

PERFORATION OF UTERUS BY LIPPES LOOP

(A Case Report)

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History

The use of an intrauterine contraceptive device to control conception is not a new concept, but revival of interest in its application is recent. Ancient Arabs introduced a small round smooth pebble by means of a hollow tube into the uterus of the camel to prevent conception. As early as 1920, interest was aroused in India by the work of Grafenberg (Germany) who made use of special rings of silver and gold wire as an intrauterine device. Since then different materials and shapes were tried, like plastic wheels by Ota in 1934, silkworm gut by Oppenheimer (1959), and stainless steel rings by Hall and Stone (1962). Ishihama (1959) reported good results with Grafenberg ring and Ota ring respectively. It was in 1962 that Margulies (1962), Lippes (1962), and Birnberg and Burnhill (1964) devised the polythene spiral, loop and bow respectively, loaded with barium which could be detected by x-rays.

The Indian Council of Medical Re-

search in 1962 undertook an independent study of this subject. In 1965, the Indian Council of Medical Research recommended confidently the use of Lippes loop to solve the population problem on a national scale.

Since then, Lippes loop has become very popular, though it is not an ideal contraceptive as it produces certain complications. Among various complications, the following are the common:—abnormal uterine bleeding, pain, perforation of the uterus, intraperitoneal displacement not due to perforation, ectopic pregnancy, irritating excessive vaginal discharge.

Perforation of the uterus is one of the serious complications. Here, an interesting case of perforation of uterus by Lippes loop with pregnancy is reported.

Case Report

Mrs. S., aged 30 years, came for check up in the Out-patient Department on 2-10-67 with a history of 10 weeks' amenorrhoea. She was 8th gravida. She had three sons and one daughter. The last child was 2½ years old.

Her menstrual history was regular with normal flow, 5/28-30 days.

On 6th February, 1967, Lippes loop was inserted (size 30) at a Family Planning clinic. During the insertion of the loop she

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complained of pain in the epigastric region which immediately subsided. Later on she had no pain, no menstrual disturbances, nor any other symptoms.

Pelvic examination showed a thread outside the cervix; the uterus was anteverted and anteflexed, about 12 weeks' size, soft and mobile; left fornix was free. Some irregular coil was felt in the right fornix, anteriorly, near the uterus, at the level of the internal os, which ultimately proved at laparotomy to be the loop. The thread was felt in the vagina coming out through the cervix. On speculum examination the cervix was healthy, but blue, and the nylon threads were seen coming out through the cervix. A little pull on the nylon thread did not move the loop at all. She was advised admission. She got herself admitted on 6-10-1967.

Plain x-ray of the pelvis showed the loop transversely situated a little to the right, so that it could be said that it was ectopically displaced (Fig. 1). A probable diagnosis of perforation was made.

On 7th October, 1967, under spinal anaesthesia, a laparotomy was performed. The abdomen was opened by a median subumbilical incision. The uterus was found to be enlarged to the size of 12 weeks' pregnancy and was soft. Lippes loop was visualised under the anterior leaf of the broad ligament near the isthmus of the uterus on the right side (Fig. 2). An injection of syntocinon 5 I.U., I.V., in a drip was started before doing a hysterotomy. Abdominal hysterotomy was done in the usual way. The gestational sac was removed along with placenta. The uterus was stitched in layers. Sterilisation was done by the cornual resection method. Later, the peritoneum over the loop was incised and the loop removed. There was a small pinhole perforation detected on the anterior wall of the uterus. There was no need of stitching the uterine perforation, because of its size. The peritoneal layers were stitched. General peritoneal cavity closed after instillation of penicillin solution. Abdomen closed in layers. Post-operative period was uneventful.

Mechanism of action

The mechanism of action of intra-

uterine device is a subject of continuing speculation. Von Graefenberg is quoted by Haire (1929) as believing that a noninflammatory hypertrophy of the endometrium resulted which inhibited pregnancy. A change in the pH has been offered as a possible mechanism of action. Now, a considerable amount of experimental work has been done on animals and it would appear that there are marked species differences in the mode of action.

