

Available online at [www.sciencedirect.com](http://www.sciencedirect.com)

ScienceDirect

journal homepage: [www.elsevier.com/locate/radcr](http://www.elsevier.com/locate/radcr)

## Case Report

# A rare condition similar to inguinal hernia in pregnancy: A case of bilateral varicose veins of round ligament of uterus ☆,☆☆

Qiaoyong Liu<sup>a</sup>, Yanwen Zheng<sup>b</sup>, Hong Fu<sup>c</sup>, Xinyan Ke<sup>a,\*</sup><sup>a</sup> Department of Ultrasonic, The First People's Hospital of Xiaoshan, Hangzhou, China<sup>b</sup> Department of Respiratory, The First People's Hospital of Xiaoshan, Hangzhou, China<sup>c</sup> Department of Ultrasonic, Wangcang County People's Hospital, Guangyuan, China

## ARTICLE INFO

## Article history:

Received 13 May 2024

Revised 24 May 2024

Accepted 8 June 2024

## Keywords:

Ultrasound

Inguinal hernia

Pregnant women

Round ligament

## ABSTRACT

Round ligament varicosities (RLV) are a very rare cause of an inguinal mass, which is very similar to an inguinal hernia, and should be taken seriously by women, especially in mid-pregnancy. Ultrasound can confirm the diagnosis of the RLV and can prevent unnecessary interventions.

We report a case of a patient with bilateral RLV: the primigravida was 31 years old, G<sub>1</sub>P<sub>0</sub>, gestation 30<sup>+</sup>2w. The patient presented to the clinic 1 month ago due to the discovery of bilateral inguinal masses. After the diagnosis was confirmed by ultrasound, this patient received regular reviews during labor and delivery and is currently in good maternal condition.

The patient came to the clinic 1 month after the discovery of bilateral inguinal area masses for 1 month.

© 2024 The Authors. Published by Elsevier Inc. on behalf of University of Washington.

This is an open access article under the CC BY-NC-ND license

(<http://creativecommons.org/licenses/by-nc-nd/4.0/>)

## Introduction

In women, inguinal area masses are uncommon, and RLV occurs almost exclusively during pregnancy [1]. The prevalence of RLV is about 0.13% according to McKenna et al. [2]. This needs to be differentiated from many other conditions including lymph node disease, inguinal hernia, subcutaneous lipomas, Nuck cysts, tumors, etc [3–5]. It is easy

to mistake RLV for inguinal hernia as the clinical signs and symptoms are very similar to those of inguinal hernia. Therefore, we report a case of a patient with bilateral RLV, and after the diagnosis was confirmed by ultrasonography, this patient was accompanied by regular reviews during labor and delivery, and the pregnant woman is now in good condition. Here, we re-emphasize the importance of ultrasonography to avoid unnecessary surgery or intervention [1,2].

☆ Acknowledgments: This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors. No funding was received for this study.

☆☆ Competing Interests: The authors have no conflicts of interest to declare.

\* Corresponding author.

E-mail address: [15808395754@163.com](mailto:15808395754@163.com) (X. Ke).

<https://doi.org/10.1016/j.radcr.2024.06.023>

1930-0433/© 2024 The Authors. Published by Elsevier Inc. on behalf of University of Washington. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>)

## Case reports

**Case presentation:** primigravida 31 years old, G<sub>1</sub>P<sub>0</sub>, gestation 30<sup>+2</sup>w. The patient came to the clinic because of the discovery of bilateral inguinal area mass 1 month ago. One month ago, the patient suddenly felt discomfort in bilateral inguinal area after severe coughing due to cold and felt a mass without obvious pain, it enlarged in standing position, and it could disappear when lying down, and she was referred to the general surgery department for further examination.

