

PELVIC INFECTIONS

by

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Pelvic infections form an important gynaecological problem responsible for considerable invalidism and occasional diagnostic enigmas. In spite of powerful antibiotics, it still worries us today. In pelvic infections, mainly the pelvic organs like the uterus and its adnexae, pelvic cellular tissue, pelvic peritoneum etc., are involved. It may be acute in nature, often seen by the general practitioner, gynaecologist, venereologist and rarely by the surgeon. Chronic lesions are much more common and are responsible for numerous gynaecological complaints like chronic pelvic pain, low back-ache, sterility, dysmenorrhoea, dyspareunia, leucorrhoea etc.

The incidence of pelvic infections is about 5% (Table 1) in our hospital. Infections of the cervix and the tubes are common.

welchii etc. have been incriminated. Fungal infections (like actinomycosis) are rarely seen affecting the pelvic organs. According to etio-pathology, the pelvic infections may be broadly divided into 3 groups (i) Pyogenic infections (Strepto, staphylo etc.) due to induced abortions, sequelae of puerperal sepsis, instrumentation like D & C, minor pelvic surgical procedures associated with family planning like insertion of IUD and vaginal tubal ligations; (ii) Gonococcal infections—most of the cases seen in gynaec practice are chronic. Acute cases are often seen in a V.D. clinic; (iii) Tuberculous infections which are mainly chronic in nature. The mode of spread, structures involved and the type of lesions and their sequelae vary in these 3 main groups. In the first group, acute lesions like pelvic cellulitis,

TABLE I
Pelvic Infections
(Institute of Obstetrics & Gynaecology, Madras)

1973-74:	
No. of cases seen in Gynaec. O.P.	: 28,422
No. of pelvic infections	: 1,576 (5.5%)
1969-1974:	
No. of Gynaec. admissions	: 24,543
No. of Pelvic infections	: 1279 (5.2%)
Pelvic infections in	: 7.7%
Erskine Hospital, Madurai	: 5.7%
	Outpatients
	Inpatients

The organisms responsible for pelvic infection are mainly bacterial and rarely mycotic. Amongst the bacterial—strepto, staphylo, Gono, E. coli, tuberculosis,

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adnexitis, peritonitis or pelvic abscess may be seen. Depending on the virulence and the type of infection, it may spread to general peritoneal cavity or produce a septicaemia, endotoxic shock and death. The chronic lesions are pelvic cellulitis,

cornual block, meso-salpingitis, pelvic thrombophlebitis etc.

The bacterial spectrum responsible for these post-abortal or puerperal infections have been changing. Pasteur (1879), nearly a century ago, was the first to point out that streptococci were the most important pathogens in the causation of this type of infections. Sixty years later Colebrook, Lancefield and others (1933; 1935) found *Strep. pyogenes* causes severe and fatal forms of the disease. During the last 15 years, Dean and Russel (1960), Jones (1962), Neuwerth *et al* (1963) found that the dominant organism responsible for severe endotoxic shock and death in these cases was *E. coli*. We reported on a similar study 10 years ago (Rao *et al* 1965) and found that *Strep. faecalis*, *Strep. pyogenes* etc. were still the dominant organisms in the vaginal, cervical and blood cultures of these patients but *E. coli* group was rather increasingly incriminated in the severe and fatal forms of postabortal pelvic infections. Perhaps a study now may show a further change in the type of organisms. The cervical or uterine swabs do not necessarily give us a true indication of the type of organisms responsible for these infections. The contaminants may overgrow the pathogens on culture. The antibiotic given to the

patient may not control the infection and a small amount of the antibiotic in blood may suppress its growth on the culture medium. We found gram's staining of vaginal smears not at all useful in identifying the organisms. The organisms responsible were entirely different on culturing the uterine swab, bit of conceptus or the blood and did not confirm to those noticed from the smears. Quite often multiple organisms are responsible especially on culture of the pelvic abscess. Six to 10 types of bacteria may be found in one case. *Clostridium welchii* and tetani are rarely seen but may lead to serious and even fatal course in septic abortions.

