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Effect of contraceptive choice on rapid repeat pregnancy

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ABSTRACT

Objective: To describe the prevalence of rapid repeat pregnancy (RRP), defined as repeat pregnancy within 18 months of delivery, in a large health system and to determine the impact of contraceptive method on RRP.
Study design: Retrospective cohort.
Results: The prevalence of RRP among patients who delivered in August 2014 (n=804) was 27.2%. After controlling for age and sociodemographic characteristics, women experiencing RRP were less likely to have used long-acting reversible contraception (LARC) [adjusted odds ratio (aOR) 0.45, 95% confidence interval (CI) 0.24–0.85, p=.014; RRP in 19% of implant and 18% of IUD users)] and more likely to have been prescribed a progestin-only pill (aOR 5.106, 95% CI 2.157–12.083, p<.001; RRP in 53% of users) compared to women choosing all other reversible contraceptive methods.
Conclusions: Postpartum LARC decreases the odds of RRP, while a prescription for progestin-only pills is not protective.

1. Background

Rapid repeat pregnancy (RRP) is associated with adverse neonatal outcomes, including small-for-gestational-age and low-birth-weight infants, preterm birth and perinatal death [1]. Maternal outcomes after RRP include an increased risk of anemia [2], uterine rupture [3] and poverty among teen mothers [4]. Studies demonstrate that long-acting reversible contraception (LARC) offered in the immediate postpartum period is a convenient, reliable and cost-effective means of decreasing unintended and short-interval pregnancies [5], but the groups studied have been mainly restricted to adolescents and low-income women [5–7]. Given population-based data demonstrating that postpartum LARC use is rare but protective against unintended pregnancy [8], we sought to assess the prevalence of, and risk factors for, RRP in a health system with a diverse, urban population including both public and private payers, and hospitals that do and do not offer immediate postpartum LARC.

2. Methods

We performed a retrospective cohort study of all patients delivered at PennMedicine in August 2014. Using our institution's clinical data warehouse, we reviewed the medical records of all eligible subjects through February 2016 (18 months after the index delivery), with all billing, diagnostic and procedure codes from our health system available. In addition, charts were manually reviewed to ensure data integrity. We excluded patients with no visits to our health system after delivery and those who had a postpartum bilateral tubal ligation in order to reduce bias from loss to follow-up and because risk of pregnancy after immediate bilateral tubal ligation is estimated to be less than 1/1000 [9].

We defined any subsequent pregnancy within 18 months of the index delivery, including pregnancies ending in a living or demised term or preterm birth, miscarriages, abortions and ectopic pregnancies, as an RRP. We defined “immediate postpartum LARC use” as any documented placement of the etonogestrel subdermal contraceptive implant, the levonorgestrel intrauterine system or the copper T380A intrauterine device prior to postpartum hospital discharge. Only three women chose to have an IUD placed in the 6 weeks prior to their postpartum visit, so these were included in the “immediate group” for analysis. We defined “non-LARC use” as a documented plan to use any of the following methods of contraception after hospital discharge: short-acting hormonal contraceptives (including combined hormonal

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Table 1
Univariate and multivariate analysis of patient characteristics and contraceptive use on RRP

	Univariate analysis				Multivariate analysis	
	RRP[a]	No RRP[a]	OR	95% CI	aOR[b]	95% CI
	N=203	N=542				
Age	27.7 (5.22)	29.5 (6.06)	0.95	0.92–0.98	0.952	0.92–0.98
Race						
Black	107 (53)	242 (45)	-	-	-	-
White	80 (39)	221 (41)	0.82	0.58–1.15	1.033	0.68–1.57
Other	16 (8)	79 (39)	0.39	0.16–0.95	0.448	0.18–1.12
Ethnicity (Hispanic)	22 (11)	48 (9)	1.25	0.73–2.13	1.204	0.68–2.15
Insurance						
Public	110 (54)	243 (45)	-	-	-	-
Private	82 (40)	264 (49)	0.69	0.49–0.96	0.887	0.59–1.33
None	11 (5)	35 (6)	0.69	0.34–1.42	0.787	0.38–1.63
Hospital						
HUP	89 (44)	245 (45)	-	-	-	-
PAH	114 (56)	297 (55)	1.06	0.76–1.46	1.164	0.82–1.66
Parity	1 (0–4)	0 (0–5)	0.99	0.95–1.03	0.99	0.95–1.03
GA at birth						
Term	163 (80)	466 (86)	-	-	-	-
Preterm	28 (14)	51 (9)	1.57	0.96–2.57	1.505	0.91–2.50
Unknown	12 (6)	25 (5)	1.37	0.67–2.79	1.249	0.57–2.73
Contraceptive method[c]						
Non-LARC[d]	188 (93)	476 (88)	-	-	-	-
LARC[e]	15 (7)	66 (12)	0.58	0.32–1.03	0.451	0.24–0.85

