THE ROLE OF CYTOLOGY IN CONTRACEPTION IN RELATION TO I.U.C.D.

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In the evaluation of the effects of intrauterine contraceptive devices on the lining of the genital tract, the cytological examination of the discharge from the genital tract rightly attracted the attention of the investigators. The presence of the foreign body in any closed cavity and the constant contact of the foreign material of plastic nature would induce contact and pressure effects on the lining epithelium of the genital canal. To it are added the allergic reactions to impregnated materials used in the plastic I.U.C.D. and its tail. The presence of this material in the sterile cavity like the non-pregnant uterus and upper part of the cervical canal may not be adding any infective or inflammatory factors but the presence of the foreign material in the lower part of the cervix and upper part of the vagina may favour the transfer of the infective organisms to the higher level in genital tract and may favour inflammatory and cell metaplasia reactions in the lining epithelia. The repeated examinations required can be carried out from time to time without disturbing I.U.C.D. The long term follow up study can be undertaken to determine how far the changes produced are reversible or permanent, and advancing and progressive—even after the I.U.C.D. has been taken out from the body. Even though some of the metallic elements are added to reduce the pregnancy rate and infection (to some extent), its organic union in the protoplasm of the lining cells will have to be watched for sufficient number of years for the changes of cell dysplasia, reversible or advancing types. Hagenfeldt and Johnnission (1972) have shown that the insertion of Cu. T device interfers with the cellular DNA in the endometrium, and produces delay in the development of the S phase of the mitotic cycles. This effect may last as long as 6-12 months following the use of Cu. T device. The progesterone impregnated I.U.C.D.s may have protective actions on the lining of the endometrium from the point of malignant dysplastic changes but its presence will not have the same protective effect on the epithelium of the portio especially in the presence of mild local infection and associated changes in the pH of the vaginal secretions

In the evaluation of the effects of the I.U.C.D. we have to consider many factors as age, parity, presence of erosion on the cervix, existence of bacterial infection prior to the insertion of I.U.C.D., duration of the menstrual period etc. The normal figures for different age groups and parity groups as regards the incidence of dysplasia of different degrees should be available for comparison before any reliable conclusions can be drawn. When the I.U.C.D. is being used in the younger group of 20 to 25, for spacing the amount of dysplastic changes and for incidence of monilial and trichomonas infections

these will decidedly be lower than those in the series of elderly multigravidae above 35 years who are wrongly given I.U.C.D. for permanent method of birth control. At this age, factors like diabetes, local infection, advanced age are all in favour of vaginal infection and some degree of dysplasia is expected in the smears. Failure to take such factors into consideration have been partly responsible for the disparity in the results mentioned by different authors while reporting their series.

The development of the abnormal cells in the positive smears is determined by the factors similar to those which determine the development of cervical cancer. Hence increasing sexual age will favour more marked dysplasia changes in the individual by the use of I.U.C.D. in the upper age group. Since the known epidemiological factors of cancer cervix are more likely to initiate the cancer 'in situ' process than to determine its prognosis, the same fact holds good for the use of I.U.C.D. in the upper age group.

Shulman and Merritt have shown, in 1973, that the 'pill' users have a great tendency for dysplasia and cancer 'in situ' than I.U.C.D. users in California. However, they have not carried out the long term effects of these methods on the population. Now in the West a different view is gaining ground. It concerns I.U.D. and early introduction to coitus, as the latter factor is very important as an etiological agent in cell dysplasia and even for producing smears suspicious for malignancy. It is noted that young women with early sex life have increased incidence of metaplasia which appears to be initiated and maintained by often repeated coitus. The use of I.U.D. as a contraceptive in the teenagers would bring the age of dysplasia to a lower decade and increase the incidence of cervical ectopy. The exposure of the cervical columnar cells to the acidic vaginal contents results in ectopy in development of the squamous metaplastic cells on the portio vaginalis of the cervix. Hence the ideal contraceptive from the oncogenic point of view would be one contributing to the preservation of a healthy cervical epithelium as noted by the absence of severe dysplasia changes and healthy vaginal contents as witnessed by the presence of the Doederleins flora. Bringing back the normal vaginal flora and the discharge by acid vaginal douches would be real prophylaxis against cervical malignancy. The parasitic infection e.g. trichomonas which is responsible for favouring the dysplastic changes in the lining epithelium in the vagina would be thus reduced.

