

Intrauterine Device - A Long - term Effective Contraceptive Method

MARIANA STUPARU-CRETU^{1,2}, ALINA MIHAELA CALIN^{1,3*}, AUREL NECHITA^{4*}, ANCA SAVA^{5*}, LUANA MACOVEI⁶, GHEORGHE RAFTU⁷

¹ Dunarea de Jos University of Galati, Faculty of Medicine and Pharmacy, Centre of Research in Medical-Pharmaceutical Field, 47 Domneasca Str., 800008, Galati, Romania

² Buna Vestire Hospital of Obstetrics and Gynecology, Family Planning Department, 99 Nicolae Alexandrescu, Str., 800151, Galati, Romania

³ Sf. Apostol Andrei Emergency Hospital, Obstetrics and Gynecology Department, 177 Brailei Str., 800578, Galati, Romania

⁴ Dunarea de Jos University of Galati, Medical Clinical Department, Faculty of Medicine, 47 Domneasca Str., 800008, Galati, Romania

⁵ Grigore T. Popa University of Medicine and Pharmacy, I-st Morpho-Functional Sciences Department, Faculty of Medicine, 16 Universitatii Str., 700115, Iasi, Romania

⁶Grigore T. Popa University of Medicine and Pharmacy Iasi, Department of Rheumatology, Rehabilitation, Physical Medicine and Balneology, 16 Universitatii Str., 700115, Iasi, Romania

⁷University of Medicine and Pharmacy Ovidius, 124 Mamaia Blvd., 900527, Constanta, Romania

The Intrauterine Device (IUD) is a modern method of intrauterine contraception, with high efficiency and long lasting uninterrupted use. The study of IUD dropout rate in first year of use and the frequency of unexpected pregnancies. A prospective study was conducted within the Buna Vestire Galati Obstetrics and Gynecology Hospital during 2014 - 2015, which tracked women who had requested the installation of an IUD via the Family Planning Practice in the hospital ambulatory and who observed the recommended control visits. Various types of IUDs, most of them T-Cooper 380 and with progestagen (LNG-IUD), less with Gold were fitted. Of the total number of IDUs in that period, 67.6% returned to the indicated annual check or when some issues were reported. As a complaint to the method, there was only one case of intrauterine pregnancy and two IUDs lost. Three women gave up the IUD to have a pregnancy, and two requested extraction of an LNG-IUD due to repeated bleeding. One case had a PID that required admission and removal of IUD. IUD is a highly user-friendly method. We assume that women who have not returned to control tolerated IUD in a good way, and a small percentage of all users had specific problems.

Keywords: contraception, T-copper IUD, LNG-IUD

As a need for fertility control, contraception recorded an obvious percentage increase over the past decades. A recent United Nation study performed in 195 countries found an increase in global contraceptive use from 34% in 1970 to 64% in 2015 [1-3].

Modern contraceptive methods are the most demanding, surgical sterilization (19%), IDUs (14%) and the hormonal pill (13%) being on the first three positions. On the other hand, in the same year, it has been noticed that 12% of women all over the world has an unsatisfied need for family planning, and therefore new research and investment is needed in this area [1,2].

Intrauterine contraceptive devices (IUD) is one of the most modern intrauterine contraceptive methods, with a high efficiency of 97-99% [4]. This type of contraception can be used uninterruptedly for an long period of time, between three and ten years depending on the manufacturing materials and the manufacturer. There have also been reports of prolonged use of IUDs up to 50 years [5].

People have been preoccupied ever since ancient times with fertility control for the purpose of spreading births over longer periods, with beneficial effects both on mother's and child's health as well as financially and socially. We can say that the first IDUs belong to the ancient Egyptians, who introduced various stones in the camel's uterus in order to be able to use them as a burden animal when not pregnant. The contraceptive effect is mentioned in the writings because of the presence in the uterus of those stones, without being able to physiologically argue this activity. Later on, research will demonstrate the effect of IUD on endometrial mucosa and sperm [6].

Users

History of New Intrauterine Contraceptive Devices (IUD) begins in 1909 in Poland, when Dr. Richter created a silk ring, and in 1920 in Berlin, Dr. Grafenberg made this ring of silver or gold. In the 1960s, the first devices of inert materials (plastic or steel) were created in various shapes, and nine years later Copper was introduced as an additional material. Adding a progestagen in 1990 changes its name in the Intrauterine System [7].

