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Springer Science and Business Media Deutschland GmbH
2021

Heikinheimo , O & Suhonen , S 2021 , Contraception After an Induced Abortion and Childbirth . in M C Merigiola & K Gemzell-Danielsson (eds) , Female and Male Contraception . 1st ed. edn , Trends in Andrology and Sexual Medicine , Springer Science and Business Media Deutschland GmbH , pp. 229-242 . https://doi.org/10.1007/978-3-030-70932-7_14

<http://hdl.handle.net/10138/355211>

https://doi.org/10.1007/978-3-030-70932-7_14

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Contraception after an induced abortion and childbirth

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Even though the rate of unintended pregnancy has been declining globally during the last 20 years, unintended pregnancy remains a significant public health issue and burden throughout the world. In 2014 the rate of unintended pregnancy was globally 62/1000 15-44 -year-old women, and varied from that of 41/1000 women in Europe to 96/1000 in Latin America. Also the proportion of unintended pregnancies resulting in an abortion varies markedly in different parts of the world. The highest proportion (70%) was seen in Europe and the lowest (36%) in North America (Bearak *et al.*, 2018). In addition to the high need of induced abortion, unintended pregnancy is associated with an increased risk of adverse pregnancy outcomes, such as low birth weight infant (Hall *et al.*, 2017).

Similarly, recent studies from US show that nearly 50% of all pregnancies are unintended. Approx. 40% of these result in an induced abortion, the risk being higher among older and highly educated women (Finer and Zolna, 2016). Thus, unmet need of contraception remains a significant global public health challenge.

Pregnancy and childbirth bring most women to the attention of medical professionals, and thus providing an opportunity for contraceptive counselling and initiation. Providing effective contraception – regardless of the pregnancy outcome – is highly justified and may even be life-saving in settings where abortion is illegal (Glasier *et al.*, 2019, Morroni and Glasier 2020).

The contraceptive efficacy of a contraceptive method in a given woman depend on her capacity of conceive, frequency and timing of intercourse, degree of compliance and inherent contraceptive protection of the method (Steiner *et al.*, 1996). Thus, women with a recent history of an induced abortion and/or childbirth are highly fertile and likely to resume sexual activity soon after the pregnancy. This is highlighted in studies analyzing the need of subsequent abortion in women with history of abortion. Previous pregnancies (both deliveries and induced abortions) and young age - indicators of high fertility and sexual activity emerge as risk factors for a subsequent abortion. In contrast, the use of effective contraceptive methods requiring minimal daily compliance, such as contraceptive implants and/or intrauterine devices significantly reduce this risk (Heikinheimo *et al.*, 2008, Goodman *et al.*, 2008, Niinimäki *et al.*, 2009, Rose *et al.*, 2012). Therefore, safe and effective contraception, preferably with minimal daily/regular remembering is important if another pregnancy is not desired soon.

In this chapter we focus on contraceptive choices after induced abortion and childbirth. The high efficacy of the long-acting reversible methods of contraception (i.e. contraceptive implants and intrauterine devices) and importance of rapid post-pregnancy initiation of contraception are highlighted.

Return of ovulation and resumption of sexual activity

After an induced abortion

After either medical or surgical abortion, and expulsion of the placenta, the circulating levels of both estradiol and progesterone decline within few days (Lähteenmäki, 1978, Honkanen et al., 2002). The disappearance of hCG follows slightly different pattern and occurs in several phases. The initial half-life of hCG is rapid, less than 20 h following both surgical and medical abortion. However, the total elimination of hCG may take up to 35 days after termination of first trimester pregnancy (Lähteenmäki, 1978).

Nevertheless, the recovery of ovarian function is fast. First ovulation takes place on the average at 16 days after first trimester surgical, and 21 days after administration of mifepristone in medical abortion (Lähteenmäki, 1978, Schreiber *et al.*, 2011). However, it may occur as early as 8 days after early medical abortion (Schreiber *et al.*, 2011). The first post-abortion menstrual cycle is ovulatory in approx. 80-90% of women undergoing a first trimester abortion. Thus, effective contraception without delay is needed after an induced abortion regardless of the method of abortion.

