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REVIEW ARTICLE OPEN ACCESS

Ultrasound as A Viable Option in the Diagnosis of Pelvic Congestion Syndrome

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The Pelvic Congestion Syndrome is a disease that manifests usually with chronic pelvic pain, impairments in daily activity due to pain severity, dyspareunia, and dysmenorrhea. It affects mainly women in premenopausal stages. The gold-standard procedure for diagnosis is venography, which has an invasive character. This syndrome is underdiagnosed, partly because women tend not to report symptoms to their doctors, but also because of the tendency to delay or deny invasive procedures until there is a severe alteration in the quality of life. Transabdominal and transvaginal ultrasound examination can detect pelvic vein insufficiency, which is the main cause of pelvic congestion syndrome. Vein diameter, the grade of reflux, velocity, and extension of affected vessels are among the parameters that can be assessed. Implementing a diagnosis scheme using only ultrasound parameters could lead to an increase in the number of diagnosed patients.

Keywords: Pelvic congestion syndrome, pelvic pain, ultrasonography

Introduction

Pelvic congestion syndrome (PCS) represents a cause of chronic pelvic pain (CPP). CPP is defined as a non-cyclic pelvic pain which occurs for a period of time usually longer than 6 months, mainly in premenopausal women. The pain can generate functional disabilities and is not relieved by standard pain medication. Beside the CPP which worsen after prolonged hours of standing or sitting, symptomatology can include dyspareunia, depression, rectal discomfort, dysmenorrhe and urinary frequency (1, 2). Risks factors associated with PCS include women at premenstrual period, multiparity, hormonal impairments, polycystic ovaries and inferior limb varices (3). Also, during pregnancy there is an increased volume of blood flowing through the ovarian vein which in turn dilates. These changes can persist after giving birth and can contribute to the venous insufficiency (3).

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The causes of PCS are still debatable. Several factors are thought to be implicated. Some patients present with congenital absence of valves at the level of the ovarian veins. Because of anatomical reasons, the left ovarian vein is more frequently affected in terms of dilatation and reflux then the right vein. It drains into the left renal vein which in turn drains into the inferior vena cava compared to the right ovarian vein which drains directly into the inferior vena cava (4).

Golden standard diagnosis is attributed to venography. Findings include a larger diameter of the ovarian vein (>6mm), ovarian venous reflux, delay in contrast clearance, presence of pelvic tortuous collaterals. Other investigations that can contribute to the diagnosis are ultrasound (US), computed tomography (CT), magnetic resonance imaging (MRI) and magnetic resonance venography (MRV) (1).

The aim of the present review is to present the implications and potential use of US in diagnosis of PCS.

Materials and Methods

We searched MEDLINE for reports in English from Jan 1, 2000, to March 01, 2020. We used the search terms "pelvic congestion syndrome diagnosis", "pelvic congestion syndrome ultrasound", "pelvic vein insufficiency diagnosis", "ovarian vein ultrasound". Relevant articles were reviewed, and the ones in which detailed ultrasound procedures were preferably cited. Additional reports were identified from the reference lists of the selected articles.

Results

In general US is the first procedure performed as it is non-invasive, quick, requiring 5-7 minutes for experienced doctors and instantly gives a view about possible diagnosis. Examination with the Doppler mode can give valuable information about the dynamics of the blood flow (1, 5).

Transvaginal US (TVU) examination should take place in a private environment, at a warm temperature, and should preferably be performed by the gynecologist following up the patient. Informed consent should be obtained from the patient before the examination. TVU can be performed at 45-degree Fowler position or in a semi upright position (on the edge of the examination bed with feet on the floor) (5,6).

A wand-shaped transducer is used for this approach, with a frequency of 5-9 MHz and 2D/3D features. The probe is covered with enough ultrasound gel to act as an acoustic window and also not to incommode the patient. A thorough analyzation of the uterus, myometrium, adnexa and pelvic viscerae should be performed to rule out any other possible diagnosis. Special attention should be devoted to the local vascularization, especially venous circulation, bilaterally. Ovarian, internal iliac, uterine vein should not be missed (7).

