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IMMEDIATE POSTPARTUM CONTRACEPTION
BY USING THE LOOP ANTICON 300

A thesis submitted for the
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INTRODUCTION

The use of intrauterine device in contraceptive purposes dates back to the end of last century, but only Richter (1909) published a report on this subject suggesting a number of silk threads to be inserted in the uterine cavity.

From that date on, many trials have been made to improve loop efficiency and to minimize its side effects.

Majority of women living in under developed countries occasionally look for a medical advice and many times present to the obstetrician for the first time while she is in labour.

So, immediate postpartum contraception is an important issue in such countries.

Postpartum contraception by IUD has a higher rate of perforation and expulsion.

Still, it may be the only time when medical advice can be provided to many women.

Immediate Postpartum Contraception

By using IUCD (Anticon 300)

HISTORY

Tatum (1972) has reviewed the chronologic history of IUCD and classified it into :

1. Embryonal stage :-

During the 11th century the first report was by the Islamic Scientist Avicenna.

During 19th century stem pessaries were inserted inside the vagina and the stem is protruded into cervical canal and peritoneal cavity. The purpose of these were :

- 1) Induce abortion.
- 2) Correct position of the uterus.
- 3) Prevent pregnancy.

So these were not technically intrauterine devices.

The first to design IUCD was Richard Richter. The device was ring-shaped and made of silk worm-gut.

Pust (1923) has incorporated silk worm threads in a cervicouterine device. He reported no pregnancies among 453 cases in whom he inserted the device.

2. Infancy stage :-

Grafenberg (1928) has many trials :

- a) Six-pointed star made of 3 silk worm gut pieces tied at the centre. He found it difficult to detect the star in the uterus by a sound.
- b) Substitution of the control ties by a thin silver. Star was partially radio-opaque , soft and easily expelled.
- c) Rings made of silk worm gut and strengthened by thin silver. Such rings are radio-opaque. This ring was the first I.U.C.D. commercially manufactured.

Ota (1934) made rings of metal. They were more effective than Grafenberg rings but more difficult to insert.

3. Childhood stage :-

This stage started on 1962 when Jack Lippes designed the first widely used plastic I.U.C.D. Lippes loop has two features :

- a) Transcervical thread that assist in detection and removing the device.
- b) Barium sulfate is incorporated with plastic to make it radio-opaque.

4. Adolescence stage:-

From 1962 to 1968 Lippes loop was the most widely used. For evaluation of newly designed loop a term "Use effectiveness" was postulated.

This term means, the ability of the loop to protect against pregnancy under the real life conditions including carelessness, ambivalence etc.

5. Pubescent stage :-

In this stage there is a progression from philosophical concept to practical application. The size and shape of potential uterine cavity depend on the contractile stage of the myometrium.

As the myometrium contracts, walls thicken and shorten and uterine cavity becomes smaller in all dimensions.

As the contraction increases, lateral walls come nearer and the cavity assumes a T-shape. It persists even the uterus contracts maximally.

The 1st T IUCD was moulded in 1967 by Zipper from poly-ethelene and barium sulfate and tested clinically by Tatum and Zipper.

Incidence of pain is 1/5 that of Lippes and the expulsion rate was 1/2 of Lippes.

This improvement is due to :

- 1) The T conforms easy to uterine cavity so no distortion in the cavity occurs.
- 2) Rotation and displacement is prevented by 3 points of contact.

But, due to small surface higher failure rates do occur.

6. Maturation stage :-

Metalic copper has been used by Zipper to increase the contraceptive effectiveness.

Metallic copper is in the form of wire turned round the vertical arm.

There is a definite direct correlation between the area of copper (exposed to the endometrial surface) and the contraceptive effectiveness.

A combination of copper and zinc for synergism has also been used.

Doyle and Clewe (1968) designed hormone releasing devices and in 1970 demonstrated that the antifertility effect of exogenous progestin was local rather than systemic.

Also, Crexato, Vera and Pogra (1970) i.e., at the same time proved that progestagen act locally.

Progestagens have reduced excessive and/or irregular uterine bleeding (Scommegno, Pandya, Chirst, Lee and Cohen, 1970).

Types of IUCDs

Tatum (1980) have classified currently used loops into :

1. Non-medicated devices :-

* Lippes loop :

Designed by Jack Lippes (1962) - marketed in 1964. Its shape is like double. Available in 4 sizes A, B, C and D which vary from 22.5 mm to 30 mm in width and 33.0 - 36.0 mm in length.

