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A Comparison of Women's Regret After Vasectomy Versus Tubal Sterilization

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OBJECTIVE: To compare the 5-year cumulative probability of regret and risk factors for regret among women whose husbands underwent vasectomy with women after tubal sterilization.

METHODS: A total of 525 women whose husbands underwent vasectomy were compared with 3672 women who underwent tubal sterilization in a prospective, multicenter, cohort study.

RESULTS: The cumulative probability of a woman expressing regret within 5 years after her husband's vasectomy was 6.1% (95% confidence interval [CI] 3.6, 8.6), which was similar to the 5-year cumulative probability of regret among women after tubal sterilization (7.0%, 95% CI 5.8, 8.1). Women who reported substantial conflict with their husbands before vasectomy were more than 25 times more likely to request that their husband have a reversal than women who did not report such conflict (rate ratio 25.3, 95% CI 2.9, 217.2). Similarly, women who reported substantial conflict with their husbands or partners before tubal sterilization were more then three times as likely to regret their decision and more than five times as likely to request a reversal than women who did not report such conflict (rate ratio 3.1, 95% CI 1.4, 7.0, and rate ratio 5.4, 95% CI 1.6, 17.6, respectively).

CONCLUSION: Most women did not express regret after their husband's vasectomy and the probability of regret was similar to sterilized women. However, when there was substantial conflict between a woman and her husband before vasectomy or tubal sterilization, the probability of subsequent request for reversal was increased. (Obstet Gynecol 2002;99:1073–9. © 2002 by the American College of Obstetricians and Gynecologists.)

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Surgical sterilization has become the most popular method of contraception in the world.[1] In the United States, approximately 4 million men and 10 million women have been sterilized.[2] Couples seeking a permanent method of contraception may consider both vasectomy and tubal sterilization as options. In counseling couples about sterilization, the probability of later regretting having had the procedure is an important consideration. Although there is information available about regret after female sterilization,[3,4] there is little known about regret after male sterilization.

The US Collaborative Review of Sterilization (CREST) has previously reported findings about post-sterilization regret among 11,232 women who underwent tubal sterilization.[3,4] This current report is the first to provide an in-depth analysis of CREST findings regarding determinants of regret for the cohort of women whose husbands underwent vasectomy. The purpose of this current report from the CREST data set was to evaluate the 5-year cumulative probability of regret among women whose husbands underwent vasectomy and to compare this probability with that associated with tubal sterilization. In addition, we evaluated potential

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risk factors for regret identifiable before vasectomy and compared them with risk factors for regret identifiable before tubal sterilization.

MATERIALS AND METHODS

Between 1985 and 1987, 3672 women aged 18–44 years who underwent tubal sterilization at medical centers in six cities (Buffalo, NY, Chapel Hill, NC, Houston, TX, St. Louis, MO, San Francisco, CA, and Memphis, TN) were enrolled as participants in CREST. All women undergoing sterilization procedures under study at these medical centers were offered enrollment in the study (ie, universal consecutive sampling design). During the same period, the study enrolled 525 control women aged 18–44 years whose husbands underwent vasectomy in the cities (except Memphis, TN) in which women undergoing tubal sterilization were enrolled. All study participants gave written informed consent, and the study protocol was approved by the institutional review board at each center. The sterilized women were part of a larger cohort of women enrolled from 1978 to 1987; women enrolled but sterilized before 1985 were not included in this analysis to enhance the comparability of the women undergoing tubal sterilization with the women whose husbands underwent vasectomy.

Women were eligible for inclusion in this analysis if they completed at least one follow-up interview and answered at least one of the questions used to measure poststerilization regret. Women were interviewed in person before tubal sterilization or around the time of vasectomy and by telephone at 1, 2, 3, and 5 years after the sterilization. The number of women in the vasectomy group completing a follow-up interview at 1, 2, 3, and 5 years was as follows: 494 (94%), 470 (90%), 467 (89%), and 430 (82%); follow-up at 1, 2, 3, and 5 years for the women undergoing tubal sterilization was as follows: 3389 (92%), 3030 (83%), 2905 (79%), and 2721 (74%).