After delivery

In non-lactating women, ovulation rarely occurs until 6 weeks from delivery (Jackson and Glasier, 2011), but earlier ovulation cannot be excluded. It is recommended that these women should start use of contraception 3 weeks after childbirth (WHO MEC 2015, FSRH 2017).

In contrast, exclusively breastfeeding women ovulate seldom (20%) during the first 6 months after childbirth (Lewis *et al.*, 1991). There is, however, great individual variation how strongly lactation inhibits recovery of ovarian function. Therefore, lactation itself cannot be regarded as a method for preventing pregnancy.

Contraception after an induced abortion

Surgical abortion

For several decades surgical abortion has been, and continues to be the standard of care in several countries. Initiation of contraception after surgical abortion is rather straight forward. In the absence of contraindications, all systemic hormonal methods (incl. oral contraceptive pills, and contraceptive implants, injections and patch) may be started immediately after surgical abortion (WHO, 2015).

Also, intrauterine contraception (IUD) can be safely initiated at the time of uncomplicated surgical abortion (WHO, 2015). While immediate IUD insertion is associated with somewhat increased risk of expulsion, the number of women using IUD during follow-up is higher among women receiving the device at the time of abortion (Okusanya et al., 2014). Moreover, post-abortal use of IUD has been proven effective in reducing the need of subsequent abortion. In several cohort studies the use of intrauterine contraception has been associated with 60-70% reduction in the need of subsequent abortion compared to non-IUD contraception

(Goodman *et al.*, 2008; Rose and Lawton, 2012). Thus, insertion of IUD at the time of surgical abortion has become a standard of care and should be liberally provided.

Changing landscape of abortion care

Medical abortion by means of antiprogestin mifepristone followed by administration of synthetic PGE-analogue misoprostol 1-3 days later is being increasingly used in several countries. In the Nordic countries and in Scotland more than 80% of all induced abortions are currently medical abortions (THL, 2019). As misoprostol can be self-administered at home, most women undergoing early first trimester abortion visit the gynecological unit responsible for abortion care only once. As in the case of surgical abortion, all hormonal methods with systemic action can be started at the time of medical abortion (Table 1).

However, increasing use of medical abortion, and recognition of the high efficacy of LARC methods and recommendations for their liberal use in women of all ages pose a challenge to the post-medical abortion contraceptive service-delivery system.

Medical abortion and contraceptive implants

Contraceptive implants are among the most effective contraceptive methods. The high efficacy of implant contraception has also been shown in post-abortal use (Hognert *et al.*, 2016; Raymond *et al.*, 2016).

The optimal timing on implant insertion at the time of medical abortion has been studied in two randomized trials. Recent North European and American studies assessed implant insertion at the time of mifepristone ingestion vs insertion later, following completion of medical abortion (Hognert *et al.*, 2016; Raymond *et al.*, 2016). In both studies the efficacy of medical abortion was not affected by the immediate insertion of the implant. However, the uptake of implant contraception and its use during the follow-up period was significantly higher when provided at the time of mifepristone ingestion. Thus, providing contraceptive implants at the clinic initiating medical abortion is a very logical and cost-effective means of providing effective long-term post-abortal contraception after medical abortion.

Medical abortion and intrauterine contraception

According to current global guidelines intrauterine contraception after medical abortion may be started as soon as the pregnancy has ended (WHO, 2015; FSRH, 2017). In most clinical settings this would imply insertion at post-abortal follow-up visit or at the time of next menstruation. However, the need of post-abortal follow-up visits is questionable, and not routinely recommended in international guidelines on abortion care (WHO, 2015). Also, the compliance with such routine visits is often not good.

