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Evaluation of two applications of methylcyanoacrylate for female sterilization

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Abstract

Sixty-one women underwent non-surgical female sterilization with two applications of methylcyanoacrylate (MCA) at intervals of two months, three months or four months apart. Bilateral closure (as determined by hysterosalpingogram (HSG) ranged from 86% for women with an interval of four months between applications to 100% for women with an interval of two months between applications. One pregnancy occurred in a woman three months after she was declared sterile.

Introduction

Voluntary sterilization is the most prevalent method of contraception in the world today. Simplification of the procedure would probably result in an even higher prevalence. Investigators have attempted to develop a non-surgical method of female sterilization which would improve the safety and acceptability of the procedure while reducing the costs and need for medical resources [1].

Methylcyanoacrylate (MCA) is a tissue adhesive which has potential for use in occluding the Fallopian tubes. MCA produces tubal occlusion by causing tissue necrosis, inflammation and fibrosis of the tubal lumen; the adhesive biodegrades after 12 weeks [2]. Studies in animals and humans have been accumulated which indicate the safety and effectiveness of MCA for tubal occlusion [3].

The MCA is delivered transcervically to the oviducts by means of the FEMCEPT device, a balloon-tipped cannula designed to deliver a measured amount of the adhesive to each tube. Initial human trials showed a bilateral occlusion rate of greater than 70% for one application of MCA as demonstrated by hysterosalpingogram (HSG). Tubal closure did not always follow tubal entry of the MCA as determined by X-ray. Two applications of MCA, one month apart, increased the bilateral closure rate to 90% [4].

The one month interval between procedures may not have been optimal, since

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at one month postprocedure tubal necrosis and inflammation are still occurring and may prevent the second MCA application from reaching the tubes. A study designed to evaluate the closure rates when women receive two MCA applications with longer than a one month interval between applications is described in this paper.

Materials and methods

The FEMCEPT device is inserted transcervically into the uterus until the tip touches the fundus. On manual activation of a plunger, approximately 0.20 ml of MCA is delivered to each tube.

From February 1983 to June 1983, 61 women at an outpatient clinic at the University Austral de Chile School of Medicine, Valdivia, Chile, entered the study after giving informed consent. One-third of the women were to receive two MCA applications at two months apart, one-third at three months apart and one-third at four months apart.

Healthy, parous, fertile women between the ages of 21 and 40 with normal pelvic organs and perceived normal, regular menstrual cycles were selected for participation in the study. Women with a history of pelvic inflammatory disease (PID) or abnormal menses, women who had used an IUD within the past 14 days, women with uterine measurements less than 7.0 cm or greater than 10.0 cm and women who had not had two normal menses since last pregnancy termination were excluded.

Procedures were scheduled from four to seven days following onset of menses to rule out pregnancy. Premedication of 0.5 mg atropine, 10 mg diazepam and 50 mg demerol was given intravenously 10 to 15 min before MCA application. Women were instructed to use oral or barrier contraception until the results from the hysterosalpingogram, scheduled for four months after the second application, indicated bilateral tubal closure.

Clinical follow-up for each woman was scheduled for one month after each procedure and four months after the second procedure. Women who did not show patency on HSG examination at the four month visit were declared sterile and scheduled for follow-up at six month intervals for two years.

Results

The mean age of the women from 31.6 to 32.3 years, and the mean number of live births ranged from 3.2 to 3.5.

Of the women entering the three groups, six did not return on schedule. For analysis purposes these women became a part of the other protocols, depending on when they did return for the second procedure. All women returned for the second procedure.

Table 1 shows the difficulties and safety of the procedure. Difficulties with the insertion and functioning of the FEMCEPT device occurred for 10–18% of the

Table 1 Procedure problems and complications for all applications

	Interval between procedures					
	Two months (N = 34)*		*Three months* (N = 44)*		*Four months* (N = 44)*	
	No.	%	No.	%	No.	%
Procedure problems						
Insertion difficulties						
Passing device through cervix	2	5.9	3	6.8	1	2.3
Cervical dilatation	0	0.0	1	2.3	0	0.0
Narrow uterine cavity	1	2.9	0	0.0	0	0.0
Difficulty in reaching fundus	0	0.0	1	2.3	0	0.0
Adnexal tenderness	0	0.0	1	2.3	0	0.0
Balloon visible	1	2.9	0	0.0	0	0.0
MCA not evenly distributed across balloon	1	2.9	2	4.5	6	13.6
Total procedures with problems	5	14.7	8	18.2	7	9.1
Discomfort (pain) during procedure						
Mild	6	17.6	13	29.5	4	9.1
Moderate	1	2.9	2	4.5	0	0.0

* N is the number of procedures, not number of women. All women received two procedures.

procedures. Difficulty in passing the device through the cervix was reported at the first procedure four times and at the second procedure twice. Only one woman had this problem at both procedures. Adnexal tenderness was reported for one woman at the time of the first procedure. None of the difficulties prevented the procedures from being completed. Only three women had moderate pain during one of the two procedures they received; in all three this occurred at the time of instrument insertion.