To evaluate regret among women whose husbands underwent vasectomy, four components of regret were measured using the following questions that the women were asked at each follow-up interview: "Do you think vasectomy as a permanent method of birth control was a good choice for you and your husband?" Possible answers were "yes," "no," or "don't know." For women who answered "no," the following additional questions were asked: "Have you ever requested that your husband have a vasectomy reversal?", "Has your husband ever requested a reversal from a physician?", and "Did your husband have the reversal procedure?" These four questions may reflect three progressive stages of regret: first, expressing regret, then, considering reversal, and finally, obtaining the reversal. Women who underwent tubal sterilization were asked a series of questions including: "Do you think tubal sterilization as a permanent method of birth control was a good choice for you?", "Have you ever requested that your sterilization be reversed?", and "Did you have the reversal procedure?" We chose to use these latter three questions for this analysis because they permitted a more direct comparison with the vasectomy group than the otherwise similar regret questions asked of the entire cohort of 11,232 sterilized women reported previously.[3,4]

Because our primary focus was on the occurrence (rather than the persistence) of regret, women who answered "no" at any time during the follow-up to the question about thinking sterilization was a good choice were defined as having regret. The 5-year cumulative probability of regret among the 525 eligible women whose husbands underwent vasectomy and among the 3672 women who underwent tubal sterilization were calculated and compared.

We evaluated several characteristics documented at the first interview that may have influenced the probability of regret. These included age, race, education, history of induced abortion, number of living children, Medicaid enrollment, time between birth of youngest child and husband's vasectomy, reason for vasectomy, person who felt most favorable about the decision to undergo sterilization (woman or man), and whether there was conflict between the spouses/partners. In assessing the reasons for sterilization, each woman was read a list of possible reasons and asked to indicate the importance of each reason in their decision. Women could choose more than one option. Conflict between the woman and her husband or partner was assessed by asking one of the following two questions: "When you decided to have a tubal sterilization, was there any conflict between you and your husband or partner?" or "When it was decided that your husband would have a vasectomy, was there any conflict between you and your husband?" Possible responses included "no," "yes, some," and "yes, a lot."

We used the actuarial life table method to estimate the cumulative probability of regret, request for reversal by the wife (of her tubal sterilization or his vasectomy) or husband, and obtaining reversal. Participants were considered at risk for any of the three outcomes considered in this report (regret, requests for reversal, or obtaining reversal) until the particular outcome occurred. If any of these outcomes occurred before 5 years, only the time between enrollment and the event (or loss to follow-up) were included in the calculations. Similarly, for any woman lost to follow-up before the completion of the 5-year enrollment period, data were truncated at the date

of loss to follow-up. If women experienced a major second event, such as hysterectomy, pregnancy, tubal anastomosis, repeat tubal sterilization, or death, the study design stipulated that follow-up cease at that time. Therefore, for the present analysis, those women who experienced major second events also had their data truncated at the time of the second event, assuming that they had not previously reported vasectomy-associated regret, requests for reversal, or obtaining reversal. Unadjusted hazard ratios were used to examine whether the cumulative probability of regret was increased in any subgroups of participants.

RESULTS

There were significant differences between the 525 participants whose husbands underwent vasectomy and the 3672 women who underwent tubal sterilization (Table 1). Because of enrollment criteria, all 525 women in the vasectomy group were married, whereas only 61% of the women in the tubal sterilization group were married. Women whose husbands underwent vasectomy were older, more likely to be white, had more education, were less likely to be enrolled in Medicaid, and were less likely to have had an induced abortion than women who underwent tubal sterilization. Women whose husbands underwent vasectomy were less likely to cite financial reasons and other people's opinions as reasons for sterilization compared with women who underwent tubal sterilization. The other partner's beliefs regarding the benefits of sterilization were more likely to be cited as a reason for sterilization by women whose husbands underwent vasectomy than by women who underwent tubal sterilization. As a reason for sterilization, women in the vasectomy cohort were more likely than women who underwent tubal sterilization to state that pregnancy would strain their relationship with their husband/partner. The person who felt most favorably about the decision to have sterilization was more often the woman in cases of tubal sterilization and more often the man in cases of vasectomy.

