

Is Menstrual Dysphonia Associated With Greater Disability and Lower Quality of Life?

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Summary: Objectives. The aim of the present study had been to examine the relationships between menstrual dysphonia and measures of psychosocial distress, in a sample of female professional voice users.

Design and Methods. This is a prospective study of 52 consecutive professional voice users, aged 18–40 years, affected by transient dysphonia related to the menstrual cycle and recruited in the Division of Phoniatrics and Audiology of the Second University of Naples, from April 2011 to September 2014. The following evaluation protocol was used: videoendoscopy, the GIRBAS scale, the Voice Handicap Index, and the determination of sexual hormonal plasma levels both during the menstrual and the luteal phase of the cycle. Furthermore, we measured, in all patients, the levels of perceived disability and quality of life during and after the dysphonia episodes by means of the Manchester Short Assessment of Quality of Life and the Sheehan disability scale.

Results. Laryngoscopic evaluation revealed that only minor morphologic changes were present during the first days of the follicular phase, usually returning to normal morphology after the menstrual period was over. However, we found that dysphonia episodes of varying degree were present in most evaluated subjects; women with a moderate degree of dysphonia also had a lower quality of life and greater overall disability, during menses.

Conclusions. Despite minimal morphologic signs of laryngeal pathology, menstrual dysphonia might represent a disease which is frequent among female professional voice users, which in turn is associated with a certain degree of disability and lower quality of life during premenstrual and menstrual phases.

Key Words: Dysphonia–Menstrual cycle–Female hormones–Disability–Quality of life.

INTRODUCTION

It is long known that hormones, particularly sexual hormones—including androgens, progesterone, and estrogen, may exert a major influence on female voice quality and characteristics, as the larynx is extremely responsive to them. As witnessed by the evolution of the female voice from childhood to menopause or by the masculine changes that a woman's voice undergoes after an injection of testosterone, sexual hormones represent a dominant factor in determining voice changes throughout life.¹ Furthermore, laryngeal and uterine (cervix) tissues have been demonstrated to contain receptors for sexual hormones and tend to respond with similar histologic changes to sexual hormonal fluctuations.² Vocal alterations during the days preceding the onsets of menses and during the first days of the menstrual phase have been reported, especially in singers and other professional voice users.³

It is known that estrogen and progesterone act synergistically on the vocal musculo-mucosal complex and have vascular, hydration, and secretory effects.¹ Premenstrual symptoms, including true vocal disorders, may occur specifically during the last days of the luteal phase of the menstrual cycle,⁴ and they are generally most severe during a time interval that begins on approximately day 24 of the menstrual cycle (ie, luteal phase before the onset of menses) and ends on day 4 of the menstrual

period (ie, the beginning of the follicular phase).⁵ The drop in estrogen which occurs during the menstrual cycle may cause changes in the vocal folds, such as fluid buildup beneath the mucous tissue covering the vocal folds thus affecting its vibratory characteristics.⁶

The variation in levels of estrogens, during the premenstrual phase of the menstrual cycle, has been reported to possibly induce submucosal edema of the vocal fold, because of a degradation of mucopolysaccharide into small polymers that combine easily with water and, also, determine an increased blood flow with vasodilatation, increase of vascular permeability, and salt and water retention in the connective tissue of the vocal fold in all women.⁷ Female professional voice users are at higher risk to suffer from the so-called “premenstrual vocal syndrome,” which is characterized by vocal fatigue, decreased range, a loss of power, and loss of certain harmonics.⁸ The syndrome is thought to start some 4–5 days before menstruation and may continue until the day 3 or 4 of menses; it is associated with minor morphologic changes of the larynx (mainly congestion, microvarices, edema of the posterior third of the vocal folds, and a loss of vibratory amplitude) and affects about 33% of women.⁸ Recently, the “premenstrual voice syndrome” or “dysphonia premenstrualis” has also been proposed to represent one of the many symptoms of the premenstrual syndrome (PMS), due to estrogen level increase.⁹

However, although some studies reported a high incidence (over 60%) of dysphonia among female voice users,¹⁰ others^{11–13} did not confirm that female professional voice users had greater vocal load, psychological distress, or physical complaints. The most recent literature concerning women undergoing menopausal hormonal fluctuations^{14,15} tends to confirm that sexual hormones determine significant voice changes (the so-called “menopausal drop” of the dominant frequency of the voice) but does not report a significant impact of

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such changes on their vocal and psychological well-being. Thus, to date, there has been no clear evidence concerning the presence of clinically significant laryngeal morphofunctional modifications during the menstrual phase or their impact on disability and quality of life among female professional voice users.

The aim of the present study had been to assess the effect of sexual hormones, in particular, during the first days of the follicular phase, on morphofunctional characteristics of the larynx, vocal performance, perceived disability, and quality of life in a sample of female professional voice users.

MATERIALS AND METHODS

We recruited a sample of 53 female professional voice users, including school teachers ($n = 20$), singers ($n = 22$), and call center operators ($n = 11$), aged between 18 and 40 years, affected by transient dysphonia which is related to the menstrual cycle; the sample was recruited in our Department of Phoniatrics and Audiology of the Second University of Naples, from April 2011 to September 2014.