We recently performed an RCT comparing early vs. late provision of LNG-IUS following medical abortion. The LNG-IUS was provided within 3 days (i.e. next working day) after early first trimester medical abortion, or on the day of late first trimester (i.e. weeks 9⁺⁰ - 12⁺⁰) or second trimester (12⁺¹ - 20⁺⁰) medical abortion, and compared with that of the routine IUD provision between 2-4 weeks (Korjamo *et al.*, 2014). The uptake

of the LNG-IUS was significantly higher if provided rapidly. However, the rate of partial IUS expulsions was higher among women randomized to early LNG-IUS provision. Nevertheless, the use of IUS at the 6 / 12 mo follow-up was higher among women receiving the device immediately. Moreover, the incidence of various post-abortal complications was similar between the groups randomized to early vs late IUS provision. Also, the bleeding patterns did not differ between the groups of early and late LNG-IUS provision (Table 2, Figure 1). These results are in line with previous studies assessing the use of early (within one week) IUD provision after medical abortion (Sääv et al., 2012)

Thus, intrauterine contraception may be initiated rapidly after medical abortion. Provision within one week after medical abortion is safe and no interval contraception would be needed. The challenges in early IUD provision lie in organizing the service-delivery system as well as in ensuring the compliance to attend the early IUD insertion visit. Structure of the health care system is likely to have a major effect on how successful this is.

Injectable progestin after medical abortion

Injectable contraception, especially that of depot medroxyprogesterone acetate (DMPA) is widely used globally, and considered a LARC by some authors. Immediate injection of DMPA, administered at the time of mifepristone ingestion was compared to later administration in randomized trial performed in the USA and in Mexico (Raymond et al., 2016b). Surprisingly, the rate of on-going pregnancy was significantly higher following immediate injection (3.6 vs 0.9%) (Raymond et al., 2016). However, no such difference in the rate of on-going pregnancy was seen in follow-up cohort study in which DMPA was administered 1-2 days later, i.e. at the time of misoprostol administration (Lang et al., 2018). Theoretically the reduced efficacy of simultaneously administered mifepristone and DMPA might be related to pharmacological interaction of MPA competing with mifepristone for binding to the uterine progesterone receptors. Nevertheless, the possible reduced efficacy of medical abortion must be considered if DMPA is to be administered at the same time.

Contraception after childbirth

Can breastfeeding be used as contraception?

WHO and UNICEF recommend exclusive breastfeeding for 6 months after delivery especially to ensure the health and growth of the newborn (WHO). However, this goal is seldom achieved. Globally, less than 40% of children under the age of 6 months are exclusively breastfed (Victora *et al.*, 2018).

As described previously, breastfeeding suppresses ovulation but for an individual length of time due to individual responses in secretion of GnRH and prolactin to lactation. Lactational Amenorrhoea Method (LAM) as a contraceptive method after childbirth was defined in 1988 (Kennedy *et al.*, 1989). If the infant is less than 6 months old, the mother is amenorrhoeic and the infant is exclusively breastfed, LAM gives a 98% protection from pregnancy. However, all these three criteria must be met. As regards the last of them, this criterium is quite strict; only vitamins, infrequent intake of water or juice are allowed, the breastfeeding must be regular; during daytime feedings should not be more than 4 hours apart, and during

night-time 6 hours apart. Thus, in real life with a newborn, the last criterium is not easily met as rest and sleep are valued and important for the mother, too. Therefore, return of fertility, need of contraception and alternatives in it, must be discussed, information given and an efficient method started early enough. This does not exclude or underestimate the importance and value of breastfeeding.

Interpregnancy pregnancy interval

Recovery, both physical and psychological after an abortion, spontaneous or induced, needs and takes its time. Counseling must be available and offered especially for those with history of psychosocial contacts and needs. Also counseling as regards the eventual risks of future pregnancies and / or the need of contraception must be covered. Similarly, after the childbirth, it takes time and energy both physically, psychologically and socially of the mother and her nearest to adapt to the new and different way and rhythm of the everyday life.

An interval between pregnancies is generally recommended (IPI, interpregnancy interval). Pregnancies with short intervals carry a risk for preterm delivery, small birth weight, neonatal deaths and also maternal anemia (Smith *et al.*, 2003, Bigelow and Bryant, 2015). Generally, the recommended IPI time has been one year, i.e., the time between the delivery and time to next conception. However, WHO recommends an even longer IPI, up to 2 years (WHO, 2007).