The two groups were also similar in several respects. About 94–95% of the women in both the vasectomy and tubal sterilization groups had at least one child, and the time from the birth of the youngest child to the sterilization was at least 1 year in 55–59%. More than 90% of women in both groups reported that completion of childbearing was an important reason for sterilization.

Of the 525 women in the vasectomy cohort, 25 expressed regret at least once during the 5 years of follow-up, seven women requested that their husband have a reversal, and four of their husbands requested a reversal from a physician. Two of the women's husbands obtained a reversal. Overall, the 5-year cumulative probabilities of expressing regret, of a woman requesting that her husband have a reversal, of a husband requesting a reversal, and of obtaining reversal were as follows: 6.1%, 2.0%, 1.4%, and 0.4% (Table 2).

The overall cumulative probability of regret at 5 years was similar for women whose husbands underwent vasectomy (6.1%, 95% confidence interval [CI] 3.6, 8.6) and for women who underwent tubal sterilization (7.0%, 95% CI 5.8, 8.1) (Table 2). The overall cumulative probability of the woman requesting that the sterilization be reversed was similar for women whose husbands underwent vasectomy (2.0%, 95% CI 0.4, 3.6) and for women who underwent tubal sterilization (2.2%, 95% CI 1.5, 3.0). The cumulative probability of obtaining reversal was similar for those undergoing vasectomy (0.4%, 95% CI 0, 1.1) and for those undergoing tubal sterilization (0.2%, 95% CI 0, 0.4).

The probability of regret among all subgroups was similar for women whose husbands underwent vasectomy and women who underwent tubal sterilization including the probability of regret by site of enrollment; the estimates of regret for different cities generally had overlapping 95% CIs with no important differences by site observed (data not shown).

Among the 25 women in the vasectomy cohort who expressed regret, 17 reported a reason for regret. The reasons given included: wanting another child ($n = 8$), loss of a child through death ($n = 2$), menstrual problems ($n = 1$), medical problem attributed to vasectomy ($n = 1$), divorced or separated ($n = 1$), or other ($n = 4$). None of the women reported regret because of sterilization failure, making the decision without proper consideration, not understanding that the procedure was permanent, or loss of sexuality by the partner.

Among women whose husbands underwent vasectomy, there were no significant predictors of overall regret, that is of reporting that vasectomy was not a good choice (Table 3). Young age at the time of sterilization, black race, less education, and the husband or partner feeling more favorably about the sterilization than the wife were all risk factors for regret among women who underwent tubal sterilization. In addition, among such women, those who cited completed childbearing or not wanting to use contraceptives anymore were less likely to express regret than women who did not cite these reasons for undergoing sterilization. Women who reported conflict between them and their husbands/partners were also more likely to express regret (Table 3).

In addition to evaluating risk factors for overall regret, risk factors for reversal were examined (Table 4). Women who reported substantial conflict with their husband before vasectomy were more than 25 times as

Table 1. Characteristics of 525 Women Whose Husbands Underwent Vasectomy and 3672 Women Who Underwent Tubal Sterilization

