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Editorial

PELVIC INFLAMMATORY DISEASE

The concepts of pelvic inflammatory disease (PID) have changed during recent years. It is therefore necessary to review these changes.

The commonest (PID) is salpingitis but because of communicating lymphatics between the tube and the ovary it is salpingo-oophoritis. It is in majority of cases sexually transmitted disease. Until a decade ago the predominant organism was *Neisseria gonorrhoea* but from mid 70's another organism *chlamydia trachomatis* was found and there are now two organisms for (PID). The incidence of (PID) has increased because of the three P's—permissiveness, promiscuity and Pill. The seriousness of (PID) can be gauged from the figures that are available from developed countries. About 20 per cent become sterile after one attack. The incidence of ectopic pregnancy in women who do become pregnant is ten times that of women without infection. A number of women suffer from crippling backache which will eventually require surgery to remove the densely adherent adnexae. In fact, women suffering from chronic (PID) are often less concerned about their infertility and more concerned for their crippling backache and demand surgical relief for the backache. The amount of morbidity is thus evident and that too in young women.

Although in about three fourths of the cases it is a sexually transmitted disease,

in the remaining cases it is an ascending infection from the patients own endogenous cervico-vaginal flora. In these cases ascending infection occurs following comparatively minor surgical procedures such as dilatation and curettage, vacuum aspiration, tubal insufflation, hysterosalpingography or intrauterine contraceptive device insertion. In an occasional case it is secondary from adjacent intra abdominal organs such as appendicitis or diverticulitis.

In all cases the infection starts as cervicitis with mucopurulent vaginal discharge. If the cervicitis is promptly treated further ascending infection does not occur. From untreated cervicitis the infection ascends to the endometrium. The most vulnerable time for endometritis is during menstruation following cervicitis because at this time the endometrium is denuded. The heralding sign of acute endometritis is prolonged excessive uterine bleeding. Further extension then results in salpingo-oophoritis.

It is therefore most important to promptly treat cervicitis. Theoretically, this is an important preventive measure but until properly oriented sex education is imparted in school going children, the morbidity resulting from salpingo-oophoritis is not likely to be lowered. The adolescent, girls as well as boys must be made aware of the dangers of irresponsible coitus with multiple part-

ners without barrier contraceptive methods and prompt treatment of mucopurulent vaginal discharge.

Mucopurulent discharge is often considered by adolescent girls and their guardians as normal at this age and is neglected. Incidentally, the danger of cancer cervix developing at later age as a result of multiple sexual partners at very early age will also be known to them.

The clinical diagnosis of salpingo-oophoritis is difficult. Gonococcal salpingitis is typically associated with sudden abdominal pain, marked tenderness, muscle rigidity, fever and signs of peritonitis. In contrast, chlamydial salpingitis is subacute associated with slowly developing abdominal pain, mild to moderate tenderness, no fever and without signs of peritonitis. Despite milder clinical manifestations for women with chlamydial than gonococcal (PID) the degree of acute tubal damage visualised laparoscopically is equal in the two types.

To add further difficulties only about 40 per cent of women manifest leucocytosis, elevated sedimentation rates or fever. Other acute abdominal emergencies, most commonly appendicitis, ectopic pregnancy twisted ovarian cyst, or rupture of endometrial cysts of pelvic endometriosis complicate the diagnosis of (PID). Women with predominant gastro-intestinal symptoms and right sided tenderness suggest appendicitis. However, laparoscopy when available is a useful tool for diagnosis of acute abdominal pain. Laparoscopy is most useful for women with chronic pain to exclude (PID). By timely laparoscopy, unwanted laparotomy can be avoided.

All patients with acute abdominal pain and fever should be hospitalised. The modern antibiotic regimen is to inhibit aerobic as well as anaerobic organisms. Aerobic organisms are treated by penicillin as well as tetra cyclines. Anaerobes are inhibited by metranidazole.

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ULTRASONIC ASSESSMENT OF CERVIX IN 'NORMAL' PATIENTS

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SUMMARY

We studied 30 normal pregnant women from the first trimester to 36 weeks. This group of patients had no previous miscarriage, termination of pregnancy, operations on the cervix or premature labour. Fifteen were primigravidae and the remaining were multi-gravidae. There was no significant difference in the length of the cervix from 10 to 36 weeks of gestation ($P > 0.05$). The mean width of the cervix gradually increased from 10 to 36 weeks of gestation ($P > 0.01$). The mean width of the cervical canal showed no significant change from 10 to 36 weeks of gestation ($P > 0.05$).

