CHAPTER I

INTRODUCTION

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Undoubtedly I.U.Ds. have become important elements in modern contraception.

They are one of the principal modalities in our Family Planning Programme.

IUDs have been used for many years in both animals and humans. It was mentioned before that pebbles in camels uteri were effective to prevent pregnancy in old times.

Recently, however, the method was revived and used in humans by the japanees (Ota, 1934) and by the Germans (Grafenberg, 1929); the first used a metal ring with central spokes and the latter used a metal ring as intra-uterine devices in the twenties of this century.

1. Metal rings:

These are made of stainless steel, silver, gold, or platinum; the Grafenberg and the Ota rings are example of these. These need dilatation of the cervix to No. 8 or 10 Hegar's under anaesthesia for insertion.

The Grafenberg ring has a coiled wire rim; we have seen many complications resulting from it in our hospital.

They frequently perforate the uterine wall, and cause severe bleeding, internal haemorrhage and peritonitis. The Ota ring on the other hand is safer, has a very low rate of pregnancy or expulsion; it is widely used in East and South East Asia.

A modern modification of the Ota ring is now manufactured of plastic material.

2. Silk worm gut and nylon rings:

Oppenheimer used four threads of silk worm gut wound together in the form of a ring that is inserted into the uterine cavity without or with slight dilatation of the cervix.

Zipper (1969) of South America, made a similar ring with nylon threads.

These are safe methods, but have a high rate of spontaneous expulsion.

3. Polyethylene plastic devices:

These are the modern types of intrauterine devices; they are made of non-irritating pliable polyethylene which is mixed with barium sulphate to make them radio-opaque, so one can make sure of their presence by X-rays. They are inserted and removed without anaesthesia.

Three types of these are now widely used allover the world and one of these (Lippes loop) is quite popular in our country:

a) Lippes loop:

This is a double S loop, extending mildly at one end to which 2 nylon threads are tied. It comes in four sizes: A (25.5 mm); B (27.5 mm); C (30.5 mm) and D (30.5 mm ., but with thicker bends).

b) Margulies coil:

This is a coil of two and half turns that end in a long headed stem. It is threaded through a plastic inserter which passes through the internal os into the uterus and its piston then pushes the coil in.

After removing the inserting tube, the long beaded end protrudes through external os; it should be cut across the stem , leaving one bead outside the external os to avoid irritating the male organ.

c) Birnberg Bow:

It looks like a bow-tie and is inserted through a special metal inserter; it has a reputation of being the IUD that perforate more uteri than any other. It has no nylon threads or stem protruding in the vagina, so its removal is dangerous, as a metal hook is used for this purpose.

d) The safety coil (Saf. T. Coil):

This type is made of 2 coils joined at the top of a bar that harbours two threads similar to those of the Lippes' loop. Each coil is of a single turn, yet one is slightly longer and has a knob at its tip. This device is supplied already sterile and threaded.

e) Copper bearing intrauterine devices:

The addition of a thin copper thread, wound around a polyethylene I.U.D., decreases the pregnancy and expulsion rates and the occurrence of spotting (Zipper et al., 1971). Copper acts by blocking the enzymatic system normally present in the endometrium, as it interferes with and displaces certain trace elements that are necessary for their actions; it is either T or 7 shaped with nylon threads in cervical canal:

i) The copper T 200:

This model is wound with copper wire having a surface area of 200 mm^2, preliminary data by Mishell (1974) indicate that this T with the additional 100 mm^2 of copper surface dose provide a lower pregnancy rate than T copper 200 when used in multiparous women; Copper T 300 (Tatum, 1974).

ii) The copper 7:

This model is wound with sufficient copper wire to provide a surface area of 200 mm^2 of copper (Tatum, 1974).

iii) Lippes loop A with copper:

Two models of the loop A bearing metallic copper wire were made, the loop A-135 and the loop A-200. The loops were prepared by moulding the liquid polyethylene through copper sleeves. The numbers 135 and 200 indicates the surface area of copper present on each device (Tatum, 1974).

Intrauterine devices can be left inside the uterus for months or even years without harm, and they prevent conception in over 97% of cases.

Most of them are sterilised by immersion in an antiseptic solution for 15 minutss (diluted chlorhexidine or tincture of iodine).

They can be inserted soon after labour or abortion without ill effects. Patients are told of the various side effects so as to avoid unnecessary anxiety; they are instructed to report back following the next period or if any complication or discomfort is felt.

Periodic six monthly examinations are advisable.

Action of intrauterine devices:

The mechanism by which an intrauterine contraceptive device works is not understood. The following explanations have been proposed (Howkins, and Bourne, 1971).

1. In those instances where nylon protrudes through the cervix, the pH of the cervical canal may be altered.

2. They interfere with the ascent or capacitation of spermatozoa.

3. A foreign body within the uterus provokes not only uterine contractility but also tubal contractility, so that the fertilised ovum is propelled down the Fallopian tube more rapidly than is normal and it reaches the uterine cavity before the development of the chorionic villi and is therefore unable to implant.

