

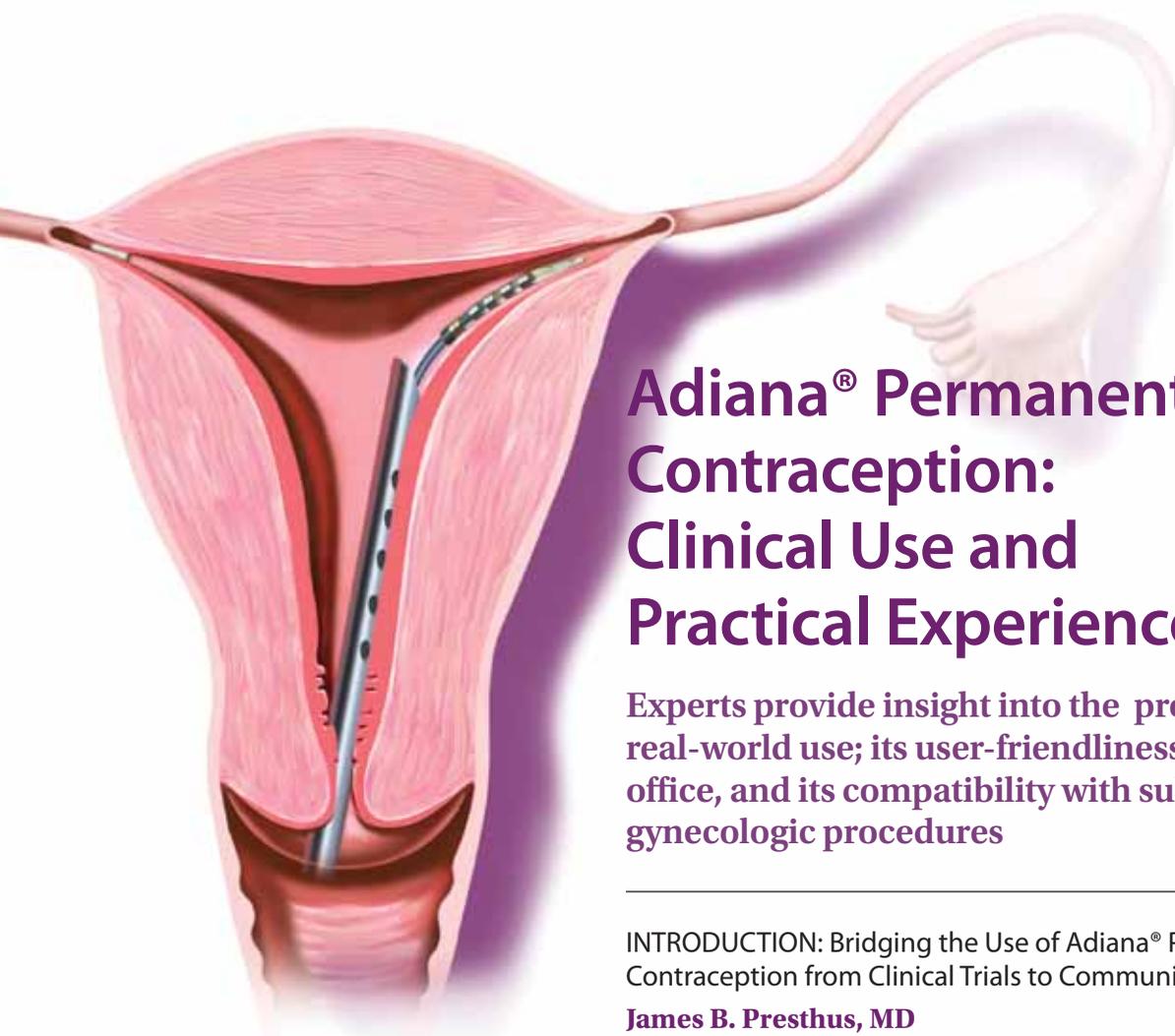
Funding to support the preparation of this supplement was provided by Hologic, Inc.

SUPPLEMENT TO

OBG
MANAGEMENT

January 2011

Available at obgmanagement.com



Adiana® Permanent Contraception: Clinical Use and Practical Experience

Experts provide insight into the procedure's real-world use; its user-friendliness in the office, and its compatibility with subsequent gynecologic procedures

INTRODUCTION: Bridging the Use of Adiana® Permanent Contraception from Clinical Trials to Community Practice

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Intrauterine Procedures in Women Who Have Previously Undergone Adiana® Permanent Contraception

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Bridging the Use of Adiana® Permanent Contraception From Clinical Trials to Community Practice

James B. Presthus, MD
EASE Trial Investigator



The contraceptive needs of women change as they progress through life. Nearly all sexually active women (98%) aged 15 to 44 years have used at least one form of contraception.¹ In women aged 35 to 44 years,

female sterilization is the most common form of contraception, and the second most common choice of contraception in those aged 15 to 44 years.¹

With the approval of transcervical sterilization, permanent female sterilization is now less invasive. In 2009, the US Food and Drug Administration approved Adiana® Permanent Contraception (Hologic™, Inc., Marlborough, Mass.), a female sterilization procedure that involves surgical implantation of a polymer matrix into the fallopian tubes.² The EASE (Evaluation of the Adiana System for Transcervical Sterilization Using Electrothermal Energy) pivotal trial demonstrated safety and efficacy of Adiana in 645 women aged 18 to 45 years. The 3-year pregnancy prevention rate was 98.4%.²

DISCLOSURES AND ACKNOWLEDGEMENTS

Dr. James B. Presthus is a paid consultant for Hologic, Inc., and an active speaker, preceptor, and investigator. He is also a consultant and investigator with stock ownership for Interlace Medical, and a consultant and speaker for American Medical Systems and Olympus/Gyrus/ACMI.

Industry support for this study was provided by Hologic, Inc., Marlborough, MA. Editorial support was sponsored by Hologic, Inc., and provided by Ed Shifflett, PhD, and Amanda McGeary, MS, at AlphaBioCom.

During its first year of use, approximately 5,000 Adiana procedures have been performed. A community-based survey was conducted to evaluate US physicians' experiences with Adiana. Results of the survey are presented in "Results of a Community-based Survey Evaluating Pregnancy Prevention with Adiana Permanent Contraception."

The option to perform the Adiana procedure in the office offers several benefits to both patient and physician. Performance of the Adiana procedure in two different settings is reported in "The Adiana Procedure in the Office Setting Compared With the Operating Room."

Considering the age (35 to 44 years) of many women who choose permanent sterilization to prevent pregnancy, it is likely that many patients will need to undergo subsequent gynecologic interventions. Safety data from the EASE trial are evaluated in "Intrauterine Procedures in Women Who Have Previously Undergone Adiana Permanent Contraception."