Introduction

Incompetence of the sphincter mechanism of the uterus is now a well-established cause of habitual miscarriage in the middle trimester. Cervical incompetence was first described by Palmer and LaComme (1948). Since 1957 much literature has accumulated and many series have been recorded, notably Barter *et al* (1958), Taylor and Hansen (1959) Lash (1961) and Brandy and Peterson (1961).

The incidence of cervical incompetence to all pregnancies varies from 0.05 per cent to 1 per cent (Barter *et al* 1958; Jennings, 1972; Kuhn and Pepperell, 1977). However, as many as 16 per cent of second trimester pregnancy losses are due to cervical incompetence (Stromme

and Haywa, 1963). Classically, cervical incompetence has been characterised as a repetitive, acute, painless second-trimester abortion without associated bleeding or uterine contraction. It is often associated with premature rupture of membranes or bulging of the fetal membranes into the vagina. Prematurity is one of the main problems in obstetrics and in perinatal period. The incidence has not changed much in spite of trials of different treatment modalities. One reason for premature birth is cervical incompetence.

Several diagnostic procedures have been suggested for the non-pregnant woman whose history is suspicious but not diagnostic of cervical incompetence. Passage without resistance of a Pratt dilator, Goodell dilator or a Hegar No. 8 dilator into the cervical canal is suggestive of cervical incompetence (Craig, 1973; Jennings, 1972; Toaff and Toaff, 1974). Although this procedure is consistent with other direct methods of

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measurement of the cervical canal diameter (Holman, 1973; Johnstone *et al*, 1976) neither these, nor radiographic measurement (Asplund, 1952; Peterson and Keifer, 1973) or traction tests (Bergman and Svennerund, 1957) are invariably diagnostic of cervical incompetence. Usually, the diagnosis of this condition was made retrospectively and based on past obstetric history of repeated second-trimester abortions and/or early premature labour resulting from painless gradual effacement and dilatation of the cervix and sudden unexpected spontaneous rupture of the amniotic sac. The proper choice of the operative method and the selection of the optimum time, whether during pregnancy or in the non-pregnant state, can be improved by a thorough diagnostic study of cervical incompetence. Ultrasonography can provide an additional method for the diagnosis of cervical incompetence. This is non-invasive and is safe during pregnancy. This method was found to be promising by Vaalamo and Kivikoshki (1978); Sarti *et al* (1979); Brook *et al* (1981) and Vaalamo and Kiviskoski (1983).

We decided to study 30 normal patients who had no previous miscarriage, terminations of pregnancy, operations on the cervix or premature labour, of which 15 were primigravidae and the remaining 15 were multigravidae. This study was planned to assess the changes in the cervix of pregnant women from the first trimester until 36 weeks of gestation.

Material and Methods

All ultrasonic examinations were performed using Gray scale of Disonograph 4200 (Nuclear Enterprises Ltd). Bimanual examination was made to determine the position and direction of the cervix. The balloon of Foley cath-

ter was inserted against the external cervical os and the balloon (30 ml) was filled with water to identify the external cervical os initially. The full bladder technique was used. Patients were requested to empty the bladder and drink 500 mls of water one hour before the ultrasonic examination was performed. A bladder filled to a volume of 400-500 ml will clearly demonstrate the vagina, cervix and the region of the internal os.

Longitudinal scans were done following the direction of the cervix at 5 mm intervals. When the cervical canal was visualised, the scans were adjusted to see the whole length of the cervical canal. The lateral walls of the cervix will show echoes similar to those of the rest of the uterine myometrium. The endocervical canal will appear as a strong linear echo usually in the centre of the myometrial echoes of the cervix (Fig. 1). If the bladder is not properly filled the cervix will be shorter and bulkier in appearance. A short contracted cervix often appears more lucent due to inadequate filling. The endocervical canal will be difficult if not impossible to visualise under this circumstance. As the bladder fills, the cervix will stretch and elongate giving better visualisation of the endocervical canal. If the bladder is distended it can markedly elongate the cervix (Fig. 2). Overfilling will increase bladder pressure and may also increase pressure on the lower uterine segment and the cervix appears to be closed, whereas under less pressure it might appear open. In cases in which there is a high index of suspicion of a dilated endocervical canal we first study the urinary bladder completely filled and then again following partial emptying (Fig. 3).