4. The normal preparation of the endometrium is prevented by the presence of the device.

5. The device may irritate the uterus to such an extent that it expels the newly implanted ovum.

Contraindications:

1. Infection any where in the genital tract.

2. Heavy and prolonged menstrual bleeding or irregular uterine bleeding.

3. Uterine tumours, e.g. Fibroids.

4. Bicornuate uterus, as pregnancy can develop in the empty side of the uterus.

5. Suspicion of pregnancy.

Advantages:

1. They are easy to insert and to remove.

2. They are cheap and do not require any maintenance care.

3. They provide a high degree of contraceptive effect for a long period of time, i.e. a continuous method which avoids the human error of memory failure that can occur with other methods.

4. They are valuable for cases unfit for using other methods and among untrained women who cannot properly use the diaphragm.

5. They do not cause permanent infertility, i.e. the patient can conceive once the IUD is removed.

6. They do not need continuous motivation.

Complications of IUDs:

The intrauterine devices, once inserted into the uterine cavity, remain there as long as they are tolerated i.e. for months or even for a few years. They are effective as contraceptives in 97% of the cases but they still have certain drawbacks.

1. Bleeding:

Intermenstrual spotting, menorrhagia and menostaxis not infrequently follow the insertion of the intrauterine

device. Heavy periods are commonly encountered for the next one or two cycles. These results from mechanical irritation of the endometrium. Vitamin K, C and rutine are valuable aids in the management; Methergin tablets or drops are used if the bleeding is not controlled. This can be avoided if the IUD is inserted properly with its transverse bar in the transverse diameter of the uterine cavity.

2. Cramps and dull aches follow the insertion for a week or two. They result from the uterine response to a foreign body, especially if the IUD is not properly lying in the uterine cavity.

3. Infection:

This results from the flare up of a pre-existing pelvic infection in badly selected cases. Introduction of infection during insertion may also occur.

4. Leucorrhoea:

Non-infective discharges may be excessive as a response to the irritation by the foreign body.

5. Fainting, collapse, nausea and vomiting:

These manifestations may occasionally develop immediately following the insertion.

6. Perforation of the uterine wall:

This is a rare complication which may occur either, at the time of insertion due to a fault in the technique or it

may spontaneously develop many months afterwards. No ill-effects result in most cases.

7. Spontaneous expulsion:

This usually occurs during a menstrual period and may pass unnoticed by the patient.

8. Pregnancy:

Intrauterine pregnancy is reported to occur in 3 to 5% of patients with IUD, in such cases it is best left undisturbed, or the IUD may be removed.

9. Complications of insertion:

These include injury to the cervix or perforation of the uterine wall.

10. Irritation of the husband during coitus.

Of all models devised, the Lippes loop designed by Dr. Jack Lippes (1962) has best stood the test of international experience, it remains the standard against which other devices are usually judged.

Some of the unsolved problems with regard to the loop which have engaged the attention of workers include its mode of action, the causes of side effects, the way in which the loop is sometimes expelled and perforation of the uterus.

Although the effectiveness and safety of the IUD have been recently the subject of many discussions, yet only few authors have reported uterine perforation.

DESCRIPTION OF LIPPES LOOP

This is a loop shaped like an S continued in a lower smaller S.

It is made of low density, 0.920, non-irritating pliable polyethylene which is mixed with barium sulphate to make the loop radio-opaque, so one can make sure of its presence by X-rays. Because the plastic loops are flexible, they can be strainghtened and placed in a tubular inserter with an oval cross section which is about 4 mm. in external diameter, the tip of this can be inserted into the uterine cavity without dilating the cervix. To allow easy determination, at subsequent examination, of the presence or absence of the loop and to facilitate its withdrawal, a linear polyethylene thread, 0.010 inch by 0.012 withdrawal, a linear polyethylene thread, 0.010 inch by 0.012 inch in diameter was threaded through its lower tip tied is place with a square knot.

Patients can be tought to examine themselves vaginally and palpate the threads. This self examination gives them the reassurance that protection continues.

<u>Lippes loop comes in four sizes:</u>

<u>Loop A</u> (formerly called size 1) measures 25.5 mm. across the upper part and weights 290 mg.

When it was found that this was frequently expelled, a larger, thicker and stiffer loop was designed, loop D (formerly size 2), measuring 30.5 mm. across the top and weighting 709 mg. To reduce stiffness and to allow easier insertion into the application tube, a third loop was designed where the sharply curved portions were reduced in diameter with the remaining dimensions the same. This weighted 615 mg. and was termed "size C" (formerly size 3). Size B (formerly size 4), similar to size C but smaller, 27.5 mm. across the upper part and weighting 526 mg. has also been used (Lippes, 1965).

The loop in common use in our centre in the Family Planning and post-partum clinics of the Shatby Maternity Hospital of the University of Alexandria is the Lippes loop C (Fig. 1 and 2).