The aforementioned Adiana data provide insight into 1) real-world use of the procedure and 2) its compatibility in the office and with subsequent gynecologic procedures. Data presented here are encouraging, and show how the Adiana procedure can be easily integrated into clinical practice. ■

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1. Chandra A, Martinez G, Mosher W, Abma J, Jones J. Fertility, family planning, and reproductive health of U.S. women: Data from the 2002 National Survey of Family Growth. National Center for Health Statistics. *Vital Health Stat.* 2005;23(25):1-160.
2. Adiana Permanent Contraception Instructions for Use. Marlborough, MA: Hologic, Inc.; 2009.

Results of a Community-based Survey Evaluating Pregnancy Prevention With Adiana® Permanent Contraception

Randall S. Starcher, MD

KEY POINTS

- This was a US community-based survey evaluating 1) physicians' experiences with permanent sterilization; 2) preferences when performing the Adiana procedure; 3) hysterosalpingogram (HSG) evaluations; 4) efficacy trends (commercial use); 5) ease-of-use; and 6) opinions on Adiana compared with another transcervical sterilization product
- The majority (79.8%) of respondents estimated that more than 85% of patients are bilaterally occluded at the 3-month HSG and can rely on Adiana. Adiana is compatible with an in-office setting (86.7%). Patients are generally satisfied with the procedure (97.5%). The procedure compares favorably to another transcervical sterilization procedure
- In its first year of commercial use, Adiana offers a reliable method of permanent contraception that can be safely performed in the hospital or office setting

ABSTRACT

Objective To obtain a better understanding of physicians' current opinions of Adiana® Permanent Contraception, and how the procedure compares with another transcervical sterilization procedure.

Methods Survey invitations were sent to all Adiana-trained physicians in the United States (US)

DISCLOSURES AND ACKNOWLEDGEMENTS

Dr. Randall S. Starcher participates as a consultant and advisor for Hologic, Inc.

Industry support for this study provided by Hologic, Inc., Malborough, MA. Editorial support was sponsored by Hologic, Inc., and provided by Amanda McGeary, MS, at AlphaBioCom.

and all US EASE pivotal trial investigators. The survey was designed to evaluate physician experience with Adiana's clinical performance characteristics, including anesthesia, compliance with hysterosalpingogram (HSG), and the observed rate of tubal occlusion.

Results Survey invitations were sent to 337 physicians (168 physicians began the survey; 156 completed it). Physician responses represent experience with approximately 1,500 patients. Physicians who responded to the survey reported that the majority of hysteroscopic sterilizations (55%) are performed in-office, and the majority of respondents perform 10 to 25 hysteroscopic sterilizations annually. Physicians (59.1%) reported that more than 95% of patients return for the 3-month HSG; 79.8% (126) estimated that over 85% are bilaterally occluded. A large majority (93.7%) agreed or strongly agreed that the Adiana device can be easily deployed, and 86.7% agreed or strongly agreed that the procedure is compatible in the office setting. Among physicians surveyed, 97.5% agreed or strongly agreed that patients are generally satisfied with the Adiana procedure and that patient satisfaction is similar or better compared with another transcervical sterilization product (83.5%).

Conclusions The Adiana procedure provides a reliable method of permanent contraception, which is well-accepted by patients and physicians. Physicians responding to this survey recognized the value of a hysteroscopic sterilization procedure that can be performed in either a hospital or office setting.

INTRODUCTION

In the United States (US), there were 75.2 million women of reproductive age (15–49 years) in 2008. This number is expected to reach 76 million in 2015.¹ Age, sexual activity, number of partners, desire to have children, and family history of certain diseases can influence a woman's contraceptive choice.²

As of 2002, 10.3 million US women relied on female sterilization.³ In the US, female sterilization is the most common form of contraception for women aged 35 to 44 years and the second most common choice for women aged 15 to 44 years.³ Annually, 684,000 women undergo sterilization procedures.⁴

Compared with tubal ligation, transcervical sterilization offers several advantages, including decreased potential for complications and greater convenience for patients. Incisions are not required, and patients typically experience less discomfort and shorter recovery time. Transcervical sterilization may be performed in a hospital or office setting. It is possible that this option may result in more women electing to undergo the procedure in-office, as many women may be more comfortable being in their regular doctor's office rather than a less familiar hospital setting.

Adiana® Permanent Contraception (Hologic™, Inc., Marlborough, Mass.) is a transcervical sterilization system indicated for women who desire permanent birth control by occlusion of the fallopian tubes. Here, the findings from a US community-based survey evaluating physicians' experiences with Adiana are presented. The survey was designed to collect information on baseline characteristics of commercial use of Adiana to gauge physician response to the training and performance characteristics of the product.

METHODS

Physicians were invited by email to participate in the Web-based survey, including all those trained to use Adiana since its approval in the US and all US EASE (Evaluation of the Adiana System for Transcervical Sterilization Using Electrothermal Energy) trial investigators.

TABLE 1

Demographic make-up of respondents

Demographic consideration	N	Percentage (%)
Type of practice		
Academic practice	12	7.4
Partnership/multi-specialty	13	8.0
Partnership (ObGyn)	59	36.4
Private practice (ObGyn)	78	48.1
Practice location		
Rural	13	8.0
Suburban	101	62.3
Urban	48	29.6
Years in practice		
<5 years	9	5.6
5–10 years	37	22.8
11–20 years	62	38.3
>20 years	54	33.3

ObGyn, Obstetrics and Gynecology.

Participants who completed the survey were offered compensation. The survey was available online for 30 days (August–September 2010). After the survey was open for approximately 14 days, email reminders were sent to unresponsive physicians. One week prior to the close of the survey, additional email reminders were sent to physicians who had begun but not completed the survey. The 29 multiple-choice–question survey was designed to evaluate several areas of practice specific to Adiana. Questions focused on: 1) experiences with permanent sterilization; 2) preferences when performing the Adiana procedure; 3) hysterosalpingogram (HSG) evaluations; 4) efficacy trends (commercial use); 5) ease-of-use; and 6) opinions on Adiana compared with another transcervical sterilization product.

RESULTS

Respondents

In total, 337 physicians were invited to participate in the survey; 168 physicians began the survey, and 156 completed it. Physician responses

TABLE 2
Experience with permanent sterilization

	N	Percentage (%)
Location of hysteroscopic sterilization		
In-hospital	N/A	26.86 (mean %)
In-office	N/A	54.27 (mean %)
Other (i.e., surgical center)	N/A	19.11 (mean %)
Number of hysteroscopic sterilizations performed per year		
<10	18	11.2
10–25	81	50.3
25–50	43	26.7
50–100	14	8.7
>100	5	3.1
Number of laparoscopic tubal ligations performed per year		
<25	132	85.0
25–50	22	13.7
50–100	5	3.1
101–150	2	1.2

N/A, Not applicable.

represent experience with approximately 1,500 patients and cases. There was good geographic and practice-type representation (TABLE 1, page S3). Almost half of physician-respondents work in private practice obstetrics and gynecology (ObGyn) offices in suburban US areas.