Transabdominal US can also be used for assessing the pelvic area. A transductor with the frequency of 7-15 MHz can be used. It is advised for the patient to have their bladder full in order to have a better visualization of the pelvic viscerae. Investigation for vascularization should be carried out starting from the inferior vena cava and the left renal vein to rule out any possible compression of the two (8,9).

In the literature, criteria for diagnosis of varicosities using US and Doppler include: dilated ovarian veins (>4 mm), tortuous arcuate veins in the myometrium that communicate with varicose pelvic veins, venous blood reflux and slow blood flow (<3 cm/second) (1,10,11). It

has been long thought that the diameter of the ovarian vein is directly correlated with the grade of venous reflux, but in a recent study Dos Santos et al. proved the contrary (5). A group of patients underwent US examination of the ovarian and internal iliac vein assessing vein diameter and existent reflux. Patients with identified reflux underwent venography. Results showed no correlation between the two parameters, reflux potentially being found in veins of lower or larger caliber than 8 mm (which was considered the cut-off value) (5).

A study from 2016 evaluated the efficacy of transvaginal US (TVS) in detecting pelvic venous reflux. Ovarian vein, internal iliac vein and para-uterine veins, bilateral, were assessed. Patients were examined in supine position and semi upright position, with and without Valsalva maneuver. A reversed flow of blood persistent for more than 0.5 seconds was considered to define venous incompetence. Results showed benefits of performing TVS in both positions. In some cases, the reflux present in supine position was absent in semi upright position, demonstrating the implication of the gravity in maintaining valves closed. Another finding that supports the previous study from 2015 is the lack of evidence supporting correlations between the vein diameter and presence of reflux (6).

In Table 1, we present the basic US parameters that we consider should be examined in all patients that undergo this procedure, even at regular visits.

Discussion

PCS is an underdiagnosed disease, for a number of reasons. Premenopausal women, up to 15%, have pelvic vein varicosities, although symptomatology is not present in all cases (3). However, when PCS tends to be symptomatic, many patients do not seek up medical care, especially if their quality of life is not severely affected. Although women tend to do regular gynecological check-ups during which an US examination could raise the suspicion of pelvic vein insufficiency, many refuses to undergo invasive procedures for a certainty diagnosis.

TVU and transabdominal US can give a broad image of the pelvic anatomy and circulation patterns, due to Doppler mode and Power Doppler. Reflux, diameters, blood velocity, overall appearance of principal veins and their collaterals can all be assessed. Also, using both US approaches gives the possibility to perform a differential diagnosis. The old belief of correlating vein diameters with the presence or severity of reflux should be abandoned as no statistical significance has been found, in multiple recent studies (5,6). Another crucial detail when evaluating vein reflux is to examine at rest and under Valsalva maneuver. When performing TVU, the position of the patient can influence the grade of reflux. It is recommended not to limit the examination in the classical lithotomy or 45-degree Fowler positions, but also examine in a semi upright position, for assessment in presence of a higher gravitational force (6).

Treatment options include medical, surgical and interventional approaches. As the vast majority of patients prefer the interventional option, that by default includes the use of venography. US could be used to determinate which patients actually can benefit from this form of treatment in order to avoid undergoing unnecessary radiations and contrast agent administration. PCS presents similarities to the varicocele, affecting male patients. US and physical examinations are used for diagnosis

and treatment options following the same principles. However, the downside of PCS is that presence of inguinal or inferior limb varices can lead to assumption of pelvic vein insufficiency and that US assessment is more difficult r given that all the vessels are situated more profound compared to varicocele.

Conclusion

US could have the potential of becoming a trusted procedure for diagnosis of PCS. Awareness should also be raised upon this particular pathology. This would increase the rate of diagnosed patients, without significant additional costs or investigations.

Conflict of Interests

The authors have no conflicts of interests to declare for the present review article.

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