	Length	Width
Loop A	33.0	22.5
Loop B	34.0	28.0
Loop C	35.0	30.0
Loop D	36.0	30.0

Loop is formed of Barium impregnated polyethelene with two transcervical threads.

2. Medicated devices :-

These work as carriers for hormones, metals :

* Copper T devices (CuT.) or (Tatum-T) :-

(1) Cu T 200 :

It was designed by Tatum (1975) and copper wire was wrapped round Tatum original T-loop. The no. 200 indicates 200 mm² of copper to the endometrial cavity.

(2) Cu-T 300 :

Also, by Tatum on 1975 exposing 300 mm² of copper to endometrial cavity but he reports no significant higher effectiveness than 200.

(3) Cu-T 380 A :

Tatum (1975), Sleeves of copper and silver placed on the transversa arm, in addition to that on the vertical arm. In 1980 he reported that this device is the most effective IUCD developed by the population council.

(4) Cu-T 220 C :

Tatum (1975) - 220 mm² of copper Addition of copper in multiple sleeves to increase life expectancy within the uterine cavity at least 5 years.

(5) Nova-T 200 :

Modified plastic T bearing a coil of silver-core copper wire on the vertical stem. Silver core wire

prevents the copper coil from fragmentation segmentally and thus provides an estimated 6-12 years more service.

Copper 7 device (Gravigard)

Designed by Zipper and Ambrasson (1968) and marketed on 1974. Surface area of copper was 200 mm².

Saf T- coil

Transverse arm is coiled from both sides in addition to copper on the vertical stem marketed on 1967. Its production was stopped on 1982 for economic reasons.

Progestasert-T

Scommegna (1974) and Phomias (1974) reported independently developed a slow release system of progesterone (65 ug/day) into the uterine cavity. This device has the advantage of being effective for a full year.

It consists of a core containing progesterone suspended as microcrystals in a fluid medium surrounded by a rate limiting homer of an ethylene copolymer.

Mechanism of Action of IUCDs

Theories of mode of action of loop by Mayer and Show (1972) :

* Inert devices :-

- 1) IUCD acts as an abortifacient, mechanically by traumatizing endometrium and recently implanted embryo.
- 2) IUCD increases peristalsis of the oviduct and fertilized ovum movement into uterine cavity and vagina prematurely.
- 3) Alters function and life span of corpus luteum, hence leads to luteolysis.
- 4) IUCD produces a migration of mobile inflammatory cells which, when present in markedly increased quantity in the uterine cavity, exert an embryotoxic effect on the pre-implanted embryo, most probably as a result of degeneration of cellular constituents.
- 5) IUCD reduces number of sperms by enhancing phagocytosis, although sperms do arrive at the ampullary portion of the oviduct.

There is a qualitative correlation between the number of leucocytes elicited by IUCD and the degree of fertility (El Sahwi - Moyer, 1970).

Embryotoxic products resulting from autolysis of leucocytes can destroy the unimplanted blastocyst prior to its nidation (El-Sahwi, Wilson, Loyer and Swith, 1971).

Trauma of the loop may release prostoglandines that evoke uterine activity and interfere with either implantation or growth of the implanted blastocyst (Chandhur, 1971).

Myatt, Bray, Gordon, Morely (1975) found that macrophages^E adherent to IUCD were a likely source of prostaglandin.

Action of IUCD may be initiated through increasing levels of serum immunoglobulin A, G and M Gume, Horton, Lomboru, Forsyth, Mountrose (1975).

Beliry, Cedurivot and Fucks (1976) Landesman (1976) also reported elevated serum levels of H.C.G. during luteal phase of IUCD users, suggesting that these women may have been pregnant and aborted.

* Medicated Devices :-

In (1969) Zipper prevented the implantation of blastocyst in the uterine neck of a female rabbit in which a copper thread has been introduced.

In (1970) Chang emphasized the superiority of copper to other metals. The same author also showed that the contraceptive effect of copper was not connected to fecundation but to the impossibility of implantation of blastocyst.

Phoriss, Erickson, Bushow, Hoff, Place and Zoffaroi (1974) reported that the apparent mechanism of contraceptive action of progesterone bearing IUCD is due to the development of a continuous state of progestational or decidual endometrium which is not compatible with implantation of blastocyst.

They state that the effect of these hormones bearing IUCDs is local without demonstrable systemic effects.

Martinez-Manoutu, Amurao, Salines and Topete (1974) reported that progestasert affects cervical mucus-so sperm penetration may be impaired.

Progestasert impairs normal sperm physiology-Rosado Hicks Azonar and Mercode (1974)..

Uterine contractility is changed by progestasert which disrupts the developing embryo (Ruiz-Velasco, 1974).