Septic abortions (Table 2) formed 10% of all abortions seen in Madurai. Though clinically they may be graded into-3 types depending on whether inflammation is limited to the uterus, adnexa or the peritoneum most of the hospitalised cases belonged to group II or III and this explains the high mortality of 4.6%. In 73%, the deaths were due to endotoxic shock. Tetanus was seen in 9 cases (Rao, 1971). In Madras city, we found (Rao and Mallika, 1975) that almost 1 out of 5 maternal deaths (and 1 out of 3 due to direct or obstetric causes) was due to septic abortions (Table 3). Fortunately

TABLE II
Septic Abortions
(Government Erskine Hospital, Madurai 1961-1972)

No. of spontaneous abortions	: 18,733
No. of deaths	: 6 (0.32%)
No. of illegal abortions	: 2,045
No. of deaths	: 95 (4.6%)

TABLE III
Maternal Mortality and Septic Abortions in Madras City in 1974

No. of Maternal Deaths	: 186
Deaths due to direct obstetric causes	: 98
Deaths due to septic abortions	: 32

In 1974, 18.6% of maternal deaths in the city were due to septic abortions, and they formed 33% of deaths due to direct causes.

TABLE IV
Bacteriology of Intrapartum and Postabortal Infections

160 patients studied
Streptococci commonest

Strep. faecalis
Strep. enterococcus
Strep. Pyogenes

E. Coli next
Staphylo

E. coli seen in 25% of septic abortions and was responsible for 3 out of deaths.

these illegal abortions are on the decline with the liberalisation of abortion laws and availability of these services in urban and semiurban areas. For various reasons, we have not been able to eliminate this problem of septic abortions as yet. Provision of MTP facilities in PHCs and assurance of anonymity to the patient may contribute to further reduction of this sociomedical problem of septic abortions and resultant pelvic infections.

Even with legalised abortions, pelvic infection is still seen in 1 to 10% of cases

—depending on the physician, the centre, equipment and method used (Table 5). It is higher in the second trimester than the first one, more with D & C than with vacuum aspiration and higher following intra-amniotic injections of hypertonic glucose than with hypertonic saline or urea. For fear of gross sepsis, intra-amniotic glucose is not used. With extra-amniotic rivanol, risk of sepsis is less. It may be noted from Table 6 that the induced abortions still carry a small but definite risk and the death rate may vary from 3 to 30 per 100,000 legal abortions.

TABLE V
Pelvic Infection Rate with Abortions (Legal)

Author and year	Total complication rate	Infection rate
Edstrom (1972) Review of Lit.	0.8 — 7.3% 5.4 — 15.3%	0.8— 5% (V.A.) 5—10% (D & C)
Jurukovski and Sukarov (1971) —	3.9% 4.8%	1.13 (V.A.) 1.65 (D & C)
Tietze (1971) JPSA	26.3	10.7%

TABLE VI
Mortality due to Induced Abortions

Author and year	Mortality per 100,000 abortions	
	Legal	Illegal
Tietze (1970)	3.4	1000 (untrained) 50-100 (trained personnel)
Tietze and Lewit (1971)	9.4	—
Kuck (1969)	2.3	42.3
Beric (1973)	0.4	11.8
Jalnawala (1975)	31.9	—
Ours (1975)	16.6	411

It must however be said that the death rate following illegal abortions is 20 to 25 times higher than due to legalised abortions even in developed countries. In developing countries like ours, the ratio is very much higher owing to the gross infection and ignorance.

