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Efficacy and Safety of Long-Acting Reversible Contraception in Women With Cardiovascular Conditions

Quyen Vu, BAH^a, Elizabeth Micks, MD, MPH^b, Erin McCoy, MPH^b, and Sarah Prager, MD, MAS^b

^aUniversity of Washington School of Medicine

^bDepartment of Obstetrics and Gynecology, University of Washington

Abstract

The physiologic changes that occur during pregnancy can be deleterious to women with a cardiovascular condition. Evidence-based contraceptive counseling and provision is essential in this patient population. While long-acting reversible contraceptives (LARC), which include the intrauterine device (IUD) and the etonogestrel contraceptive implant, have been found to be safe and effective in healthy women, there are inadequate data regarding LARC use in patients with cardiovascular conditions. We conducted a retrospective chart review of women diagnosed with cardiovascular disease who had a copper IUD, levonorgestrel-releasing intrauterine system (LNG-IUS) or contraceptive implant placed at the University of Washington Medical Center from 2007-2012. We abstracted and analyzed patient demographic characteristics, medical conditions, indications for LARC placement, and complications. The sample included 470 women with cardiovascular conditions. The mean age was 34.6 years. One hundred and twenty four (26.11%) were nulligravid and 169 (35.58%) were nulliparous. Four hundred and ten chose the LNG-IUS (87.23%), 33 opted for the copper IUD (7.02%), and 23 chose the etonogestrel implant (4.89%). Eighteen patients (3.83%) had a confirmed IUD expulsion, two patients (0.43%) became pregnant, and there were four cases of pelvic inflammatory disease (0.85%). There were no cases of perforation. There were no confirmed cases of infective endocarditis associated with LARC insertion. In conclusion, LARC devices appear safe with few complications for women with cardiovascular conditions. Clinicians can be reassured that LARC may be offered as an appropriate option when counseling women with cardiovascular disease on safe contraceptive methods.

Keywords

intrauterine devices; contraception; outcome assessment; patient education

Corresponding author: Quyen Vu, Telephone: +1-425-533-8634, quyen.vu@uw.edu, mailing address: University of Washington School of Medicine, Box 356460 1959 Pacific Street, Seattle WA 98105.

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Introduction

In patients with cardiovascular conditions, there are limited data regarding the safety and efficacy of long-acting reversible contraception (LARC).^{1,2} This lack of data is evident in the Centers for Disease Control and Prevention (CDC) United States Medical Eligibility Criteria for Contraceptive Use (USMEC) clinical recommendations: “Theoretical concern exists about the effect of levonorgestrel (LNG) on lipids,” and, “No direct evidence exists on the safety of IUDs among women with peripartum cardiomyopathy. Limited indirect evidence from noncomparative studies did not demonstrate any cases of arrhythmia or infective endocarditis in women with cardiac disease who used IUDs”.¹ The present study examined the safety and efficacy of LARC use in women with cardiovascular conditions.

Methods

We conducted a retrospective chart review of women previously diagnosed with a cardiac condition who had a LARC device (IUD or contraceptive implant) placed at the University of Washington between January 1, 2007 and March 1, 2012. The University of Washington Institutional Review Board approved the study. Data were both abstracted and extracted from the electronic medical records from the University of Washington Medical Center, Harborview Medical Center, and other University of Washington affiliated clinics using Microsoft Amalga Unified Intelligence System. Study data were collected and managed using REDCap electronic data capture tools hosted at the University of Washington.³ We identified subjects using ICD-9 codes for a wide range of cardiovascular conditions (see Appendix 1). We included the following categories of cardiovascular conditions: cardiac arrhythmias, congenital heart disease, heart failure, valvular heart disease, coronary heart disease, pulmonary heart disease, cardiomyopathy, venous and arterial vascular disease, rheumatic heart disease, and hypertensive heart disease. We analyzed patient characteristics, indications, and complications following LARC placement. All analyses were performed in Stata 13.

Results

There were 470 women with cardiovascular conditions who had a LARC device placed during the study period. Baseline patient characteristics, time of LARC device placement, and type of LARC device chosen are summarized in Table 1.

The most common category of cardiovascular diagnosis was cardiac arrhythmia (Table 2). ICD-9 diagnosis codes included in each category of cardiovascular condition as well as the frequencies for each are listed in Appendix 1 (Supplemental Materials). Many patients were noted to have more than one cardiovascular diagnosis.