The diagnosis of dysphonia was based on the anamnestic evaluation and laryngovideostroboscopic examination (complemented in the menstrual phase by the Reflux Finding Score [RFS] to exclude laryngopharyngeal reflux [LPR]) that allows an objective evaluation of the upper airways, performed by means of a Storz 70° rigid optic (diameter, 5.6 mm; equipped with an ATMOS L endo-stroboscope KARL STORZ GmbH & Co. KG, Tuttlingen, Germany, 2010) and operated with the endoscopic software *Daisy* (Amplifon Spa, Italy; 2010; Version 3.6.8). All instrumental evaluations were performed by the same trained laryngologist (U.B.), blind to diagnosis and menstrual phase.

Patients had to fulfill the following inclusion criteria: (1) diagnosis of dysphonia related to menstrual cycle, as specified previously; (2) being a female professional user (school teachers, professional singers, and call center operators); (3) age range 18–40 years; (4) presence of a regular menstrual cycle (without estrogenic treatment over the last 6 months); (5) no concurrent medical condition; (6) negative history of head trauma, epilepsy, substance abuse, or dependence; (7) no current use of tobacco; (8) absence of vocal fold lesions such as kissing nodules, polyps, and so forth; (9) absence of LPR (as revealed by an RFS score <7); (10) informed consent to participate in the experimental procedures, which conformed to the ethical principles for medical research endorsed in the Declaration of Helsinki.

Evaluation

Data concerning basic demographic features and clinical history were collected by means of an *ad hoc* schedule. This schedule also included the evaluation of previous and/or current upper respiratory infection, allergy, cigarette smoking, and voice excessive demands; furthermore, a general laryngologic clinical evaluation, an otoscopy, and a rhinoscopy were also performed as clinical routine investigation in each patient by a trained laryngologist (U.B.).

Phoniatric evaluation. The auditory assessment of deviant voice quality was performed by means of the GIRBAS scale,¹⁶ which provides information concerning six vocal parameters (global grade of dysphonia, instability, roughness, breathiness, asthenia, and strain); for each parameter, a score ranging from 0 (euphonia) to 3 (severe degree of dysphonia) is provided, whereas in the case of the presence of whisper, the patient was marked as aphonic. After the evaluation of the quality of voice, the listeners gave the final mark by comparison. GIRBAS scale was administered by two trained laryngologists (U.B. and M.R.B.), blind to diagnosis and menstrual phase. Given the subjective nature of the scale, in a subset of 10 randomly selected patients, interrater agreement for the GIRBAS total and subtotal scores was calculated. The overall interrater reliability, measured as Cohen kappa, was found to be very good ($\text{kappa} = 0.87$).

The subjective self-assessment of voice was obtained using the Italian translation of the Voice Handicap Index (VHI) which assesses the subject's perception of disability, handicap, and distress related to the voice disorders.^{17,18} VHI consists of 30 questions, each with a five-point equal scale scored from 0 (never) to 4 (always) and quantifies the subject's self-rating degree functional, physical, and emotional impact of a voice disorder on a patient's quality of life. A maximum total score of 120 corresponds with the highest grade of psychosocial impact of the voice. VHI was administered to all included subjects, both in the luteal and the follicular phases.

Endoscopic evaluation. The laryngostroboscopic evaluation was performed in all women from day 1 to day 3 of the menstrual cycle (follicular phase), and it was repeated also after 15–17 days (luteal phase). To evaluate the eventual presence and degree of LPR, the RFS¹⁹ was also performed; both the endoscopic examination and the RFS were calculated by the same trained laryngologist (U.B.), using a direct light source, and it was designed to characterize morphologic lesions presumably associated with LPR; it takes into account 8 parameters (ie, infraglottic edema or pseudosulcus, ventricular obliteration, erythema/hyperemia, vocal fold edema, diffuse laryngeal edema, posterior commissure hypertrophy, granulo/granulation, and thick endolaryngeal mucus). RFS scores range from 0 (normal) to 26 (most severe); a score of 7 is generally considered to be indicative of LPR.

Hormonal evaluation. Blood samples from every patient were obtained in two different phases of menstrual cycle, both during menses (ie, first to third cycle day) and after menstruation (ie, 15–17 days from menses, corresponding to the luteal phase); the following hormones were evaluated: fT3 (normal range, 1.5–5.9 pg/mL), fT4 (5.2–15.8 pg/mL), TSH (0.4–4.0 microUI/mL), Anti-HTG (<100 UI/mL), Anti-TPO (<30 UI/mL), LH (1.6–9.3 UI/L), FSH (2.4–9.3 UI/L), Estradiol (35–212 pg/mL), Prolactin (2.5–14.6 ng/mL), and Testosterone (10–98 ng/dL).

Psychometric evaluation. The Sheehan disability scale (SDS) is a three-item self-completion scale designed to assess the severity of disability.²⁰ It measures the impact of symptomatology on work, social, and family functioning; the three domains are scored on a 10-point Likert scale, where a score of

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