

Is There Still a Role for Sterilization by Tubal Ligation as a Contraceptive Method?

Norman D Goldstuck 

Department of Obstetrics and Gynaecology, Faculty of Medicine and Health Sciences, University of Stellenbosch, Tygerberg Hospital Francie van Zyl Dr, Cape Town, South Africa

Correspondence: Norman D Goldstuck, Email namumzh@yahoo.com

Abstract: Tubal ligation has been used since the late nineteenth century to control undesired fertility in women. Over the years, there have been many improvements to the surgical technique, and the procedure has become a lot safer. Some recent developments, however, appear to make this procedure obsolete. In the first instance, there is now ample evidence that removing the Fallopian tubes rather than ligating them or closing them provides protection against developing ovarian carcinoma. The many surgical approaches and closure methods are therefore no longer appropriate. In the second instance, the use of long-acting reversible contraception has been shown to be as effective in preventing future pregnancy, more cost-effective and with even more health benefits than tubal ligation or tubectomy. This is especially true of the use of intrauterine levonorgestrel. The problem of regret and request for tubal ligation reversal, where that was performed, is eliminated as is the surgical concern of operating on older women with increased body mass index and medical co-morbidities.

Keywords: tubal ligation, tubectomy, LARC, intrauterine contraception

Background

The first human tubal ligation was performed by Samuel Smith Lungren in 1880 using silk sutures. In the subsequent 143 years the procedure has been performed using a multiplicity of techniques and surgical approach routes.¹ These include open abdominal, laparoscopic and transvaginal. Tubal ligation was then and is still now considered to be irreversible, although this is no longer strictly true since the days of tubal microsurgery. Truly effective reversible contraception is a 20th century development. Intrauterine contraception was first used in 1909 using silk gut and was later improved using thermoplastics by 1962. Oral and injectable contraception using progestins and estrogen/progestin combinations (COCs) became available at about the same time.

Long-acting reversible contraception (LARC) is a late 20th century concept which includes intrauterine, implant and to a lesser extent injectable contraception. LARC contraception appears to give the convenience and “forgettability” of sterilisation but it is tainted with its developmental past including its association with the combined oral contraceptive thrombosis scares of the first-generation estrogen/progestin pills in 1969² and the third-generation progestin containing COCs in 1995.³ The thermoplastic and copper IUDs had their infection crises periodically, but especially in the late 1980’s. Apologists for these methods continually reminded us that the risks of pregnancy were greater than the risks of these methods and that they represented the lesser of the evil of unintended pregnancy versus the administration of foreign hormones and mechanical devices containing a thread to the exterior as a gateway to unwanted bacterial contamination. This view is totally inappropriate in the 21st century. Thromboembolic phenomena of the earlier COCs appears to be due to increasing Activated Protein-C (APC) resistance. This does not appear to be the case with estetrol and to a lesser extent with estradiol rather than ethinyl-estradiol as the estrogen in COCs.^{4,5} Progestin-only contraception by any delivery system has not been shown to be thrombogenic, despite the cautionary warnings in the World Health Organization (WHO) guidelines. By 1992, the role of IUDs and pelvic inflammation was clarified as not being due to the device per se, but regular attendant clinical risk.⁶

The American investment bank Morgan Stanley has completed a study showing that by 2030, 45% of women aged 18–45 in the United States will be childless (Rise of She Economy, August 22, 2019). A more appropriate safety comparison should thus be between modern hormonal birth control and regular menstrual cycles. Historically, menstruation was a rare occurrence due to short lives, childbirth and stillbirth, and lactation and starvation. It still is relatively uncommon for certain populations like the Khoi, who live the same way they did hundreds of years ago.⁷ Following industrialization by 1900 modern women experienced an average of 100 cycles and the 18–45 cohort previously mentioned are likely to experience around 450 cycles.⁸ We now know that the breakdown of the decidualized endometrium is a highly inflammatory event. Local inflammation triggered by histamine production from degranulating mast cells produces release of serotonin, heparin and bradykinin which stimulate production of prostaglandin E₂, tumour necrosis factor- α (TNF- α), cytokines, chemokines, interleukins, interferons, granulocyte macrophage colony stimulating factor (GM-CSF) which also enter the systemic circulation.^{8,9} Modern hormonal contraception prevents the formation of a decidualized endometrium and thus the prevention of the formation and release of most of these inflammatory markers. This produces powerful therapeutic and preventative effects including reduction of bleeding and pain and reduction of the risk of endometrial and ovarian and colorectal cancer by COCs.^{9,10}

More especially, the levonorgestrel 52mg intrauterine device (LNG-IUD 52mg, Mirena[®], Liletta[®]/Levosert[®], Eloira[®]), which was originally developed as a contraceptive, is now recognized as a powerful therapeutic agent which is on the WHO list of essential medicines. The LNG-IUD 52mg contains progestin only, suppresses decidualization, and has been shown to control excessive uterine bleeding caused by every category in the “PALM-COEIN” classification (the currently accepted categorization of abnormal uterine bleeding) and to control the inflammation and pain of endometriosis and the pain of dysmenorrhoea.¹¹ It has also been shown to help prevent endometrial and ovarian carcinoma and more recently to perhaps reduce the incidence of pancreatic and lung carcinoma, although possibly being associated with a slightly increased relative risk for breast cancer.¹² Its contraceptive lifespan in the United States is now officially recognized to be 8 years by the FDA, but there is some evidence that it is clinically effective for 10 years¹³ and a detailed examination of its pharmacokinetics indicates that it should maintain contraceptive efficacy for 10 years at least.¹¹ The pregnancy failure rate of around one in 200 is about the same as that of surgical sterilization.

In the last 10 years tubal ligation has been replaced by salpingectomy in many centres as part of a program of “opportunistic salpingectomy” which appears to reduce the incidence of ovarian carcinoma by about 80%.^{14,15} Nevertheless, the recent increased availability of the LNG-IUD 52mg in the most countries worldwide provides an opportunity to largely replace a 19th century surgical procedure with a more beneficial (and cost-effective) 20th century technology.¹⁶ While the LNG-IUD 52 mg appears expensive, much cheaper generic versions are becoming available, and the cost of tubal surgery is not inconsequential either and while it may produce menstrual problems in a percentage of users it will also prevent these problems from arising in those who had tubal ligations, as well as helping to reduce blood loss and anemia in many. It avoids having to sail between the Scylla of subjects who are “too young and too few children” for the procedure, who may then experience future regrets, and the Charybdis of those who are old enough to have diminishing fertility, a high body mass index (BMI), previous abdominal surgeries and medical co-morbidities, each with their own problems. Tubal ligation or salpingectomy does not prevent future decidualized endometrial breakdown and therefore does not prevent the associated inflammatory cascade. In fact, following surgical sterilization, there may often still arise a need for therapeutic intrauterine LNG, including during menopausal hormone therapy (MHT).¹¹

Opinion

The vast majority of women will benefit from intrauterine LNG, including the lower dose LNG-IUDs (whose benefits are not as well described)¹⁰ rather than the potential hazards of tubal surgery, and we need to convince them and dispel the negativity they will get on social media regarding hormonal therapy of any kind which often produces “hormonophobia”.

By contrast, male sterilization remains a viable option. There is no LARC for men and vasectomy is a simple, safe and effective method of contraception and should be the method of choice for couples who are determined that one of the partners should be sterilized.

Disclosure

The authors report no conflicts of interest in this work.

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