There is a great variability in the use of IUD in the world. The dilemma of choosing a contraceptive method and the partner's consent overlaps the legislation of the area where a couple lives, costs and religious customs. Also, a number of myths and problems related to some methods have also influenced the variability of IUD's acceptance. For example, there is a low percentage of American women who have chosen a IUD (8.1% in 2013) compared to Asia (29.7%) or Europe (21.1%) [8,9]. This is justified by some studies of the negative effects of the Dalkon Shield type in the 70-80s and the resulting processes: unplanned or extrauterine pregnancies, septic abortion, bleeding, pain, uterine perforation, pelvic inflammatory disease (PID), sterility [10]. There is, however, an overall increase in the use of IDUs in the US, from 5.1% in 1970 to 8.1% in 2013, following the trend of decrease in fertility and increase in the level of instruction of women [9].

Experimental part

Materials

The mode of action of IUD was described by Corfman PA and Segal SJ in 1968 [10], starting from experiments on small and large laboratory animals. They appreciated the different forms of IDU used (rings, loops, springs, coils) in

* email: alina_calin@hotmail.com, aurelnechita@yahoo.com, anca.sava@umfiasi.ro

order to occupy the uterine cavity without creating pressure. The materials used were steel or mixtures of silk, nylon or polyethylene threads and barium sulphate, with antifertility effect. The comparative study in women evaluates endometrial damage by infiltration with lymphocytes and plasma cells, local edema, stroma fibrosis and local vascular growth [6]. In 1987, and then in 1996, Ortiz ME and Croxatto HB presented in a broader review the proinflammatory activity of IUD on the endometrium, which also affects the utero-ovarian interrelation [11, 12]. The action on gametes has also been demonstrated in the sense of affecting the spermatozoons and ovule morphology, obtaining a reduced number of embryos or with anomalies [11, 12].

Initially, modern IUDs were made of inert metals (gold, silver) using extrauterine pessaries as intrauterine foreign bodies. Dr. Grafenberg's research in Germany and of Dr. Ota T in Japan in 1934 were interrupted by the Second World War. In fact, Dr. Ota was the one who tried to use IUD in plastic, but the fabrication of the material was at the beginning, the resistance was deficient, and the contraceptive effect was not the desired one [13]. In 1969, in Chile, Dr. Zipper J added copper to an IUD's plastic arms, which increased both its contraceptive efficacy (to 95%) by the spermicidal effect of metal ions and the recommended maintenance time in the uterus [13]. In many countries, steel IUD models have been dropped due to the increased perforation risk, and the Dalkon Shield model has generated many cases of infections and even deaths in America. The forms that researchers have created over time have been diverse in the attempt of occupying the uterine cavity without forcing the walls. However, a number of possible complications of IDUs have been reported, the most frequent being the occurrence of a pregnancy (intra- or extrauterine) and expulsion [14].

Because the pro-inflammatory effect on the endometrium increases the duration and the amount of menstrual bleeding, researchers have found another alternative to the IUD model by adding a progestagen to the vertical arm. Levonorgestrel was chosen for its benefits in terms of increased IUD efficiency and due to its therapeutic effect of decreasing the duration and amount of menstrual bleeding [15, 16].

Following the retrospective studies on the rate of rejection of IDUs, side effects and interference with some metabolisms or associated diseases, the CDC has issued eligibility criteria for safe use and risks of contraceptive methods, as well as recommendations for use. These criteria are periodically upgraded to comply with new evidence on the use of existing methods and new methods [17-19].

Objectives

Study of the IUD renunciation rate in the first year of use and the frequency of unexpected pregnancies in women who have requested the installation of an IUD through the Family Planning Practice at the ambulatory of the Buna Vestire Galati Obstetrics and Gynecology Hospital.

Methods

A prospective study was conducted during the years 2014-2015, which tracked women who requested the fitting of an IUD and followed the check-ups indicated after the date of fitting: one week, once a year or when unusual problems occurred (pelvic pain, intermenstrual bleeding, dyspareunia, changes in the rhythm and appearance of menstruation, etc.). The control visit involved anamnestic data, local clinical examination and pelvic ultrasound.

Results and discussions

The study targeted a total of 250 eligible women aged 19-44 years with a IUD fitted in the two years mentioned: T-Cooper in case of 178 women and LNG- IUD in case of 72 women. Of the total number of users registered in the Family Planning Practice, during that period IDUs accounted for 17.4% of cases in 2014 and for 20.7% of cases in 2015, with an average of 18.9%, which exceeded the percentage statistic of the country, being close to the European one.

The method's reversibility explains the high number of users across the globe, in balance with hormonal contraceptive methods and the condom. It is estimated that more than 150 million women in the world use IDUs in the world, in China alone being 100 million (41% of Chinese women), and 21.1% of women in Europe have a IUD (see table 1) [8].

