Timing of postpartum intrauterine device placement: a cost-effectiveness analysis

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Objective: To determine if immediate postpartum (PP) intrauterine device (IUD) placement prevents pregnancy and is cost-effective compared with routine placement.
Design: We developed a decision-analysis model to determine the number of pregnancies prevented and the cost-effectiveness of immediate PP IUD placement defined as within the first 10 minutes of placental expulsion compared with routine placement at the PP visit. Associated costs and probability estimates for adherence to PP follow-up, IUD placement, expulsion, and pregnancy were determined from the literature.
Setting: Hospital and outpatient facility.
Patient(s): Women desiring PP IUDs.
Intervention(s): IUD placement.
Main Outcome Measure(s): The main outcome measure was the number of pregnancies prevented per 1,000 women. The secondary outcome was an incremental cost-effectiveness ratio (ICER) defined as the marginal cost per quality-adjusted life-year (QALY) gained. An ICER of <$50,000/QALY gained was considered to be cost-effective.
Result(s): Immediate PP IUD placement prevented 88 unintended pregnancies per 1,000 women over a 2-year time horizon. Immediate PP IUD placement was the dominant strategy. For every 1,000 women who desired a PP IUD, attempted immediate PP placement resulted in a cost savings of $282,540 and a gain of 10 QALYs. The model is most sensitive to the cost of an undesired pregnancy. When the cost of a live birth is <$6,000, immediate placement is no longer cost-saving but remains cost-effective. Monte Carlo simulation demonstrates that immediate PP IUD placement is cost-effective in 99% of simulations.
Conclusion(s): Immediate PP IUD placement is a dominant strategy that prevents unintended pregnancy. (Fertil Steril® 2015;103:131–7. ©2015 by American Society for Reproductive Medicine.)
Key Words: Contraception, QALY, utility, expulsion, pregnancy

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According to the Centers for Disease Control (CDC) and the National Vital Statistics (NVSS), ~10% of women of reproductive age become pregnant annually (1). Of these pregnancies, ~50% are unintended (1). During pregnancy, given the frequent nature of prenatal visits, physicians have a unique opportunity to discuss, counsel, and readdress contraceptive planning. Despite this fact, within the first postpartum year, women have a particularly high pregnancy rate, ranging from 6% to 40% depending on the population (2–6).

American women are very familiar with contraception. In fact, 99% of women of reproductive age in the United States have used contraception in their lifetime (1). However, the average annual probability of an unintended pregnancy during a woman's reproductive years despite contraceptive use is ~12% and as high as 17% with condom use (1). The unintended pregnancies among contraceptive users are more frequently related to inconsistent use and patient error than to

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contraceptive failure (1). Intrauterine devices minimize these patient-related factors while providing a long-term effective and reversible method of contraception. The vulnerability of postpartum women to unintended pregnancy makes immediate post-placental placement of intrauterine devices (IUDs) an appealing solution (2–6). Although the American Congress of Obstetricians and Gynecologists state that the immediate postpartum period is a "favorable time" for insertion, this practice has not been widely adopted in the United States (2, 3, 7). Concerns over the possible risk of infection, bleeding, higher expulsion rates, and even reimbursements have limited the use of immediate placement. Multiple studies have been conducted comparing immediate and routine placement of postpartum IUDs. All of the studies show a higher expulsion rate in the immediate post-placental groups (18%) compared with routine placement (4%); however, infection rates are negligible and use at follow-up is similar (3, 8–14).

Given these findings, immediate post-placental IUD placement may be advantageous for women, particularly those who may resume intercourse before their postpartum clinic visit or those who do not attend a postpartum visit. However, in this era of health care reform, an important consideration is the cost-effectiveness of such a medical practice. Earlier research has shown that IUDs are highly cost-effective methods of contraception (15, 16). However, the cost-effectiveness of immediate post-placental IUD insertion is unknown. Therefore, we constructed a decision-analysis model to evaluate both the number of unintended pregnancies prevented and the associated incremental cost-effectiveness of immediate post-placental insertion compared with routine insertion at the postpartum visit.