Doyle and Margulies (1963, 1964), indicate that the I.U.D. prevents implantation by interfering with the normal process of decidualisation. They exemplified the appearance of deciduomatous response round about the loop in rat uteri which definitely interferes with implantation. I.U.D. does not prevent ovulation or impair sperm migration. They also observed the demonstrable lack of uterine sensitivity.

Parr (1964) observed on the experimental evidence in rodents that the presence of a foreign body in the cavity of the uterine horn induces changes in the uterine environment which either destroy the blastocyst before implantation or prevent satisfactory nidation.

Mastroianni and Rosseau (1965) suggests that in the monkey it causes failure of implantation through some influence on myometrial and endometrial behaviour. The presence of the I.U.D. in the uterus causes a rapid discharge of the ovum through the tube to such a degree that the blastocyst reaches the uterine cavity before the development is sufficiently advanced for it to be able to nidate. However, in a study on the action of

I.U.D. in parous, regularly cyclic rhesus monkeys, Kelly and Marston (1967) found that the pattern of tubal transport is not markedly disturbed in the presence of the I.U.D. In women fitted with an I.U.D. and in another control group no significant difference was found in the number of egg recoveries from the uterine tubes. They suggest that fertilised eggs enter the uterus normally and once in the uterine lumen they undergo either rapid degeneration and/or premature expulsion. The exact mechanism of the action of I.U.D. remains unknown but it might be mediated by alteration of the uterine environment and/or the pattern of uterine motility.

Margulies (1964) proposed the theory that I.U.D. causes hurried peristalsis of the tube so that the ovum is propelled before it has a chance to get fertilised, and even if fertilised, it reaches the unprepared uterus prematurely and does not implant due to lack of trophoblast.

Johnson *et al* (1966) did not observe changes in the uterine motility using intra-uterine pressure recordings before and after insertion of I.U.D.

Rozin *et al* (1967) studied the mode of action of I.U.D. using uterography with concomitant television screening and cinematography before and after insertion of the device. They concluded that the mode of action of the I.U.D. may be based on the distention of the uterine cavity and impaired tonicity of the myometrium which may explain the interference with implantation of the blastocyst.

Some scientists have expressed their views that a foreign body altered the rat uterus by producing an hostile environment which destroyed the ovum. In the human endometrium response may differ, since it is progestational with increased vascularity and oedema, thus creating unfavourable biochemical environment in which the ovum absorbs moisture. It is also believed that by reason of osmotic changes the ovum undergoes certain changes which cause its disintegration. According to Willson (1965) the histological pattern of the endometrium of women using I.U.C.D. differs from the normal. The most consistent changes are increased superficial vascularity with development of large thin-walled vascular channels and presence of oedema in the superficial layers.

It is possible that an intra-uterine foreign body acts locally to prevent the utilisation of hormones or to create a hormonal imbalance by altering the cells permanently, and also the vascularity or enzyme patterns of the uterus, so that the fertilised ovum cannot hold on to the decidua.

Absence of uterine contractility may be an additional factor, which leads to loss of tonicity of the uterine body and loss of supporting conditions for the blastocyst. These changes may explain the interference with mechanism of implantation of the blastocyst.

The failure of the I.U.D. may be explained by insufficient distention of the uterine cavity and approximation of portions of the endometrial lining, so that the process of nidation may not be impaired.

Incidence

The precise incidence of loop perforation is not yet known. Probably it varies with the time of insertion and the skill of the operator. Tietze (1965) reported 43 perforations by 33 investigators; the greatest number occurred with the Birnberg bow which was responsible for 27 perforations in 4,389 insertions, approximately 6 per 1000. In Tietze series there were 6 perforations, 4 with Lippes loop, 1 with Margulies coil and 1 with Grafenberg ring, with an incidence of approximately 0.4 per 1000 for each device. Fourteen of these perforations were complicated by unplanned pregnancy. Hall (1966) reported 5 perforations with the Birnberg bow in 1041 insertions, and 1 perforation in 969 cases of Lippes loop with an incidence of approximately 1 per 1000. Ledger and Wilson (1966) reported 5 cases with an incidence of 1.400; Lehfeldt's figures, quoted by Clarke, are 1 in 150 Lippes loop. Chakrabarty and Mondal (1968) reported 4 cases of perforation from approximately 16,000 total insertions, an incidence of 1 in 4000 insertions. Pujari *et al* (1968) reported 2 cases in 475 women, who had been fitted with loop. In Jaipur (Rajasthan) 9 perforations were reported in total 9662 insertions with an incidence of approximately 0.9 per 1000.

