

Bölüm 12

KONTRASEPTİF YÖNTEM OLARAK RAHİM İÇİ ARAÇLAR

Raziye TORUN¹

Rahim içi araç (RİA), yüksek etkinliği ve güvenliği, kullanım kolaylığı ve maliyet etkinliği nedeniyle en çok kullanılan uzun etkili geri dönüşümlü kontrasepsiyon yöntemidir. Kadın doğum kontrolü kullanıcılarının ortalama yüzde 23'ü tarafından kullanılmaktadır; ülkeye bağlı olarak yüzde <2 ila >40 aralığındadır (1, 2).

Hamileliği önlemek için cerrahi sterilizasyon kadar etkili, cerrahi olmayan bir seçenek sunar.

RİA yerleştirilmesi ve çıkarılması genellikle ofis ortamında eğitilmiş kişiler tarafından gerçekleştirilebilecek nispeten basit prosedürlerdir. Genel olarak mükemmel güvenlik profiline rağmen, yerleştirme sırasında ve yerleştirmeyi takip eden farklı zaman noktalarında yan etkiler ve komplikasyonlar ortaya çıkabilir.

RİA TİPLERİ

En sık kullanılan RİA'lar plastik bir çerçeveye sahiptir ve cihazın kontraseptif etkisini arttırmak için bakır veya progestin salgılar.

Bakırlı RİA, 380 mm² bakır içeren T şeklinde bir cihazdır. ABD Gıda ve İlaç İdaresi (FDA) tarafından 10 yıl kullanım için onaylanmıştır (3).

Levonorgestrelli (LNG) RİA'lar, LNG RİA' lar, LNG' yi serbest bırakan T şeklinde cihazlardır. Değişen miktarlarda LNG salan, yaygın olarak bulunan dört LNG RİA' sı vardır (4-7). Ülkemizde sadece 52 mg LNG içeren RİA (bilinen ticari ismi MİRENA) bulunmaktadır.

¹ Op. Dr., İzmir Tepecik Eğitim ve Araştırma Hastanesi, Kadın Hastalıkları ve Doğum AD Perinatoloji Bölümü e-mail: drraziyeturun@gmail.com, ORCID iD: 0000-0002-0272-7196

Hastalık Kontrol ve Önleme Merkezleri (CDC) uyarınca, LNG'li RİA'yı meme kanseri tedavisi gören veya meme kanseri öyküsü olan kişilerde doğum kontrolü için kullanmıyoruz.

DİĞER:

LNG'li RİA'ların aktif karaciğer hastalığı gibi hormonal açıdan hassas spesifik durumlarla ilgili ek göreceli kontrendikasyonları vardır. Bu sorunları yaşayan kişiler bakırlı RİA'ları güvenle kullanabilirler.

RİA'LI HASTALARDA MANYETİK REZONANS GÖRÜNTÜLEME:

RİA'lı bireyler manyetik rezonans görüntüleme (MRI) prosedürlerini güvenli bir şekilde geçirebilirler. Bazı RİA'lar metal içermesine rağmen (bakır RİA'lar, LNG'li 19,5 ve 13,5 mg RİA'lar gümüş halkalıdır), bu RİA'lar tıbbi teşhis için kullanılan MR sırasında hareket etmez veya yerel sıcaklığı önemli ölçüde artırmaz (manyetik alanlar $\leq 3,0$ Tesla birimi) (4-7, 26, 123).

Bakırlı ve 19,5 ve 13,5 mg LNG'li RİA kullanıcıları, MR sırasında RİA'nın varlığı konusunda radyoloğa bilgi vermelidir; çünkü bu, kullanılan sekansların tipini, çalışmanın süresini ve meydana gelebilecek artefaktları etkileyebilir. Spesifik olarak, bakır 380 mm² RİA paketinin prospektüsünde 1,5 Tesla'lık manyetik alanların kabul edilebilir olduğu belirtilmektedir, ancak cihaz aynı zamanda incelenmiş ve 3,0 Tesla'da güvenli bulunmuştur (26).

52 mg LNG'li RİA Liletta kullanıcıları $\leq 3,0$ Tesla manyetik alanlarla MR çalışmalarına güvenle girebilirler (89).

