URETHRAL SYNDROME: TREATMENT WITH OXYGEN AND HYALURONIC ACID

Submitted to: Gynecology and Pelvic Medicine

Urethral pain syndrome, also called urethral syndrome, is a symptom of pain and / or burning and / or itching of the urethra with urination. It is a very common urinary symptom experienced by most people at least once in their life.

Symptoms of urethral pain syndrome include an increase in urinary frequency[1] and bladder pain that is slightly relieved by urination. There may also be hesitation, slowed urine flow, and a feeling of incomplete emptying of the bladder.

Urine cultures are usually negative, and urinary symptoms are generally worse during the day than at night.

This disorder typically presents with dysuria as one of the key symptoms, the original description of urethral syndrome being urinary frequency and dysuria with no evidence of infection. Dysuria typically occurs when urine comes in contact with the inflamed or irritated urethral mucosa. This symptom is aggravated by contraction of the detrusor muscle and urethral peristalsis, which then stimulates submucosal pain receptors that cause pain or a burning sensation when urinating. Several conditions can cause dysuria through different mechanisms. The problem was thought to be mainly due to treatable urethral stricture with serial urethral dilations. Urethral dilations are now thought to be appropriate in only a very small minority of patients.

True dysuria requires differentiation from other symptoms, which can also occur due to pelvic disorders from various bladder conditions such as interstitial cystitis, prostatitis, and suprapubic or retropubic pain[2].

Urethral pain syndrome is found predominantly in women between the ages of thirty and fifty. In this group of women, vaginal pathology (vaginal infections, atrophic vaginitis and similar conditions) should be carefully excluded. It is thought that up to a quarter of all patients, particularly women, with lower urinary tract symptoms without a documented infection may actually have urethral pain syndrome.

Diagnosis is primarily one of exclusion. There is clearly an overlap between urethral pain syndrome and other urogenital disorders, as there is a distinct lack of consensus on specific criteria among these disorders and they may not be mutually exclusive. The exact cause of urethral pain syndrome is unknown; however, certain health conditions and environmental factors can increase the risk of developing urethral syndrome.

Sexually transmitted infections can increase the risk of developing urethral syndrome. Sexually transmitted infections that can lead to urethral syndrome include gonorrhea, chlamydia, and mycoplasma genitalium.

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[1] Abrams P, Cardozo L, Fall M, Griffiths D, Rosier P, Ulmsten U, Van Kerrebroeck P, Victor A, Wein A., Standardisation Sub-Committee of the International Continence Society. The standardisation of terminology in lower urinary tract function: report from the standardisation sub-committee of the International Continence Society. Urology. 2003 Jan;61(1):37-49. [PubMed: 12559262]

[2] Dysuria: What You Should Know About Burning or Stinging with Urination. Am Fam Physician. 2015 Nov 01;92(9): [PubMed: 26554482]

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Some foods may contain elements that can irritate the urethra. Foods that can increase the risk of urethral syndrome in some people include caffeine, alcohol and spicy foods.

The chemicals in soaps, personal hygiene products and contraceptives may contain chemicals that irritate the urethra in some people.

People can sometimes develop urethral syndrome after recently having a urinary tract infection. This is because the urethra can be very sensitive during recovery from an infection.

The treatment of urethral syndrome depends on the suspected cause of the condition and may include the use of anti-inflammatories, dietary and lifestyle changes for preventive purposes and also psychological support, being the fundamental psychic component in the course of the disorder. The difficulty in identifying the causes makes it difficult to establish a truly effective therapeutic path.

For the treatment of urethral syndrome, oxygen therapy was chosen as the use of this technique satisfies the treatment of symptoms such as: burning, pain and inflammation that characterize this pathology.

Oxygen therapy has a powerful regenerative, antibacterial and anti-inflammatory effect[3], it is therefore believed that it can also be very useful in the treatment of this pathology for the treatment of symptoms such as itching and burning. Oxygen therapy increases the availability of oxygen to the tissues, promotes the increase in tissue repair processes and the disposal of pain and inflammation mediators (histamine, serotonin, prostaglandins)[4].