We studied 15 primigravidae and 15 multigravidae. The age of the patient

ranged between 18 and 40 and the parity ranged between 0 to 5. The length of the cervix, the whole width of the cervix at the level of internal cervical os were measured longitudinally from 10 to 36 weeks of gestation at intervals of 2 weeks. The length of the cervix was measured from the external cervical os which was identified using a Foley's catheter bulb filled with 30 ml of water and the full bladder technique, to the internal cervical os which was identified as the level of the angle between the uterine cervix and body at the point of the greatest anterior posterior diameter. The whole width of the cervix at the internal cervical os level was measured at the point of the greatest anterior posterior diameter (Fig. 4). This measurement included the echoes produced by the cervix which were similar to those of the rest of the uterine myometrium. The width of the cervical canal at the level of the internal cervical canal was measured (Fig. 5). All measurements were done using a digital caliper.

Results

Table I shows the mean cervical

length, cervical width and the width of the cervical canal and the 2 standard deviations for each week of pregnancy from 10 to 36 weeks for the 30 patients including primigravidae and the multi-gravidae.

The mean cervical length ranged between 3.97 to 3.02 cm. There was no significant difference in the length of the cervix from 10 to 36 weeks of gestation ($P > 0.05$). The mean width of the cervix at the level of the internal cervical os, showed a gradual increase from 1.58 cm to 4.02 cm from 10 to 36 weeks gestation. The difference was significant ($P < 0.01$). The mean width of the cervical canal remained more or less the same from 10 to 36 weeks of gestation. It ranged between 4.38 mm and 5.53 mm.

Table II shows the mean and 2 standard deviations of the length of the cervix, the width of the cervix at the level of internal cervical os and the width of the cervical canal from 10 to 36 weeks of gestation in the primigravidae and multi-gravidae.

When we analysed the mean cervical length for the primigravidae and multi-gravidae separately we did not find any

TABLE I
Mean and 2 Standard Deviations of the Length of the Cervix, the Width of the Cervix at the Level of Internal Cervical os and the Width of the Cervical Canal from 10 to 36 Weeks Gestation

	Weeks in Gestation													
	10	12	14	16	18	20	22	24	26	28	30	32	34	36
<i>Length of Cervix in Cm</i>														
Mean	9.02	3.06	3.4	3.76	3.66	3.38	3.76	3.82	3.97	3.48	3.63	3.45	3.08	3.06
SD	0.61	0.62	0.76	0.64	0.61	0.63	0.63	0.61	0.83	0.51	0.55	0.65	0.54	0.26
<i>Width of the Cervix at the Level of Internal Cervical Os in Cm</i>														
Mean	2.58	3.02	2.84	3.16	3.27	3.52	3.44	3.20	3.44	3.56	3.67	3.88	3.86	4.02
SD	0.41	0.48	0.44	0.56	0.56	0.67	0.63	0.78	0.71	0.68	0.44	0.58	0.45	0.42
<i>Width of the Cervical Canal in Mm</i>														
Mean	4.67	4.92	4.83	4.77	4.67	5.10	4.94	4.92	4.50	5.53	4.68	5.22	4.38	4.77
SD	0.86	0.84	1.08	1.18	0.84	1.04	0.60	0.92	0.64	1.03	0.83	1.15	0.81	0.86

TABLE II

Mean and 2 Standard Deviation of the Length of the Cervix, the Width of the Cervix at the Level of Internal Cervical Os and the Width of the Cervical Canal from 10 to 36 Weeks of Gestation in the Primigravidae and Multigravidae