All of the women returned for one or more follow-up visits. Table 2 shows the events occurring after MCA instillation. Changes in menstrual flow and dysmenorrhea were the most frequent events reported at follow-up.

HSGs were performed for all the women. Bilateral closure (as determined by the investigator) ranged from 86% for women with an interval of four months between procedures to 100% for women with an interval of two months between procedures (Table 3). HSGs were reread by an independent evaluator and agreement between the two readings was 97%.

Three-quarters of the women have been followed up for six months and three-fifths for 12 months after they were declared sterile. One pregnancy has been reported; it occurred three months after the woman was declared sterile.

Discussion

The two-procedure delivery of MCA seems to be safe: no serious morbidity was reported and complaints were minor and temporary. The premedication regimen

Table 2 Follow-up complications and complaints

	Interval between procedures					
	Two months (N = 17)		*Three months (N = 22)*		*Four months (N = 22)*	
	No.	%	No.	%	No.	%
Events since procedure						
Pregnancy	1	5.9	0	0.0	0	0.0
Uterine tenderness	1	5.9	0	0.0	0	0.0
Cervical stenosis	0	0.0	1	4.5	0	0.0
Endocervical stenosis	0	0.0	0	0.0	1	4.5
Endometrial adhesions	0	0.0	2	9.1	0	0.0
Menstrual changes						
Increased menses	3	17.6	2	9.1	5	22.7
Decreased menses	7	41.2	9	40.9	9	40.9
Oligomenorrhea	0	0.0	3	13.6	1	4.5
Secondary amenorrhea	0	0.0	1	4.5	0	0.0
Increased dysmenorrhea	4	23.5	6	27.3	0	0.0
Decreased dysmenorrhea	1	5.9	8	36.4	6	27.3
Total women with events	10	58.9	18	81.8	14	63.6

Table 3 Bilateral closure as determined by HSG

	Interval between procedures					
	Two months (N = 17)		*Three months (N = 22)*		*Four months (N = 22)**	
	No.	%	No.	%	No.	%
HSG performed	17/17	100.0	22/22	100/0	22/22	100.0
Bilateral closure						
Reported by investigator	17/17	100.0	21/22	95.5	19/22	86.4
Reported by independent evaluator*	16/17	94.1	19/21	90.5	19/21	90.5
Agreement between two readings	16/17	94.1	20/21	95.2	21/21	100.0

* One woman in the three month group and one in the four month group did not have a second reading

used appeared to be successful in controlling pain. The use of premedication lengthened the time that the women spent in the clinic, however, since a rest of two to three hours was needed after the procedure.

Although the results of this study must be interpreted cautiously because of the small number of cases in the trial, the use of a second procedure at two, three or four months after the first procedure appears to increase the likelihood of bilateral closure compared with that of a single procedure.

No significant difference was found in the bilateral closure rates obtained in the three groups of women ($p>0.05$).

The closure rate based on HSG ranged from 86% to 100% as reported by the investigator and an independent evaluator. HSG tests are not always adequate for determining tubal closure because tubal spasms can cause the test to show lack of patency. The real test of the procedure will come with the determination of one and two year pregnancy rates.

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Resumé

Soixante-et-une femmes ont subi une intervention non-chirurgicale de stérilisation par deux injections de méthyl-cyano-acrylate à deux, trois ou quatre mois d'intervalle. L'occlusion bilatérale (déterminée par l'hystérosalpingogramme (HSG)) allait de 86% chez les femmes dans le cas de l'intervalle de quatre mois à 100% dans le cas d'un intervalle de deux mois entre les deux injections. Une femme est tombée enceinte trois mois après avoir été déclarée stérile.

Resumen

Sesenta y una mujeres fueron esterilizadas, por un medio no quirúrgico, con dos aplicaciones de metilcianoacrilato a intervalos de dos, tres o cuatro meses. Oclusiones bilaterales (determinadas por histerosalpingograma) variaron desde un 86% en mujeres con intervalos de cuatro meses entre las aplicaciones, a un 100% para mujeres con un intervalo de dos meses entre procedimientos. Hubo un embarazo en una mujer tres meses después que fuera declarada estéril.