KAYNAKLAR

1. United Nations. World contraceptive use 2011. <http://www.un.org/esa/population/publications/contraceptive2011/contraceptive2011.htm> (Accessed on March 20, 2014).
2. Buhling KJ, Zite NB, Lotke P, et al. Worldwide use of intrauterine contraception: A review. *Contraception* 2014; 89:162.
3. Creinin M, Kohn JE, Tang JH, et al. Society of Family Planning Committee statement on IUD nomenclature. *Contraception* 2022; 106:1.
4. MIRENA- levonorgestrel intrauterine device. US Food and Drug Administration (FDA) approved product information. Revised August, 2021. US National Library of Medicine. <https://dailymed.nlm.nih.gov/> (Accessed on September 02, 2021).
5. KYLEENA- Levonorgestrel intrauterine device. US Food and Drug Administration (FDA) approved product information. Revised July, 2021. US National Library of Medicine. <https://dailymed.nlm.nih.gov/> (Accessed on September 02, 2021).

6. SKYLA- levonorgestrel intrauterine device. US Food and Drug Administration (FDA) approved product information. Revised July, 2021. US National Library of Medicine. <https://www.dailymed.nlm.nih.gov> (Accessed on September 02, 2021).
7. LILETTA- levonorgestrel intrauterine device. US Food and Drug Administration (FDA) approved product information. Revised November, 2022. US National Library of Medicine. <https://dailymed.nlm.nih.gov/> (Accessed on November 28, 2022)
8. Rivera R, Yacobson I, Grimes D. The mechanism of action of hormonal contraceptives and intrauterine contraceptive devices. *American Journal of Obstetrics and Gynecology* 1999; 181:1263.
9. Stanford JB, Mikolajczyk RT. Mechanisms of action of intrauterine devices: Update and estimation of postfertilization effects. *American Journal of Obstetrics and Gynecology* 2002; 187:1699.
10. Alvarez F, Brache V, Fernandez E, et al. New insights on the mode of action of intrauterine contraceptive devices in women. *Fertility and Sterility* 1988; 49:768.
11. Ortiz ME, Croxatto HB. Copper-T intrauterine device and levonorgestrel intrauterine system: Biological bases of their mechanism of action. *Contraception* 2007; 75: S16.
12. El-Habashi M, El-Sahwi S, Gawish S, et al. Effect of Lippes loop on sperm recovery from human fallopian tubes. *Contraception* 1980; 22:549.
13. Mechanism of action, safety and efficacy of intrauterine devices. Report of a WHO Scientific Group. *World Health Organization technical report series* 1987; 753:1.
14. Ortiz ME, Croxatto HB, Bardin CW. Mechanisms of action of intrauterine devices. *Obstetrical & gynecological survey* 1996; 51:S42.
15. Seleem S, Hills FA, Salem HT, et al. Mechanism of action of the intrauterine contraceptive device: Evidence for a specific biochemical deficiency in the endometrium. *Human reproduction (Oxford, England)* 1996; 11:1220.
16. Patai K, Szilagy G, Noszal B, et al. Local tissue effects of copper-containing intrauterine devices. *Fertility and Sterility* 2003; 80:1281.
17. Tetrault AM, Richman SM, Fei X, Taylor HS. Decreased endometrial HOXA10 expression associated with use of the copper intrauterine device. *Fertility and Sterility* 2009; 92:1820.
18. Lewis RA, Taylor D, Natavio MF, et al. Effects of the levonorgestrel-releasing intrauterine system on cervical mucus quality and sperm penetrability. *Contraception* 2010; 82:491.
19. Scommegna A, Pandya GN, Christ M, et al. Intrauterine administration of progesterone by a slow releasing device. *Fertility and Sterility* 1970; 21:201.
20. Mandelin E, Koistinen H, Koistinen R, et al. Levonorgestrel-releasing intrauterine device-wearing women express contraceptive glycodelin A in endometrium during midcycle: another contraceptive mechanism? *Human reproduction (Oxford, England)* 1997; 12:2671.
21. Videla-Rivero L, Etchepareborda JJ, Kesseru E. Early chorionic activity in women bearing inert IUD, copper IUD and levonorgestrel-releasing IUD. *Contraception* 1987; 36:217.
22. Minalt N, Caldwell A, Yedlicka GM, et al. Association of Intrauterine Device Use and Endometrial, Cervical, and Ovarian Cancer: an Expert Review. *American Journal of Obstetrics and Gynecology* 2023.