Characteristic	Vasectomy % (*n*)	Tubal % (*n*)
Woman's age at time of sterilization (y)*		
18–30	37.5 (197)	49.1 (1802)
>30	62.5 (328)	50.9 (1870)
Race*†		
White	90.7 (476)	50.5 (1853)
Black	2.3 (12)	38.6 (1417)
Other	7.0 (37)	10.9 (401)
Education (y)*		
<12	5.9 (31)	20.9 (767)
12	33.7 (177)	42.3 (1552)
>12	60.4 (317)	36.9 (1353)
Marital status at enrollment*†		
Married	100.0 (525)	61.3 (2251)
Not married	0	38.7 (1419)
History of induced abortion*†		
No	83.6 (438)	74.5 (2730)
Yes	16.4 (86)	25.5 (936)
Number of living children		
0	4.9 (26)	5.8 (214)
1	14.3 (75)	13.9 (512)
2–3	72.0 (378)	64.7 (2377)
>3	8.8 (46)	15.5 (569)
Medicaid enrollment*		
No	99.4 (522)	73.1 (2684)
Yes	0.6 (3)	26.9 (988)
Time from birth of youngest child until sterilization (y)‡		
<1	41.3 (206)	44.9 (1650)
≥ 1	58.7 (293)	55.1 (2022)
Reasons for sterilization†		
Completed childbearing	91.4 (480)	92.6 (3399)
Didn't want to use contraceptives anymore	69.1 (363)	68.8 (2527)
Financial reasons*	34.7 (182)	49.1 (1804)
Health reasons	31.4 (165)	34.0 (1250)
Other partner thought s/he should have one*§	28.0 (147)	13.7 (504)
Mental health reasons	27.4 (144)	25.9 (952)
Pregnancy would strain relationship with husband*	16.0 (84)	10.5 (384)
Other people's beliefs regarding sterilization*	3.8 (20)	7.7 (284)
Other*	21.9 (115)	11.3 (415)
Person who felt most favorably about decision to have sterilization*†		
Woman	21.3 (111)	47.4 (1738)
Husband/partner	23.7 (124)	2.9 (108)
Same	55.0 (287)	30.5 (1119)
N/A‖	0	19.2 (704)
Conflict between woman and her husband/partner before sterilization†		
No	92.5 (483)	74.4 (2728)
Yes, a lot	1.0 (5)	1.6 (57)
Yes, some	6.5 (34)	4.8 (177)
N/A‖	0	19.2 (705)

N/A = not applicable.

* $P < .05$.

† Sample size decreased because of missing data.

‡ Twenty-six subjects had no children.

§ In the case of vasectomy, the wife felt the husband should undergo vasectomy. In the case of tubal sterilization, the husband/partner thought she should undergo tubal sterilization.

‖ For vasectomy group, all women were married. For tubal sterilization group, women were married, unmarried with a male partner, or had no husband or partner (not applicable).

Table 2. Comparison of Cumulative Probability (%) of Regret and Reversal at 5 Years With 95% Confidence Intervals

	Vasectomy (n = 525)	Tubal sterilization (n = 3672)
Regret	6.1 (3.6, 8.6)	7.0 (5.8, 8.1)
Woman requests reversal	2.0 (0.4, 3.6)	2.2 (1.5, 3.0)
Husband requests reversal	1.4 (0, 2.8)	*
Obtaining reversal	0.4 (0, 1.1)	0.2 (0, 0.4)

* Women not asked whether husbands/partners requested that the tubal sterilization be reversed.

likely to subsequently request vasectomy reversal as those reporting none. Among women who underwent tubal sterilization, women who reported conflict between them and their husbands/partners were three to five times more likely to request reversal as women who did not report such conflict. When an important reason for vasectomy was that other people thought the husband should have a vasectomy, the husband was more than 25 times as likely to obtain a reversal (Table 4).

DISCUSSION

The cumulative probability of women expressing regret during follow-up interviews at 5 years after their husband's vasectomy was about 6% and was similar to the probability of regret among women who underwent tubal sterilization. Among women whose husbands underwent vasectomy, the probability of requesting reversal (2.0%) was similar to women who underwent tubal sterilization (2.2%). Few of the men (n = 2) and few of the women (n = 10) had undergone reversal within 5 years of follow-up.

This and previous reports[3,4] indicate that most couples who chose sterilization as a permanent method of contraception are satisfied with their decision and do not experience regret. With respect to vasectomy, the cumulative probability of regret among women whose husbands underwent vasectomy in our study was comparable with that reported in Thailand (8%).[5] In the Thai study, women who underwent tubal sterilization were more likely to express regret (12%) than women whose husbands underwent vasectomy (8%). In a Swedish study, 5% of 108 men interviewed 2 years after vasectomy reported regret.[6]

The number of women who reported that their husbands actually obtained surgical reversal is low. Vasectomy reversal requires an expensive surgical procedure, and the likelihood of successful reversal depends on a variety of factors including the skill and techniques of the surgeon, the vasectomy technique, and the time between vasectomy and reversal.[7] Although couples may regret their decision about vasectomy, it is not surprising that a small proportion actually undergo the reversal procedure. Similarly, few women undergo tubal reanastomosis. This study did not specifically ask about use of in vitro fertilization or other assisted reproductive technologies.