Thus, the contraceptive wishes, needs and alternatives must be discussed and offered timely after every pregnancy. However, also contraceptive methods differ and the outcome of the recent pregnancy, delivery and postpartum period must be kept in mind while choosing the method. Table 3 summarizes the usable methods in relation to breastfeeding and time from delivery (WHO MEC, FSRH MEC 2017).

Short and long-acting alternatives in contraception after childbirth (SARCs and LARCS)

Although an interval between pregnancies is recommended, families have different wishes. The constantly advancing age of the mother at first delivery especially in developed countries sets limits to the time when a new successful pregnancy is likely and reasonable. The growth, health and favorable prognosis of both the fetus and the mother are to be evaluated. In Finland, the age at first delivery was 29.3 years in 2018, being 26.6 years in 1990. During the same time period, the percentage of mothers over 35 years of age at the time of delivery increased from 13.3% to 23.7% (THL, 2019). The increasing risks in a new pregnancy and also the method of contraception with advancing age of the mother must be kept in mind.

In most developed countries, a check-up after childbirth is a routine. At least then is the time to discuss, plan and schedule the start of contraception.

SARC

As the name tells, the efficacy of these contraceptive methods per intake does not last long. If pills are chosen, daily remembering is essential, if patch it is weekly, and in case of contraceptive ring at least once a month. Does this fit in the everyday life with an infant is worth discussing with the woman considering SARC methods.

Combined hormonal contraception (pill, patch, ring)

Contraceptives with estrogen-progestin combination (combined hormonal contraception, CHC) carry a risk for deep venous thrombosis and the risk is highest during the first months of use. After childbirth, there is an endogenous tendency for hypercoagulation and thus, risk for deep venous thrombosis (DVT) (Virkus *et al.*, 2011). Therefore, during the first 6 weeks after delivery, other contraceptive methods should be preferred. Naturally, general contraindications for combined hormonal contraception must be taken into account (see section CHC) as well as general health including especially present BMI and blood pressure. There is no data supporting that CHC use started after 6 weeks following childbirth has a negative effect on breastfeeding or infant weight gain (Tepper *et al.*, 2016, Espey *et al.*, 2012).

Progestin-only pills (POP)

Progestin-only contraception does not interfere with breastfeeding, does not carry risks either for the infant or the mother. If POP is chosen, they can be started immediately after delivery. If a follow-up for the infant and mother are included in the health care system, during these visits also contraception, the acceptability and the suitability of the pills must be discussed. Daily remembering is required, and in an everyday life with a newborn, this limits both adherence and acceptability and thus, also the efficacy of the chosen method. Especially when breastfeeding is gradually reduced and ovarian function restored, irregular bleeding and spotting typical to progestin only contraception may occur. Non-breastfeeding mothers can experience this earlier. Counseling concerning the characteristics of the chosen method especially as regards bleeding is essential also in postpartum contraception.

Injectable progestin contraception

Although there has been some concern that progestin-only injections might carry a slight risk for DVT in the first few postpartum weeks or have an unfavorable effect on lactation and infant growth, there is no reliable data supporting this. Thus, the first injection can be given already at the delivery unit, if progestin injections are the chosen method.

LARC

The contraceptive efficacy of long-acting reversible contraception is well-established, and the easiness of the method and trust in it are highly appreciated by the users. However, it is also important in counseling women after childbirth choosing LARC, especially if a new pregnancy is planned in the future, that resumption of fertility is rapid after removal of a LARC method.

Progestin implants

If a longer-term contraception is planned, progestin implant is a valuable option without the need of daily remembering. The implant(s) can be inserted at the delivery unit or later at maternity care or family planning services. Prior to a later insertion is in question, it should be checked that LAM criteria are fulfilled, or POPs have been used as a bridging method or some other contraceptive method and the risk of pregnancy is ruled out. Similarly to POPs, information about the typical effects of the method on patterns of bleeding is important. Depending on the type of implant chosen, either one releasing etonogestrel or levonorgestrel, the recommended time of use can be up to 5 years (ref?).

