



Contents lists available at ScienceDirect

International Journal of Surgery Case Reports

journal homepage: www.casereports.com

Round ligament varicosities diagnosed as inguinal hernia during pregnancy: A case report and series from two regional hospitals in Japan



Yuka Mine^{a,b}, Susumu Eguchi^{b,*}, Akihito Enjouji^a, Masayoshi Fukuda^a, Junzo Yamaguchi^a, Yusuke Inoue^a, Fumihiko Fujita^a, Ohzora Tsukamoto^c, Hideaki Masuzaki^c

^a Department of General Surgery, National Hospital Organization Saga National Hospital, 1-20-1, Hinode, Saga, 849-8577, Japan

^b Department of Surgery, Nagasaki University Graduate School of Biomedical Sciences, 1-7-1, Sakamoto, Nagasaki, 852-8501, Japan

^c Obstetrics and Gynecology, Nagasaki University Graduate School of Biomedical Sciences, 1-7-1, Sakamoto, Nagasaki, 852-8501, Japan

ARTICLE INFO

Article history:

Received 16 January 2017

Received in revised form 6 May 2017

Accepted 7 May 2017

Available online 15 May 2017

Keywords:

Round ligament varicosity

Pregnancy

Ultrasonography

Doppler

ABSTRACT

INTRODUCTION: Round ligament varicosities (RLV) are not well-known and they are usually caused by pregnancy. Although the groin swelling of RLV mimics an inguinal hernia, it is difficult to distinguish between them through clinical examination alone, and there have been few published reports on this topic, especially from Asia.

CASE PRESENTATION: A 37-year-old Japanese woman complained of left groin swelling for 2 weeks at her 28th week of gestation of her first pregnancy. According to a physical examination, she had a soft, painless swelling in the superficial inguinal ring of the left groin. An inguinal hernia was suspected and she was thus scheduled to undergo herniorrhaphy. However, since she had varicosities in the left labia majora, she first underwent color Doppler ultrasonography and a final diagnosis of round ligament varicosities was this made. Her symptoms resolved after delivery of her baby.

DISCUSSION: We herein report 10 cases of RLV in pregnant Japanese women who were initially suspected of having an inguinal hernia. All of them were suspected to suffer from inguinal hernias after a clinical examination by their attending gynecologist. All of them were diagnosed using gray scale and color Doppler ultrasonography, treated with conservative management, and the symptoms resolved in all cases after the delivery.

CONCLUSION: This is the largest report from Asia regarding RLV. To avoid unnecessary surgery in pregnant women, surgeons must be aware of this entity make an accurate diagnosis based of the findings of Doppler ultrasonography.

© 2017 The Authors. Published by Elsevier Ltd on behalf of IJS Publishing Group Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

1. Introduction

Round ligament varicosities (RLVs) are not well-known and they are mostly caused by pregnancy. The groin swelling of round ligament varicosities mimics an inguinal hernia. It is difficult to distinguish between them based on clinical examination alone. The round ligament passes from the lateral uterus, through the internal abdominal ring, and along the inguinal canal and terminates at the labia major. The round ligament contains arteries, veins,

lymphatics and nerves. RLVs arise from the veins draining the round ligament and the inguinal canal into the inferior epigastric vein [1]. We herein report our most recent case and describe ten similar cases of RLVs that were initially suspected to be an inguinal hernia during pregnancy. Our case series is compliant with the PROCESS Guidelines [2].

2. Case presentation and series

A 37-year-old woman complained of a left groin swelling of 2 weeks duration at her 28th week of gestation for her first pregnancy. Therefore, she was referred to our surgical department due to suspicion of an inguinal hernia. According to a physical examination, she had a soft, painless swelling in the superficial inguinal ring of the left groin. Her past history included *Toxoplasma gondii* infection. An inguinal hernia was suspected and she was scheduled to undergo herniorrhaphy. However, since she had varicosities in the left labia majora, she first underwent color Doppler ultrasonog-

Abbreviations: RLVs, Round ligament varicosities; US, Ultrasound.

* Corresponding author.

E-mail addresses: dionysos917@hotmail.co.jp (Y. Mine), sueguchi@nagasaki-u.ac.jp (S. Eguchi), enjouji@saga-nh.hosp.go.jp (A. Enjouji), fukuda@saga-nh.hosp.go.jp (M. Fukuda), yamaguchi-j@saga-nh.hosp.go.jp (J. Yamaguchi), inoue17@live.jp (Y. Inoue), ffujita@nagasaki-u.ac.jp (F. Fujita), ysypq904@yahoo.co.jp (O. Tsukamoto), bunbuku@nagasaki-u.ac.jp (H. Masuzaki).