Procedural Information

Physicians who responded to the survey reported that almost 55% of hysteroscopic sterilizations are performed in-office, 27% in-hospital; the remaining 19%, at other sites (e.g., ambulatory surgical center)(TABLE 2). The number of hysteroscopic sterilizations performed annually varied greatly. The majority of physicians (50.3%) perform 10 to 25 hysteroscopic sterilizations annually; a small percentage (3.1%) perform more than 100 hysteroscopic sterilizations. In the previous year, 49.1% of physicians performed 5 to 10 Adiana procedures; 8.1% of physicians performed more than 25 Adiana procedures. However,

respondents predict their number of procedures will increase; 38 physicians (23.5%) expect to perform more than 25 Adiana procedures next year (FIGURE 1).

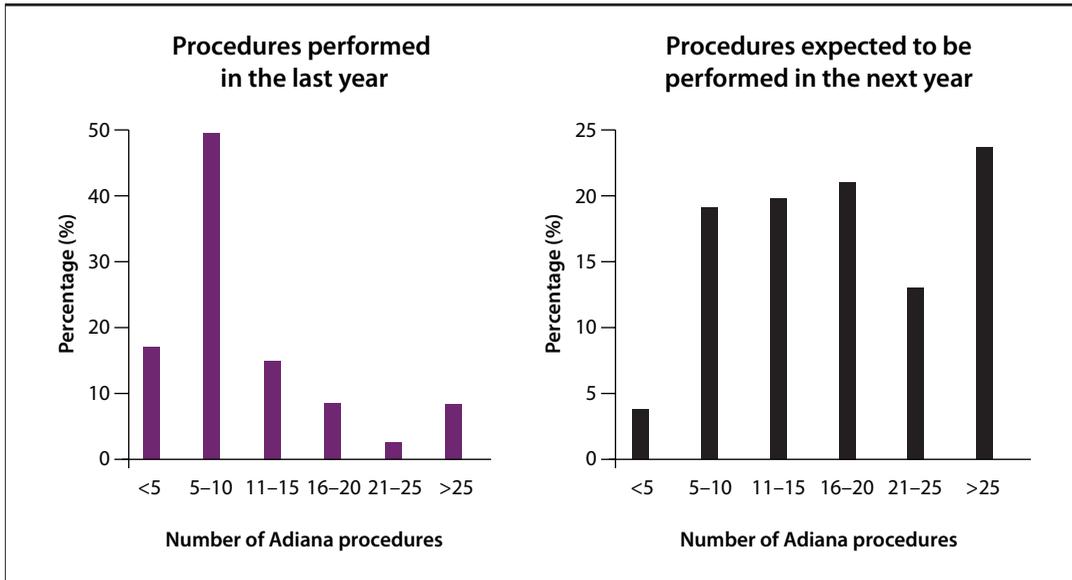
Fifty physicians (30%) reported using a paracervical block as anesthesia during in-office hysteroscopic sterilization procedures. In contrast, when performing hysteroscopic sterilization procedures in-hospital, 20 physicians (12.4%) use paracervical block and 106 physicians (65.8%) use general anesthesia. Approximately 43% of physicians prefer to perform the Adiana procedure during the early to mid-follicular phase of the menstrual cycle, while the rest of the procedures appear distributed throughout the cycle. Fifty-nine physicians (36.6%) reported that cycle timing is irrelevant because patients are prescribed cycle-suppressing medication. The preferred distention media for the Adiana procedure is glycine (54.4%); others report using sorbitol (22.5%), mannitol (13.1%), a mannitol-sorbitol mix (8.8%), or other (1.3%).

POST-PROCEDURE FOLLOW-UP

Overall, 85 physicians (53.1%) reported that more than 95% of patients comply with contraception use during the waiting period following the procedure. Ninety-four physicians (59.1%) reported that over 95% of patients return for the 3-month HSG evaluation; 49 (30.8%) reported that 75% to 95% of patients return for the evaluation. Physicians (43.1%) prefer to perform the HSG during the early to mid-follicular phase of the menstrual cycle. The majority of HSGs are conducted by the gynecologist/a partner (46.3%). Whereas 46.3% of respondents always review the confirmatory HSG film, 25.6% never review the film. The ability to rely on Adiana after the film has been reviewed is most often conveyed to the patient by the gynecologist (74.4%). Most participants (126; 79.8%) estimated that more than 85% of patients are bilaterally occluded at 3 months. The majority of physicians (96; 60.8%) estimated that more than 95% of patients are bilaterally occluded at the 3-month HSG and can rely on Adiana.

FIGURE 1

Compared with the last 12 months, physicians expect to perform more Adiana procedures over the next year



Of those who reported a rate of less than 95% bilateral occlusion, 30 physicians (19%) estimated a bilateral occlusion rate of 86% to 95%; 17 (10.8%) estimated a rate of 76% to 85%; 15 (9.5%) estimated a rate lower than 75% (FIGURE 2).

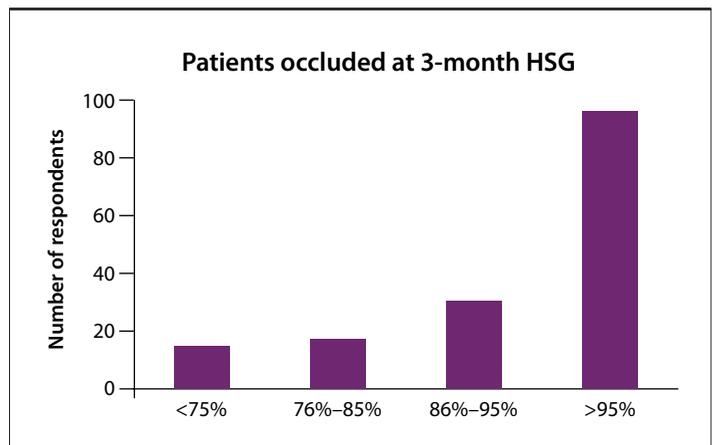
EXPERIENCE WITH THE ADIANA DEVICE

A main objective of this survey was to evaluate the ease-of-use of Adiana as an individual device (TABLE 3A, page S6) and compare it with another transcervical sterilization product (TABLE 3B). When comparing groups, alpha values ranging from 0.7 to 0.8 are considered satisfactory.⁵ In terms of ease and best use, the survey results are reliable (Cronbach's alpha = 0.760). Most physicians (148; 93.7%) agreed or strongly agreed that the device can be easily deployed into the tubal ostia. The majority of physicians (86.7%) agreed or strongly agreed that the Adiana procedure is compatible with an in-office setting. Importantly, 97.5% (154) of physicians agreed or strongly agreed that patients are generally satisfied with the procedure. Results are also reliable (Cronbach's alpha = 0.764) for survey questions comparing Adiana with another transcervical

sterilization product. Physicians (131; 82.9%) reported that ease of deployment of the Adiana device is similar or better compared with the other product. Physicians (122; 77.2%) reported that the in-office compatibility of the Adiana system is similar or better than that of another transcervical sterilization product. Additionally, 132 (83.5%) of physicians reported that patient satisfaction with Adiana is similar or better

FIGURE 2

Bilateral occlusion rates are reported as by survey respondents



HSG, Hysterosalpingography.

