Multi-Detector Row Computed Tomography Findings of Pelvic Congestion Syndrome Caused by Dilated Ovarian Veins

Suat Eren
Department of Radiology, Faculty of Medicine, Ataturk University, Erzurum, Turkey

Abstract

Objective: To evaluate the efficacy of multi-detector row CT (MDCT) on pelvic congestion syndrome (PCS), which is often overlooked or poorly visualized with routine imaging examination.

Materials and Methods: We evaluated the MDCT features of 40 patients with PCS (mean age, 45 years; range, 29-60 years) using axial, coronal, sagittal, 3D volume-rendered, and Maximum Intensity Projection MIP images.

Results: MDCT revealed pelvic varices and ovarian vein dilatations in all patients. Bilateral ovarian vein dilatation was present in 25 patients, and 15 patients had unilateral dilatation. While 12 cases of secondary pelvic varices occurred simultaneously with a retroaortic left renal vein, 10 cases were due solely to a mass obstruction or stenosis of venous structures.

Conclusion: MDCT is an effective tool in the evaluation of PCS, and it has more advantages than other imaging modalities.

Key Words: CT angiography, Multi-detector row CT, Venous congestion

Introduction

Pelvic congestion syndrome (PCS) is a cause of chronic pelvic pain in women. Because the etiology of pelvic vessel dilatation may be multifaceted (e.g., hormonal and mechanical factors), PCS may occur along with other serious diseases, so imaging these vasculatures has a crucial importance in screening. With very promising treatment results of PCS, we present the findings of PCS acquired with multi-detector row CT (MDCT) angiography.

Materials and Methods

This study was performed with a group of 40 patients with PCS (mean age, 45 years; range, 29-60 years) and used a 16-row MDCT. A non-ionic contrast agent was administered by a power injector at 2.0 ml/sec through a 20-gauge catheter. The CT examinations were acquired during a breath hold at suspended inspiration, and scanning began 25 seconds after the start of the contrast injection. The CT scanning was done using 1.5-mm collimation, 1.0-mm slice thickness, 7.5-mm table travel per rotation, 0.5-second tube rotation time, 120-kVp tube voltage, and 250-mA tube current.

Results

The CT examinations of all patients clearly revealed pelvic varices and ovarian vein dilatations (Figure 1). A bilateral ovarian vein dilatation was present in 25 patients, and 15 cases had a unilateral dilatation. A retroaortic left renal vein
(RLRV) was present in 12 cases, and five cases had a circumaortic left renal vein variation. One of the cases with bilateral ovarian vein dilatation showed vascular variations as the right ovarian vein drained into the right renal vein and the RLRV (Figure 2). In the group of patients with malignancies, there were 5 cases with abdominal aggressive lymphoma and two cases with lymph node metastasis from gastric cancer, which were caused by compression of the inferior vena cava (IVC) and/or renal vein. There were also two cases of liver cancers. The case with a left ovarian vein dilatation was due a mass compressing the superior vena cava (SVC), which presented as a collateral venous pathway with imaging (Figure 3). Four cases had a cardiac insufficiency. In eight PVC cases, no primary pathology was detected with imaging.

**Discussion**

The gonadal veins originate from the ovarian venous plexus, and they usually drain into the left renal vein on the left side and the infrarenal IVC cava on the right side. Though the renal vein originates from the intersubcardinal anastomosis, the gonadal vein originates from a portion of the distal subcardinal vein. Most anomalies in this region are caused by a persistent connection between the left middle-lower portion of the subcardinal vein and the ipsilateral sacrocardinal vein [1].

Gonadal vein anomalies may play an important role in the ovarian vein syndrome. The association of pelvic pain with tubo-ovarian varicoceles was first suggested by Cotte in 1928 and then by Taylor in 1949 [2, 3]. In PCS, varicosities with stasis and congestion are consistent findings, and blood-flow through the veins is sluggish with the persistence of contrast medium being as much as 5 min. The histology of the dilated vessels walls is similar to that of varicose veins elsewhere [4]. The diagnostic criteria of venous congestion have been described in the literature as congestion of the ovarian plexus, an ovarian vein diameter greater than 5 mm, a uterine vein diameter greater than 6 mm, uterine venous engorgement, filling of the veins across the midline, or filling of the vulval and thigh varicosities [3-5].

Dilatation of the gonadal vein may be the result of obstruction or stenosis of the ovarian veins, increased blood flow through the collateral vessels, or increased blood pressure in the drainage vein [6]. Figure 2 shows the dilatation of ovarian veins due to the compression of the left renal vein by the aorta and abnormal right ovarian vein drainage within the right renal vein. Some studies have shown that pelvic venous congestion can also be caused by IVC reflux associated with cardiac failure [5, 7]. Dilatation of the gonadal veins may also manifest as collateral pathways in stenosis and occlusion of the IVC or SVC.

Increased blood pressure in the left renal vein and the left gonadal vein may be caused by physiological stenosis between the aorta and the superior mesenteric artery, a condition known as Nutcracker Syndrome [6].

Imaging and identifying normal and abnormal vascular- latures, as well as their underlying pathologies, are very important [1, 6, 8]. Different methods have been used to diagnose the utero-ovarian venous vascularization: intraoperative measurements, pelvic venography, ultrasound examination, CT, and magnetic resonance imaging [5, 6]. CT angiography is relatively non-invasive and an effective procedure for evaluating abdominal vessels. MDCT with 3D volume rendering is helpful for detecting focal stenoses and dilatations, the relationship of the great vessels to each other, and the extent of collateral vessel formation.

During image interpretation, normal variants of the IVC, such as duplication of the IVC and left-sided IVC may be confused with a dilated left gonadal vein. They are distin-
Although an effective treatment for PCS has yet to be established, the surgical repair of pelvic varices using an abdominal approach, a lumbar approach, or a laparoscopic surgery have been described in the literature [3, 4]. In the majority of the cases, transcatheter ovarian vein embolization of symptomatic pelvic varices may be an effective treatment [1, 3, 5].
Conflict of interest statement: The authors declare that they have no conflict of interest to the publication of this article.

References