<http://dx.doi.org/10.1016/j.ijscr.2017.05.006>

2210-2612/© 2017 The Authors. Published by Elsevier Ltd on behalf of IJS Publishing Group Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

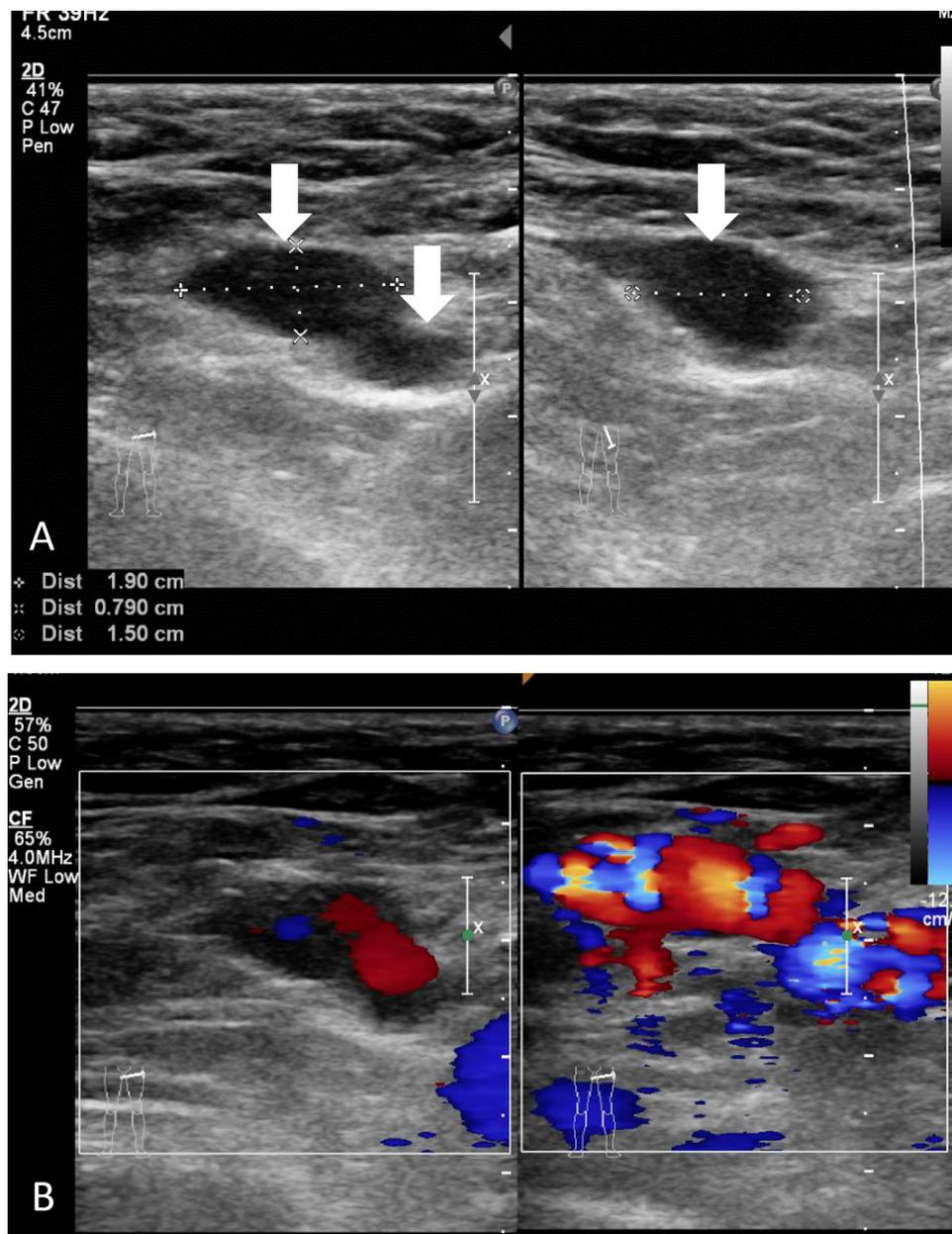


Fig. 1. A. Transverse gray-scale sonogram shows echo-free tubular structures (arrows) in the left inguinal canal. B. A color Doppler sonogram demonstrates multiple dilated veins with a blood flow.

raphy and a definitive diagnosis of round ligament varicosities was made (Fig. 1A and B). Her symptoms resolved after delivery of her baby.

