized by a full interference pattern, with a duration range from 5.5 to 7.5 ms and an amplitude range from 200 to 500 μ V.

RESULTS

Fourteen out of 18 (77.7%) examined patients showed a spontaneous increase in tonic basal activity. In 13 out of 18 patients a correct attempt of straining did not inhibit this basal activity showing, conversely, a paradoxical activation with an increased motor unit potentials firing. In all patients during anal sphincter maximal contraction, a full interference pattern was registered by the concentric needle. Motor unit firing was normal and the EMG pattern did not show significant differences with normal women. Polyphasic motor unit potentials were present in a normal percentage. Anal reflex was normal.

DISCUSSION

The current diagnostic criterion of vaginismus, based on the Diagnostic and Statistical Manual of Mental Disorders, 4th edition, text revision (DSM-IV-TR), includes the presence of recurrent or persistent involuntary spasm of the musculature of the outer third of the vagina that interferes with intercourse. However, there are few studies which tried to prove this involuntary spasms, and debate still exists about which vaginal pelvic or vaginal muscle is involved in vaginismus. A recent study (7), in which vaginal/pelvic spasms were tested using intravaginal EMG surface electrodes, during relaxation, sustained and alternate contraction, found no significant differences in muscle EMG activity in patients with vaginismus, dyspareunia or no-pain women. Authors concluded that vaginal/pelvic spasms do not appear to be a critical clue in vaginismus diagnosis.

In our study, in a carefully selected population of women affected by severe vaginismus, an EMG recording with concentric needle from the levator ani muscle, was performed. This is the first study documenting an abnormally increased basal tonic activity of the LA muscle associated with a lack of, or reduced ability to inhibit it with straining. These finding may explain the severity of the vaginismus, its possible neuro(myogenic) etiology, and the co-morbidity with constipation reported by 15/18 of the examined patients. These clinical and neurophysiological patterns seem to be the expression of a generalized pelvic floor involuntary and sustained hypercontraction and dyssynergia, as seen in other neurological conditions characterized by involuntary and sustained muscular contractions due to a wrong motor programming, i.e. focal dystonia, such as writer's cramp or spasmodic torticollis.

We hypothesize that severe vaginismus, and constipation which is reported in co-morbidity, or generally speaking, pelvic floor hypertonia, could derive from an erroneous central motor programming that could be triggered by abnormal sensory input. This may lead to a completely different pathophysiologic and interpretative model.

CONCLUSIONS

This is the first study documenting an abnormally increased basal tonic activity of the LA muscle associated with a lack of, or reduced ability to inhibit it with straining, in women affected by severe vaginismus. These findings may explain the severity of the vaginismus, its pathophysiologic difference from dyspareunia with other etiologies, and the high co-morbidity reported with constipation. Further studies are needed to confirm our hypothesis, which could have important nosographic and therapeutic consequences.

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