23. Backman T, Huhtala S, Blom T, et al. Length of use and symptoms associated with premature removal of the levonorgestrel intrauterine system: A nation-wide study of 17,360 users. *BJOG: an international journal of obstetrics and gynaecology* 2000; 107:335.
24. Jensen JT, Nelson AL, Costales AC. Subject and clinician experience with the levonorgestrel-releasing intrauterine system. *Contraception* 2008; 77:22.
25. Diedrich JT, Zhao Q, Madden T, et al. Three-year continuation of reversible contraception. *American Journal of Obstetrics and Gynecology* 2015; 213:662.e1.
26. Paragard [package insert]. North Wales, PA: Teva Pharmaceuticals USA, Inc; 2014.
27. Davies GC, Feng LX, Newton JR, et al. Release characteristics, ovarian activity and menstrual bleeding pattern with a single contraceptive implant releasing 3-ketodesogestrel. *Contraception* 1993; 47:251.
28. Croxatto HB, Mäkäräinen L. The pharmacodynamics and efficacy of Implanon. An overview of the data. *Contraception* 1998; 58:91S.
29. Barnhart KT, Schreiber CA. Return to fertility following discontinuation of oral contraceptives. *Fertility and Sterility* 2009; 91:659.
30. Mansour D, Gemzell-Danielsson K, Inki P, Jensen JT. Fertility after discontinuation of contraception: A comprehensive review of the literature. *Contraception* 2011; 84:465.
31. Chiou CF, Trussell J, Reyes E, et al. Economic analysis of contraceptives for women. *Contraception* 2003; 68:3.
32. Hostynek JJ, Maibach HI. Copper hypersensitivity: Dermatologic aspects. *Dermatologic therapy* 2004; 17:328.
33. De la Cruz D, Cruz A, Arteaga M, et al. Blood copper levels in Mexican users of the T380A IUD. *Contraception* 2005; 72:122.
34. Cleland K, Zhu H, Goldstuck N, et al. The efficacy of intrauterine devices for emergency contraception: A systematic review of 35 years of experience. *Human reproduction (Oxford, England)* 2012; 27:1994.
35. Cleland K, Raymond EG, Westley E, et al. Emergency contraception review: evidence-based recommendations for clinicians. *Clinical obstetrics and gynecology* 2014; 57:741.
36. Shen J, Che Y, Showell E, et al. Interventions for emergency contraception. *The Cochrane database of systematic reviews* 2019; 1:CD001324.
37. Sufrin CB, Postlethwaite D, Armstrong MA, et al. Neisseria gonorrhoea and Chlamydia trachomatis screening at intrauterine device insertion and pelvic inflammatory disease. *Obstetrics and gynecology* 2012; 120:1314.
38. Birgisson NE, Zhao Q, Secura GM, et al. Positive testing for Neisseria gonorrhoeae and Chlamydia trachomatis and the risk of pelvic inflammatory disease in IUD users. *Journal of women's health* 2015; 24:354.
39. Farley TM, Rosenberg MJ, Rowe PJ, et al. Intrauterine devices and pelvic inflammatory disease: An international perspective. *Lancet* 1992; 339:785.
40. Toivonen J. Intrauterine contraceptive device and pelvic inflammatory disease. *Annals of medicine* 1993; 25:171.
41. Peipert LJ, Collins KE, Zhao Q, Peipert JF. Copper intrauterine device and incident sexually transmitted infections. *American journal of obstetrics and gynecology* 2021; 225:579.
42. Mechanism of action, safety and efficacy of intrauterine devices. Report of a WHO Scientific Group. *World Health Organization technical report series* 1987; 753:1.