Any surgical procedure involving the pelvic organs may lead to pelvic infections. Thus gynaecological vaginal surgery whether it is a D & C or hysterotomy may lead to sepsis. These days in our country sterilisation (tubectomy) happens to be the most common operation in the hospital or the field. Of the different types of tubal ligations, we found (Mallika and Rao, 1974) the morbidity was least with puerperal ligations and most with vaginal sterilisations performed concurrently with abortions. Infection rate with vaginal ligations varied from 1.5% to almost 10% (Table 7). Interval

times and 5.2% of the cases required readmission because of sepsis. It may be emphasised again that abortions with sterilisations carried a higher risk of pelvic infection than when either procedure was done alone. Sogolow (1971) and Mukhopadhyaya and Das (1975) reported that almost 1 out of 10 such cases developed pelvic infection. According to the latter, the pelvic infection rate was 3 times more when abortion was associated with sterilisation than with abortion alone. In our (1973) own series of 3053 vaginal sterilisations, we found (Table 8) the morbidity rate was 6% and pelvic infection rate 1.4%. We lost 4 cases due to sepsis and in 3 of these abortions were performed concurrently. Table 9 presents the mortality rates due to tubal ligations. The most important complication following tubectomy is pelvic sepsis. Rarely it may lead to death

TABLE VII
Vaginal Tubal Ligations and Pelvic Infections

Author and year	No. of cases	Infection rate (%)
COLPOTOMY:		
Sogolow* (1971)	124	9.6
Rao and Ghose (1972)	1,833	1.5
Soonawala (1973)	2,269	1.4
Edwards and Hakanson (1973)	278	3.6
Mukhopadhyaya and Das (1975)	68	2.9
	340*	9.4
CULDOSCOPIC:		
Thambu (1973)	250	7.6
Koetswang (1974)	400	1.4

* Concurrent sterilisations.

vaginal sterilisations carried a less morbidity than concurrent procedures. The pelvic infection rate was higher with culdoscopic than laparoscopic sterilisations for obvious reasons. When these vaginal tubal ligations were carried out in large camps, our experience showed that the morbidity rate went up 3

of these unfortunate women. The most tragic part of this is, that some of these apparently healthy women have been enticed with incentives to undergo the operation but have succumbed to post-operative pelvic infection.

Amongst the iatrogenic causes of pelvic infection—perhaps the most important

TABLE VIII
Vaginal Sterilisations
(Institute of Obstetrics and Gynaecology, Madras) (3053 cases 1965-73)

	Morbid- ity rate	Mortality
Rectal injury	6	
Pelvic peritonitis	10	
Pelvic abscess	12	
Genl. peritonitis	6	4 due to general peritonitis and septicaemia ± 0.13%
Pelvic infection, Cellulitis	26	
Urinary infection	32	
Menorrhagia	56	
Dysmenorrhoea	27	
Dyspareunia	14	
Total	189 (6%)	

TABLE IX
Mortality due to Tubal Ligations

Author and year	No. of cases	Mortality	Cause
Rao and Ghouse (1972)	1,833 (vaginal)	3 (0.16%)	Sepsis
Soonawala (1973)	2,269 (vaginal)	3 (0.04%)	Sepsis
Saigal (1973)	3,56,000	49 (0.013)	22 due to sepsis

and associated with our national family planning programme—is the one due to the intrauterine device. The pelvic inflammatory disease related to IUD varies from 0.5 to 2.5% (Table 10). Next to bleeding, it is the most important medical

cause for removal of IUDs. The incidence is higher with loops than with Copper T (prepacked sterile kit) and in those with cervical extensions. The rate does not increase with the length of time the IUD is resident in the uterus. This is

TABLE X
Pelvic Inflammatory Disease and IUD

Author and year	Type of IUD	No. of women	P.I.D. (per cent)
Tietze (1970)	Lippes Loop (mainly)	27,000	1.3-2.5 (2 years)
Rajam (1972)	Lippes Loop	2,485	0.84
Rao and Prema (1972)	"	1,706 (5 years)	0.6
Tatum (1972)	T cu 200	945	0.8
Zipper <i>et al</i> (1972)	Cu 7	516	0.2
Tejuja (1974)	T cu 200	4,357	0.5 (1 year) 1.1 (30 months)

confirmed in our own experience (Rao and Prema, 1972) and of Tejuja (1974). The infections in IUD acceptors may be unrelated to the insertion of IUD itself. When pelvic infection is noticed over a month after IUD insertion, it is likely to be of gonococcal origin. It is important to treat the infection first than remove the IUD.

