

# Quinacrine Pellets: An Examination Of Nonsurgical Sterilization

By Cheri Pies, Malcolm Potts and Bethany Young

*The quinacrine method of nonsurgical female sterilization has been studied for over a quarter of a century, but knowledge of its recent availability has aroused significant interest and concern. In the early 1970s, some attention to this method was generated by the shift from a liquid "slurry" method to slow-release pellets, although by that time many commentators saw the method as having an unacceptably high failure rate and as presenting serious risks. Findings from field studies in 1989-1992 in Vietnam have captured the attention of women's health activists and advocates, contraceptive researchers, policymakers, family planning providers and others affected by the development and use of this nonsurgical procedure. Of particular interest is the scientific rigor with which the field trials have been conducted, and the potential short-term and long-term health effects associated with the use of quinacrine pellets.*

(International Family Planning Perspectives, 20:137-141, 1994)

The demand for sterilization is increasing in many countries.<sup>1</sup> In fact, female sterilization is the most widely used contraceptive method, with over 138 million married women of reproductive age relying on its protection. In industrial and countries, the average woman now achieves her desired family size within six years of marriage, and spends 50% of her reproductive life potentially fertile but not wanting any more children? In developing countries, with an expanding number of women in fertile age-groups and a backlog of unmet need for fertility control, an estimated 150 million new sterilizations—many of them female sterilizations—could be performed in many of these countries during the 1990s.<sup>3</sup>

Female sterilization has been considerably simplified over the past few years, particularly with the introduction and widespread utilization of minilaparotomy, which can be performed as an outpatient procedure. Despite these advances, female sterilization is a surgical procedure;

thus, it exposes a woman to certain irreducible risks—of infection, for example, or of injury to the viscera. Effective anesthesia and adequate postoperative pain control are sometimes unavailable, and surgical standards have not always been maintained at a satisfactory level. That many users of sterilization have been referred by friends and relatives who themselves have been sterilized under less than optimal conditions is testimony to the strength of the desire for family planning! Given this situation, a simple, inexpensive and easy-to-administer nonsurgical approach to female sterilization has the potential for widespread use and appeal.

In July 1993, an article published in *The Lancet* described the results of two and one-half years of field trials in Vietnam of quinacrine pellets, an experimental method of nonsurgical female sterilization.<sup>5</sup> The report generated renewed interest in the technique, as well as widespread concern?

Since the 1980s, close to 25 articles concerning the use of quinacrine as a method of nonsurgical female sterilization have been published in a range of scientific journals, yet health care providers and the general public were largely unaware of the method, and many of those who had heard of it may not have known that the method

was being used anywhere on a large scale. Others may have heard of the method but dismissed the research as a result of questions over potentially high levels of teratogenicity, mutagenicity and toxicity. Furthermore, until the publication of the *Lancet* article, there had been little discussion of the quinacrine method among members of the family planning community or the public at large. If a method of this nature is going to benefit women and genuinely expand family planning choices, then health care providers, potential consumers and the general public need to review the data, discuss the implications of introducing such a procedure, and debate the policy issues that require consideration.

In this article, we give a brief overview of the development of the quinacrine method, review issues of safety and efficacy raised by field studies, discuss several key concerns with regard to ensuring that women are able to make free and informed contraceptive and reproductive choices, evaluate the potential for misuse and abuse of the quinacrine method, and review the need for further research. Above all, we want to stimulate further dialogue—on the one hand, on the issue of quinacrine, but on the other hand, on the larger issue of the ethical development and testing of new contraceptive technologies. The authors of this comment have each approached the writing of this article from very different perspectives. We believe that it is important to reflect the diverse viewpoints regarding both quinacrine and contraceptive development, in an effort to promote open dialogue and to further the best interests of family planning consumers worldwide.

## History of Quinacrine

A number of chemical agents have been used in attempts to develop nonsurgical female sterilization techniques.<sup>7</sup> One of these, quinacrine, was developed in the

Cheri Pies is associate professor in the Department of Health Science at San Jose State University, San Jose, Calif. Malcolm Potts is Bixby Professor of Population and Family Planning in the School of Public Health and Bethany Young is a doctoral student in epidemiology at the University of California at Berkeley.