Hyaluronic acid is a natural polysaccharide that forms a fundamental part of the extracellular matrix of the skin and cartilage. Hyaluronic acid: has remarkable adhesive, moisturizing and repairing properties of the mucosa[5].

The association of high concentration oxygen and hyaluronic acid has been shown to have therapeutic efficacy in the treatment of vulvo-vaginal atrophy[6], in particular in the reduction of painful symptoms associated with this condition, the aim of the study is to use the association between high concentration oxygen and hyaluronic acid for the treatment of urethral syndrome.

[3] Kellar RS et al. Topically delivered dissolved oxygen reduces inflammation and positively influences structural proteins in healthy intact human skin. J Cosmet Dermatol. 2013 Jun;12(2):86-95.
[4] Tomphac PC, et al. Cell response to HBO treatment. Int J Oral Maxillofac Surg, 1997 Apr; 26 (2): 82-6
[5] Chen J et al. "Evaluation of the efficacy and safety of hyaluronic acid vaginal..." J Sex Med. 2013; 10; 1575-84
[6] Condemi L, Di Giuseppe J, Delli Carpini G, Garoia F, Frega A, Ciavattini A. Vaginal natural oxygenation device (VNOD) for concomitant administration of hyaluronic acid and topical hyperbaric oxygen to treat vulvo-vaginal atrophy: a pilot study. Eur Rev Med Pharmacol Sci. 2018 Dec;22(23):8480-8486.

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Treatment

Seven weekly oxygen therapy treatments were performed on 20 women diagnosed with urethral syndrome, for a total of five weeks. five minutes of oxygen therapy and 15 minutes of oxygen therapy combined with hyaluronic acid.

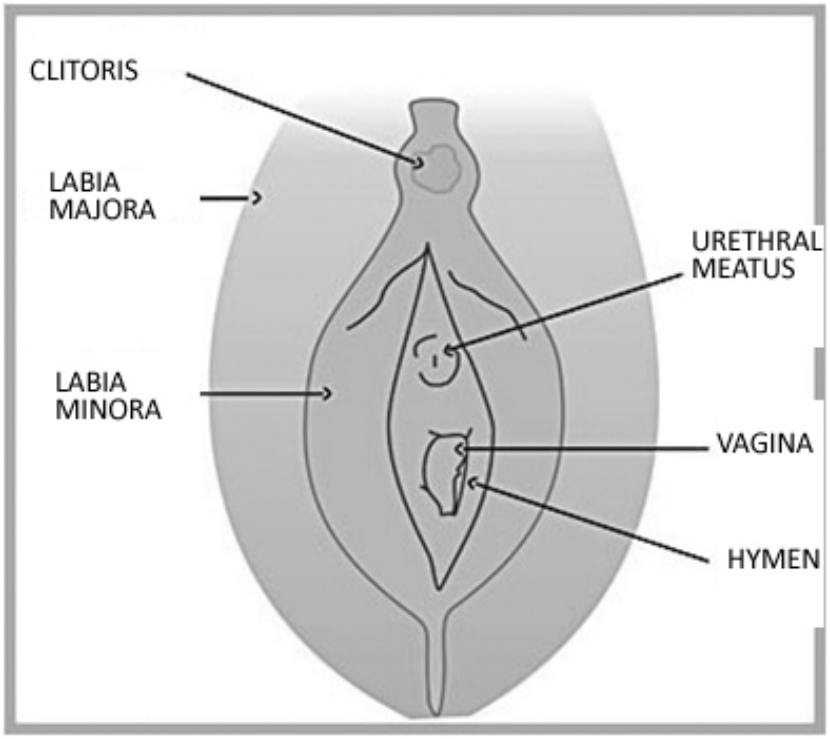

FIGURE 1

Patients are taught home behavior rules, which are necessary to contribute to pelvic health; name that include hygiene, good and healthy nutrition, indications for sexual intercourse.

For the treatment, the Caress Flow system was used, an oxygen therapy device for gynecological use that allows the topical administration of oxygen with a high degree of purity up to 93 ± 3%, at a flow of 1-6 l / minute.