TABLE 3

Physician experience with Adiana alone and compared with another transcervical sterilization product

A) Physician experience with the Adiana device

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Device can be easily deployed into the tubal ostia	2.5%	1.9%	1.9%	26.6%	67.1%
Procedure is compatible with an in-office setting	3.2%	1.3%	8.9%	19.6%	67.1%
Procedure is best suited to an operating room setting	40.5%	24.7%	19.0%	10.1%	5.7%
Patients are generally satisfied with the procedure	1.3%	–	1.3%	25.3%	72.2%

B) Physician experience with the Adiana device compared with another transcervical sterilization product

	Don't know	Worse	Similar	Better
Compared with other transcervical sterilization products, the device can be easily deployed into the tubal ostia	12.0%	5.1%	31.6%	51.3%
Compared with other transcervical sterilization products, the procedure is compatible with an in-office setting	18.4%	4.4%	62%	15.2%
Compared with other transcervical sterilization products, the procedure is best suited to an operating room setting	24.1%	3.2%	63.9%	8.9%
Compared with other transcervical sterilization products, patients are generally satisfied with the procedure	14.6%	1.9%	62.0%	21.5%

than patient satisfaction with another transcervical sterilization product.

DISCUSSION

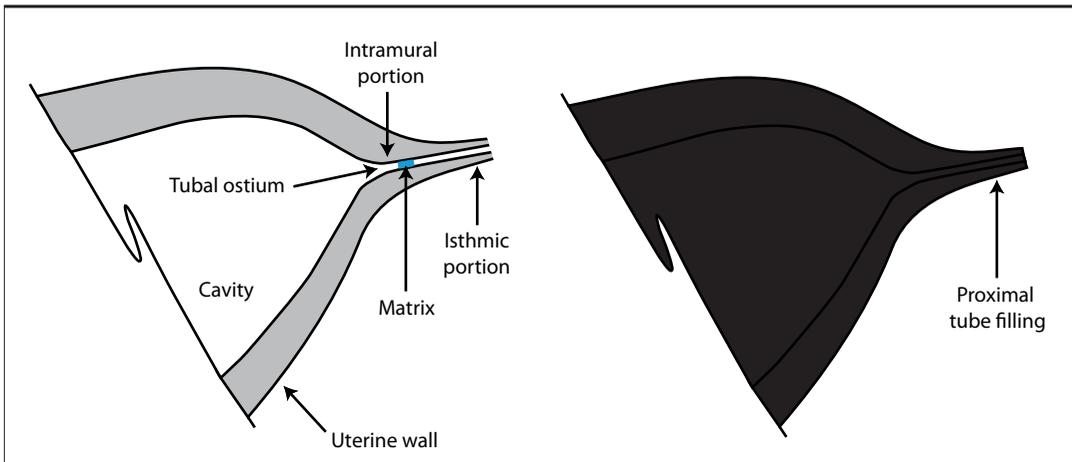
The findings of this survey support physician and patient acceptance of Adiana Permanent Contraception since its introduction in July 2009. Physicians (97.5%) surveyed agreed or strongly agreed that their patients were satisfied with the Adiana procedure. For patients, hysteroscopic sterilization offers many benefits over other forms of female sterilization, including a short procedure, local or no anesthesia, no incisions, minimal recovery time, and the convenience of undergoing the procedure in-office. Hysteroscopic sterilization also offers benefits for the physician; 86.7% of respondents agreed or strongly agreed that the

Adiana procedure can be performed in-office. In-office procedures decrease physicians' operating room time, thereby reducing the amount of time spent out of the office.

According to the Adiana Instructions for Use,⁶ physicians should perform an HSG to evaluate and confirm bilateral tubal occlusion 3 months postprocedure. Three-month bilateral occlusion rates are reported as greater than 85% by 79.8% (126) of physicians surveyed. However, less than half of the physicians provided data on 6-month bilateral occlusion rates. The 3-month occlusion rate compares favorably to that found in the EASE trial, where 85.4% (551/645) of intent-to-treat patients were ultimately able to rely on Adiana Permanent Contraception.⁷ Additionally, in EASE, the 6-month bilateral occlusion rate

FIGURE 3

The Adiana matrix is delivered into the intramural portion of the fallopian tube and is located approximately 10 mm into the tube. The following figures depict the implanted matrix location (left) and the HSG image (right).



Tubal occlusion is confirmed by verifying that there is a total blockage of contrast medium in the fallopian tube at, but not beyond, the implanted matrix.⁶ There should be no evidence of a flow of contrast medium within the isthmic portion of the fallopian tubes nor spill of contrast medium into the pelvis or abdomen.⁶

was 88.4% (570/645).⁷ Physicians (119; 74.8%) reported that more than 85% of their patients return for the 3-month HSG. Although this number is encouraging, there is room for improvement. It is important to ensure com-

pliance and patient recall on this important confirmatory step. Only after bilateral occlusion is confirmed should the patient rely on Adiana (FIGURE 3).⁶ An HSG image demonstrating fill in the proximal tubes is critical to confirming bilateral occlusion (FIGURE 4).

FIGURE 4

HSG confirmation of bilateral occlusion



Successful occlusion is confirmed when contrast material flows into the proximal tubes but not into the isthmic portion, and there is no spillage into the pelvis or abdomen.

In its first year of commercial use, Adiana offers a reliable method of permanent contraception. Although a precise pregnancy calculation was not the basis of the survey, the survey did provide important information that allowed for a correlation of pregnancy events between those reported in the survey against those reported to the manufacturer. Using this information, in conjunction with a series of assumptions based on commercial units sold and days of reliance and fertility/fecundity, Herbst and Evantash recently reported an estimated 12-month pregnancy failure rate of 0.57% for Adiana.^{8*} This rate compares favorably to the pregnancy failure rate of 1.07% observed in the EASE trial.