IUD may rarely cause serious illness or even death due to acute pelvic infections (Table 11). A survey organised by the

number of women who had accepted this type of device, the death rate was higher for this than for any other type. Out of 18 deaths due to sepsis in pregnant women with IUD in-situ, 13 were due to the Dalkon Shield. Out of 14 deaths due to the Dalkon Shield itself, 13 were due to severe sepsis with abortion. Typically, patient experiences septicaemia first without pelvic or uterine pain followed by spontaneous abortion. Recently, 219 infected abortions have been reported

TABLE XI
Mortality due to Pelvic Infection I.U.D.
(A.C.O.G. Survey, 1967)

Out of 561 critical illnesses due to IUD, 369 due to PID
7 out of 10 deaths associated with IUD were caused by pelvic infection (4 within a month and 3 later)

American College of Obstetricians and Gynaecologists resulted in collection of 561 cases of critical illnesses due to IUD (Scott, 1968). Of these 369 (fully two thirds) were caused by pelvic inflammatory disease. Out of the 10 deaths, 7 were due to pelvic infection; 4 of these occurred within a month of IUD insertion. A recent report (Jennings, 1974) on deaths associated with IUD is perhaps more disturbing especially regarding the Dalkon shield (Table 12) considering the

with Dalkon Shield and as a result the ICMR have instructed that such as IUD should be promptly removed if the patient be pregnant. The trial with this IUD have been discontinued till it is suitably modified. A proper selection of cases and insertion of gamma ray radiated IUDs now available with careful and aseptic precautions help a long way to prevent pelvic infections due to IUD.

Pelvic abscess is a type of lesion seen in acute pelvic infections. Though a diag-

TABLE XII
Deaths Associated with IUD (1966-1974)
(F.D.A. Report, 1974)

	Dalkon Shield	Loop	Saf T coil	Others	Total
<i>Not pregnant:</i>					
Sepsis	1	8	1	3	13
Perforation and sepsis	0	3	1	0	4
<i>Pregnant:</i>					
Embolism	0	2	2	0	4
Sepsis	0	1	0	0	1
S. abortion	13	3	0	1	17
Total	14	17	4	4	39

nosis could be made from the typical history and findings in a given case, often it may be missed if one is not careful. These days a common cause of pelvic abscess is vaginal ligation or sequelae of septic abortion. Table 13 shows how it

possible to identify the organism, in the chronic cases it is not easy (Esenbach and Holmes, 1975). Treatment of acute gonococcal pelvic infections consists of a large dose of Cryst-penicillin followed by ampicillin 2.0 g. daily orally for 10 days.

TABLE XIII
Pelvic Abscess — Etiology

Author and year	No. of vaginal sterilisations	No. of pelvic abscess
John and Dunster (1973)	50	3 (6.0%)
Laufe (1972)	263	2 (0.76%)
Rao (1973)	3053	12 (0.4%)
Gutierrez (1972)	1305 (Culdoscopic)	6 (0.5%)
Rao (1971)	1190 (S. ab.)	37 (3.1%)

may be seen in 0.5 to 6% of tubal ligations and in 3% of septic induced abortions. The incidence is higher in concurrent sterilisations, and is seen even after endoscopic procedures. Other causes are infected pelvic haematocoele (old ectopic), acute gonococcal infections etc. Treatment is easy; a colpotomy and drainage leading to dramatic improvement in the clinical picture.

STD (Sexually Transmitted Disease) is on the increase mainly syphilis and gonorrhoea. In our country and particularly in Tamilnadu, gonorrhoea is a major problem than syphilis (Sowmini, 1975). In the V.D. clinic mostly, acute cases of G.C. are seen. About 10% of these women may develop PID and may report at the gynaec. clinics, complaining of leucorrhoea, dysmenorrhoea, menorrhagia or sterility. Examination may show Bartholinitis rarely. Often there is chronic cervicitis, chronically inflamed tender tubes or T.O masses with retroverted fixed uterus. Though during the acute phase in about 50% of cases, it is

But what is most important to the gynaecologist is to realise that unless the contacts are also treated simultaneously, the therapy is futile and the lady will come back time and again beside disseminating the infection.