1920s as an antimalarial drug, and was subsequently administered orally to over three million American servicemen during World War II.<sup>8</sup> It has also been used to treat tapeworm, giardia, lupus and malignant effusions of the pleural and peritoneal cavities.<sup>9</sup>

In 1970, Jaime Zipper, the gynecologist and contraceptive researcher who invented the Copper T intrauterine device, described the intrauterine instillation of quinacrine, in a liquid "slurry" form, as a method of female sterilization.<sup>10</sup> When inserted into the uterus, quinacrine destroyed the epithelium of the tubal opening and occluded the near end of the tube. The technique was used on a small scale in several countries, but the failure rate was high and there were several types of medical complications associated with the rapid absorption of quinacrine into the vascular system, as well as burning in the vaginal canal. By 1976, Zipper had concluded that the method was "unsatisfactory for widespread use."<sup>11</sup>

In the late 1970s, however, Zipper and colleagues developed a solid pellet of quinacrine that was easy to insert and required only a short time to liquefy. The pellet dose was six times lower than that of the slurry, produced a lower failure rate and reduced the possibility of medical complications.<sup>12</sup>

Since the 1980s, field studies of quinacrine pellets have been conducted in Chile, India, Vietnam and other developing countries, and pre-hysterectomy studies have taken place in the United States.<sup>13</sup> Although studies have examined several different regimens, the most common approach involves the transcervical administration of seven pellets of quinacrine (a total of 252 mg) 5-7 days after the first day of menstrual bleeding (i.e., in the proliferative phase of the cycle). The pellets are deposited at the uterine fundus using a modified Copper-T inserter. Two insertions are performed, one month apart. The initial destruction of the tubal epithelium is followed by an inflammatory process over the next 3-5 days that leads eventually to the growth of fibrous tissue and to tubal occlusion. This occlusion appears to be lim-

\*It should be noted, though, that in the case of accidental use during an early pregnancy, quinacrine is more likely to kill the exposed embryo and produce an abortion than it is to cause damage to an embryo that would then survive to term.

†However, on anatomical grounds, the occlusion of the proximal, intramural part of the fallopian tube might even lessen the possibility of an ectopic pregnancy, as there is less of a cul-de-sac for the fertilized egg to lodge in following quinacrine treatment than when the distal part of the tube is occluded.

ited to the section of the tube a few millimeters into the isthmus.<sup>14</sup> Some investigators have tried to improve the rate of tubal occlusion by adding various potentiating agents,<sup>15</sup> but no modification of the method described above has progressed beyond the experimental stage.

Results from some field studies, as well as other research on quinacrine, point to several concerns about the method. Quinacrine has been found to be both teratogenic and embryocidal.<sup>16\*</sup> In addition, incomplete occlusion of the fallopian tubes could increase the risk of ectopic pregnancy. Furthermore, the Ames test, a laboratory method for identifying potentially carcinogenic agents, suggests that quinacrine must be considered a possible cancer-causing agent in mammals.

In the early 1980s, Family Health International (FHI) conducted toxicology studies in cynomolgus monkeys, which were given varying amounts of quinaaine intravenously.<sup>17</sup> When the quinacrine was deliberately placed in the peritoneum of small cynomolgus monkeys, it led to serious side effects, including death. However, when the experiment was repeated with pigs (whose peritoneal cavity is comparable in size to that of humans), there were no serious sequelae.<sup>18</sup>

The results of these studies, which provided data on the systemic effects of quinacrine, led to the initiation of U.S. clinical trials. In one study, 10 volunteers received quinacrine pellets 24 hours prior to elective hysterectomy in an FHI-sponsored clinical trial approved by the U.S. Food and Drug Administration (FDA). Another 11 U.S. women subsequently received quinacrine 30 days before elective hysterectomy. Blood levels of quinacrine and other parameters were measured. The small number of women who participated in these pre-hysterectomy studies were monitored clinically during the interval when any serious immediate reaction to the systemic absorption of quinacrine could be expected to occur.

FHI's direct involvement with quinacrine ceased after these limited studies, however, for several reasons. Perhaps the most important was that much contraceptive development work is funded largely by the U.S. Agency for International Development (USAID), which is permitted to provide only contraceptives that have been

approved by the FDA. There was little likelihood that the quinacrine method would be submitted for FDA approval, however. Some doubted that there was much of a U.S. market for such a method, and potential manufacturers may have feared that the method's failure rate would expose U.S. physicians to an unacceptable burden of litigation. Quinacrine was also of little interest to Western manufacturers because it could not be patented, and so was not likely to generate a significant profit. Thus, although the quinaaine method was clearly of great potential interest to some, and FHI continued to assist in data collection in Chile among women treated with quinacrine in Zipper's studies, no further trials of the quinacrine method occurred in developed countries.

