Probability of pregnancy after sterilization: A comparison of hysteroscopic versus laparoscopic sterilization

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Executive Summary

In the United States, 345,000 women undergo sterilization annually and a total of 10.3 million women rely on female sterilization (when a woman gets her "tubes tied"). Recently, an increasing number of women are undergoing hysteroscopic sterilization instead of laparoscopic sterilization each year. Advantages of hysteroscopic sterilization include that it is a non-incisional method, avoids the abdominal entry required with laparoscopic sterilization (which may be especially important in women with extensive scar tissue or significant medical problems), can be performed as an office procedure, and avoids general anesthesia. However, unlike laparoscopic sterilization on which women can immediately rely for pregnancy prevention, hysteroscopic sterilization is a multi-step process that includes the need to use additional effective birth control for at least 3 months until blockage is proven on hysterosalpingogram (HSG), an X-ray dye test, before it can be relied upon. Each step of this process introduces a chance of error or failure, and may increase the risk of unintended pregnancy. Furthermore, it is possible that pregnancies may occur after a successful hysteroscopic sterilization procedure, just as they do after laparoscopic sterilization. Unfortunately, little is known about the risk of pregnancy after hysteroscopic sterilization.

The objective of this study was to compare the probability of pregnancy after hysteroscopic to laparoscopic sterilization procedures.

An evidence-based clinical decision analysis using a Markov model was performed to estimate the probability of pregnancy after a hysteroscopic sterilization procedure, a laparoscopic sterilization procedure with bipolar coagulation, and a laparoscopic sterilization procedure with silicone rubber band application over 10 years. For the model, procedure success, probability of completing follow-up testing, and risk of pregnancy after different sterilization procedures were estimated from published sources.

In the base case analysis, for all age groups, at all points in time after the sterilization procedure, the initial and cumulative risk of pregnancy after sterilization is higher for hysteroscopic than laparoscopic sterilization, either by bipolar coagulation or silicone band application. The pregnancy rate per 1,000 women at one year post-procedure is 56 women for hysteroscopic sterilization, 7 women for laparoscopic sterilization with silicone rubber band application, and 3 women for laparoscopic sterilization with bipolar coagulation. At ten years post-procedure, the cumulative pregnancy rate per 1,000 women is 84 women for hysteroscopic sterilization, 30 women for laparoscopic sterilization with silicone rubber band application, and 24 women for laparoscopic sterilization with bipolar coagulation.

Sensitivity analyses predict that hysteroscopic and laparoscopic sterilization procedures would have an equivalent pregnancy risk of approximately 70 per 1,000 women at ten years if the probability of successful laparoscopic sterilization drops to 92% for both bipolar coagulation and silicone ring application, and the probability of successful bilateral coil placement on first hysteroscopic sterilization attempt increases to 97% or the probability of returning for a mandated HSG increases to 99%.

Based on available data, the initial and cumulative risk of pregnancy after sterilization is higher for hysteroscopic than laparoscopic sterilization, either by bipolar coagulation or silicone band application.