Intrauterine contraception

Intrauterine devices (IUDs) have traditionally been regarded as a method recommended especially to parous women. As stated above, nulliparous and also nulligravid women are at present satisfied users of this method and LARC with IUDs recommended for them, too.

IUDs either copper-IUDs (Cu-IUD) or hormone(levonorgestrel)releasing intrauterine system (LNG-IUS) offer contraceptive efficacy from 3 up to 10 years depending on the type of IUD. Especially, if the couple considers that the recommended IPI (1-2 years) suits their family plans or no further pregnancies are wished at all, intrauterine contraception is a valuable option to be discussed.

The typical effects on menstrual bleeding and pain and eventual hormonal side effects, if LNG-IUS is chosen, must be covered in the counseling and especially when considering whether to choose copper- or hormone-IUD.

Time of insertion

Early, easy and user-friendly initiation of an efficient contraceptive method after childbirth is important, increases continuation rates as described earlier in this section and reduces the risk of an unplanned pregnancy.

An IUD can be inserted as soon as the placenta is delivered up to 48 hours postpartum. If a cesarean section is performed, the IUD can be fitted in after removal of the placenta. Heavy bleeding, signs of infection or uterine malformations are contraindications for post-placental insertion. The risk of expulsion in post-placental insertions is higher (Jatloui *et al.*, 2018) than during later insertions (≥ 4 weeks), but continuation rates are higher. Especially, if a prompt start of a long-term, effective contraception is important and attendance to a later insertion unlikely due to social or logistic reasons, post-placental insertion is worth considering. In post-placental insertions, a later check-up is recommended to verify that the IUD is *in situ*. If needed, a new IUD can be inserted.

The high efficacy of post-partum IUD provision was highlighted in a recently published FIGO sponsored large multicenter trial performed health care settings from low- and middle income countries. Following systematic training of the health care providers (both medical doctors and nurses) the insertions were highly successful and the rates of IUD expulsion low (<4%) following insertion after both vaginal and cesarean delivery (Makins *et al.*, 2018). Also, the rate of complications such as pelvic inflammatory disease was low (0.1%).

In the time window from 48 hours till 4 weeks post-partum as regards IUD insertion, the risk of IUD expulsion is higher and outweigh the benefits, and is thus not recommended (WHO MEC 2015, FSRH 2017, Jatloui *et al.*, 2018).

After 4 weeks postpartum, the IUD insertion is again a valuable option to be considered in contraception. Especially if a longer time from delivery has elapsed, the appropriate use of preceding contraception whether LAM, condom or pills, and possibility of a new pregnancy are important to evaluate before the insertion.

However, every IUD insertion carries a risk of uterine perforation, although small, 0.4-1.4/1000 insertions (Kaislasuo *et al.*, 2012, Heinemann *et al.*, 2015). Most of the perforations have been diagnosed in women

with a recent delivery (< 6 months) and / or breastfeeding (Kaislasuo *et al.*, 2012, Heinemann *et al.*, 2017). Lactation increased the risk of perforation to 4.5/1000 insertions (Heinemann *et al.*, 2017). Also, the inexperience of the health care provider correlates with the risk of perforation (Heinemann *et al.*, 2015). Experience in the insertion procedure and knowledge of uterine involution in the puerperium is important, the uterus is smaller, its walls are thinner and softer.

If an LNG-IUS is inserted, it is important to inform that irregular spotting might occur during the first few months similarly to insertions during normal ovarian function and is due to the mechanism of action of the IUS on the endometrium and does not necessarily mean resumption of menstruation.

Table 4 summarizes the risks and benefits of the different post-abortion and -partum IUD insertion times.