### The Vietnamese Trials

The hesitancy of Western funders and pharmaceuticals to explore the use of quinacrine did not halt all research, however. In field trials conducted between January 1989 and October 1992, 31,781 Vietnamese women received at least one insertion of quinacrine pellets.<sup>19</sup> According to Vietnam's vice-minister of health,<sup>20</sup> the women who volunteered to receive the quinaaine pellets were rigorously screened, and had to be over 30 years old with at least two living children in order to participate. However, the volunteers were almost exclusively of lower socioeconomic status and were poorly educated; also, some published information suggests that the screening criteria may not have been strictly enforced.<sup>21</sup> Furthermore, the field studies were conducted in a resource-poor environment; the per capita expenditure for health in Vietnam is \$2.00 per year, of which only 10% goes to maternal and child health and family planning. Moreover, the quinacrine method was offered alongside a limited choice of modern methods in Vietnam--sterilization and the IUD. Finally, protocols may not have been followed in every detail, and follow-up

Table 1. Failure rates for quinacrine method, by months of follow-up, according to number of quinacrine pellet insertions, Vietnam, 1989-1992

No. of insertions	6mo.	12 mo.	18 mo.	24 mo.
<b>Two (N=9,461)</b>				
N	0,623	7,048	3,574	1,146
Failure rate	1.54	2.63	3.50	4.31
standard error	0.13	0.17	0.21	0.31
<b>One (N=2,225)</b>				
N	2,036	1,065	537	103
Failure rate	4.42	5.15	5.15	5.15
Standard error	0.44	0.46	0.46	0.46

Source: See D. Hieu et al., 1993, reference 1.

may have been imperfect in some groups.

In Table 1, we show selected data from the Vietnam study concerning pregnancy rates among users of the quinacrine method. At 12 months of follow-up, women who received two insertions of quinacrine had a failure rate of 2.6 pregnancies per 100 users, about half the rate seen among women who received just one insertion of quinaaine (5.2 per 100). By 24 months, failure rates among women with one insertion had not changed, while those among women with two insertions had climbed to 4.3 per 100.

The Vietnamese data on failure rates are valuable; however, data on rare adverse effects need to be approached critically. No deaths were reported among participants in the field trials. According to the researchers, a plausible calculation suggests that 6-31 women might have died during a comparable number of surgical sterilization procedures, and that more than 240 maternal deaths would have occurred in this group in the absence of fertility control.<sup>22</sup> More data from the follow-up of ectopic pregnancies and other long-term, rare, but possibly serious risks would be important. One death from ectopic pregnancy in Vietnam after the closure of data collection has been documented.<sup>23</sup>

### Ethics and Policy Considerations

Some women often seek irreversible methods of family planning because they lack other birth control options. It is essential to provide sterilization services as one birth control choice among many alternatives. When assessing need, however, we should be cautious: Women who want no more children do not necessarily want an irreversible method. In addition, we cannot lose sight of the strong, tenacious relationship between maternal mortality and other key social, political, economic and health-related factors.

Family planning practitioners, policy-makers and consumers around the world would agree that there is a vast unmet demand for fertility control, particularly for simple, effective and inexpensive reversible methods. Nevertheless, we must ask ourselves, how well does quinacrine fill such a demand? Moreover, how are the immediate benefits of a new method such as quinacrine to be balanced against possible-short-term and long-term risks? Furthermore, where should the locus of control lie—with international agencies such as the World Health Organization, with national drug regulatory authorities or with consumers themselves? And in what way should women be informed of pos-

sible risks? How should organized groups express their perspectives?

When the pressure for change is not profit but perceived human good and two schools of thought find themselves in opposition, then the temperature of the debate rises. With the quinacrine method, in essence, one group wants to guarantee that Vietnamese women are not subjected to long-term physical harm and exploitation, by ensuring either that the quinacrine method is never used or that more extensive tests are done while its use is postponed. Others hold that to discontinue use of the quinacrine method is to deny Vietnamese women a potentially life-saving choice. In this case, because of quinaaine's unknown potential for long-term side effects, women's organizations and other concerned groups successfully pressured the Vietnamese government to cease further use of quinacrine until studies have demonstrated that there are no negative effects on women's health.