43. Sivin I, Schmidt F. Effectiveness of IUDs: A review. *Contraception* 1987; 36:55.
44. Heinemann K, Reed S, Moehner S, et al. Comparative contraceptive effectiveness of levonorgestrel-releasing and copper intrauterine devices: The European active surveillance study for intrauterine devices. *Contraception* 2015; 91:280.
45. Long-term reversible contraception. Twelve years of experience with the TCU380A and TCU220C. *Contraception* 1997; 56:341.
46. Bahamondes L, Faundes A, Sobreira-Lima B, et al. TCU 380A IUD: A reversible permanent contraceptive method in women over 35 years of age. *Contraception* 2005; 72:337.
47. Ti AJ, Roe AH, Whitehouse KC, et al. Effectiveness and safety of extending intrauterine device duration: a systematic review. *American journal of obstetrics and gynecology* 2020; 223:24.
48. Wu JP, Pickle S. Extended use of the intrauterine device: A literature review and recommendations for clinical practice. *Contraception* 2014; 89:495.
49. Cortessis VK, Barrett M, Brown Wade N, et al. Intrauterine Device Use and Cervical Cancer Risk: A Systematic Review and Meta-analysis. *Obstetrics and gynecology* 2017; 130:1226.
50. Guleria K, Agarwal N, Mishra K, et al. Evaluation of endometrial steroid receptors and cell mitotic activity in women using copper intrauterine device: Can Cu-T prevent endometrial cancer? *The journal of obstetrics and gynaecology research* 2004; 30:181.
51. Curtis KM, Marchbanks PA, Peterson HB. Neoplasia with use of intrauterine devices. *Contraception* 2007; 75:S60.
52. Spotnitz ME, Natarajan K, Ryan PB, Westhoff CL. Relative Risk of Cervical Neoplasms Among Copper and Levonorgestrel-Releasing Intrauterine System Users. *Obstetrics and gynecology* 2020; 135:319.
53. Averbach S, Silverberg MJ, Leyden W, et al. Recent intrauterine device use and the risk of precancerous cervical lesions and cervical cancer. *Contraception* 2018.
54. Liletta Supplement Approval. Food and Drug Administration. Department of Health and Human Services. October 2018. www.accessdata.fda.gov/drugsatfda_docs/appletter/2018/206229Orig1s007ltr.pdf (Accessed on October 18, 2018).
55. MIRENA (levonorgestrel-releasing intrauterine device). US FDA approved product information; Whippany, NJ: Bayer Health Care Pharmaceuticals Inc.; 2000. www.accessdata.fda.gov/drugsatfda_docs/label/2022/021225s043lbl.pdf (Accessed on August 23, 2022).
56. Jensen JT, Lukkari-Lax E, Schulze A, et al. Contraceptive efficacy and safety of the 52-mg levonorgestrel intrauterine system for up to 8 years: findings from the Mirena Extension Trial. *American journal of obstetrics and gynecology* 2022; 227:873.e1.
57. Xiao BL, Zhou LY, Zhang XL, et al. Pharmacokinetic and pharmacodynamic studies of levonorgestrel-releasing intrauterine device. *Contraception* 1990; 41:353.
58. Nilsson CG, Haukkamaa M, Vierola H, et al. Tissue concentrations of levonorgestrel in women using a levonorgestrel-releasing IUD. *Clinical endocrinology* 1982; 17:529.
59. Nilsson CG, Lahteenmaki PL, Luukkainen T, et al. Sustained intrauterine release of levonorgestrel over five years. *Fertility and Sterility* 1986; 45:805.
60. Luukkainen T, Lähteenmäki P, Toivonen J. Levonorgestrel-releasing intrauterine device. *Annals of medicine* 1990; 22:85.