There were few factors that could be identified preoperatively that reliably predicted subsequent regret among women whose husbands underwent vasectomy. Although young age at the time of sterilization is an important predictor of subsequent regret after tubal sterilization, young age of the woman at the time of her husband's vasectomy is not a significant risk factor for

Table 3. Rate Ratios for Regret at 5 Years by Selected Characteristics (With 95% Confidence Intervals)

Characteristic	Vasectomy (n = 525)	Tubal sterilization (n =3672)
Age at time of partner's sterilization (y)		
>30	1.0	1.0
18–30	1.4 (0.6, 3.0)	2.2 (1.6, 3.1)
Race		
White	1.0	1.0
Black	2.3 (0.3, 16.9)	1.6 (1.1, 2.2)
Other	1.2 (0.3, 5.1)	0.9 (0.5, 1.7)
Education (y)		
<12	1.0	1.0
12	0.8 (0.1, 7.1)	0.6 (0.4, 0.9)
>12	1.8 (0.2, 13.2)	0.5 (0.3, 0.8)
Person who felt most favorably about decision to have sterilization		
Same	1.0	1.0
Wife	1.8 (0.7, 4.3)	1.4 (0.9, 2.1)
Husband/partner	1.0 (0.4, 2.9)	2.7 (1.3, 5.6)
Important reasons for sterilization*		
Completed childbearing	0.4 (0.5, 1.3)	0.6 (0.3, 0.9)
Didn't want to use contraceptives anymore	0.5 (0.3, 1.2)	0.7 (0.5, 0.9)
Financial reasons	1.1 (0.5, 2.4)	1.2 (0.9, 1.6)
Health reasons	0.3 (0.1, 1.0)	1.3 (0.9, 1.8)
Partner's influence	0.6 (0.2, 1.6)	1.0 (0.6, 1.6)
Mental health reasons	1.0 (0.4, 2.4)	1.1 (0.8, 1.5)
Pregnancy would strain relationship	0.7 (0.2, 2.4)	0.8 (0.5, 1.5)
Other people thought he should have one	2.3 (0.5, 9.8)	1.0 (0.6, 1.8)
Conflict between woman and her husband/partner		
No	1.0	1.0
Yes, a lot	5.9 (0.8, 43.8)	3.1 (1.4, 7.0)
Yes, some	1.4 (0.3, 5.9)	2.4 (1.4, 4.0)

* Referent group is those women not reporting that particular reason as important in decision regarding sterilization.

Table 4. Rate Ratios for Reversal at 5 Years by Selected Characteristics (With 95% Confidence Intervals)

Characteristic	Vasectomy (n = 525)			Tubal sterilization (n = 3672)	
	Woman requests reversal	Husband requests reversal	Obtaining reversal	Woman requests reversal	Obtaining reversal
Important reasons for sterilization*					
Completed childbearing	0.2 (0, 1.2)	0.3 (0, 2.8)	0.1 (0, 1.3)	0.8 (0.3, 2.3)	†
Didn't want to use contraceptives anymore	0.3 (0.1, 1.4)	0.4 (0.1, 2.7)	0.4 (0, 6.9)	1.0 (0.5, 2.0)	2.2 (0.3, 18.5)
Financial reasons	0.7 (0.1, 3.7)	1.8 (0.3, 12.5)	†	1.1 (0.6, 2.0)	1.1 (0.2, 5.4)
Health reasons	0.3 (0, 2.6)	0	0	1.1 (0.6, 2.0)	†
Partner's influence	0.4 (0.1, 3.1)	0.7 (0.1, 6.6)	2.4 (0.2, 9.0)	0.9 (0.4, 2.1)	†
Mental health reasons	1.9 (0.4, 8.3)	0.8 (0.1, 8.0)	2.5 (0.2, 40.2)	1.7 (0.9, 3.1)	1.4 (0.3, 7.7)
Pregnancy would strain relationship	0.9 (0.1, 7.0)	1.7 (0.2, 16.2)	5.2 (0.3, 83.8)	0.8 (0.3, 2.1)	†
Other people thought he should have one	3.8 (0.5, 31.7)	6.9 (0.7, 67.7)	25.4 (1.6, 405.4)	1.1 (0.4, 3.2)	†
Conflict between woman and her husband/partner					
No	1.0	1.0	1.0	1.0	1.0
Yes, a lot	25.3 (2.9, 217.2)	0	0	5.4 (1.6, 17.6)	†
Yes, some	0	0	0	2.9 (1.2, 7.0)	3.9 (0.4, 35.2)