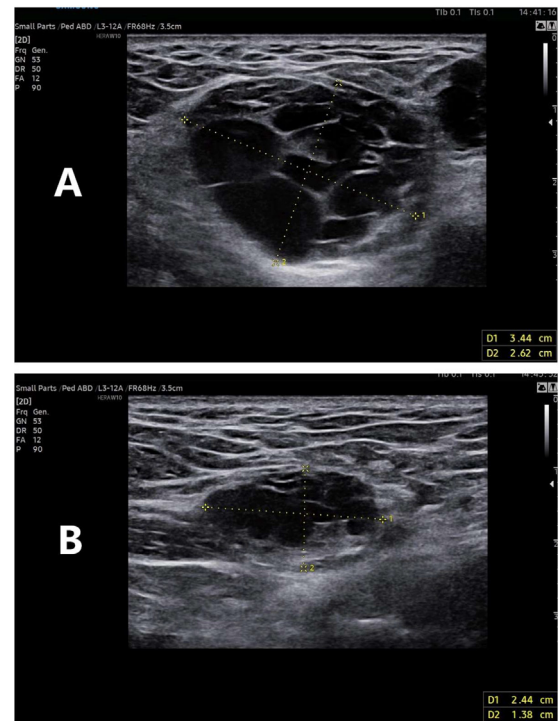
The surgeon performed a relevant physical examination and found that the size of the bilateral inguinal mass was about 3 × 2 cm (right) and 5 × 4 cm (left), with normal skin color, no redness, no pressure, and a soft, immovable mass. The mass increased in size when doing Valsalva maneuvers and disappeared when lying down. No bowel sounds or other abnormal sounds were detected on auscultation. Examination of the external genitalia was normal and no vulvar or lower extremity varicose veins were found. A preliminary diagnosis of “bilateral inguinal hernia” was made, and ultrasonography was recommended for a definitive diagnosis.

Ultrasound using a HERA W10 diagnostic ultrasound machine (Samsung, Gangwon Province, Korea) suggested a twisted and thickened tubular echogenicity subcutaneously at the bilateral inguinal area mass, with internal foveal changes extending to the bilateral parietal interstitium. The tubular lumen could be flattened after the probe was pressurized, and the size of the right side was about 2.4 × 1.4 cm in standing and that of the left side was about 3.4 × 2.6 cm (Fig. 1), and color Doppler flow imaging (CDFI) showed abundant red and blue blood flow signals visible within the bilateral echoes, and the pulsed wave Doppler (PW) showed a low-flow venous spectrum (Fig. 2). The mass disappeared when lying down. The mass increased in size during the Valsalva maneuver, with the right side measuring approximately 2.6 × 1.3 cm and the left side measuring approximately 3.8 × 2.7 cm (Fig. 3), and the CDFI showed increased blood flow within the bilateral echoes, and the PW showed a low-flow venous spectrum. The patient came for a follow-up examination 1 month later and found that the mass had increased in size and did not disappear when he lay down. On ultrasound review, the size of the right side was about 3.0 × 1.3 cm when standing, and the size of the left side was about 5.3 × 2.9 cm (Fig. 4), and no abnormal echoes were seen within.

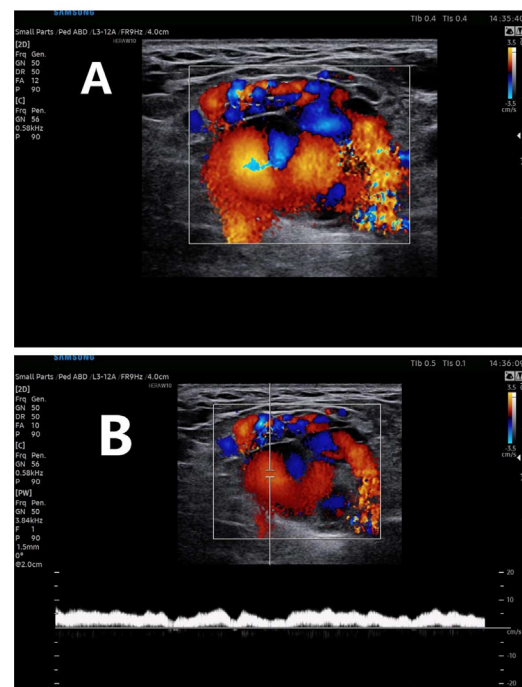
This patient consents to the reporting of images and other clinical information about his or her case in a medical journal.

## Discussion

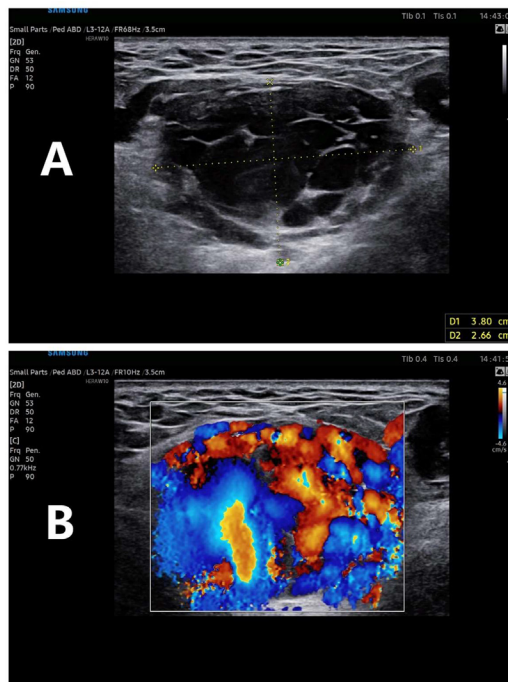
Anatomically, the round ligament of the uterus begins at the lateral margin of the uterus, anteriorly below the uterine opening of the fallopian tube. Covered by the anterior layer of the broad ligament of the uterus, it extends anterolaterally, crosses the inguinal canal, and terminates at the mons pubis and the upper part of the labia majora. It also contains veins, arteries, lymphatics, and nerves [6–9].



