KYMOGRAPHIC UTERO-TUBAL INSUFFLATION IN THE CHRONIC PRESENCE OF INTRA- UTERINE DEVICES

by

I. KAMAL, M.Ch. ; F. HEFNAWI, M.Ch. ;
M. A. GHONEIM, M.Ch. ; O. KANDIL, M.Ch. ;
M. M. TALAAT, M.Ch., and N. YOUNIS, M.Ch.

From The Department of Gynaecology, Cairo and Al Azher University Hospitals

In an attempt to investigate the possible mode of action of the I. U. D., a series of investigations were performed. In a previous study, the effect of the acute presence of I. U. D., i. e. directly after insertion, on kymographic utero-tubal insufflation was reported (Kamal et al. 1965). In the present work, the investigation was extended to cases after the lapse of one year at least, i. e. in the chronic presence of I. U. D., to help exploring its possible mode of action.

MATERIAL and METHOD

During the last two years, about 1350 IUDs were inserted by the group of investigators in six different centers of family planning. Kymographic Insufflations as well as other investigations were performed on 100 of those retaining the device for a period of a year or more. In 8 cases tracings were repeated after removal of the device. All experiments were performed using the same technique described in the previous communications (Kamal et. al. 1964—1965). In 20 patients who showed blocked tubes, the conditions of the tubes were investigated further by lipiodol hysterosalpingography after removal of the devices. Age of patients ranged between 24 and 40 years and parity was between 2 and 13.

RESULTS

Tracings were compared with the normal accepted standard (Kamal and Kandil 1964). These patients being highly fertile the possibility of organic abnormalities was remote. Table I showed the analysis of the 100 tracings as regards :

1. Presence or absence and severity of spasm.
2. Changes in the initial rise of pressure.
3. Basal tonus.
4. Range of oscillations
5. Frequency and presence or absence of secondary waves.

TABLE I

Analysis of Tracings (100 cases)

Functional	Initial Rise of Pressure		Basal Tonus		Range of Oscillations	
Spasm above 200 mm. Hg.	Above 100 mm. Hg.	Below 100 mm. Hg.	Above 80 mm. Hg.	Below 80 mm. Hg.	Above 20 mm. Hg.	Below 20 mm. Hg.
36	49	15	51	13	24	40

From the above table it is seen that 36 cases showed maintained pressure above 200 mm. Hg. That these were cases of functional and not organic block was verified by lipiodol hysterosalpinography after removal of the devices.

The remaining 64 cases revealed tubal patency. Of these the initial rise of pressure was above 100 mm. Hg in 49 cases (76.5% of the patent tubes). Those showing high basal tonus (above 80 mm. Hg.) amounted to 74.5%. On the other hand 37.5% showed range of oscillations above 20 mm. Hg. However the frequency of primary oscillations did not show any significant deviation from the accepted standard.

Analysis of the Tracings According to the Suggested Functional Disturbance :

Thorough study of all tracings made it possible to divide the investigated cases into the following groups :

I.-**Tracings showing blocked tubes (Fig. 1) :** These amounted to a high percentage (36%), and were considered as cases of severe spasm of uterotubal sphincter. Organic obstruction was ruled out in 20 of these cases by hysterosalpingography after removal of the device.

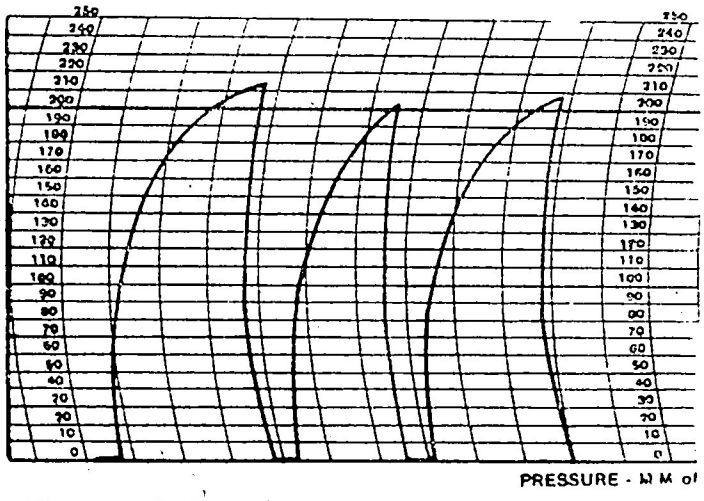

Figure - 1

II.-Tracings with high basal tonus and high range of oscillations (Fig. 2) : This type of tracing was met with in 12 cases and were considered as a manifestations of spastic uterotubal sphincter. It is most interesting that in 5 out of these 12 cases normal kymographic tracings were obtained after removal of the device (Fig. 2 B).