Is gonococcal infection on the increase? Darrow (1975) firmly believes that it is on the rise thanks to the 3 Ps—Permissiveness, Promiscuity and the Pill. In his study covering a V.D. clinic, gonococcal infection was noticed in 2.3% of condom users and 4.5% of IUD acceptors compared to 46.6% of those on the pill. The pill users were found to be the most promiscuous. In Madras city too the venereologist feels that for the last 10 years G.C. is on the increase along with other STD (Sowmini, 1975). In Sweden, health education again emphasises the use of the Condom as it is really a 'prophylaxis' against the STD infections besides conception. Copper in ionisable forms in IUD have been claimed to be gonococidal (Fiscina *et al* 1973) and therefore such IUDs are not likely to give

rise to gonococcal infections. However, further study is needed to substantiate this claim.

Pelvic tuberculosis is an important but rare cause of chronic pelvic infections. Its incidence depends on the incidence of tuberculosis in general. It is estimated that in our country there is no decrease of PT in the last 2 decades and that about 8.5 million cases of tuberculosis are there (ICMR Bulletin 5, 1975). Our own hospital incidence shows that for the past 15 years the problem has not been appreciably on the decline (Table 14). It is

sterility clinic, if patient has secondary amenorrhoea, and no obvious pelvic pathology, the chances of finding endometrial tuberculosis are quite high (30-50%). In a study of over 200 secondary amenorrhoea patients, we found 18% had tuberculous infections of the endometrium (Rao, 1966).

The diagnosis is easy from the history, pelvic examination and investigations including histopathology, culture and guinea pig inoculation of the endometrium. Different schedules of treatment have been prescribed but the ICMR

TABLE XIV
Pelvic Tuberculosis
(Institute of Obstetrics and Gynaecology, Madras)

1958-1959 — Incidence	1.1%	} 18% of Secondary Amenorrhoea had endometrial tuberculosis.
1969-1974 (192 cases) — Incidence	0.8%	
Secondary Amenorrhoea	: 55%	
Sterility	: 22.5%	

seen in about 1% of gynaecological admissions. Malkani (1975) believes that the incidence will be higher in an infertility clinic. She found 9.3% of 2583 infertile cases had endometrial tuberculosis.

studies have revealed that for the long term therapy best results are obtained with intermittent medication over a period of 12 to 18 months and the drop out rate is low (Table 15). With con-

TABLE XV
Chemotherapy of Tuberculous Infections
(ICMR Bulletin 5, No. 9, 1975)

Daily Schedule:	PAS 10 g. and INH (200 mg)	for 1 year
OR	INH (300 mg) and Thiacetazone 150 mg	
Intermittent:	Streptomycin 1 g. I.M. twice weekly + INH 15 mg/Kg wt. single dose oral twice weekly — suitable for urban areas	1-1½ years
OR	PAS 10 g. + INH 15 mg/KG oral single dose twice weekly	
Resistant cases:	Streptomycin + Pyrazinamide daily	1 year
OR	Cycloserine and Ethinamide daily	

Most of them were latent, non toxic and afebrile. Common complaint was secondary amenorrhoea and it was seen in 55% of our cases. Primary amenorrhoea is rare and was reported in 4.3% of cases of genital tuberculosis by Malkani. In a

servative chemotherapy, 85-90% cure rates are obtained.