	Weeks in Gestation													
	10	12	14	16	18	20	22	24	26	28	30	32	34	36
<i>Mean Length of Cervix in Cm</i>														
Primi-gravidae														
Mean	3.02	2.95	3.67	3.64	3.28	3.31	3.33	4.07	3.62	3.53	3.45	3.36	3.28	3.23
SD	0.42	0.32	0.34	0.41	0.32	0.28	0.36	0.41	0.38	0.40	0.32	0.28	0.31	0.29
Multi-gravidae														
Mean	2.94	3.10	3.75	3.71	3.85	3.41	3.60	4.08	3.58	3.75	3.52	3.62	3.45	3.20
SD	0.29	0.40	0.32	0.34	0.33	0.32	0.36	0.31	0.29	0.28	0.31	0.32	0.31	0.31
<i>Mean Width of the Cervix at the Level of Internal Cervical Os in Cm</i>														
Primi-gravidae														
Mean	2.64	2.98	3.0	3.28	3.19	3.40	3.37	3.53	3.64	3.73	3.83	3.72	3.68	3.78
SD	0.30	0.31	0.32	0.28	0.26	0.31	0.38	0.34	0.38	0.33	0.35	0.32	0.36	0.37
Multi-gravidae														
Mean	2.86	3.20	3.40	3.48	3.63	3.66	3.78	3.85	3.91	3.92	3.96	4.02	4.06	4.08
SD	0.29	0.32	0.34	0.34	0.32	0.34	0.32	0.31	0.29	0.36	0.35	0.33	0.38	0.41
<i>Mean Width of the Cervical Canal in Mm</i>														
Primi-gravidae														
Mean	4.52	4.66	4.12	4.5	4.6	4.23	4.5	4.9	5.2	4.8	4.7	4.8	4.9	5.3
SD	0.64	0.64	0.65	0.58	0.48	0.52	0.51	0.48	0.5	0.62	0.61	0.58	0.52	0.59
Multi-gravidae														
Mean	4.62	4.68	4.87	5.20	4.56	5.6	5.2	5.3	4.9	5.2	5.05	5.2	5.3	5.1
SD	0.49	0.51	0.48	0.51	0.52	0.54	0.52	0.51	0.48	0.61	0.48	0.49	0.55	0.58

significant difference in the length of the cervix ($P > 0.05$). When we looked at the mean cervical width for the primigravidae there was a slight difference between the two means from 10 to 36 weeks of gestation though not highly significant. The mean width of the cervix for the primigravidae was 2 to 3 mm less than the mean width of the cervix for the multigravidae at all periods of gestation. There was slight differences between the mean width of the internal cervical os for the primigravidae and multigravidae. The mean width of the cervical canal for

the primigravidae was slightly less than the mean width of the cervical canal for the multigravidae at all the gestational periods ($P > 0.05$).

Discussion

In a normal pregnancy, the cervix remains closed to assure adequate fetal maturation. The incidence of incompetent cervix in relation to the number of normal deliveries has been established. There is a wide variation in the literature from 0.1 to 1.8 per cent (McDonald, 1980). This variation arises partly because there

are no standard criteria for the diagnosis of cervical incompetence.

Anatomically, the cervix consists mainly of fibrous tissue and isthmus consists mainly of muscular tissue. The mean population of smooth muscle varies between 6.4 per cent in the lower third of the cervix, 18 per cent in the middle, and 29 per cent in the upper third. From the third month of pregnancy the isthmus which is part of the corpus, elongates, dilates and from the fifth month of pregnancy it presents the lowest part of the uterine cavity (Cousins, 1980). Thus the shortening of the cervix is a physiological phenomenon of the mid-trimester and may be misdiagnosed as cervical incompetence. The normal length of the cervical length during pregnancy is about 3.5 cm (3.06-3.97). None of the patients whose cervical length remained 3 cm in length went into labour before 37 weeks. Vaalamo and Kivikoski (1978; 1983) reported that the pregnancies continued without complications if the cervical length was 2 cm or more. Brook *et al* (1981) measured the width of the internal cervical os in 19 women with normal obstetric histories. The mean width of the internal cervical os in their study of normal women was 1.67 cm. If the width of the internal os was below 1.9 cm the pregnancy continued without problems until term. We found that the length of the cervix, in normal uncomplicated pregnancy which ended in labour at 38 weeks or after, was 3 cm or more. The whole width of the cervix at the level of internal cervical os was 2.5 cm at 10 weeks and 4.02 cm at 36 weeks gestation and the width of the cervical canal was 4.5 to 5.5 mm from 10 to 36 weeks gestation.

Ultrasound is a valuable investigative tool and is a simple and non-invasive

technique, with minimal inconvenience to the patient and can be repeated. The results are encouraging and further study on a group of patients who were at risk of having a mid-trimester abortion or premature labour was done to assess the value of ultrasonographic examination in identifying the problem early enough to improve the prognosis.

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See Figs. on Art Paper I, II

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