61. Seeber B, Ziehr SC, Gschließer A, et al. Quantitative levonorgestrel plasma level measurements in patients with regular and prolonged use of the levonorgestrel-releasing intrauterine system. *Contraception* 2012; 86:345.
62. Orme ML, Back DJ, Breckenridge AM. Clinical pharmacokinetics of oral contraceptive steroids. *Clinical pharmacokinetics* 1983; 8:95.
63. Sivin I, Lähteenmäki P, Ranta S, et al. Levonorgestrel concentrations during use of levonorgestrel rod (LNG ROD) implants. *Contraception* 1997; 55:81.
64. Turok DK, Gero A, Simmons RG, et al. Levonorgestrel vs. Copper Intrauterine Devices for Emergency Contraception. *The New England journal of medicine* 2021; 384:335.
65. McNicholas C, Swor E, Wan L, et al. Prolonged use of the etonogestrel implant and levonorgestrel intrauterine device: 2 years beyond Food and Drug Administration-approved duration. *American journal of obstetrics and gynecology* 2017.
66. Bahamondes L, Fernandes A, Bahamondes MV, et al. Pregnancy outcomes associated with extended use of the 52-mg 20 µg/day levonorgestrel-releasing intrauterine system beyond 60 months: A chart review of 776 women in Brazil. *Contraception* 2018; 97:205.
67. Creinin MD, Schreiber CA, Turok DK, et al. Levonorgestrel 52 mg intrauterine system efficacy and safety through 8 years of use. *American journal of obstetrics and gynecology* 2022; 227:871.e1.
68. Abou-Setta AM, Al-Inany HG, Farquhar CM. Levonorgestrel-releasing intrauterine device (LNG-IUD) for symptomatic endometriosis following surgery. *The Cochrane database of systematic reviews*, 2006; :CD005072.
69. Lethaby AE, Cooke I, Rees M. Progesterone or progestogen-releasing intrauterine systems for heavy menstrual bleeding. *The Cochrane database of systematic reviews*, 2005; :CD002126.
70. Cim N, Soysal S, Sayan S, et al. Two Years Follow-Up of Patients with Abnormal Uterine Bleeding after Insertion of the Levonorgestrel-Releasing Intrauterine System. *Gynecologic and obstetric investigation*, 2018; 83:569.
71. Kaunitz AM, Bissonnette F, Monteiro I, et al. Levonorgestrel-releasing intrauterine system or medroxyprogesterone for heavy menstrual bleeding: a randomized controlled trial. *Obstetrics and gynecology* 2010; 116:625.
72. Baker WD, Pierce SR, Mills AM, et al. Nonoperative management of atypical endometrial hyperplasia and grade 1 endometrial cancer with the levonorgestrel intrauterine device in medically ill post-menopausal women. *Gynecologic oncology* 2017; 146:34.
73. Bofill Rodriguez M, Lethaby A, Jordan V. Progestogen-releasing intrauterine systems for heavy menstrual bleeding. *Cochrane database of systematic reviews* 2020; 6:CD002126.
74. Beelen P, van den Brink MJ, Herman MC, et al. Levonorgestrel-releasing intrauterine system versus endometrial ablation for heavy menstrual bleeding. *American journal of obstetrics and gynecology* 2021; 224:187.e1.
75. Harada T, Ota I, Kitawaki J, et al. Real-world outcomes of the levonorgestrel-releasing intrauterine system for heavy menstrual bleeding or dysmenorrhea in Japanese patients: A prospective observational study (J-MIRAI). *Contraception* 2022; 116:22.