The reduction of maternal mortality has been mentioned prominently in discussions about quinacrine and its place on the menu of family planning options.<sup>24</sup> Certainly, extensive efforts must be made to address the ongoing problem of maternal mortality and morbidity, especially in developing countries. At the same time, we must recognize that the quinacrine method is not a panacea for maternal morbidity. Simply focusing on fertility control procedures in order to reduce maternal mortality fails to recognize the clinical need for improved obstetric and family planning services, as well as the need for governments to provide better health care services overall, to distribute resources more adequately, to pay greater attention to health and cultural issues and to promote safe, legal abortion services.

Undoubtedly, one of the most difficult issues is how to evaluate the long-term risk of carcinogenesis. Case-control and cohort studies following widespread human use may be the only way of giving complete assurance. To this end, a retrospective study of women in Chile, Vietnam and elsewhere who have used quinacrine should be undertaken to learn more about long-term effects—those reported anecdotally as well as those reported directly to clinicians. The need for additional animal data has been clear for over a decade, but the international community has not been willing to make the needed investment. Should animal studies be conducted, however, they may not provide unambiguous information. The choice between condemning the method at this stage on the basis of the

Ames test or continuing its use while monitoring users closely (as was done with hormonal contraceptives and IUDs) is a weighty issue, and one where disagreements are likely to persist.

### Practical Issues

It may be extremely difficult to prevent the misdirected use of any technology, but the interests of the user are most likely to be given priority if there is:

- an analysis of the context in which a new method will be used;
- \*an objective and thorough evaluation of the scientific data relating to the strengths and weaknesses of a new method;
- a clear definition of the areas requiring further research, and a realistic statement of what it will take to answer these questions; and
- \*an honest appreciation of how a new technology could be misused.

In addition, serious and concerted efforts must be made to build opportunities for dialogue between contraceptive researchers, reproductive scientists, consumers and women's health advocates. Such a dialogue will serve to facilitate a deeper understanding on the part of the scientific community of what women want in the way of contraceptive technologies, what women's experiences have been with different contraceptive choices, and what problems they have encountered.

### Providing Free, Informed Choice

The circumstances in health clinics and family planning settings must be such that women are not subject to coercion in the context of demographic goals, fraud or misinformation, or enticed by special inducements. This can happen only if practitioners and other family planning providers are sensitive to the complex and multiple influences on women's lives, including the cultural and familial implications of permanent sterilization. We must ensure that women have adequate time for the decision-making process prior to having the procedure.

In the case of the quinacrine method, consumers would need to be clearly informed that the technique is still largely experimental, that it carries with it risks of failure and ectopic pregnancy, and that women need to receive two applications of quinacrine. Additional information needs to be provided with regard to the method's risk of side effects, its lack of protection from infection with the human immunodeficiency virus and other sexually transmitted diseases, and its potential cancer risks. Finally, women would need to

be informed about what choices exist (or do not exist) should pregnancy occur.

**Threats of Potential Misuse**

Even a casual observer can imagine the potential for misuse and abuse with a sterilization technique such as the quinacrine method. The insertion technique is identical to that of the IUD, and it is possible to imagine that a clinician who believed that a patient might be better suited to sterilization could insert quinacrine pellets in place of an IUD without the patient's knowledge.

Concerns about the potential misuse of nonsurgical sterilization come on the heels of fears concerning the misuse of the contraceptive implant,<sup>25</sup> which is now in use in many countries around the world. In addition, one cannot ignore the long history of compulsory sterilization, both in the United States and in many developing countries. In the United States, much of this abuse was focused on the poor, the mentally retarded, prison populations and ethnic minorities. All too often, the potential for misuse and abuse is driven by the competing priorities of the individual's right to reproductive choice in the midst of ongoing efforts to slow rapid population growth. Thus, it is not enough to look solely at the benefits reaped from a new contraceptive technology. We must also face the realities of potential misuse, and address them directly, responsibly and in a timely manner.

**Possible Benefits of Quinacrine**

Low-income women often find surgical sterilization to be prohibitively expensive. Furthermore, in some countries, such as India, there is a tradition of paying the acceptor an "incentive," either in cash or in kind. The incentive is sometimes interpreted as compensation for the pain and time lost due to surgery, but whatever the rationale, there is a genuine conflict between voluntarism and payments of any sort. Given that the cost of materials for the quinacrine method is US \$1 per operation, and because the procedure is more convenient to administer than surgical sterilization, this method should be offered without incentives if it is ever provided on a large scale.