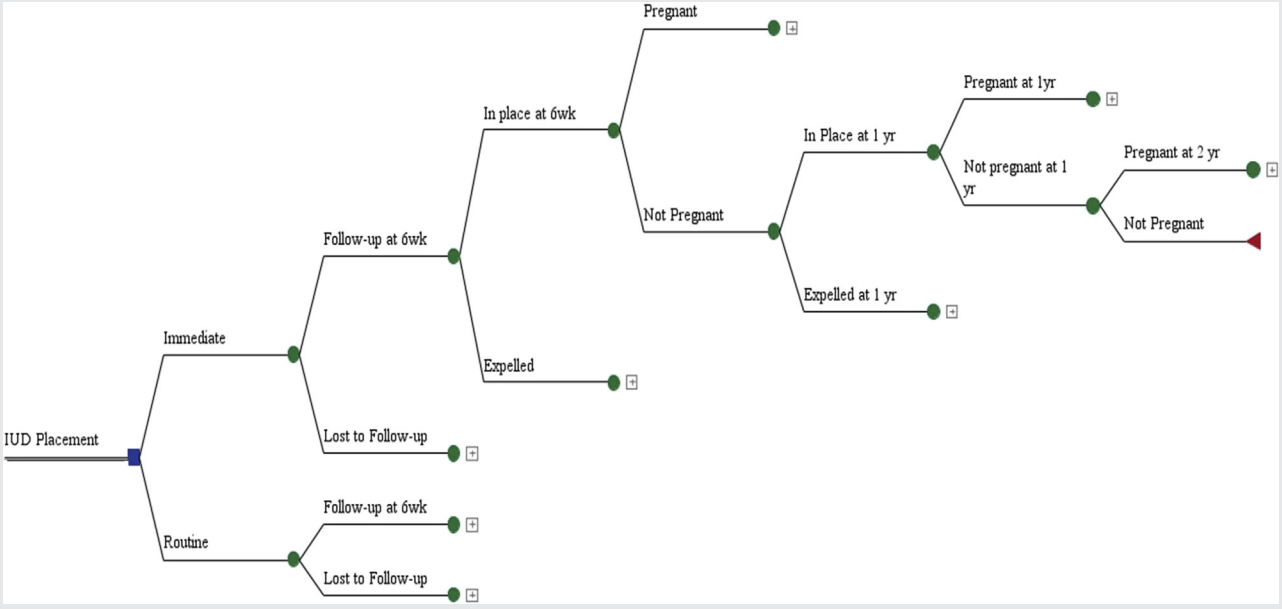
MODEL DESIGN

We designed a decision-tree model with the use of TreeAge Pro 2014 (TreeAge Software) that compared the expected costs and health outcomes of immediate and routine placement of postpartum IUDs. Figure 1 shows a simplified schematic of the decision tree. Immediate placement (strategy 1) was defined as placement within 10 minutes of placental expulsion. Routine placement (strategy 2) was defined as placement at 6–8 weeks postpartum. This study used data from both the levonorgestrel intrauterine system and the copper TCu380 IUD. The decision model was used to simulate health system outcomes and costs from the health care perspective over a 2-year time horizon.

Strategy 1 included women who underwent immediate postpartum IUD placement. It was assumed that 18% of these women experienced IUD expulsion before their postpartum visit (3). Nonpregnant women with an expelled IUD that followed up at the 6–8 week postpartum visit were eligible to receive an additional IUD if they so desired (5, 12, 17, 18). The original or second IUD either remained in place or was expelled by the 1-year time point. The women whose IUD remained in place at 1 year and were not pregnant continued with that method until year 2. Outcomes included successful contraception, intrauterine pregnancy, ectopic pregnancy, miscarriage, or pregnancy resulting in termination. The costs associated with each outcome were considered.

Strategy 2 included women who received routine IUD placement. Based on earlier studies on postpartum follow-up rates, it was assumed that 81% of these women attended their postpartum visit at 6–8 weeks (12, 17, 18) and that

FIGURE 1



A simplified version of the decision tree used in the study. Strategy 1 represents immediate postpartum placement. Strategy 2 represents placement at the routine 6–8-week postpartum visit. IUD = intrauterine device.

Washington. Postpartum IUD cost-effectiveness. Fertil Steril 2015.