Place for Surgery in Pelvic Infections

In acute pyogenic pelvic infections, treatment is mainly conservative. Apart

for drainage of abscesses, if any, hysterectomy has a very limited place. In septic induced abortions when the uterine tear is irregular and infected or in grossly infected cases not responding to conservative therapy, removal of the uterus is indicated. The place for hysterectomy in endotoxic shock is debatable. Chronic non-tuberculous lesions persisting inspite of broad spectrum antibiotics, corticoids and display of anti-inflammatory drugs like Tanderil etc., may call for surgery depending on the nature of the residual lesions, age, parity, type and severity of symptoms. If the adnexal masses are persisting or increasing in symptomatic women, hysterectomy is done if the uterus is adherent or there is a chronic endocervicitis or if she is a parous woman of over 35 years of age. In younger patients, unilateral or bilateral removal of the tubes with conservation of the ovary may be considered. In chronic endocervicitis giving rise to distressing pelvic pain or leucorrhoea not responding to antibiotics and cauterisation, conisation of the cervix gives good results. In the older patients, hysterectomy is advisable. Bartholin's cyst can be excised with patience. In chronic pelvic infections of tuberculous origin, surgery is not conservative—hysterectomy with removal of the tubes and ovaries is the treatment of choice where (i) the lesion is persisting inspite of chemotherapy—resistant or recurrent cases, (ii) in menorrhagia seen in elderly women (iii) where the adnexal masses have not resolved or increasing and are associated with symptoms and (iv) in cases of tuberculous fistulae. Preoperative and prolonged postoperative antituberculous cover is always needed for these cases.

What are the chances of fertility following pelvic infections? After an in-

duced abortion or instrumentation, the acute infection may resolve completely and only rarely affect the endosalpinx or the fimbriae. The chances of fertility then are fairly good. However, some cases after legal or illegal abortions may remain sterile due to the cornual block in the tubes. With such cases, reimplantation may give 25-30% chance of pregnancy. In gonococcal infections as the tubal mucosa is mostly damaged and fimbriae may be agglutinated or drawn in and closed, sterility is common or in mild cases, ectopic gestation may result. In chronic cases where the cervical lesion has healed, hysterosalpingography may give us an idea of the extent of the tubal patency. If the tubes are not palpable but radiographically visualised fully but without a spill, tuboplasty could be profitably carried out. If tubes are not visualised multiple blocks in the tubes including the fimbrial ostia has to be borne in mind before laparotomy is considered. In mild cases of hydrosalpinx tuboplasty is mainly an exercise at operative gynaecology as the fimbriae are destroyed, the endosalpinx is non-ciliated and flattened and the tubal peristalsis absent. Even after a cuff salpingostomy, the chances are practically nil. Schaefer (1970) found on a survey of the literature that out of over 7000 cases of genital tuberculosis, there were 155 term pregnancies, 67 abortions and 125 ectopics; but over half the term pregnancies were poorly documented. Perhaps only 31 of these could be accepted. In minimal cases with adequate therapy, pregnancy is possible; but it should be emphasised that genital tuberculosis mostly leaves the patient permanently sterile. Tuboplasty after 2 years of adequate therapy and after the disease is arrested for atleast 18 months

may be tried but the chances of success are remote.

To Conclude

In gynaecological practice, these days, the type of material in relation to pelvic infections is not the same as it was 2 to 3 decades ago. The bacterial spectrum too is different. The acute lesions mostly respond to powerful broad spectrum antibiotics but at times, due to delayed and inadequate therapy or recurrent infections, it may not completely resolve and residual chronic lesions may be the end result. Postabortal pelvic infections and those associated with tubal ligations or IUD form a good proportion of the cases seen in gynaecological practice outside or in our institutions. Gonococcal lesions are again on the rise thanks to the favourable social conditions, liberalised abortion laws and easily available contraceptives. Most pelvic infections are preventible. Severe morbidity and mortality of septic illegal abortions are totally preventible. With proper precautions, the sequelae of legalised abortions and tubal ligations can be minimised. It is a mistake to believe that the powerful broad spectrum antibiotics are always available to combat infection, should it occur and relax the ordinary aseptic and antiseptic precautions in our day to day practice. We have seen some of these organisms not sensitive to any known antibiotic cause severe sepsis and in a short duration even kill the patient. It is hoped that further research would help us to control these infections better and to minimise the distress or suffering in women.

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