In addition, many women eventually regret having been sterilized. In the 1982 U.S. National Survey of Family Growth, up to one woman in 10 responded that she would reverse her sterilization if it were safe to do so.<sup>26</sup> Regret after sterilization has been found to be related to several social and economic factors. Moreover, women may

be more apt to regret sterilization if they have had to make their decision without time to consider the ramifications of the operation, or if medical personnel encouraged the decision by emphasizing the perceived convenience of postpartum sterilization.<sup>27</sup>

The quinacrine method changes the decision-making equation after delivery. To date, it has not been offered postpartum, and is likely to remain technically unsuitable for use after delivery. The fact that it is a simple procedure that can be performed outside the hospital setting, and that it is a procedure that can be performed by a range of health care workers, removes pressure from providers and users to capitalize on any convenience associated with postpartum tubal surgery. Overall, a method like quinacrine could preempt large-scale postpartum surgical sterilization programs, thereby potentially reducing the number of situations in which women would find themselves experiencing poststerilization regret.

**Conclusions**

Decisions on the use of the quinacrine method are likely to be made at a national level, but there are key questions that require additional study and the broad sharing of objective information. Among these are gathering data on women's perspectives on the procedure, as well as continuing to monitor users in Chile and Vietnam in order to gain further insight into the possible long-term side effects, particularly ectopic pregnancy and reproductive cancer.

It is important to keep in mind that quinacrine is not sterilization in the conventional sense; instead, it can be viewed as an irreversible long-acting contraceptive method with a moderate failure rate and a high continuation rate. As can be seen in Figure 1, this makes the quinacrine method unique, in that all other methods now in use that have a moderate failure rate are reversible.

Studies of the quinacrine method's acceptability and utilization are urgently needed in order to determine the social, physical, psychological and economic im-

pact of this procedure on women and their families. Clearly, from a consumer's perspective, it is the family planning community's responsibility to ensure that accurate and thorough data are collected and analyzed before we begin the process of introducing this method.

To initiate this process, beginning in mid-1994, FHI will undertake a retrospective study of quinacrine acceptors in Vietnam to describe their social and demographic characteristics, identify predictors of method failure, ask women about their decision to select this method, and compare the perceptions and experiences of women using quinacrine with those of women using the IUD.

At the present time, the available data concerning this method have substantial limitations? For decision-makers overseeing family planning services, the quinacrine method presents an unusual problem, largely because it has not been submitted to any of the developed countries' drug regulatory agencies (beyond the FDA-approved Phase I clinical trials conducted previously). Further testing in these countries is unlikely. In addition, the lack of potential developed-country markets produces a "Catch-22" type of situation, in that the U.S. AID, which is the major source of noncommercial funds for contraceptive development, finds it difficult to pursue a method that is unlikely to be approved for use in the United States.

Moreover, the questions relating to toxicity and carcinogenicity of quinacrine present serious dilemmas in assessing the method's long-term safety and efficacy. Some commentators dismiss cancer concerns as unfounded, arguing that quinacrine has been used on a large scale for other purposes without evidence of subsequent cancer. Others fear that the long-term cancer risk may outweigh any short-term benefits, and point out that quinacrine has not been used in the uterus before.

At a time when many perceive the control of women's fertility to be a quick fix for many contemporary social, economic and environmental problems, we must be cautious and deliberate in our evaluation of any new reproductive technology. Is quinacrine to be perceived by program managers as yet another weapon in the arsenal of "chemical warfare" against women's reproductive choices, or as a welcome addition to the "cafeteria" of birth control options? In the latter case, is the method being introduced as a shortcut to the reduction of maternal mortality, or as part of the overall delivery of health services to women? These and re-

**Figure 1. Leading methods of contraception, by reversibility and relative failure rates**

Reversibility	Failure rate	
	Moderate	Low
Permanent	Quinacrine	Vasectomy Tubal ligation
Reversible	Condom Female condom Spermicide Sponge	Implant Pill IUD

lated questions must be addressed if consideration is given to introducing a method such as quinacrine.