Additionally, results demonstrate that physicians believe that Adiana can be easily integrated into office-based practices. Benefits include a device that can be easily

deployed, and a procedure that can be performed in-office without general anesthesia and incisions, as well as a lower risk of complications. Results show that the majority of patients are generally satisfied following the procedure. Considering the growing population of reproductive women in the US, it is important that physicians have access to a safe and effective method of hysteroscopic sterilization that can be conveniently per-

formed in a setting that best accommodates physicians and patients. ■

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*The equivalent annual pregnancy rate of 0.57% was calculated using a model that 1) takes the estimated number of Adiana procedures as input; 2) computes the number of women relying on the Adiana procedure each month to give an estimate of the number of patient-relying months; and 3) uses the number of reported pregnancies. The model computes the rate equal to 572,798 patient-relying days, which equates to 1,569 patient-relying years. Assuming all patients had a consistent fecundity rate in the first year of relying, the pregnancy rate at 1-year can be estimated based on the number of reported pregnancies divided by patient-relying years. This estimate represents the period of time between January 2009 and September 2010.

The Adiana[®] Procedure in the Office Setting Compared With the Operating Room

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KEY POINTS

- Benefits of performing transcervical sterilization in the office rather than in the operating room include shorter recovery time, shorter return-to-work time, and a lower pain value
- The Adiana procedure does not require any incision. It can be performed either in-office or in an operating room (hospital or surgical center) under local anesthesia
- The ability to perform the Adiana procedure in an office is functionally the same as in the operating room

ABSTRACT

Objective: To evaluate whether Adiana[®] Permanent Contraception is functionally different when used in-office versus a hospital operating-room setting.

Methods: All data were collected during the EASE (Evaluation of the Adiana System for Transcervical Sterilization Using Electrothermal Energy) clinical study. Here, we evaluated women aged 18 to 45 who underwent the Adiana procedure either in-

office ("OFFICE") or in a hospital or surgical center ("OR"). Procedure duration, percentage of procedure attempts, device reliance, pain, and recovery and return-to-work times were recorded.

Results: Procedure duration was slightly longer for the OFFICE group (12.8 minutes vs 11.2 minutes; $P = .02$). The percentage of procedure attempts (OFFICE, 87.3% vs OR, 85.5%; $P = .56$) were not significantly different. Device reliance was not significantly different at 3 months (OFFICE, 89.0% vs OR, 91.0%; $P = .09$) or at 6 months (91.2% vs 94.4%; $P = .49$).

For pain assessment, the OFFICE group had a significantly lower value during matrix placement (3.8 +/- 11.7 vs 8.8 +/- 18.1; $P < .001$). The OFFICE group also displayed significantly shorter recovery time (0.8 +/- 1.2 hours vs 1.2 +/- 1.3 hours; $P = .02$) and return-to-work time (0–2 days [median, 0] absent vs 0–7 days [median, 1] absent; $P < .001$).

Conclusion: Adiana in-office performance is functionally the same as in the operating room. Improvements were seen in the OFFICE group compared with the OR group for pain assessment, recovery time, and return-to-work time.

DISCLOSURE

Dr. James B. Presthus is a paid consultant for Hologic, Inc. and an active speaker, preceptor, and investigator. He is also a consultant and investigator with stock ownership for Interlace Medical, and a consultant and speaker for American Medical Systems and Olympus/Gyrus/ACMI.

Dr. Thierry G. Vancaillie is a paid consultant and investigator for Hologic, Inc.

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INTRODUCTION

Nearly all women aged 15 to 44 years who have had sexual intercourse have used at least one form of birth control in their lifetime (98%).¹ Female sterilization is the second most common form of contraception in this age group with more than 10.3 million women currently relying on this contraceptive

FIGURE 1

The Adiana Permanent Contraception system



Figure provided by Hologic, Inc.

method.¹ In 2001, there were 3.1 million unintended pregnancies in the United States, half of which were related to contraceptive failures.² One factor that may contribute to contraception failure is the high rate of discontinuation of temporary birth control in the first year, estimated to range from 10% to 70%.³

With the approval of transcervical sterilization, permanent female sterilization is now a less invasive hysteroscopic procedure. Some of the advantages of transcervical sterilization over tubal ligation include a decreased potential for complications, greater patient convenience, and minimal anesthesia. There are no incisions required with transcervical sterilization; therefore, women generally have less discomfort and a shorter recovery time. Women with certain medical conditions, such as heart disease or obesity, can undergo this procedure. Additionally, as transcervical sterilization often requires minimal anesthesia, it can be safely performed in an office setting as an alternative to the operating room.

In 2009, the US Food and Drug Administration approved a new form of female sterilization, Adiana® Permanent Contraception (Hologic™, Inc., Marlborough, Mass.) (FIGURE 1), which involves surgical implantation of a polymer matrix into the fallopian tubes (FIGURE 2). The Adiana procedure does not require any incision and can be performed either in-office or in an operating room (hospital or surgical center) under local anesthesia.

The EASE (Evaluation of the Adiana System for Transcervical Sterilization Using Electrothermal Energy) clinical study was the pivotal trial to evaluate the efficacy and safety of the Adiana procedure. In this clinical investigation, no uterine or tubal perforations, expulsions, injuries related to matrix placement, excessive pain, or bleeding occurred. One report of hyponatremia was reported and resolved without complication. Adiana Permanent Contraception demonstrated a 98.4% efficacy rate for 3-year pregnancy prevention.

Transcervical sterilization can be completed in the office and may offer greater patient benefits compared with completing the procedure in the operating room. We sought to evaluate the functionality of the Adiana procedure both in the office and in the operating room based on the EASE study. Our objective was to determine whether Adiana Permanent Contraception is functionally different when used in an office than in an operating room.

METHODS

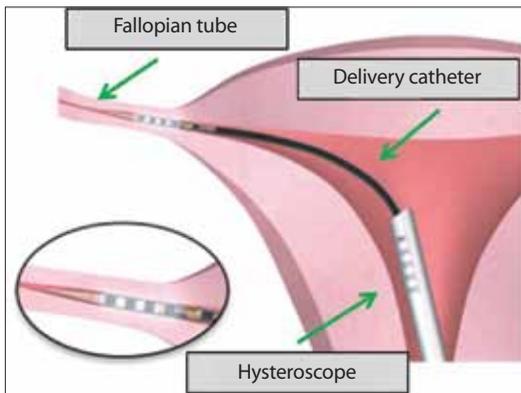
The EASE trial enrolled 770 women aged 18 to 45 years. Procedures were performed in-office (“OFFICE” group) or in the operating room (“OR” group). We evaluated and compared procedure duration, percentage of procedure attempts, device reliance, pain, and recovery and return-to-work times in those women who had the procedure completed in an office setting versus an operating room setting.