There were 328 women (69.79%) who had the LARC device placed for contraception. Medical records for 159 women (33.83%) indicated that the LARC device was placed for treatment of dysmenorrhea or abnormal uterine bleeding, including menorrhagia, metrorrhagia, perimenopausal bleeding, and postmenopausal bleeding. Thirty nine women (8.21%) had LARC placement to treat a gynecologic condition not related to bleeding, including carcinoma of the vulva, polycystic ovary syndrome (PCOS), endometriosis,

uterine polyps, ovarian neoplasm, endometrial hyperplasia, and dysplasia of the cervix. Finally, two women chose the LARC method for a reason coded as “Other” in the chart. One experienced migraine headaches related to her menstrual cycle and reported a desire for menstrual suppression. The second opted for an LNG-IUS because she believed the progestin hormone replacement therapy she was previously using was causing urinary incontinence.

Complications following LARC insertion are summarized in Table 3. Four women (0.85%) developed pelvic inflammatory disease (PID) or endometritis after IUD insertion. Notably, two of these had the IUD inserted immediately following an abortion procedure: one underwent suction dilation and curettage (D&C) at 14 5/7 weeks gestation and PID was diagnosed 7 days following the procedure, and the other had a suction D&C at 8 weeks gestation, with PID diagnosed 29 days following the procedure. The third case of PID was diagnosed in a patient who experienced multiple IUD expulsions. One patient (0.21%) developed endometritis after IUD insertion in the setting of a complicated gynecologic history of multiple fibroids and polyps as well as long-standing menorrhagia. This patient's IUD became malpositioned and embedded in the myometrium.

There was one case of confirmed endocarditis that was diagnosed 51 days following IUD insertion. According to the patient chart, the infectious disease department found that this patient's endocarditis was likely caused by drug-resistant *S. viridans* on a vegetation in the left distal pulmonary artery. The patient chart states that the endocarditis was not likely gynecological in origin.

Two women (0.43%) had a confirmed pregnancy with IUD in situ. In the first patient, the IUD was visualized on ultrasound in the lower uterine segment. The IUD was subsequently removed. The second patient had a positive home pregnancy test, and the IUD spontaneously expelled 3 days later. No pregnancies were diagnosed in women with the contraceptive implant.

Three hundred and ninety seven patients (84.46%) were still using the LARC device at the end of the study period.

Discussion

Our case series provides evidence that few women with cardiovascular conditions using a LARC method experience side effects and complications, including pregnancy, with rates comparable to the published data in healthy women.⁴⁻¹⁰ There were only two confirmed pregnancies in our sample of 470 women, which is consistent with the failure rate of <1% in healthy women.⁴ The continuation rate was high, and consistent with other known data on these methods.¹¹

There were several limitations of this study. This is a retrospective case series without a healthy cohort comparison group. The subjects were not randomized to the various methods and were not observed prospectively. Additionally, our patients were selected from one academic medical center, and generalizability may be limited. However, most patients with significant cardiovascular disease typically receive care at a specialized facility.

Despite these potential limitations in available data and generalizability, our study represents the largest case series to date on cardiovascular patients and LARC use. Many patients with cardiovascular disease require anticoagulation at various times, which can cause significantly heavier menstrual bleeding. The LNG-IUS decreases menstrual flow by an average of 90% after 6 months of use, which decreases anemia and improves overall health status, and is likely why it was the most commonly chosen LARC method.¹² Ultimately, the superior efficacy of LARC is of critical importance in these patients who need to either avoid pregnancy altogether or maximize their health prior to conception.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