From March 2008 to September 2016, a total of ten pregnant women were referred to our two surgical departments (Table 1). The chief complaint of all ten women was inguinal swelling and groin pain during pregnancy. All of them were suspected to have an inguinal hernia after a clinical examination by their attending gynecologist. The patients' ages ranged from 25 to 33 years (mean: 28 years). The swelling measured from 3 to 4 cm in diameter along the inguinal ligament based on a clinical examination while the patients were standing.

Most of them (7/10) first noticed inguinal swelling in the second trimester, 1/10 in the first, and 2/10 in the third (mean: 23 week of pregnancy). The symptoms were located on the left side in 7/10 patients and on the right side in 3/10, while none of the patients demonstrated symptoms on both sides. The symptoms were groin

swelling alone in 4/10 patients and painful groin swelling in 6/10 patients. A gray scale US examination revealed multiple echo-free tubular structures in the inguinal canal. Color Doppler US examinations demonstrated multiple dilated veins and an increased blood flow either while standing or during the Valsalva maneuver. Because of these findings, all of the patients were finally diagnosed to have RLVs. After a correct diagnosis was made, they were managed conservatively, and successfully underwent an uncomplicated delivery. The symptoms all resolved within two weeks postpartum.

3. Discussion

A hernia of the inguinal region appearing for the first time during pregnancy is uncommon because most of the intra-abdominal structures that could potentially fill the hernia sac will be pushed aside by the growing uterus [3]. In a recently published article, it was emphasized that groin swelling that appears during preg-

Table 1
Characteristics of the 10 cases of round ligament varicosities.

Cases	1	2	3	4	5	6	7	8	9	10 (present case)
Patient age (years)	22	27	29	27	31	33	25	31	33	37
Initial symptom date (week of pregnancy)	30	32	26	19	26	20	20	13	17	26
Location	R	L	L	R	L	L	L	R	L	L
Pain	yes	no	yes	no	yes	yes	yes	no	yes	no
Previous history during pregnancy	no	no	no	yes	no	yes	no	no	no	no
Parity	1	1	1	3	2	2	2	2	1	1

nancy is due to RLVs more frequently than inguinal hernias [4]. Even pre-existing hernias could temporarily disappear during pregnancy because the enlarged uterus pushes the intestines away from the inguinal canal and thus blocks the internal inguinal ring [3]. Other considerations when making a differential diagnosis for an inguinal mass include femoral hernia, hydrocele of the canal of Nuck, extragenital endometriosis, subcutaneous lipoma, lymphadenopathy, vascular aneurysm, soft tissue malignancies, and abscess formation [5]. Giant extragenital endometriosis could be included in the differential diagnosis; however, such lesions usually shrink postpartum. Other diseases that cause inguinal pain or discomfort without typical groin swelling, and which should be included in the differential diagnosis, include pubic conjunctivitis, extragenital endometriosis, and inflammation of the adductor muscle attachment.

Inguinal hernias during pregnancy are reported with an incidence of 1 in 1000–3000 women [6]. RLVs are more common in pregnancy, and several mechanisms contribute to varicose vein formation of the round ligament veins during pregnancy: including progesterone-mediated venous smooth muscle relaxation causing dilatation of the round ligament veins during pregnancy, a raised cardiac output causing increased venous return and leading to engorgement of the venous impingement by the gravid uterus [6]. McKenna et al. reported the incidence of RLVs during pregnancy to be 0.13% (5/3816) [7].

According to the previously reported cases of RLVs in the English-language literature, the mean age of patients demonstrating RLVs was 29.7 years (range, 18–40 years) and the site of development site was the right side, followed by the left and then by both sides at a ratio of 11:9:6. The symptoms were simple groin swelling in 14 cases and a painful groin mass in 12 cases [8]. RLVs are usually unilateral, but one third of all cases in the literature are bilateral [11]. Another report noted that 83% of RLVs were diagnosed antepartum, among which 4% of the cases occurred in the first trimester, 46% of the cases developed in the second trimester, and 33% of the cases were observed in the third trimester. Additionally, 17% of the cases were diagnosed postpartum [9].

Normal clinical findings are in sufficient to differentiated RLV from inguinal hernia. Therefore, an ultrasound evaluation is necessary for any pregnant woman presenting with newly developed groin swelling [13]. Gray scale and color Doppler US are widely available and these findings can easily distinguish between uncomplicated RLVs and inguinal hernia. US characteristics of RLV are multiple dilated veins at the inguinal canal, the absence of lymph nodes or bowel in the inguinal canal, and the detection of veins draining into the inferior epigastric artery. Another typical finding is a 'bag of worms' appearance of the smaller varices [14].

