THE EFFECT OF THE INTRAUTERINE CONTRACEPTIVE DEVICE ON THE MAST CELL CONTENT OF THE HUMAN UTERUS

S. BHAGAT, A. DASS, S. ARORA AND R.K. SANYAL

Department of Obstetrics and Gynaecology and Department of Pharmacology, Maulana Azad Medical College and Associated Irwin & G. B. Pant Hospitals, New Delhi, India

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Amongst the varieties of procedures which have been adopted for controlling birth rate, the intra-uterine contraceptive device (IUCD) has a very prominent place. The IUCD has been found to be effective as a contraceptive device in several studies (1–4) and several theories have been proposed to explain its mechanism of action. Recently it has been suggested that the presence of IUCD in the rat uterus leads to an increase in the local mast cell population, and this may be an important factor in its mechanism of contraceptive action (5). It was further proposed that increase in number of mast cells might be directly responsible for prevention of nidation, as injection of comp. 48/80 a compound which is known to disrupt mast cells, at times allowed conception to take place even in the presence of the device.

In view of the importance of the problem, the mast cell population in human uterus after insertion of the IUCD was studied.

MATERIALS AND METHODS

The mast cell content of the human uteri was studied after surgical removal for prolapse, dysfunctional uterine bleeding and fibroid. These cases served as control. In other cases the IUCD was introduced 7–28 days before the date of surgical removal of the uterus for the causes enumerated above. The cyclical phase of the endometrium was determined in all cases by histological examination (6).

Mast cell studies: The paraffin sections (thickness 4 micron) were stained with 0.1% aqueous toluidine blue, rapidly dehydrated and mounted in dammar. The sections were first examined under the low power to get an average idea of the distribution of mast cells, following which the total number of mast cells were counted in 20 high power field.

RESULTS

In control cases, the mast cells were found to be present in the myometrium, as well as in the area just adjacent to the endometrium. In all cases, the effect of the pathological changes necessitating the removal of the uterus had to be taken into account (7). The variability in mast cell content due to cyclic changes must also be excluded (8). As such the mast cell counts in uteri after insertion of IUCD were compared with uteri obtained
from patients with similar pathological conditions, and in a similar state of cyclic change. 

**Cases of prolapse uteri**

In the control group, a total of 16 cases was examined of which six cases were in secretory phase and 10 cases in proliferative phase. Five cases were examined after insertion of IUCD, of which two were in secretory phase and 3 cases were in proliferative phase. The IUCD had been in position for 3–28 days before surgical removal, except in one case where it had been inserted one year 8 months back.

The mast cell content of different groups has been shown in Fig. 1.

There was little difference in the mast cell count in the secretory and proliferative phase, but there was a very marked reduction in the number of mast cells in uteri with the IUCD.

**Cases of dysfunctional uterine bleeding**

Fourteen control cases and 10 cases in which the IUCD had been inserted 7–21 days before were examined. Results have been shown in Fig. 1.

Here also it was seen that there was little difference in the two phases, but there was significant reduction in the number of mast cells in uteri with IUCD.

**Cases of fibroid uteri**

In all, 8 cases were examined, out of which in 2 cases, the IUCD had been inserted 10 and 14 days before operation. These two cases were in the proliferative phase. Results obtained were similar to those in cases of prolapse and dysfunctional uterine bleeding. The number of mast cells in cases with IUCD was much less than in control cases. The difference in mast cell content of cases in the two cyclic phases was negligible. On pooling
the data of all the above cases, and on statistical analysis, the difference in mast cell population produced by IUCD, was found to be highly significant (p<0.001).

DISCUSSION

In contrast to the earlier results obtained in the rat, a marked reduction in the number of mast cells was noted in the human uteri after the introduction of the IUCD. It is possible that the number of mast cells may vary according to the duration of the presence of IUCD. This does not seem to be an important factor, as reduction in the number of mast cells was noted universally in uteri where IUCD had been inserted. The earliest case of hysterectomy was 3 days after insertion, whereas in majority of cases, the IUCD was left in position for about 1–3 weeks. Only in one case, the uterus was removed 1 year and 8 months after insertion of the device.

Thus the local response of mast cells in the human being is distinctly different from that in the rats in the presence of the IUCD. In a way this is a good sign as mast cell proliferation has at times been associated with precancerous lesions (9).

The mechanism of mast cell changes, however, remains obscure. An endocrinal disbalance as a result of insertion of IUCD has sometimes been postulated (10), and it has been demonstrated that injections of oestrogens, progesterones or androgen produce a reduction in the number of mast cells in the uteri from castrated mice (11, 12). Similar changes have been noted in the human being (8).

Further work will be necessary to elucidate the mechanism of mast cell change after IUCD, but the differences observed in the rat and the human being should not be over-looked.

SUMMARY

1. There was no difference between the mast cell populations of human uteri during the proliferative and the secretory phases.
2. There was a significant reduction in the mast cell contents of human uteri after insertion of the intra uterine contraceptive device.

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