Emergency contraception

Oral options

Ovulation is unlikely in breastfeeding women during the first 3 weeks after childbirth. After this, emergency contraception (EC) is recommended in case of unprotected sex. In exclusively breastfeeding women fulfilling LAM criteria, especially if the time since delivery is close to 6 months, EC must also be kept in mind and used if needed. If breastfeeding is partial, EC is important already earlier. Both levonorgestrel or ulipristal acetate can be safely used in the postpartum period. If a breastfeeding mother chooses to use ulipristal acetate, she must be informed not to breastfeed during the first week after taking EC. However, she must be encouraged to express the milk to maintain lactation. Levonorgestrel is not excreted to milk in such an extent, that the mother could not continue breastfeeding.

IUD

The most effective alternative in EC is copper-IUD. The general contraindications of IUD insertion are to be remembered. If after resumption of menstruation, the bleedings are too heavy or painful, other options must be considered. If not, a long-term effective contraception can be continued.

Service delivery system and uptake of post-abortal and postpartum contraception

Motivation to initiate effective contraception is typically at its highest immediately after an induced abortion (Benson *et al.*, 2018). This has been highlighted in several recent studies comparing rapid vs delayed initiation of various contraceptive methods such as contraceptive implants (Hogenert, USA), LNG-IUS (Korjamo) or DMPA (Cameron). Besides the higher uptake of these various methods immediately after abortion, patient satisfaction is higher and number of subsequent unwanted pregnancies lower. It is thus important to utilize this window-of-opportunity in providing effective contraception. (Table 4)

Also, the service-delivery system is has a significant effect on the uptake of various contraceptive methods after an induced abortion and childbirth (Pohjoranta *et al.*, 2020; Gyllenberg *et al.*, 2020). The value of free-of-charge contraceptive provision especially regarding the uptake of LARC methods has been shown repeatedly in different health care settings (Secura *et al.*, 2014, Gyllenberg *et al.*, 2020). In a randomized trial routine provision of intrauterine contraception as part of abortion significantly reduced the need of

subsequent abortion during five years of follow-up (Pohjoranta *et al.*, 2020; Figure 2). Thus, providing post-pregnancy contraception rapidly and as part of the overall pregnancy (either abortion or childbirth) care are important elements of successful post-pregnancy contraceptive care.

Legends to the figures:

Figure 1

Bleeding profiles after fast-track (≤ 3 days) or delayed (2–4 weeks) LNG-IUS insertion following early first trimester medical abortion. Heavy bleeding was described as the need of large sanitary towels during the day, or overflow at night; bleeding as the need of normal sanitary towels or tampons; and spotting as the need of panty liners or small tampons, or no need of sanitary protection (Korjamo *et al.*, 2017)

Figure 2

Rate of subsequent TOP during follow-up following intervention (provision of IUD as part of abortion care) vs in the control group (provision of oral contraceptives with the possibility of obtaining free-of-charge IUD from the primary health care). Shown are (A) annual rate of subsequent TOP during the 5-year follow-up (/1000 years of follow-up) and (B) average rate of subsequent TOP during the 5-year follow-up (/1000 years of follow-up) (Pohjoranta *et al.*, 2020).

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Table 1

When to start contraception after medical abortion? - Strategies modified according to different service provision

	DAY OF		
	Mifepristone administration	Misoprostol administration	1.-(2.) weeks after
CHC/POP		+	
Implant	+	+	(+)
DMPA	(+)	+	(+)
IUD/IUS		+	+

Table 2

Fast-track/immediate vs delayed insertion of the LNG-IUS after medical abortion (Korjamo et al., 2018)

	Fast track	Delayed	RR (95%CI)	P-value
Insertion successful	95.5%	84.7%	1.13 (1.04–1.22)	0.004
Expulsion (total or partial) by 3 mo	20.7%	4.0%	5.22 (1.88–14.55)	
Verified IUS use at 3 mo	72.2%	57.3%	1.26 (1.05–1.51)	0.014
Verified IUS use at 1y	62.4%	39.7%	1.57 (1.23–2.02)	<0.001
New pregnancy by 1y	4.5%	12.2%	0.37 (0.15–0.91)	0.027