HUP, Hospital of the University of Pennsylvania; PAH, Pennsylvania Hospital.
[a] *N* (%), mean (SD), or median (range).
[b] Adjusting for age, race, insurance, hospital, parity and contraceptive.
[c] Categories included both immediate and within 6 weeks; all LARCs were immediate except for three IUDs w/in 6 weeks.
[d] Includes none (47%), injection (10%), COC (3%), patch (0.5%), ring (1%), POP (12%), condoms (15%), tubal ligation (0.5%), spermicide (0.1%) and vasectomy (0.1%).
[e] Includes implant (9%) and IUD (2%).

methods after 21 days and progestin-only methods), injectable contraceptives, barrier methods, abstinence and no contraceptive method. The Institutional Review Board at the Hospital of the University of Pennsylvania approved this study.

Based on previous data from our institution, we assumed that 30% of women would have an RRP [10]. Given the elevated risk of postplacental intrauterine device expulsion, we estimated that the prevalence of RRP among immediate postpartum LARC users would be 20% higher than expected for interval LARC placement [11]. A total sample size of 760 participants was required to have 80% power to detect a 74% reduction [odds ratio (OR)=0.26] in the odds of RRP among postpartum LARC users when compared to all subjects meeting the inclusion criteria who did not choose LARC immediately postpartum. There were 804 deliveries in August 2014, which were sufficient to meet our sample size. We computed associations between baseline characteristics, contraceptive choice and RRP with Pearson χ^2, Fisher's Exact, and Student's *t* tests. We used multivariable logistic regression with a backwards stepwise elimination strategy to adjust for potential confounders of RRP including age, race, insurance, hospital and parity. Analyses were performed with SAS 9.4 (Cary, NC,USA).

3. Results

We assessed all records of women who delivered in August 2014 for eligibility. We excluded 20 records due to loss to follow-up after delivery and 39 for tubal sterilization. Of the remaining 745 subjects with documented follow-up in our health system, 203 (27.2%) experienced RRP. Sociodemographic characteristics, with the exception of age, were not associated with odds of RRP (Table 1). In our multivariable model, women who had an RRP were younger [adjusted OR (aOR) 0.95, 95% confidence interval (CI) 0.92–0.98, p=.003]. For each additional year of age, the odds of repeat pregnancy decreased by 5%. More women choosing immediate postpartum LARC chose an