Given that our thinking and perspectives on contentious issues are shaped by our backgrounds, values and experiences, it is difficult to achieve objectivity, especially when dealing with a subject complicated by economic, political, social and cultural factors. The availability of quinacrine raises serious concerns that extend beyond questions of the method's efficacy or of the need for a procedure of this nature. We believe that consistent emphasis must be given to the user's perspective, scientific objectivity must be maintained in analyzing the data, and users must be involved in the necessary discussions and decisions concerning contraceptive efficacy and safety. It is only through these steps that it will be possible to improve the care provided to the individuals we want to serve.

## References

1. D. Hieu et al., "31,781 Cases of Non-Surgical Female Sterilizations with Quinacrine Pellets in Vietnam," *Lancet*, 342:213-217, 1993; and S.D. Mumford and E. Kessel, "Sterilization Needs in the 1990s: The Case for Quinacrine Nonsurgical Female Sterilization," *American Journal of Obstetrics and Gynecology*, 167:1203-1207, 1992.
2. J.D. Forrest, "Timing of Reproductive Life Stages," *Obstetrics & Gynecology*, 82:105-110, 1993.
3. E. Kessel and S.D. Mumford, "Potential Demand for Voluntary Female Sterilization in the 1980s: The Compelling Need for a Nonsurgical Method," *Fertility and Sterility*, 37:723-725, 1982.
4. M. Rosenberg, "Sterilization in Bangladesh: Morbidity, Mortality and Risk Factors," *International Journal of Gynecology and Obstetrics*, 20:283-291, 1982; and G.I. Zatulchni et al., eds., *Female Transcervical Sterilization*, Harper and Row, Philadelphia, 1983.
5. D. Hieu et al., 1993, op. cit. (see reference 1).
6. A. Pollack and C. Carignan, "The Use of Quinacrine Pellets for Non-Surgical Female Sterilization," *Reproductive Health Matters*, 2:119-122, 1994; and D. Hieu et al., 1993, op. cit. (see reference 1).
7. G.I. Zatulchni et al., 1983, op. cit. (see reference 4).
8. G. Duncan, "Quinacrine Hydrochloride as a Malaria-Suppressive Agent for Combat Troops," *War Medicine*, 8:805-818, 1945.
9. E. Austin and W. Flye, "The Treatment of Recurrent Malignant Pleural Effusion," *Annals of Thoracic Surgery*, 28:190-203, 1979.
10. J.A. Zipper, E. Stachetti and M. Medel, "Human Fertility Regulation by Transvaginal Application of Quinacrine on the Fallopian Tube," *Fertility and Sterility*, 21:581-589, 1970.
11. J.A. Zipper et al., "The Clinical Efficacy of the Repeated Transcervical Instillation of Quinacrine for Female

**Sterilization," International Journal of Gynecology and Obstetrics**, 14:499-502, 1976.

12. J. Zipper et al., "Quinacrine Hydrochloride Pellets: Preliminary Data on a Nonsurgical Method of Female Sterilization," *International Journal of Gynecology and Obstetrics*, 18: 275-279, 1980.

13. R. Guzman-Serani, A. Bemales and L.P. Cole, "Quinacrine Hydrochloride Pellets: Three-Year Follow-Up on a Non-Surgical Method of Female Sterilization," *Contraceptive Delivery Systems*, 5:131-135, 1984; R. Bhatt and C.S. Waszak, "Follow-Up of Insertion of Quinacrine Hydrochloride Pellets as a Means of Nonsurgical Female Sterilization," *Fertility and Sterility*, 44:303-306, 1985; J.A. Zipper, E. Stachetti and M. Medel, 1970, op. cit. (see reference 10); T. Agoestina and I. Kusuma, "Clinical Evaluation of Quinacrine Pellets for Chemical Female Sterilization," *Advances in Contraception*, 8:141-151, 1992; and I.C. Chi and S. Thapa, "Postpartum Tubal Sterilization: An International Perspective on Some Programmatic Issues," *Journal of Biosocial Science*, 25:51-61, 1993.

14. J. Zipper et al., "Efficacy of Two Insertions of 100-Minute Releasing Quinacrine Hydrochloride Pellets for Non-Surgical Female Sterilization," *Advances in Contraception*, 3:255-261, 1987.

15. G.I. Zatulchni et al., 1983, op. cit. (see reference 4).

16. J.A. Zipper, E. Stachetti and M. Medel, 1970, op. cit. (see reference 10).

17. H. Chandra and B. Malaviya, "Toxic Effects of Quinacrine Hydrochloride in Rhesus Monkeys," *Contraception*, 24:269-274, 1981.