* Referent group is those women not reporting that particular reason as important in decision regarding sterilization.
† Rate ratio and/or the 95% confidence interval is undefined because of small sample size.

regret. This study had 80% power to detect a two-fold difference in regret between younger and older women. However, it did not have adequate power to detect a similar difference for other measures of regret (request for reversal, obtaining reversal). The association of young age with subsequent regret after tubal sterilization has previously been partially attributed to young women more frequently experiencing life changes such as divorce and remarriage.[4] The lack of association between young age and regret after a husband's vasectomy may be partially attributed to the fact that if a woman divorces and subsequently remarries, her fecundity is unaffected by her ex-husband's vasectomy.

Women who experienced substantial conflict with their husbands before vasectomy were more than 25 times as likely to request subsequent reversal as those not experiencing such conflict. When there was substantial conflict between a woman and her husband before tubal sterilization, the woman was three times as likely to express regret and five times as likely to request a reversal. Our findings regarding conflict between a woman and her partner are similar to those of a previous study that reported that women whose husbands underwent vasectomy were more likely to be dissatisfied with the procedure if there was conflict over the sterilization procedure. Conflict was not, however, predictive of dissatisfaction among women who underwent tubal sterilization in that study.[8] In another study among women whose husbands underwent vasectomy, a high level of conflict during the sterilization decision-making process was predictive of subsequent regret.[9] Our findings regarding conflict underscore the importance of thorough preoperative counseling emphasizing the desirability of the couple reaching a decision that they are both comfortable with and agree upon. This may be a challenging goal given that previous studies have found that often sterilization decisions are made by individuals rather than the couple together.[10]

Limitations of this study included a relatively small sample size of 525 wives of men undergoing vasectomy. With some of the less common outcomes of interest, such as requesting reversal and obtaining reversal, the numbers of women with the outcome of interest were very small. However, other published studies of regret among men after vasectomy included smaller numbers of participants.[6,8] This study was also limited by the relatively short period of follow-up (5 years). Although only a small percentage of women expressed regret 5 years after their husbands underwent vasectomy, it is not clear what percentage of women would express regret if interviewed further out from the procedure. In a report of regret among sterilized women enrolled in CREST, Hillis et al[3] found that rather than plateauing, the cumulative probability of regret increased during the intermediate (7-year) and long-term (14-year) follow-up periods, particularly among younger women (30 years old or younger when sterilized). It is unclear whether the probability of regret among wives of men who underwent vasectomy would also increase during longer-term follow-up. In addition, in this study, only the wives of men who underwent vasectomy were interviewed, and therefore information about regret among men was very

limited. Regret among the husbands was only assessed by the women's reports of whether their husbands had ever requested a reversal from a physician. Particularly, because conflict between a woman and her husband/partner was a significant risk factor for regret and reversal, it would have been useful to know more about the nature of this conflict and whether the conflict was specifically about the sterilization procedure. However, the women were not asked to specify what the conflict was about.

In summary, we found that the probability of regret among women whose husbands underwent vasectomy was similar to the probability of regret among women undergoing tubal sterilization. Additionally, substantial conflict between a woman and her husband or partner is a strong predictor of subsequent regret after both vasectomy and tubal sterilization. In counseling patients about contraceptive options, the probability of regret associated with both male and female sterilization should be addressed, as should the possibility of regret associated with unintended pregnancy for women who do not choose a highly effective method of contraception.

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