76. Creinin MD, Barnhart KT, Gawron LM, et al. Heavy Menstrual Bleeding Treatment With a Levonorgestrel 52-mg Intrauterine Device. *Obstetrics and gynecology* 2023; 141:971.
77. Ciccone MA, Whitman SA, Conturie CL, et al. Effectiveness of progestin-based therapy for morbidly obese women with complex atypical hyperplasia. *Archives of gynecology and obstetrics* 2019; 299:801.
78. Mandelbaum RS, Ciccone MA, Nusbaum DJ, et al. Progestin therapy for obese women with complex atypical hyperplasia: levonorgestrel-releasing intrauterine device vs systemic therapy. *American journal of obstetrics and gynecology* 2020; 223:103.e1.
79. Sivin I, Stern J. Health during prolonged use of levonorgestrel 20 micrograms/d and the copper TCu 380Ag intrauterine contraceptive devices: A multicenter study. International Committee for Contraception Research (ICCR). *Fertility and Sterility* 1994; 61:70.
80. Eisenberg DL, Schreiber CA, Turok DK, et al. Three-year efficacy and safety of a new 52-mg levonorgestrel-releasing intrauterine system. *Contraception* 2015; 92:10.
81. Sivin I, el Mahgoub S, McCarthy T, et al. Long-term contraception with the levonorgestrel 20 mcg/day (LNg 20) and the copper T 380Ag intrauterine devices: A five-year randomized study. *Contraception* 1990; 42:361.
82. Andersson K, Odland V, Rybo G. Levonorgestrel-releasing and copper-releasing (Nova T) IUDs during five years of use: A randomized comparative trial. *Contraception* 1994; 49:56.
83. Schultheis P, Montoya MN, Zhao Q, et al. Contraception and ectopic pregnancy risk: a prospective observational analysis. *American journal of obstetrics and gynecology* 2021; 224:228.
84. Schwarz EB, Lewis CA, Dove MS, et al. Comparative Effectiveness and Safety of Intrauterine Contraception and Tubal Ligation. *Journal of general internal medicine*, 2022; 37:4168.
85. Diedrich JT, Desai S, Zhao Q, et al. Association of short-term bleeding and cramping patterns with long-acting reversible contraceptive method satisfaction. *American journal of obstetrics and gynecology* 2015; 212:50.e1.
86. Hobby JH, Zhao Q, Peipert JF. Effect of baseline menstrual bleeding pattern on copper intrauterine device continuation. *American journal of obstetrics and gynecology* 2018; 219:465.e1.
87. Godfrey EM, Whiteman MK, Curtis KM. Treatment of unscheduled bleeding in women using extended- or continuous-use combined hormonal contraception: a systematic review. *Contraception* 2013; 87:567.
88. Lowe RF, Prata N. Hemoglobin and serum ferritin levels in women using copper-releasing or levonorgestrel-releasing intrauterine devices: A systematic review. *Contraception* 2013; 87:486.
89. Liletta [package insert]. Irvine, CA: Allergan USA, Inc; 2019. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=aaf0eb2a-f88a-4f26-a445-0fd30176c326> (Accessed on October 17, 2020).
90. Sergison JE, Maldonado LY, Gao X, Hubacher D. Levonorgestrel intrauterine system associated amenorrhea: a systematic review and metaanalysis. *American journal of obstetrics and gynecology* 2019; 220:440.

91. Aoun J, Dines VA, Stovall DW, et al. Effects of age, parity, and device type on complications and discontinuation of intrauterine devices. *Obstetrics and gynecology* 2014; 123:585.
92. Rivera R, Chen-Mok M, McMullen S. Analysis of client characteristics that may affect early discontinuation of the TCu-380A IUD. *Contraception* 1999; 60:155.
93. Braaten KP, Benson CB, Maurer R, et al. Malpositioned intrauterine contraceptive devices: risk factors, outcomes, and future pregnancies. *Obstetrics and gynecology* 2011; 118:1014.
94. Madden T, McNicholas C, Zhao Q, et al. Association of age and parity with intrauterine device expulsion. *Obstetrics and gynecology* 2014; 124:718.
95. Trussell J. Contraceptive failure in the United States. *Contraception* 2011; 83:397.
96. Heinemann K, Reed S, Moehner S, et al. Risk of uterine perforation with levonorgestrel-releasing and copper intrauterine devices in the European Active Surveillance Study on Intrauterine Devices. *Contraception* 2015; 91:274.
97. Jensen JT, Creinin MD. Speroff & Darney's Clinical Guide to Contraception, 6th ed, Wolters Kluwer Health, Philadelphia 2019.
98. Grunloh DS, Casner T, Secura GM, et al. Characteristics associated with discontinuation of long-acting reversible contraception within the first 6 months of use. *Obstetrics and gynecology* 2013; 122:1214.
99. Dragoman MV, Simmons KB, Paulen ME, et al. Combined hormonal contraceptive (CHC) use among obese women and contraceptive effectiveness: a systematic review. *Contraception* 2017; 95:117.
100. Simonatto P, Bahamondes MV, Fernandes A, et al. Comparison of two cohorts of women who expelled either a copper-intrauterine device or a levonorgestrel-releasing intrauterine system. *The journal of obstetrics and gynaecology research* 2016; 42:554.
101. Teal SB, Romer SE, Goldthwaite LM, et al. Insertion characteristics of intrauterine devices in adolescents and young women: success, ancillary measures, and complications. *American journal of obstetrics and gynecology* 2015; 213:515.e1.
102. Teal SB, Sheeder J. IUD use in adolescent mothers: retention, failure and reasons for discontinuation. *Contraception* 2012; 85:270.
103. Grimes DA, Lopez LM, Schulz KF, et al. Immediate post-partum insertion of intrauterine devices. *The Cochrane database of systematic reviews* 2010; :CD003036.
104. Grimes DA, Lopez LM, Schulz KF, et al. Immediate postabortal insertion of intrauterine devices. *The Cochrane database of systematic reviews* 2010; :CD001777.
105. Jacob NS, Mahnert N, Livingston JB, et al. Comparison of intrauterine device expulsion rates after aspiration abortion or interval insertion. *Obstetrics and gynecology* 2014; 123 Suppl 1:10S.
106. Reed SD, Zhou X, Ichikawa L, et al. Intrauterine device-related uterine perforation incidence and risk (APEX-IUD): a large multisite cohort study. *Lancet* 2022; 399:2103.
107. Curtis KM, Tepper NK, Jatlaoui TC, et al. U.S. Medical Eligibility Criteria for Contraceptive Use, 2016. *MMWR. Recommendations and reports : Morbidity and mortality weekly report. Recommendations and reports* 2016; 65:1.
108. Espey E, Ogburn T, Hall R, et al. Use of intrauterine device in the setting of uterus didelphys. *Obstetrics and gynecology* 2006; 108:774.
109. Eskew AM, Crane EK. Levonorgestrel Intrauterine Device Placement in a Premenopausal Breast Cancer Patient with a Bicornuate Uterus. *Journal of minimally invasive gynecology* 2016; 23:133.