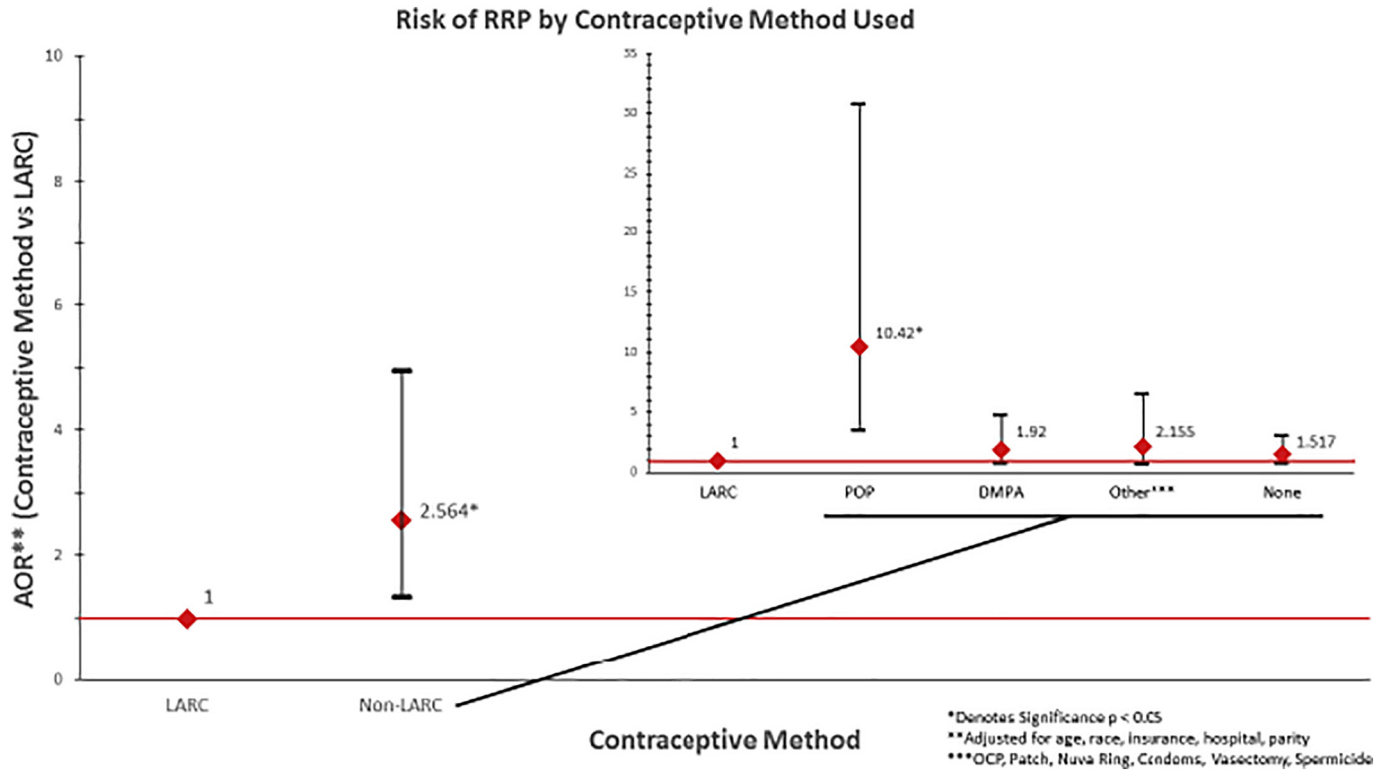

Fig. 1. RRP by contraceptive method.

etonogestrel implant than a copper or levonorgestrel IUD (Table 1). Of the 78 women who chose LARC, 19% (13/67) of implant users and 18% (2/11) of IUD users experienced RRP. Women who had an RRP were least likely to have used an immediate postpartum LARC method (aOR 0.45, 95% CI 0.24–0.85, p=.014, Fig. 1) and most likely to have been prescribed a progestin-only pill (aOR 5.106, 95% CI 2.157–12.083, p<.001) when compared with those choosing any other reversible method, including no method at all.

When short-acting postpartum contraceptive methods were examined individually as compared to long-acting contraceptives, women who chose the progestin-only pill immediately after delivery were at the highest risk of RRP (aOR 10.42, 95% CI 3.52–30.82, p=.0001, Fig. 1), with 53% (18/34) of progestin-only pill users experiencing RRP.

4. Discussion

RRP was common in our diverse population, with more than one in four women experiencing pregnancy within 18 months of delivery. Our prevalence of RRP of 27.2% is similar to the national estimate of 33.1% [12]. Not choosing postpartum LARC increased odds of a repeat pregnancy twofold when controlling for age, race, insurance, hospital and parity, while choosing a progestin-only pill increased the odds of RRP fivefold. Previous studies have demonstrated that LARC use decreases rates of RRP, but study populations were limited to adolescents [5] and low-income women [7], or were subject to recall bias [8]. This study generalizes those results to a more diverse population and benefits from a comprehensive and systematic review of documentation using a clinical data warehouse.

Limitations of our study include its retrospective nature, including the risk of misclassification bias due to documentation errors. If women delivered or terminated repeat pregnancies outside of our health system, our report of RRP prevalence would actually be an underestimate. Our search strategy minimized reporting bias by including all available data from the electronic medical record (EMR). However, there may be uncontrolled confounding as we were limited to analyzing documented information, and we could not determine all sociodemographic variables, for example, marital status and education. We were unable to determine either use of the lactational amenorrhea method (LAM) for contraception or breastfeeding status given a lack of reliable data in the EMR. Although breastfeeding is a potential confounder of the relationship between contraceptive choice and RRP, the most effective methods of contraception are not contraindicated in breastfeeding women. Some women classified as using “no contraceptive method” may have in fact used LAM. We did not collect interim histories on the reasons that almost 20% of LARC users experienced RRP, although we assume that this is due to discontinuation of methods and reflects real-world usage. Finally, while we chose of a single month to identify participants' index delivery, we have no reason to anticipate seasonal variations in contraceptive preference.

Our study has various strengths. We included women from a heterogeneous population of all reproductive ages and multiple insurance payers, expanding upon previous findings to demonstrate the implications of contraceptive choice at the time of delivery. We were able to access follow-up information on a majority of study subjects, minimizing bias due to loss to follow-up. All types of repeat pregnancy outcome were included, in contrast to prior studies that have focused on live births only [8], improving the accuracy of our estimate of RRP. We also isolated progestin-only pills from combined oral contraceptives because progestin-only pills are safe and thus prescribed preferentially in the immediate postpartum period [13], and we demonstrated that use of progestin-only pills is associated with increased adjusted odds of RRP.

Obstetric providers should make LARC available to postpartum patients and use caution when prescribing progestin-only pills to postpartum women who hope to achieve healthy pregnancy spacing.

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