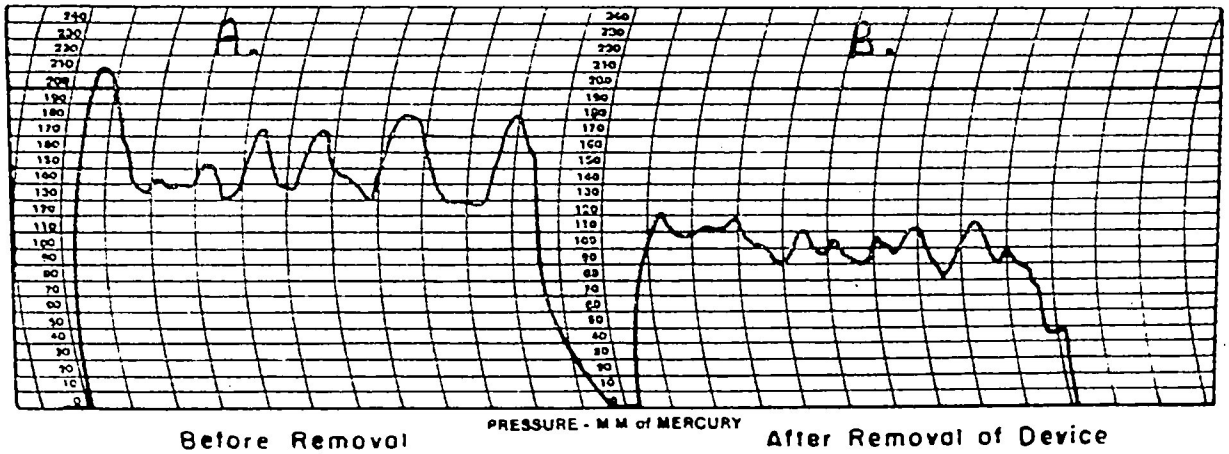

Figure - 2

III.-Tracings with high basal tonus and low irregular waves (Fig. 3) : This was taken to indicate spasm of the isthmic portion of the tubes (Kamal and Kandil 1964). this type of curve was the most commonly encountered; being present in 39% of cases. Reversal to normal tracings also occurred in the three cases in which the devices were removed.

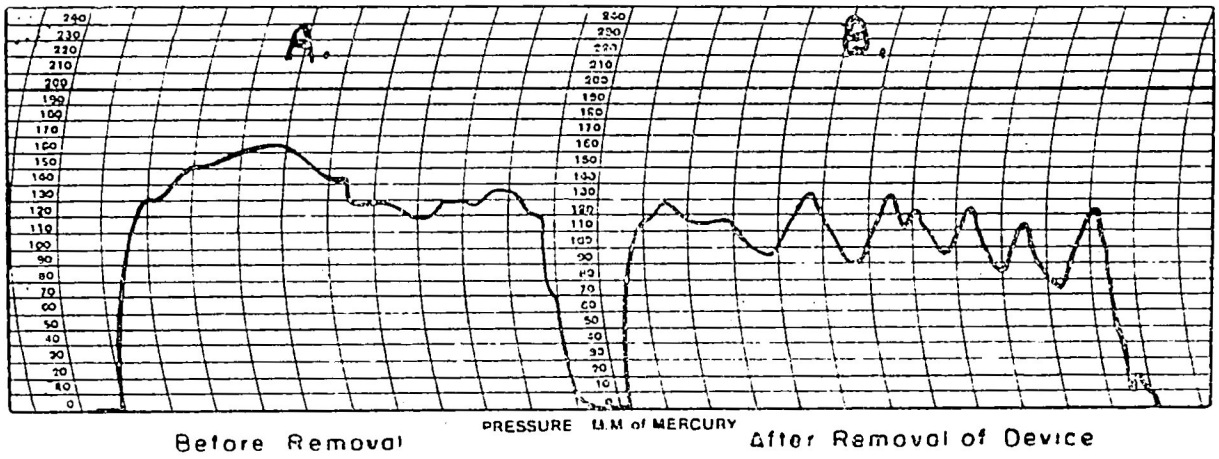

Figure – 3

IV.-Tracings with low basal tonus and high range of oscillations (Fig. 4) : These curves denote tendency to spasm of uterotubal sphincter in the 6 cases in which they were encountered.

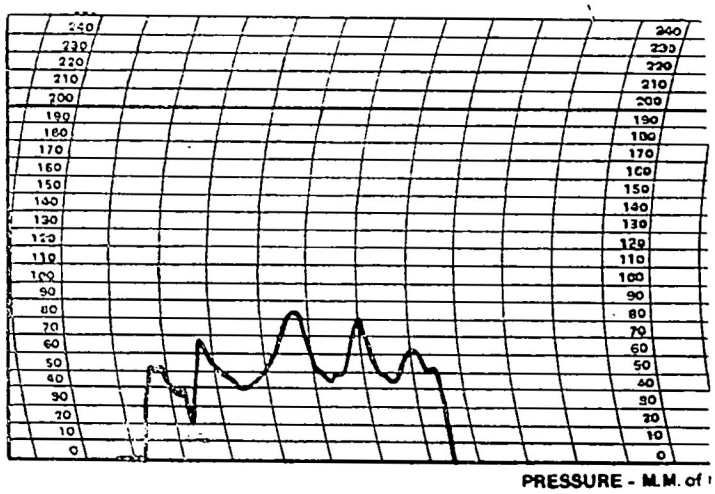

Figure – 4

V.-Tracings with high initial rise of pressure indicating unmaintained spasm were encountered in 3 cases (Fig. 5).