110. Chi IC, Farr G, Dominik R, et al. Do retroverted uteri adversely affect insertions and performance of IUDs? *Contraception* 1990; 41:495.
111. Avecilla-Palau A, Moreno V. Uterine factors and risk of pregnancy in IUD users: a nested case-control study. *Contraception* 2003; 67:235.
112. Bahamondes MV, Monteiro I, Canteiro R, et al. Length of the endometrial cavity and intrauterine contraceptive device expulsion. *International Federation of Gynaecology and Obstetrics* 2011; 113:50.
113. Liang H, Li L, Yuan W, et al. Dimensions of the endometrial cavity and intrauterine device expulsion or removal for displacement: a nested case-control study. *BJOG : an international journal of obstetrics and gynaecology* 2014; 121:997.
114. Shipp TD, Bromley B, Benacerraf BR. The width of the uterine cavity is narrower in patients with an embedded intrauterine device (IUD) compared to a normally positioned IUD. *Journal of ultrasound in medicine : official journal of the American Institute of Ultrasound in Medicine* 2010; 29:1453.
115. Workowski KA, Bolan GA, Centers for Disease Control and Prevention. Sexually transmitted diseases treatment guidelines, 2015. *MMWR. Recommendations and reports : Morbidity and mortality weekly report. Recommendations and reports* 2015; 64:1.
116. Yamaguti EMM, Sontag Dos Reis ET, Martins WP, et al. Ultrasound-guided repositioning technique for partially expelled intrauterine device: descriptive feasibility study. *Ultrasound in obstetrics & gynecology: the official journal of the International Society of Ultrasound in Obstetrics and Gynecology* 2023; 61:109.
117. Curtis KM, Jatlaoui TC, Tepper NK, et al. U.S. Selected Practice Recommendations for Contraceptive Use, 2016. *MMWR. Recommendations and reports: Morbidity and mortality weekly report. Recommendations and reports* 2016; 65:1.
118. American College of Obstetricians and Gynecologists. ACOG Practice Bulletin No. 121: Long-acting reversible contraception: Implants and intrauterine devices. *Obstetrics and gynecology* 2011; 118:184.
119. Nelson AL. Contraindications to IUD and IUS use. *Contraception* 2007; 75:S76.
120. Zapata LB, Whiteman MK, Tepper NK, et al. Intrauterine device use among women with uterine fibroids: A systematic review. *Contraception* 2010; 82:41.
121. Hatcher RA, Trussel RA, Nelson AL, et al. *Contraceptive Technology*, 20th ed, Ardent Media, New York 2011.
122. Trinh XB, Tjalma WA, Makar AP, et al. Use of the levonorgestrel-releasing intrauterine system in breast cancer patients. *Fertility and Sterility* 2008; 90:17.
123. Correia L, Ramos AB, Machado AI, et al. Magnetic resonance imaging and gynecological devices. *Contraception* 2012; 85:538.