RESULTS

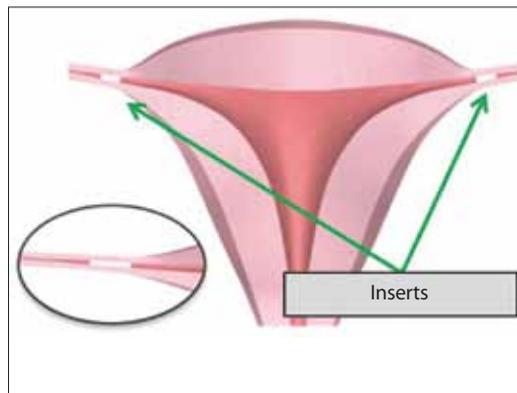
The majority of the study population was Caucasian (OFFICE, 88.2% vs OR, 68.1%); the average age at enrollment was 33.2 years for the OFFICE group and 31.2 years for the OR group (TABLE 1, page S12). There were no differences in the percentage of procedure attempts (OFFICE, 87.3% vs OR, 85.5%; $P = .56$). The reliability of the Adiana device was not significantly different at 3 months (OFFICE, 89.0% vs OR, 91.0%; $P = .09$) or at 6 months (OFFICE, 91.2% vs OR, 94.4%; $P = .49$).

FIGURE 2

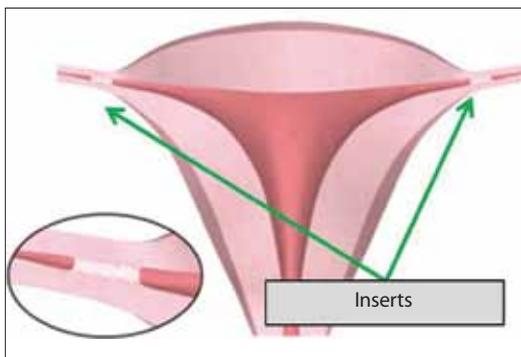
The Adiana Permanent Contraception procedure



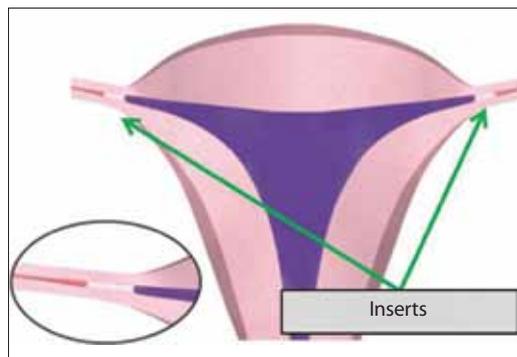
Step 1: Insert the delivery catheter through the vagina and cervix, into the uterus. Deliver a low level of radiofrequency energy to a small section of each fallopian tube. This generates heat that creates a superficial lesion.



Step 2: Where the energy was applied, insert a polymer matrix into each fallopian tube.



Step 3: New tissue will grow in and around the Adiana inserts, occluding the fallopian tubes. For the next 3 months, please inform the patient that she will need to use an alternative form of contraception.



Step 4: At 3 months, perform a hysterosalpingogram to confirm that the tubes are completely blocked. This test will ensure that the procedure has been successful.

Figures provided by Hologic, Inc.

The average duration of the procedure for the OFFICE group was slightly longer than for the OR group (12.8 minutes vs 11.2 minutes; $P = .02$; **TABLE 2**, page S12). Yet, women in the OFFICE group experienced a significantly shorter recovery time compared with the OR group (0.8 +/- 1.2 hours vs 1.2 +/- 1.3 hours; $P = .02$). Correspondingly, the women in the OFFICE group had a shorter return-to-work time than the OR group (0-2 days [median, 0] vs 0-7 days [median, 1]; $P < .001$) (**TABLE 3**, page

S12, and **TABLE 4**, page S13). We also observed a lower pain value during matrix placement for the OFFICE group than for the OR group (3.8 +/- 11.7 vs 8.8 +/- 18.1; $P < .001$) (**TABLE 5**, page S13).

DISCUSSION

Transcervical sterilization provides women with an alternative permanent method of birth control. Because the procedure is relatively simple and is often performed with local anes-

thetia, it may be completed in the office. We evaluated data from the EASE study and found that the performance of Adiana Permanent Contraception is functionally equivalent for both office and operating room settings. We

also assessed the potential benefits of performing the procedure in-office compared with the operating room. We determined that, although the average duration of the procedure was slightly longer for the OFFICE group (12.8 minutes) compared with the OR group (11.2 minutes), there were potential benefits for the patient, including shorter recovery time, shorter return-to-work time, and a lower pain value.

Although benefits such as these are often not accounted for in cost-benefit analyses, they are equally important. Patient preference is a major factor in a woman's decision to select a method of pregnancy prevention. Interventions that have minimal or no impact on their activities of daily living and quality of life, including disruptions in mood, are utilized more frequently and with better adherence rates. Again, we found that performing transcervical sterilization in the office resulted in a shorter recovery time and allowed women to return to work earlier after the procedure. It is possible that these patient benefits would make transcervical sterilization more appealing to the patient, particularly when performed in an office setting.

Medical care is constantly facing challenges. One of the challenges faced by the medical practitioner is providing the best care for the patient in a cost-effective manner, while maintaining efficacy and safety. ObGyns have traditionally performed tubal ligation for permanent contraception. Transcervical sterilization is a new option to tubal ligation that can provide similar efficacy, yet with a more favorable safety profile. In addition to the potential benefits discussed already, transcervical sterilization may be more cost-effective for the health care system. Performing the procedure in-office eliminates the need for a full preoperative examination the day before the procedure, and the overnight stay in the hospital for recovery, and lowers anesthesia costs. Although when performed in-office, transcervical sterilization may have slightly higher upfront costs for the health care system, it has a favorable cost

TABLE 1

Patient demographics

	Office	OR
Race		
Caucasian	194 (88.2%)	344 (68.1%)
African American	11 (5%)	48 (8.3%)
Asian	5 (2.3%)	0 (0%)
Hispanic	4 (1.8%)	114 (22.6%)
Other*	6 (2.7%)	5 (1.0%)
Age (years)		
Mean	33.2	31.2
Standard deviation	5.1	5.6
Range	22–46	20–46
Body Mass Index		
Mean	27.0	27.3
Standard deviation	6.4	6.9
Range	16.9–54.0	16.1–60.2

Office, In-office; OR, Operating room (hospital or surgical center).
 *Other races included Caucasian/Hispanic, Brazilian, Hispanic/African American, Pacific Islander, East Indian, Iranian, Native American Indian, and Polynesian.

TABLE 2

Procedure duration

	N	Mean (minutes)	Standard deviation
Office	192	12.8	8.5
OR	429	11.2	6.4

Office, In-office; OR, Operating room (hospital or surgical center).

TABLE 3

Recovery time

	N	Mean (minutes)	Standard deviation
Office	195	0.8	1.2
OR	460	1.2	1.3

Office, In-office; OR, Operating room (hospital or surgical center).

profile over time compared with temporary birth control methods.^{4,5}

In conclusion, we demonstrate that transcervical sterilization with Adiana Permanent Contraception is functionally equivalent when performed in-office compared with the operating room. We observed improvements in the OFFICE group compared with the OR group for pain assessment, recovery times, and return-to-work times. These outcomes, in conjunction with patient preference and physician judgment, provide additional considerations when selecting the method and determining the setting for transcervical sterilization. ■

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TABLE 4

Time to return-to-work

	N	Mean (days)	Standard deviation
Office	187	0.5	0.6
OR	424	0.9	0.8

Office, In-office; OR, Operating room (hospital or surgical center).

