

AN UNUSUAL PREGNANCY WITH INTRAUTERINE DEVICE

by

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Intrauterine device is being used as a contraceptive in many countries. It has aroused great interest not only because it is a suitable method for controlling population in the developing countries, but has also led to extensive research on its mode of action, and indirectly to the process of implantation of the ovum in different species. Grafenberg commenced using the ring as a contraceptive agent in 1920, and although it was used for a number of years by him and others, no serious attempts were made to discover its action.

Grafenberg cited the occurrence of tubal pregnancies, contending that the ring did not interfere with the upward progress of the sperm from the cervix to the fallopian tubes and inferred that it most probably prevented the implantation of the ovum in the uterine cavity.

In 1963, we had an experience with a case which clearly illustrated the above point.

Mrs. L. P., aged 21 years, the mother of two children was seen by us on 11th September, 1963. Her last delivery had occurred one year and four months previously. A biopsy done on 12th September showed that the endometrium was in the early secretory phase.

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A small Margulies' spiral was inserted on 22nd October, the 6th day of her menstrual period. She had her next period on 15th November, and on 22nd November when she was examined, two beads of the spirals were seen outside the cervix.

On the night of 28th November (on the 14th day of her menstrual cycle), she had an intercourse and the next morning, as she was going out of Bombay, she called in a local untrained midwife and had the spiral removed.

She had no further intercourse with her husband as she went to her native place for a religious ceremony and later she found that she was pregnant.

On her return to Bombay she blamed the social worker for advocating an unreliable method, but after the explanation that she was too hasty in having the device removed immediately following the intercourse, she continued to attend the antenatal clinic and delivered a normal male child on 27th August 1964. However, she elected to use the oral contraceptive tablets as a means of contraception after this delivery.

Experiments are being carried out with intrauterine foreign bodies in various animals, e.g. rats, mice, rabbits, cows and monkeys. These experiments show that different factors are involved in different animals in preventing the implantation of the fertilised ovum, as the process of nidation varies from species to species.

It is common knowledge that the fertilized egg does not adhere to the endometrium immediately after its passage through the oviduct but floats

freely in the secretions present in the uterine cavity.

In the rabbit the free period is 5 to 6 days, in the mouse 3 to 3½ days and in the humans possibly 4 to 6 days.

Three types of implantation have been described:

(1) In some, the blastocyst remains in the uterine cavity and eventually expands to fill the lumen. Such an implantation is called central.

(2) In others, the blastocyst remains small and comes to occupy a small diverticulum or cleft of the uterine lumen. This type is called an eccentric implantation. After the development of the placenta the original lumen is obliterated. Eccentric implantation is found in many rodents.

(3) In still other mammals, the blastocyst implants by passing through the uterine epithelium and becomes completely cut off from the uterine lumen. This type of implantation is interstitial. It is found in chimpanzee and in man.

Earlier studies on the process of nidation and development of decidua dealt with the endometrial factors but recently investigations are being carried out on the egg and the differences in the viscosity and adhesiveness of its envelopes are being studied.

In both rat and rabbit eggs, the zona pellucida classified as the secondary layer, contains proteins, but the type of protein is not the same. This zona pellucida in both species is covered by a mucous or albuminous layer secreted by the glandular cells in the oviducts or

uterus which is classified as a "tertiary" membrane.

In the rabbit egg, Boving, in 1954, observed that another membrane is deposited on the egg by secretions of the uterus. This membrane forms a sticky covering that functions as an adhesive attachment during positioning and orientation at the time of nidation.

It is well known that the eggs of rabbits are particularly hardy which may be due to this extra covering.

Doyle and Margulies have shown that in the rat when a foreign body is inserted, the estrous cycle, mating, sperm transport, fertilization, cleavage and tubal transport of ova are unaffected but implantation is prevented by creating an unfavourable intrauterine environment or by changing the uterine motility.

In rabbits, implantations occur in the horn containing an IUFB although the number of implantations are less than on the control side. In rabbits, normal implantation takes place on the seventh day. Chang states "with the present technique, rabbit blastocysts survive for more than three days in the uterine environment in the presence of an IUFB. Implantation can also occur, but the conceptuses degenerate".

In the monkey, Mastroianni, has shown that no implantations occur with a foreign body in the uterus but that the IUFB may act directly on the tubes, so that the ova are hurried along their passage through the uterus and may therefore reach the uterus in an immature state, so that they cannot be implanted.

Many more experiments are being carried out in other laboratories to

find out the mode of action of intrauterine device and very soon we shall come to know how implantation of the ovum occurs in women and how the intrauterine device prevents implantation.

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