The changes in the vaginal cytology are dependent upon the resultant changes in the vaginal, cervical, and endometrial epithelial response to ovarian hormones produced in the body and the inhibiting action of the I.U.C.D. in their production. It is not evident that the presence of the I.U.C.D. may not have systemic reaction on the hormone production by the ovary, or secondarily in the pituitary, although some authors tried hard to prove its existence.

Hansel and Wagner (1960) reported that in the cattle, there is an inhibition of the corpus luteum with shortening of the oestrus cycle after insertion of I.U.C.D. Vorys *et al* (1964) stated that the device might alter the phase of corpus luteum. Sammour, *et al* (1967), tried to show a decrease of oestrogen in the first half of the cycle as proved by the pyknotic index curve as well as early degeneration of

the corpus luteum. The results noted by all these authors may be accurate and correct but their aetiological factors may not be acceptable in the light of recent work in this direction.

The changes as noted in the vaginal epithelium and vaginal cytology may be summarised as follows:

1. Generalised low pyknosis.
2. Earlier peak levels around 10-12% pyknosis.
3. Gradual drop in pyknosis.
4. An erratic fluctuating pyknotic index in the last 10 days of the cycle.
5. Ovulatory cycles occur in spite of I.U.C.D. The changes seen in the colpogram are perhaps due to irritation either by the 'tail' of the device, or aggravation of the inflammatory changes which are not sufficiently severe to be detected clinically before the insertion of the loop. The bacterial vaginitis occurs more frequently in women using I.U.D. than any other mode of contraception.

The finding of an elevated karyopyknotic index curve with an early peak and prolonged progestogen effect with a delayed peak is assumed to be caused by a local reaction of the device rather than by the result of altered ovarian function. The marked low level of pyknosis is present throughout all the phases of the cycle. The peak level, which is reached at ovulation, is met with earlier than expected peak level in the normal cycle and the drop after the ovulation is not well demonstrated. The secondary rise in the normal curve which occurs about 22nd day and which is taken to correspond with degeneration of the corpus luteum is not seen when the I.U.C.D. is used.

Changes occurring in the endometrium with the use of I.U.C.D. are:

1. I.U.C.D. interferes with the cyclic endometrial response to ovarian hormone.
2. Increased mucopolysaccarides production.
3. Increased mucus production and chemically altered uterine fluid.
4. Tendency to calcification and intracellular calcium deposits.
5. Cellular atypia and proliferative and inflammatory responses.
6. Outpouring of the macrophages in the endometrial fluid favouring phagocytosis even of the spermatozoa and ovum like globules and enhancing enzymatic action of the macrophages.

Histologically the endometrium shows a retarded hormonal response to the ovarian hormones in spite of normal ovarian cycles, existence of ovulation, and normal steroid blood estimations. This is reflected in the endometrial cells found in the vaginal smears. The prolonged use of intrauterine devices leads to lymphocytic and macrophagic infiltration of the endometrium and marked adenomatous hyperplasia of the endometrial glands. This may have less serious significance in a young patient than in a patient above the age of 35 years. Most of the Indian workers have noted the presence of reversible dysplastic changes of mild and moderate types after the use of I.U.C.D. for over couple of years in few cases. There was also the presence of mild infection in some of the cases. Both the removal of the I.U.C.D. or active treatment of the infection leads, to the regression of the smear to a less dysplastic one. Those with severe degree of dysplasia would need a closer observation in the follow up programme. But here too it is rare for the smear to advance to more severe degree of dysplasia or even "in Situ" changes. When a cancer "in situ" is detected it may already be pre-existing or

latent one which is brought into prominance. The duration of severe dysplasia changes may persist for a long period of over half a decade before it turns into "in situ" changes The prolonged use of loop beyond couple of years would never be safe especially beyond the age of 35 years during the more susceptible age period.

This paper emphasizes the need for repeated vaginal cytological examination of the patient using contraceptive of the nature of I.U.C.D. as a routine procedure in every contraceptive service clinic. The use of I.U.C.D. may favour, according to some, increased promiscuity in the unmarried girls but the advantage of prevention of conception and lesser need for repeated M.T.P. will definitely prevent morbidity of repeated criminal abortion which is likely to be longer lasting and of permanent nature. The dysplasia changes and mild infections in the lower genital tract are all reversible and are safer than the ravages of repeated criminal abortions. The insertion of loop should be followed by proper cytological examination during use of I.U.C.D. as a matter of routine.

References

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