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References

- Centers for Disease Control and Prevention. U.S. medical eligibility criteria for contraceptive use, 2010. MMWR Early Release. 2010; 59:53–55.
- Thorne S, MacGregor A, Nelson-Piercy C. Risks of contraception and pregnancy in heart disease. Heart. 2006; 92:1520–1525. DOI: 10.1136/hrt.2006.095240 [PubMed: 16973809]
- Harris PA, Taylor R, Thielke R, Payne J, Gonzalez N, Conde JG. Research electronic data capture (REDCap) – A metadata-driven methodology and workflow process for providing translational research informatics support. J Biomed Inform. 42:377–381.
- Trussell J. Contraceptive failure in the United States. Contraception. 2011; 83:397–404. DOI: 10.1016/j.contraception.2011.01.021 [PubMed: 21477680]
- Winner B, Peipert JF, Zhao Q, Buckel C, Madden T, Allsworth JE, Secura GM. Effectiveness of long-acting reversible contraception. N Engl J Med. 2012; 366:1998–2007. [PubMed: 22621627]
- Madden T, McNicholas C, Zhao Q, Eisenberg DL, Peipert JF. Association of age and parity with intrauterine device expulsion. Obstet Gynecol. 2014; 124:718–726. DOI: 10.1097/AOG.0000000000000475 [PubMed: 25198262]
- Speroff, L., Darney, PD. A clinical guide for contraception. Vol. 432. Lippincott Williams & Wilkins; 2010.
- Heinemann K, Reed S, Moehner S, Minh DT. Risk of uterine perforation with levonorgestrel-releasing and copper intrauterine devices in the European Active Study on Intrauterine Devices. Contraception. 2015; 91:274–279. DOI: 10.1016/j.contraception.2015.01.007 [PubMed: 25601352]
- Hidalgo M, Bahamondes L, Perrotti M, Diaz J, Dantas-Monteiro C, Petta C. Bleeding patterns and clinical performance of the levonorgestrel-releasing intrauterine system (Mirena) up to two years. Contraception. 2002; 65:129–132. DOI: 10.1016/S0010-7824(01)00302-X [PubMed: 11927115]
- Mansour D, Korver T, Marintcheva-Petrova M, Fraser IS. The effects of Implanon on menstrual bleeding patterns. Eur J Contracept Reprod Health Care. 2008; 13:13–28. DOI: 10.1080/13625180801959931 [PubMed: 18330814]
- Peipert JF, Zhao Q, Allsworth JE, Petrosky E, Madden T, Eisenberg D, Secura G. Continuation and satisfaction of reversible contraception. Obstet Gynecol. 2011; 117:1105–1113. DOI: 10.1097/AOG.0b013e3182118ad [PubMed: 21508749]
- Hatcher RA, Trussell J, Nelson AL. Contraceptive technology. Ardent Media. 2007; 875

Table 1

Patient Characteristics

Patient Characteristics (n=470)	
Age, mean±SD (range) years	34.6±10.9 (16-77)
Nulligravid	123 (26.2%)
Nulliparous	168 (35.7%)
Insurance Status	
Private	202 (43.0%)
Public	219 (46.6%)
Self-pay	20 (4.3%)
Unknown	29 (6.2%)
Time of Placement	
Clinic	270 (57.5%)
Operating Room	75 (16.0%)
Post-partum visit [*]	53 (11.3%)
Post-partum	23 (4.9%)
Vaginal	12 (60.0%)
Delivery [†]	
C-Section [‡]	8 (40.0%)
Post-abortion	38 (8.1%)
Type of LARC [‡] Device	
LNG-IUS [§]	410 (87.2%)
Cu-IUD	33 (7.0%)
Etonogestrel Implant	23 (4.9%)

^{*} Post-partum visit indicates LARC placement at a separate visit within 6 weeks of delivery. This is separate from placement immediately post-partum.

[†] IUD only. Excludes etonogestrel implant.

[‡] Long-Acting Reversible Contraception

[§] Levonorgestrel Intrauterine System

^{||} Copper intrauterine device

Table 2
Categories of Cardiovascular Conditions

Category	n
Cardiac Arrhythmia	425
Congenital Heart Disease	334
Other	319
Heart Failure	181
Valvular Heart Disease	130
Coronary Heart Disease	129
Cardiac Device	113
Pulmonary Heart Disease	110
Cardiomyopathy [*]	98
Maternal Cardiovascular Disease [†]	71
Venous Disease [‡]	72
Rheumatic Heart Disease	66
Arterial Disease [§]	25
Hypertensive Heart Disease	8

^{*} Cardiomyopathy includes the following diagnoses: hypertrophic obstructive cardiomyopathy, alcoholic cardiomyopathy, primary and secondary cardiomyopathy, and endocardial fibroelastosis

[†] Maternal cardiovascular disease includes: peripartum cardiomyopathy including antepartum and postpartum conditions, congenital cardiovascular disease of mother antepartum, other cardiovascular diseases of mother complicating pregnancy, and other cardiovascular diseases of mother antepartum

[‡] Venous disease includes venous embolism and thrombosis

[§] Arterial disease includes: dissection of the aorta, aortic aneurysm, and arterial dissection

Table 3
Complications Following Long-Acting Reversible Contraception Insertion

Complication	n
Metrorrhagia	27 (5.7%)
Pelvic pain	20 (4.3%)
IUD * Expulsion	18 (3.8%)
Partial	7 (38.9%)
Complete	11 (61.1%)
Menorrhagia	17 (3.6%)
Pelvic Inflammatory	
Disease	3 (0.6%)
Endometritis	1 (0.2%)
Dysmenorrhea	1 (0.2%)
Mood Swings	1 (0.2%)
Uterine perforation	0 (0%)

* Intrauterine device