TABLE 5

Pain Assessment

VAS	N	Mean	Standard deviation
OFFICE			
Radio-frequency treatment	174	1.9	2.2
Matrix placement	175	0.4	1.2
At discharge or 2 hours post-procedure	189	0.4	1.1
OR			
Radio-frequency treatment	372	2.4	2.4
Matrix placement	361	0.9	1.8
At discharge or 2 hours post-procedure	421	0.6	1.1

Office, In-office; OR, Operating room (hospital or surgical center); VAS, Visual analog scale for pain.

Intrauterine Procedures in Women Who Have Previously Undergone Adiana® Permanent Contraception

Seth J. Herbst, MD
EASE Trial Investigator

KEY POINTS

- Transcervical sterilization benefits, compared with tubal ligation, include a lower incidence of serious complications, increased patient convenience, and reduced anesthesia
- Adiana Permanent Contraception is a transcervical sterilization system based on the delivery of radiofrequency (RF) energy to the intramural segment of the fallopian tube to promote tissue ingrowth into a silicone matrix to provide tubal occlusion
- Adiana Permanent Contraception appears compatible with several common diagnostic and therapeutic intrauterine procedures, such as hysteroscopy, endometrial biopsy, and dilation and curettage

ABSTRACT

Objective To assess whether Adiana® Permanent Contraception is compatible with subsequent intrauterine diagnostic and therapeutic procedures.

Methods Data were collected during the EASE (Evaluation of the Adiana System for Transcervical Sterilization Using Electrothermal Energy) clinical study. Women 18 to 45 years of age who underwent hysteroscopic sterilization using the Adiana procedure were evaluated. In the EASE clinical study, Adiana placement was attempted in 645 patients; there

DISCLOSURES AND ACKNOWLEDGEMENTS

Dr. Seth J. Herbst is a consultant and speaker for Hologic, Inc., consultant for OptiVia Medical, LLC, and consultant and investigator for Viveve, Inc.

Industry support for this study was provided by Hologic, Inc., Malborough, MA. Editorial support was sponsored by Hologic, Inc., and provided by Ed Shifflett, PhD, and Amanda McGeary, MS, at AlphaBioCom.

was successful bilateral placement in 611 women. All subsequent surgical procedures among the 645 women were recorded; this report represents gynecologic intrauterine procedures that occurred within the first 36 months of follow-up after the Adiana placement.

Results Among the 645 women, 28 intrauterine procedures were performed following the Adiana procedure, including 1 patient who underwent 2 procedures. The majority (23/28) of all procedures occurred after 1 year of Adiana use. All procedures were performed using standard of care, routine techniques. There were no immediate or delayed adverse events reported with these intrauterine procedures within the 36-month follow-up period.

Conclusion The data from the EASE cohort suggest that Adiana Permanent Contraception appears compatible with several common diagnostic and therapeutic intrauterine procedures, although the long-term safety and efficacy of these procedures have not been established.

INTRODUCTION

Worldwide, the number of women of reproductive age is growing.¹ As of 2008, there were 75.2 million women aged 15 to 49 years in the United States (US). It is projected that by 2015, 76 million women will fall into this age category.¹ Female sterilization is the most common method of contraception in the US in women 35 to 44 years of age, and the second most common method in women 15 to 44 years of age.² Annually, 684,000 sterilization procedures are performed in

the US³; in 2002, the number of US women relying on female sterilization as contraception totaled 10.3 million.²

Transcervical sterilization is beneficial over tubal ligation; advantages include decreased potential for complications and greater convenience for the patient. No incisions are required with transcervical sterilization, allowing for less discomfort and a shorter recovery time. Adiana® Permanent Contraception (Hologic™, Inc., Marlborough, Mass.) is a transcervical sterilization system based on the insertion of a polymer matrix and its integration into the fallopian tube (FIGURE 1).⁴ The EASE (Evaluation of the Adiana System for Transcervical Sterilization Using Electrothermal Energy) clinical study was initiated in 2002 to evaluate the safety and efficacy of the Adiana System. The 3-year pregnancy prevention rate for Adiana was 98.4%, with no reported uterine or fallopian perforations and no adverse device reactions.⁵

An important clinical concern for physicians is the compatibility of subsequent intrauterine diagnostic and therapeutic procedures following use of the Adiana System. Physicians may need to access the uterus to complete a thorough evaluation for the assessment or treatment of abnormal uterine bleeding and fibroids. In a national study spanning 2 years, menstrual disorders were the reason for approximately 3.8 million physician visits for gynecologic conditions.⁶ Some of the procedures that may be need to performed following sterilization include hysteroscopy, endometrial biopsy, dilation and curettage (D&C), and endometrial ablation.

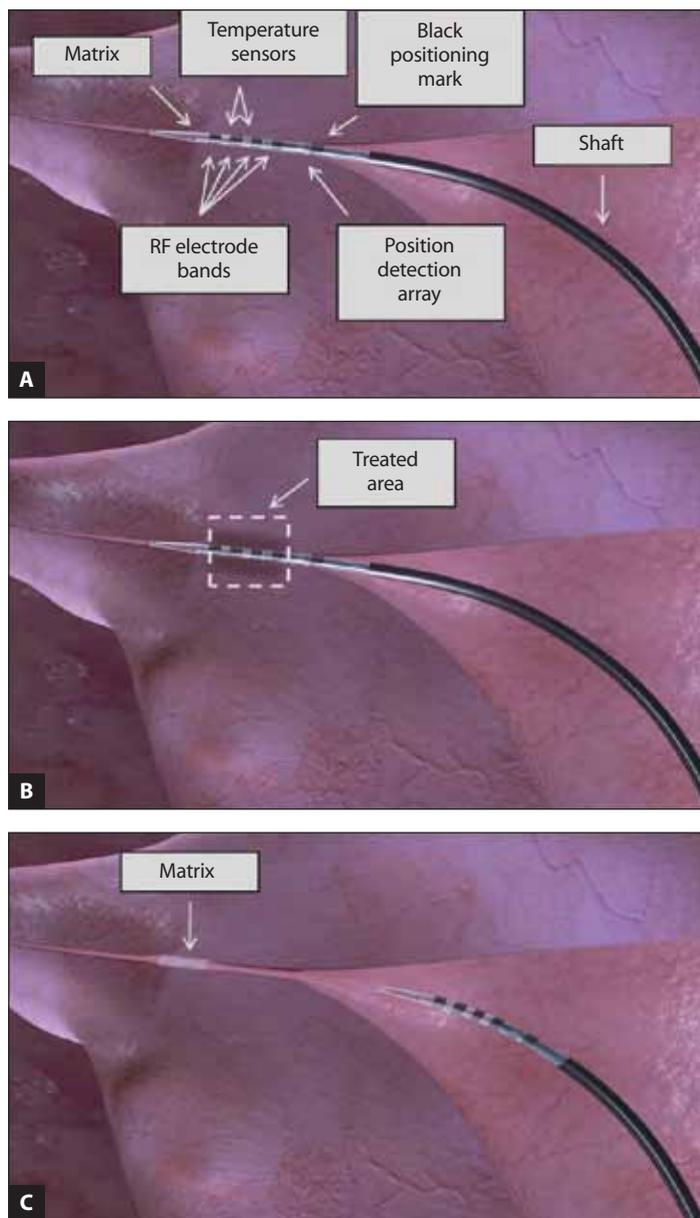
In this analysis, we sought to further evaluate the compatibility of Adiana Permanent Contraception with subsequent intrauterine diagnostic and therapeutic procedures by analyzing data from the EASE trial.