An exact diagnosis is important for the management of uncomplicated RLV, which could be treated conservatively and normally resolves within a few months after delivery. Uncomplicated inguinal hernias should be operated on after delivery. In our case no complications occurred during either pregnancy or the postpartum period. Thereafter, the RLVs regressed within 2 weeks [13]. Although some surgical experts and obstetricians elect to manage a possible inguinal hernia conservatively, not all surgeons do the same, which can thus lead to mismanagement. Furthermore,

since the enlarged uterus caps the inguinal orifice, the chance of an inguinal hernia occurring during pregnancy may be reduced. However, once the tissue becomes incarcerated, a spontaneous recovery may be more difficult to achieve in comparison to the postpartum period.

4. Conclusion

When a pregnant woman presents with groin swelling, we should employ gray scale and color Doppler US not only carry out a physical examination in order to make a correct diagnosis of RLVs. Since surgery during pregnancy and the puerperium period in associated with a risk of fetal and maternal morbidity, all unnecessary operations must therefore be avoided.

Conflicts of interest

No conflict of interest.

Funding

No funding on this study.

Ethical approval

Approval to publish this case report was waived by the institution.

Consent

Written informed consent for publication of this case report and accompanying images was obtained from the patient. A copy of the written consent is available for review by the Editor-in-Chief of this journal, on request.

Author contribution

YM drafted the manuscript and acquired the data. SE revised the manuscript and has given final approval of the version to be published. All authors read and approved the final manuscript.

Guarantor

The Guarantor is Susumu Eguchi MD, PhD.

Acknowledgment

None.

References

[1] D.R. Reisfield, Varicosities in veins of the inguinal canal during pregnancy, *J. Med. Soc. N. J.* 59 (1962) 24–26.
 [2] R.A. Agha, A.J. Fowler, S. Rammohan, I. Barai, D.P. Orgill, the PROCESS Group, The PROCESS statement: preferred reporting of case series in surgery, *Int. J. Surg.* 36 (Pt A) (2016) 319–323.

- [3] J.S. Tomkinson, W.R. Winterton, Varicoceles of the round ligament in pregnancy simulating inguinal herniae, *Br. Med. J.* 1 (1955) 889–890.
- [4] M. Lechner, R. Fortelny, D. Ofner, F. Mayer, Suspected inguinal hernias in pregnancy-handle with care!, *Hernia* 18 (2014) 375–379.
- [5] F.F. Ijpma, K.M. Boddeus, H.H. de Haan, D. van Geldere, Bilateral round ligament varicosities mimicking inguinal hernia during pregnancy, *Hernia* 13 (2009) 85–88.
- [6] D. Cheng, H. Lam, C. Lam, Round ligament varices in pregnancy mimicking inguinal hernia: an ultrasound diagnosis, *Ultrasound Obstet. Gynecol.* 9 (1997) 198–199.
- [7] H.R.K. Barber, E.A. Garber, Editorial comments on H.J. Kesseler, in: H.R.K. Barber, E.A. Graber (Eds.), *Hernias in Pregnancy*, Surgical Disease in Pregnancy, WB Saunders, Philadelphia, 1974, p. p.165.
- [8] D.A. McKenna, J.T. Carter, L. Poder, J.E. Gosnell, J. Maa, J.M. Pearl, Round ligament varices: sonographic appearance in pregnancy, *Ultrasound Obstet. Gynecol.* 31 (2008) 355–357.
- [9] K. Hryu, J.H. Yoon, Ultrasonographic diagnosis of round ligament varicosities mimicking inguinal hernia: report of two cases with literature review, *Ultrasonography* 33 (2014) 216–221.
- [11] K. Suehiro, T. Kanda, M. Sasaki, et al., Round ligament varices mimicking inguinal hernia during pregnancy and puerperium: a case report, *Acta Med. Biol.* 50 (2002) 103–105.
- [13] E. Bulbul, M.I. Taskin, B. Yanik, G. Demirpolat, E. Adali, M. Basbug, Rare cause of bilateral groin swelling: round ligament varicosities, *Pak. J. Med. Sci.* 31 (2015) 1012–1014.
- [14] C. Chi, A. Taylor, N. Munjuluri, R. Abdul-Kadira, A diagnostic dilemma: round ligament varicosities in pregnancy, *Acta Obstet. Gynecol. Scand.* 84 (2005) 1126–1127.

Open Access

This article is published Open Access at [scienceopen.com](https://www.scienceopen.com). It is distributed under the [IJSCR Supplemental terms and conditions](#), which permits unrestricted non commercial use, distribution, and reproduction in any medium, provided the original authors and source are credited.