Table 3

Safe windows (MEC1-2) to start contraception after childbirth in relation to time from delivery and lactation when general contraindications have been excluded (FSRH 2017)

<i>Lactation</i>	<i>Method/ time from delivery</i>		
	<i>CHC</i>	<i>PO (pill, implant, injection*)</i>	<i>IUD</i>
Breastfeeding	6 weeks-6 months MEC2 > 6 months MEC1	Immediately *0-6 weeks MEC2 *> 6 weeks MEC1	0-48 H MEC1 ≥4 weeks MEC1
Non-breastfeeding	3-6 weeks MEC2 > 6 weeks MEC1	Immediately MEC1	0-48 H MEC1 ≥4 weeksMEC1

Table 4

Immediate/early initiation of LARC in post-abortal and post-partum contraception – a win-win strategy

	Immediate/early	Delayed
Patient satisfaction	Optimal	Decreased
Uptake of the method	High	Lower
Compliance during follow-up	Optimal	Decreased
Need of additional visits	Not needed	Needed
Risk of unplanned pregnancy	Low	Higher in some studies
Cost efficacy	Optimal	Decreased

Figure 1

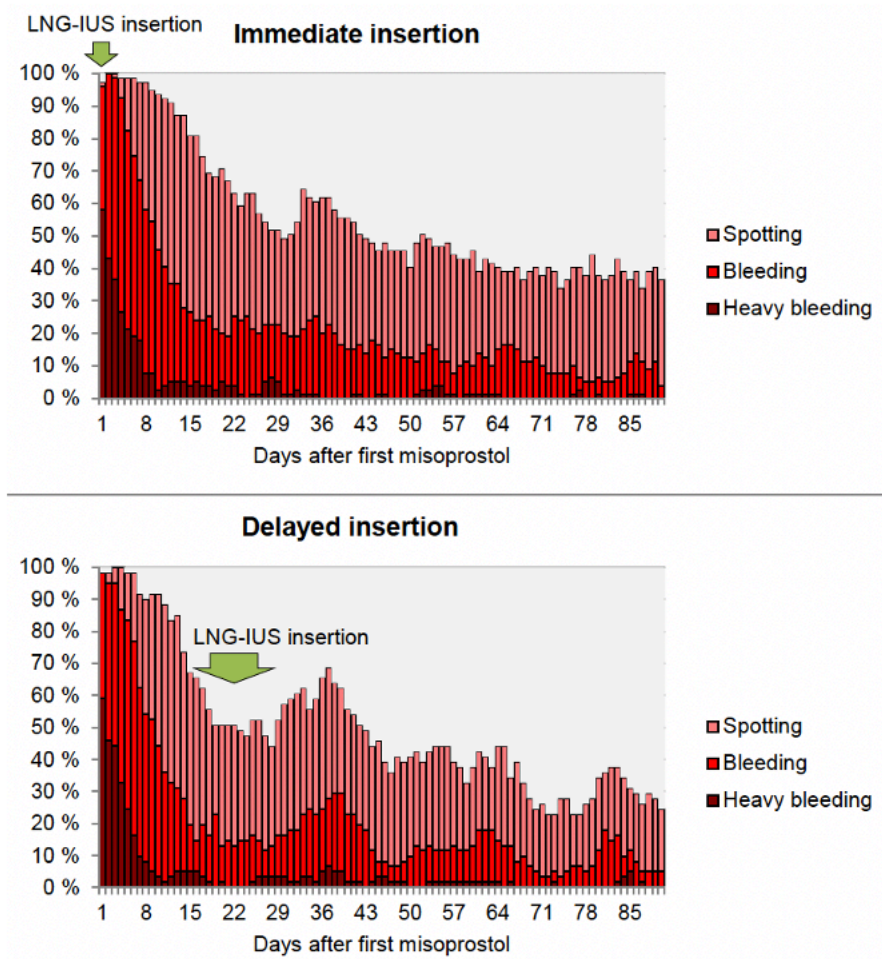


Figure 2