VI.-The remaining 4 cases showed normal kymographic tracings (Fig. 6).

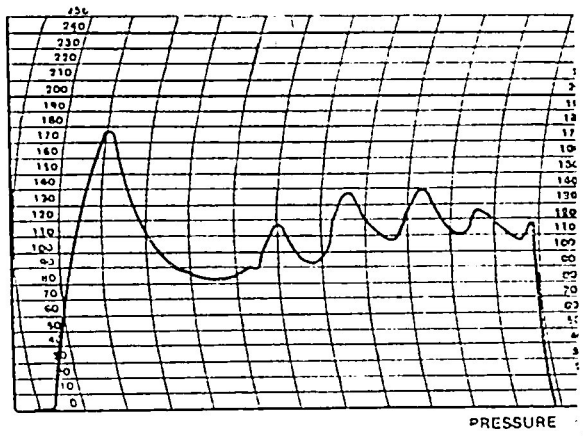

Figure - 5

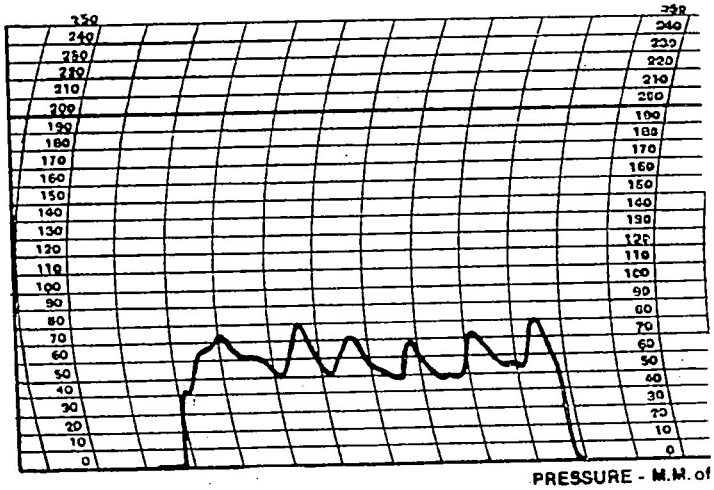

Figure - 6

COMMENT

Inspite of the World wide use of I.U.D., its exact mode of action is still the subject of research. Many contradictory reports were published, suggesting or supporting disturbances of the uterine and tubal contractions as the main factors.

Margulies in 1962 suggested that the I.U.D. prevents implantation of the fertilized egg by discoordination of the uterine contractions which are supposed to place the ovum in the center of the uterus. He also suggested that the fertilized ovum is transported by spastic peristalsis of the tube more quickly, arriving in the uterus prematurely. Jackson in 1962 mentioned that uterine muscle irritability remains the most plausible underlying mechanism of protection against pregnancy. Mastroianni (1964) demonstrated rapid transport of ova from the fallopian tube to the uterus in adult female monkeys. Burnhill and

Birnberg in 1964 by analysing hysterograms of patients fitted with the device, showed that 35 out of 75 cases had bilateral visualisation and 16 had unilateral tubal visualisation. Kamal et al. (1965) demonstrated spasm in 42 out of 50 cases studied by kymographic tracings immediately and 10 minutes after the insertion of I.U.D·S. Mazhar et al. (1966) reported 44% of cases with bilateral cornual block as demonstrated by hysterograms.

On the other hand, Seigler and Hillman in 1964, believe that no mechanical obstruction of the oviduct was present.

In the present work, the authors demonstrated definite impairment of tubal and uterotubal functions in all, except 4 cases fitted with the device for at least one year. The impairment was represented by :

1. Spasm of the uterotubal sphincter producing either a high initial spasm, high basal tonus, high range of oscillations, or complete blockage of the uterotubal junctions.

2. Spasm of the isthmic segment of the tube, producing a high curve with high basal tonus and superimposed irregular low waves (Kamal and Kandil 1964).

That these functional disorders of the tubes were due to the presence of I.U.D.S., was more verified by return of the kymographic tracings to their normal pattern in the 8 cases in which the devices were removed (the patients desiring conception) (Fig. 2B and 3B)· Incidentally it is worth noting that 3 of the 100 cases investigated got pregnant the cycle next to investigation in spite of the continuous presence of the device.

CONCLUSION

It can be concluded that one of the main actions of the I.U.D. is to produce functional incoordination in the tubouterine mechanism of ovular transportation not necessarily by rapid migration of the ovum but by spasm of the tubal isthmus and uterotubal sphincters.

SUMMARY

1. 100 patients fitted wtth I.U.D.s for a pariod of one year at least, were investigated by kymographic uterotubal insufflation.

2. Spasm of the uterotubal and isthmic portion of the tube was demonstrated in all except four cases.

3. It is concluded that functional incoordination of the normal tubouterine mechanism of ovular transport is the most plausible mode of action of I·U.D.s.

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