Perforation of the uterus with various I.U.D.s have been described by many authors in the literature. Some references are given below:—

Lippes Loop: Awon Max (1966), Nanda (1966), Indru (1966), Majumdar (1966), Clarke (1966), Gadgil and Anjaneyulu (1967), Chaturvedi and Gulati (1967), Walmiki *et al*

(1967), Phillips and Kaur (1967), Pujari *et al* (1968), Chakrabarty and Mondal (1968), Mali *et al* (1968), Basu Mallik (1968), Hingorani (1968), Rastogi and Katiyar (1968), Sabharwal (1968).

Birnberg bow: Lay (1965), Thambu (1965), Tietze (1966), Nakamoto and Buckmann (1966), Hall (1966), MacFarlen (1966) and Seward (1965).

Grafenberg ring: Jessen *et al* (1963), Tietze (1966), Davis (1966) and Dorffler (1967).

Margulies coil: Tietze (1966), Friedman and Pine (1966) and Esposito (1966).

Discussion

It is debatable how the device reached the peritoneal cavity. Perforation of the uterus by I.U.D. can occur in many ways. Usually it occurs while introducing the device.

A. The perforation rate also varied significantly with the time of insertion. The important factors which contribute to perforation at insertion are:—

1. The manner in which the device is introduced.
2. The type of device and introducer.
3. The consistency of the uterine wall.

B. One can also perforate the uterus by the hook while removing the I.U.D.

C. The other possibility is migration or erosion by the I.U.D. through the uterine wall, but the loops are so pliable that they can easily conform to the changes in the size and shape of the uterine cavity. Hence, it is unlikely that they could themselves

penetrate the intact uterine wall by muscle contraction alone.

Shirodker (quoted by Walmiki) has put forth the theory of antiperistalsis. He has suggested that the cranial end of the loop can find its way into the cornual opening of the fallopian tube and gradually by reverse peristalsis the entire loop may be expelled into the peritoneal cavity.

It seems much more likely that the uterine wall is perforated during insertion and the device placed directly into the peritoneal cavity. Supportive evidence that they do usually occur at insertion includes the following:—

A. Perforation occurs more frequently in the soft recently pregnant uterus.

B. Perforation occurs more frequently with a sprunged inflexible inserter.

C. Perforation is sometimes discovered soon after insertion; if not, pregnancy ensues promptly.

Lehfeltdt (1965), Clark and Nakamoto (1966) suggested that slow uterine perforation by pressure necrosis due to the tip of loop appears to be a more probable cause of intraperitoneal displacement.

Basu Mallik (1968) gave importance to that part of the applicator which goes inside the cervix and uterine cavity. This has a fixed length of 4.5 cm. with a flange which fixes against the portio vaginalis of the cervix. If the uterus is a little smaller in size, this may reach near the fundus and at the time of loop insertion the loop may get anchored to the muscular wall, specially if the tip of loop is rough and pointed.

Also, it is a common finding that the loop is inserted rather quickly when part of it has gone inside which may also aid in its anchorage. An additional factor is the advent of pregnancy when the raised intra-uterine pressure of the gestation sac may push the loop out of the uterine cavity. On analysing the cases of Chakrabarty and Mondal (1968) it was found that the perforations were spontaneous, not during the insertion of loop. However, slight trauma at the time of insertion may be the starting point of future perforation.

Now the question arises whether the surgical or conservative approach should be adopted. There are different views about it.

Droffler (1957) reports a case where a Grafenberg ring had escaped into the peritoneal cavity which remained for 20 years and the patient had no complaints. During this period she conceived twice and delivered normally at term.