METHODS

Data were collected during the EASE trial, in which women aged 18 to 45 years underwent hysteroscopic sterilization by the Adiana Permanent Contraception System. Women who

FIGURE 1

Adiana Permanent Contraception, a polymer matrix transcervical sterilization system procedure



A. Appropriate catheter placement with the visual marker within the uterine cavity is visible by hysteroscopy. **B.** The lesion created by electrothermal energy is approximately 0.5 mm deep. **C.** Final matrix placement.

RF, Radiofrequency.

Figures provided by Hologic, Inc.

were enrolled in the study were previously seeking permanent contraception, had been pregnant at least once, were sexually active, had regular menstrual cycles, and were willing

and able to use alternative contraception for the first 3 months following placement of the matrices.

The intent-to-treat (ITT) population consisted of the women who underwent attempted placement of the Adiana matrix.

TABLE 1

Age demographics

Patient demographic	Enrolled	ITT
Number of subjects	770	645
Median age (years)	31	31
Age groups		
18–27 years	25.8%	24.2%
28–33 years	47.3%	47.8%
34–45 years	26.9%	28.1%

ITT, Intent-to-treat.

TABLE 2

Baseline demographics

	Enrolled	ITT
Number of subjects	770	645
Race		
Caucasian	568 (73.8%)	488 (75.7%)
African American	64 (8.3%)	47 (7.3%)
Asian	5 (0.6%)	2 (0.3%)
Hispanic	120 (15.6%)	98 (15.2%)
Other*	13 (1.7%)	10 (1.6%)
Gravidity		
<2	66 (8.6%)	57 (8.8%)
2	240 (31.3%)	207 (32.1%)
>2	461 (60.1%)	381 (59.1%)
Parity		
<2	140 (18.2%)	117 (18.1%)
2	374 (48.7%)	316 (49.0%)
>2	254 (33.1%)	212 (32.9%)
Weight, mean (lbs)	162.5	161.8
Height, mean (in)	64.7	64.7

ITT, Intent-to-treat.

*Other races included Caucasian/Hispanic, Brazilian, Hispanic/African American, Pacific Islander, East Indian, Iranian, Native American, Indian, and Polynesian.

The analysis included all patients in the ITT population who were evaluable at the end of 3 years, regardless of whether bilateral occlusion was achieved. All subsequent surgical procedures were recorded and the database was analyzed for all gynecologic intrauterine procedures that occurred within the first 36 months of follow-up.

RESULTS

The majority of the women in the ITT population were between 28 and 33 years of age (48%) and Caucasian (76%; **TABLE 1 AND TABLE 2**). Slightly less than half (48%) of the ITT population was using some form of hormonal contraception prior to Adiana placement (**TABLE 3**). Of the 611 women in whom bilateral placement was successful, 28 subsequent intrauterine procedures were performed (**TABLE 4**), including 1 patient who underwent 2 procedures. During the first year of follow-up, 5 intrauterine procedures were performed. The majority of the overall procedures occurred at 18 months or later.

During the second and third year of follow-up, 23 intrauterine procedures were performed. Of these 23 procedures, 11 were endometrial ablations. All procedures were performed using routine techniques. There were no noted adverse events or sequelae following diagnostic or therapeutic procedures. However, although these data provide information regarding the potential compatibility of these procedures, the long-term safety and efficacy of intrauterine procedures and the Adiana device have not been established.

DISCUSSION

These data from the EASE trial show that a variety of intrauterine procedures, including endometrial ablation, intrauterine device insertion, and in vitro fertilization procedures, have been performed following the use of the Adiana Permanent Contraception. This is clinically important because many women may eventually require additional intrauterine procedures following the use of the Adiana System.

Abnormal uterine bleeding is one of the most common reasons why women visit their physician. The diagnostic procedures for abnormal uterine bleeding often include endometrial biopsy, hysteroscopy, hysterosalpingography, saline infusion sonography, or D&C. Surgical treatments may include endometrial ablation or surgery to remove growths (e.g., polyps or fibroids). **TABLE 4** lists the intrauterine procedures that were reported to have occurred among study subjects. Abnormal uterine bleeding is the cause of approximately 80% to 90% of D&C procedures performed in nonpregnant women in the US. This is equivalent to about 350,000 D&C procedures annually.⁷

Considering that patients may require further diagnostic or therapeutic gynecologic care, the ability to safely perform transcervical sterilization and future intrauterine procedures is of interest to both patient and physician. Data from the EASE trial show that several common diagnostic and therapeutic intrauterine procedures, including hysteroscopy, endometrial biopsy, D&C, endometrial ablation, intrauterine device insertion, and in vitro fertilization have been safely and effectively completed following use of the Adiana Permanent Contraception System. ■

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TABLE 3

Menstrual and contraceptive use history

	Enrolled	ITT
Number of subjects	770	645
Duration of menses, mean (days)	4.6	4.6
Periodicity of menses, mean (days)	28.2	28.1
Contraception prior to study entry		
Hormonal	361 (47.1%)	311 (48.2%)
Nonhormonal	352 (46.0%)	289 (44.8%)
None	53 (6.9%)	45 (7.0%)

ITT, Intent-to-treat.

TABLE 4

Procedures following Adiana Permanent Contraception

	Year 1 post-Adiana	Years 2-3 post-Adiana	Total
Hysteroscopy	2	3	5
Endometrial biopsy	0	1	1
D&C	1	3	4
IUD insertion	0	3	3
Endometrial ablation*	2	11	13
IVF procedure	0	2	2
Total	5	23	28

D&C, Dilation and curettage; IUD, Intrauterine device; IVF, In vitro fertilization.

*Endometrial ablation included bipolar radiofrequency, microwave, cryoablation, and heated saline.

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SUPPLEMENT TO

OBG
MANAGEMENT

January 2011