The device consists of a compressor that generates compressed air by sucking air from the external environment, filtering and compressing it. Inside the machine body there are zeolite molecular sieves that exploit the principle of the different absorption of gas molecules, letting the O2 pass and retaining the other gases present in the air, such as nitrogen, argon, helium and hydrogen. The machine body transforms the outside air into 93 ± 3% pure oxygen.

For the application, an airbrush connected to the machine body was used, capable of delivering oxygen in combination or not with the hyaluronic acid solution. The airbrush is used for the treatment of the external genitalia, nebulizing the combination of oxygen and hyaluronic acid.

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Hyaluronic acid is previously dissolved in distilled water, to form a 0.2% (w / v) solution.

FIGURE 2

A questionnaire assessment was performed on the treated subjects including a VAS scale from 0 to 10, where 10 represents the maximum intensity and 0 the absence of the disorder, analyzing the symptoms before the first treatment session (T0) and at the end of the 7 sessions (T7).

Results

The patients reported a significant and progressive improvement for all the sessions performed. The improvement is progressive with a decline linked to the accumulation of benefits, with the resolution of the burning sensation (Figure 3 - Kruskal-Wallis test / Two-tailed test P for trend <0.0001). The average VAS value goes from 8.2 in the first session to 1.5 after the seventh application, with a reduction of 82%.

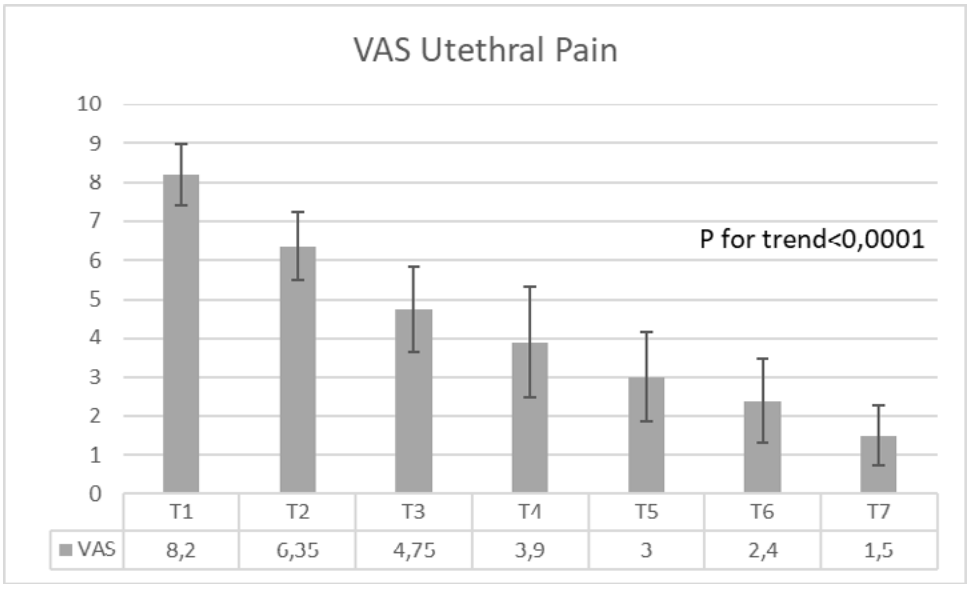

FIGURE 3

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The analysis of the treatment values shows how the greatest and statistically significant reduction (from 8.2 to 6.35) occurs between the first treatment session (Figure 3).

The analysis of the progression of the treatment (Figure 4) shows how the improvement of the values is progressively reduced with the accumulation of the induced benefits, which are however progressive.

p-values:

	T1	T2	T3	T4	T5	T6	T7
T1		0,044	0,000	0,000	<0,0001	<0,0001	<0,0001
T2			0,214	0,087	0,001	0,000	<0,0001
T3				0,968	0,224	0,037	0,001
T4					0,945	0,618	0,100
T5						0,984	0,363
T6							0,869
T7							

Figure 4

No side effects associated with the treatment were reported by the patients.

Combined oxygen therapy with hyaluronic acid has proven to be a valid method for treating symptoms associated with urethral syndrome. It is a totally painless therapy, with excellent compliance by patients. It is a fast, non-invasive and repeatable treatment, with no side effects.

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