However, current statistics show significant differences in the use of IDU globally between developed countries (14.5%) and developing countries (7.6%). There are differences in Europe as well, the percentage of IDU carriers being higher in the East (55%) and lower (8%) in the South [8]. The latest international data on Romania are from 2012 and 2016 (noted for 2005) - the latest shows that 69% of women aged 15-49 use a contraceptive method, 53.7% being modern methods; only 6.7% of women use an IUD, the first places as contraceptive methods being male condom, hormonal pills, and natural methods [20].

Of the cases we studied, 85.6% (n = 214) returned to control after one week and 67.6% (n = 169) at the annual control or during study. Of these, 98 were from the urban area (58%) and 71 from the rural area (42%). The average age for copper-IUD was 31 years old, and 41 years old for

Table 1
MODERN CONTRACEPTIVE METHOD PREVALENCE BY REGION

Contraceptive Type	Africa	Asia	Europe	Latin Am. and Caribbean	Northern America	Oceania
Percent of Couples Using Modern Contraception						
Female Sterilization	7.1	38.9	5.3	38.7	30.6	24.5
IUDs	19.6	29.7	21.1	10.4	6.6	1.9
Pill	34.8	10.0	36.5	24.5	23.0	30.5
Condom	8.0	11.5	29.1	14.3	16.5	17.3
Injections	28.6	5.3	0.5	8.1	1.9	6.5
Male Sterilization	0.0	3.7	4.3	3.4	18.8	17.3
Other Modern Methods*	1.8	1.0	3.2	0.6	2.6	1.9
* Note: Other methods include implants, vaginal barriers, and others.						
Source: Compiled by Earth Policy Institute from U.N. Population Division, World Contraceptive Use 2011, wall chart, February 2011.						

LNG-IUD. Although they were informed about the importance of regular medical visits, we assume that women who did not return to control (32.4%) tolerated IUD well and had no complications. We appreciate that the majority of women who were fitted a LNG-IUD came for a control after one year (n = 68 out of 72). Of the T copper-IUD carriers, 73 (out of 101) came to ultrasound check of the device in the first year of installation.

The most accepted form of IUD declared today as the most appropriate in terms of efficiency and tolerance is that of T or Y. The manufacturing material commonly used for the manufacture of human IUDs has become the polypropylene, to which in most cases Copper is added in various quantitative variants, depending on the manufacturer (eg: T280, 380A, 220C, M375, U200 etc.). The metal was initially inserted only on the vertical arm, then on the horizontal arm in order to increase efficiency [13] and allowed the radiological verification of the existence and the position of the IUD. The introduction of ultrasound as a non-invasive method in medical practice today allows for an efficient control of the uterine cavity and of the IUD position, without the risk of irradiation. Three-dimensional ultrasound offers extensive data on the possible displacements, perforations or malposition of IUD [21].

From the point of view of method continuity, out of the 169 cases, three women wanted extracting the IUDs after 9 and 12 months from insertion (1.7%) in order to obtain a pregnancy (one LNG-IUD and two copper IUD), and in one case IUD (0.6%) was extracted during an episode of pelvic inflammatory disease (PID), also at the patient's request.

As problems reported in the first year after fitting, there were 2 cases (1.2%) of copper-IUD lacking control wires, and there was also observed a lack of IUD in the uterus without migrating into the pelvis. It was appreciated as unobserved expulsion by users during menstruation. One case (0.6%) presented intrauterine pregnancy concurrently with copper-IUD, requiring interruption of pregnancy. There were no cases of extrauterine pregnancies reported as possible in the research literature [22]. The ultrasonographic investigation considered that the phenomenon was possible by IUD's slipping to the cervix and implantation of the embryo in the fundus segment of the uterine cavity, left free.

All IUD users who came to the annual check-up and reported no problems said they were satisfied with the method, the devices were well tolerated and maintained for the lifetime indicated by the manufacturer. Compared to other methods, a study performed in 19 countries estimated a percentage of nearly 40% of women who gave up other contraceptive methods (pills, natural methods) in the first year of their study in 2012 [23-25].

Conclusions

IUD is a highly user-friendly method. We assume that women who have not come to the check-out tolerated IUD in a good way, and a small percentage of all users had specific problems. In our geographic area, the demand for IUDs as a long-lasting use method through Family Planning Practices is appreciated at a rate closer to the Europe average. However, better communication with users is required in order to properly track the tolerance of the method and correct management of possible complications.

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Manuscript received: 21.07.2018