Lehfeltdt *et al* (1965) reported a case of perforation of uterus which presumably occurred during insertion of the loop. She had no complaint. On examination 4 weeks later, the nylon appendages of the loop were not visible. An x-ray was taken, the loop was shown to be in the free peritoneal cavity near the spleen. As the patient was asymptomatic no attempt was made to remove it. During her next menstruation another Lippes loop was inserted. A new x-ray showed the first device in the left upper quadrant of the abdomen somewhat lower than before and the second loop apparently in proper position in the uterus.

They have also collected from the

literature other instances of perforation of the uterus with plastic devices and metal rings.

Ledger (1966) reported 5 cases of uterine perforations. In 4 cases, threads of the loop were not seen. In one case the threads of the device were visible and the uterus was soft and enlarged to the size of an 8 weeks' pregnancy. Two months later she had lower abdominal pain and vaginal bleeding. At this time threads were not visible and it was assumed that the device had been expelled. The remainder of her pregnancy was uncomplicated and she delivered a normal infant at term. During the operation of tubal ligation through the posterior colpotomy incision, a Lippes loop was found within the leaves of the right broad ligament and was removed. Nanda from Assam (1966) deals with a 36 years old woman in whom a Lippes loop was inserted after her menstrual period; she later became pregnant. Subsequently, the loop penetrated through the uterus spontaneously into the pouch of Douglas. This was followed by an incomplete abortion with severe vaginal bleeding. The loop was removed by posterior colpotomy.

Clarke (1966) reported a case in which a woman came after a month of insertion of Lippes loop, with right upper abdominal pain which was thought to be due to cholecystitis; X-ray showed the loop in normal position. She had her next period with normal flow but with severe cramping. The threads of the loop were visible at the cervix. On exploration of the abdomen, segments of the loop were found protruding

from the anterior wall at the top of the fundus with the omentum adherent to it. In the case of Gadgil and Anjaneyulu (1967), the patient had spasmodic pain for nearly one month and no nylon threads were seen through the cervix. On opening the abdomen the loop was seen protruding through the uterine musculature below the uterine peritoneum. A small incision was made on the serosa and the loop was gradually drawn out. Phillips *et al* (1967) reported 7 cases. They removed the device by the abdominal approach in all the cases. All their cases had symptoms and were upset psychologically.

Chaturvedi and Gulati (1967) reported 2 cases of perforation of uterus by Lippes loop. In the first case the loop was removed while doing sterilisation; while in the second case the loop was left alone as the patient had no discomfort.

Chakrabarty and Mondal (1968) reported 4 cases of perforation; all were near the right cornu. Threads of the loop were not seen in any of the cases. In two cases, there were no symptoms for over a year. After that, in one case pain started in the right iliac fossa simulating appendicular pain, while the other had menorrhagia, but no pain. They strongly felt that whenever the diagnosis is made, a laparotomy should be performed and the loop displaced into the peritoneal cavity should be removed. Pujari *et al* (1968) are of the same opinion.

In our case the patient had no complaint. The displaced loop was only detected by chance when the patient came for confirmation of pregnancy. The nylon threads were seen through

the cervix but on vaginal examination the loop was felt lying outside the uterus.

We feel that a loop displaced into the peritoneal cavity should be removed. Lehfeltdt advises insertion of another loop in the uterus and allowing the first loop to remain in the peritoneal cavity. In our opinion, a loop displaced into the peritoneal cavity is not without complications and so it should be removed. Further, the weak point of perforation may lead to rupture of the uterus during a subsequent labour.

Summary

A case of perforation of the uterus by Lippes loop is presented.

An interesting feature was that the loop was actually seen in the layers of broad ligament on the right side, lying transversely, even though the threads were seen through the cervix.

The patient developed abdominal pain immediately after insertion of the loop which was probably due to perforation. Therefore, all patients who develop abdominal pain immediately after insertion should be investigated and perforation should be ruled out.

Utmost care and gentleness during insertion of the device is absolutely essential and no force should be used. If the procedure produces more than mild pain it is safer to abandon the insertion and to re-examine the patient immediately to rule out perforation.

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See Figs. on Art Paper VI