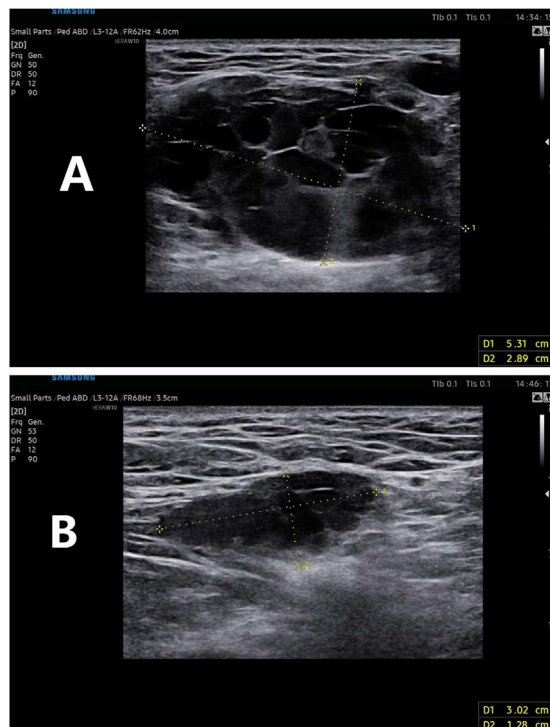
**Fig. 1 – Two-dimensional ultrasound (2D) of the inguinal region shows a twisted thickened tubular echogenicity visible within and no thrombus detected within the tube. (A) Left inguinal region; (B) right inguinal region.**



**Fig. 2 – Color Doppler ultrasound (CDS) and pulsed spectral Doppler (PW) ultrasound show that the left side: (A) internally shows abundant blood flow signals; (B) shows a low-flow venous spectrum. The right side is consistent with the left side.**



**Fig. 3** – During the Valsalva maneuver, the left inguinal region shows widening of the 2D duct (A) and the CDS shows increased blood flow in the duct (B). The right side is consistent with the left side.



**Fig. 4** – Two-dimensional ultrasound (2D) of the inguinal region shows a twisted thickened tubular echogenicity visible within and no thrombus detected within the tube. (A) Left inguinal region; (B) right inguinal region.

During a woman's pregnancy, blood volume and venous return increase, leading to venous dilatation; elevated levels of progesterone decrease venous tone, leading to relaxation and dilatation of venous smooth muscle; and, as the duration of gestation increases, the uterus and fetus and appendages enlarge can increase pelvic venous pressure [1,5–7]. Therefore, pregnancy is considered to be a necessary condition leading to the development of RLV. In addition, there are other possible causes of extrinsic compression of the veins as well, such as venous obstruction due to blood clots, compression by pelvic masses such as uterine fibroids and tumors [10]. In any case, no study to date has been able to explain exactly why RLV occurs in only some pregnant women, and it has been hypothesized that the underlying pathophysiology may be due to "Pelvic Congestion Syndrome (PCS)" [10], which needs to be further investigated.

Inguinal hernias are also rare in pregnancy because as the uterus continues to grow the intra-abdominal structures that fill the hernia sac are pushed to the sides, blocking the internal inguinal ring [11]. RLV is a rare condition most commonly seen in the second trimester of pregnancy and is usually unilateral, with the right side being more common, and one-third being bilateral [1]. The presence of concomitant varicose veins of the lower extremities or pubic region can be a clue to the diagnosis of RLV [3,6,12]. Although neither phenomenon was observed in our case, it does not completely exclude the possibility of RLV [6]. Therefore, in clinical practice, it is difficult to differentiate between inguinal hernia and RLV on the basis of symptoms alone, as their clinical presentations are very similar, and both may present with swelling, with or without pain, and can be easily be misdiagnosed as inguinal hernia [11,13].