18. G.I. Zatulchni et al., 1983, op. cit. (see reference 4).

19. D. Hieu et al., 1993, op. cit. (see reference 1).

20. D.Q. Vinh, Ministry of Health, Hanoi, personal communication, March 1994.

21. A. Pollack and C. Carignan, 1994, op. cit. (see reference 6); and D. Hieu et al., 1993, op. cit. (see reference 1).

22. D. Hieu et al., 1993, op. cit. (see reference 1).

23. S.D. Mumford, Center for Research on Population and Security, personal communication, Dec. 1993.

24. D. Hieu et al., 1993, op. cit. (see reference 1).

25. J.D. Forrest and L. Kaeser, "Questions of Balance: Issues Emerging from the Introduction of the Hormonal Implant," *Family Planning Perspectives*, 25:127-132, 1993.

26. E.F. Jones and J.D. Forrest, "Contraceptive Failure in the United States: Revised Estimates from the 1982 National Survey of Family Growth," *Family Planning Perspectives*, 21:103-109, 1989.

27. I. Kjer, "Regret of Laparoscopic Sterilization," *European Journal of Obstetrics & Gynecology and Reproductive Biology*, 35:205-210, 1990; P. Pitaktepsombati and B. Janowitz, "Sterilization Acceptance and Regret in Thailand," *Contraception*, 44:623-637, 1991; W. Miller, R. Shain and D. Pasta, "The Pre- and Poststerilization Predictors of Poststerilization Regret in Husbands and Wives," *Journal of Nervous and Mental Disease*, 179:602-608, 1991; I.C. Chi et al., "Performing Tubal Sterilizations During Women's Postpartum Hospitalization: A Review of the United States and International Experience," *Obstetrical and Gynecological Survey*, 47:71-78, 1992; and L. Wilcox et al., "Risk Factors for Regret After Tubal Sterilization: 5 Years of Follow-Up in a Prospective Study," *Fertility and*

*Sterility*, 55:927-932, 1991.

28. C.S. Carignan, D. Rogow and A.E. Pollack, "The Quinacrine Method of Nonsurgical Sterilization: Report of an Experts Meeting, Association for Voluntary Surgical Contraception, Working Paper No. 6, New York, July 1994.

## Resumen

El método quinacrino de esterilización femenina no quirúrgica ha sido estudiado durante un cuarto de siglo, pero al conocerse su reciente disponibilidad ha despertado un gran interés y preocupación. A principios de la década de los años 70, se prestó cierta atención a este método mediante el cambio de un método líquido "pastoso" a un sistema de pellas de dispersión lenta, aunque en aquel momento muchos comentaristas consideraron que el método presentaba elevadas e inaceptables tasas de falla y serios riesgos. La experiencia de los investigadores de campo en Vietnam logró captar la atención de los interesados en el sector de salud de la mujer, de los investigadores de métodos anticonceptivos y de los encargados de formular políticas, suministradores de planificación familiar y otras personas interesadas en el potencial uso erróneo de este procedimiento no quirúrgico. De particular interés es el rigor científico con que se han conducido las pruebas de campo y el potencial de los efectos que tienen sobre la salud, a corto y largo plazo, relacionado con el uso de pellas de quinacrina.

## Résumé

En tant que méthode non chirurgicale de stérilisation féminine, la quinacrine est étudiée depuis plus de 25 ans mais sa récente disponibilité a suscité un grand intérêt aussi bien que certaines préoccupations. Au début des années 70, cette méthode a attiré l'attention du fait du transfert d'une méthode de « boue » liquide à des pastilles à libération lente, bien que nombre de commentateurs aient alors considéré la méthode comme présentant des risques graves ainsi qu'un taux excessivement élevé d'échecs. L'expérience de chercheurs dans des études locales au Vietnam a attiré l'attention des activistes et promoteurs de la santé féminine, des chercheurs en matière de contraceptifs, des responsables, des fournisseurs de planification familiale et autres personnes soucieuses du message éventuel de cette intervention non chirurgicale. Il convient d'examiner de plus près la rigueur scientifique avec laquelle les études ont été réalisées sur le terrain, ainsi que les effets éventuels à court et à long terme de l'utilisation de pastilles de quinacrine sur la santé.