Ultrasound is very important for diagnosis [14]. In addition to inguinal hernia, RLV needs to be differentiated from other conditions including lymph node disease, subcutaneous lipomas, endometriosis, abscesses, hemangiomas, and tumors. The intestinal canal and peristalsis, mesentery, and other tissues can be visualized by ultrasound to identify hernia contents [15], all of which have some characteristic manifestations on imaging [2,3]. In RLV, the dilated veins can be seen as "worms" on ultrasound; on color Doppler ultrasound, venous flow signals can be seen in the echoes of the dilated ducts, and the increase in venous flow during the Valsalva maneuver can help to confirm the diagnosis. The Valsalva maneuver is very important in this examination because venous flow may not be apparent at rest. Resting state may not be evident [16]. Finally, RLV is not an emergency and is usually treated conservatively and in most cases resolves on its own after delivery [7,9,16]. If RLV is correctly diagnosed, unnecessary interventions can be avoided [1,2]. In addition, we need to test the pregnant women's coagulation function, and if a hypercoagulable state is present, subcutaneous injection of low molecular weight heparin can be administered to prevent the formation of blood clots.

## Conclusion

RLV is a very rare cause of a mass in the inguinal region and is easily misdiagnosed as an inguinal hernia. Ultrasound

is the imaging method of choice for diagnosing RLV, especially in pregnant women with inguinal masses. It is usually treated conservatively and in most cases resolves on its own after delivery. Therefore, a correct diagnosis can avoid unnecessary invasive procedures or interventions to the groin, thus reducing potential risks to the pregnant woman and the fetus.

## Patient consent

This patient consents to the reporting of images and other clinical information about his or her case in a medical journal.

## REFERENCES

- [1] Ryu KH, Yoon JH. Ultrasonographic diagnosis of round ligament varicosities mimicking inguinal hernia: report of two cases with literature review. *Ultrasonography* 2014;33(3):216–21.
- [2] McKenna DA, Carter JT, Poder L, Gosnell JE, Maa J, Pearl JM, et al. Round ligament varices: sonographic appearance in pregnancy. *Ultras Obstetr Gynecol* 2008;31(3):355–7.
- [3] Chi C, Taylor A, Munjuluri N, Abdul-Kadir R. A diagnostic dilemma: round ligament varicosities in pregnancy. *Acta Obstet Gynecol Scand* 2005;84(11):1126–7.
- [4] Oh SN, Jung SE, Rha SE, Lim GY, Ku YM, Byun JY, et al. Sonography of various cystic masses of the female groin. *J Ultrasound Med* 2007;26(12):1735–42.
- [5] Lee DK, Bae SW, Moon H, Kim YK. Round ligament varicosities mimicking inguinal hernia in pregnancy. *J Korean Surg Soc* 2011;80(6):437–9.
- [6] Ijpma FA, Boddeus KM, De Haan HH, Van Geldere D. Bilateral round ligament varicosities mimicking inguinal hernia during pregnancy. *Hernia* 2009;13:85–8.
- [7] Ng C, Wong GT. Round ligament varicosity thrombosis presenting as an irreducible inguinal mass in a postpartum woman. *J Clin Imaging Sci* 2019;9.
- [8] Naik SS, Balasubramanian P. Round ligament varices mimicking inguinal hernia during pregnancy. *Radiol Case Rep* 2019;14(8):1036–8.
- [9] García-Paredes LF, Torres-Ayala SC, Rivera-Hernández W, et al. A case of round ligament varices presenting in pregnancy. *Am J Case Rep* 2017;18:1194.
- [10] Phillips D, Deipolyi AR, Hesketh RL, Midia M, Oklu R. Pelvic congestion syndrome: etiology of pain, diagnosis, and clinical management. *J Vasc Interv Radiol* 2014;25(5):725–33.
- [11] Mine Y, Eguchi S, Enjouji A, et al. Round ligament varicosities diagnosed as inguinal hernia during pregnancy: a case report and series from two regional hospitals in Japan[J]. *International J Surg Case Rep* 2017;36:122–5.
- [12] Cheng D, Lam H, Lam C. Round ligament varices in pregnancy mimicking inguinal hernia: an ultrasound diagnosis. *Ultras Obstetr Gynecol* 1997;9(3):198–9.
- [13] AKSAN IO. A rare cause similar to inguinal hernia in pregnancy: two cases of round ligament varicosity. *Marmara Med J* 2022;35(2):254–6.
- [14] Yeo JH, Tashi S. A rare but noteworthy diagnosis for “lumps in the groin” during pregnancy: round ligament varices. *Am J Case Rep* 2021;22 e934313-1.
- [15] Jamadar DA, Jacobson JA, Morag Y, Girish G, Ebrahim F, Gest T, et al. Sonography of inguinal region hernias. *Am J Roentgenol* 2006;187(1):185–90.
- [16] Cicilet S. Acute groin pain in pregnancy: a case of round ligament varicocele. *BJR Case Rep* 2017;3(3):20150517.