LAPAROTOMY IN STERILITY†

by

USHA THAKAR*, M.D., D.G.O.

Introductio

This is an analysis of laparotomies performed on 100 infertile women during the period 1957-1963.

The role of major surgery in infertile women has been receiving much interest lately. The prognosis following pelvic surgery on distorted tubes and ovaries has improved from almost 0 per cent to 20 per cent. The surgeon henceforth feels more hopeful in undertaking a laparotomy and the patient is willing to take whatever little chance she has of fulfilling her ambitions of having a baby.

Various investigations have been described to study the function of the female internal genital tract. Although the technique and interpretation of these have improved greatly, they are at best an indirect evidence. Laparotomy has the greatest advantage in the sense that one can get a chance to see and palpate the internal genitals and confirm whatever pathology may have been suspected earlier as a result of the various investigations.

Laparotomy in infertility has a large application both as regards the diagnostic field and the therapeutic.

Material and Methods

The present study consists of a selective series of 100 sterile patients in whom 106 laparotomies were performed. This series was collected with a deliberate aim of studying pelvic pathology, incidental or otherwise, in sterile women.

None of these operative procedures were performed purely as diagnostic. In each case some therapeutic operative procedure was outlined pre-operatively and either carried out at laparotomy or suitably modified according to the findings. At the same time the beneficial effects of a laparotomy and subsequent prognosis, however poor, were first explained to the patient and her husband. The ultimate decision of undergoing the operation was left to the couple.

Analysis of 106 laparotomies

This study consists of:

Primary sterility	..	51%
Secondary sterility	..	49%
Total	..	100%

---

† *Abridged from the dissertation "Laparotomy in Sterility" awarded the S. N. Bhansali Charitable Trust Prize, 1962, by the Bombay Obstetric & Gynaecological Society.*

**Registrar, Cama and Albless Hospital, Bombay 1.*

Received for publication on 11-3-65,

Age Groups

TABLE I

Sterility	Less than 20	21-25	26-30	31-35	Above 36
Primary	3	18	21	7	2
Secondary	5	13	22	8	1
Total	8	31	43	15	3

As in most studies on infertility the commonest age group of patients coming for investigations is between 20-30 years.

Menstrual history

Fifty-three patients had normal menstrual history. Five complained of hypomenorrhoea, 8 of oligomenorrhoea, 8 of menorrhagia and 18 of dysmenorrhoea.

Symptoms

Only 29 patients came primarily for investigation and treatment of sterility. The rest had some other presenting symptom. Chronic abdominal pain was complained of by 17 cases, dysmenorrhoea by 16 and irregular menstrual periods by 11 cases. Other complaints included prolapse 10, leucorrhoea 7, lump in abdomen 5, dysparcunia 4 and backache 1.

General examination of the patient

All cases of chronic pelvic inflammation were examined in detail so as to exclude a tubercular focus. Many of them were in a run-down condition with low general health. Due to repeated attacks of pelvic inflammation, chronic blood loss due to menorrhagia and antecedent malnutrition these patients presented a typical tubercular diathesis. However, the screening of the chest, erythrocyte sedimentation rate and sputum examinations were negative. An endometrial biopsy was always done to exclude genital tuberculosis. In a few cases, although an endometrial biopsy was negative for tuberculosis, subsequent laparotomy did reveal genital tuberculosis. This poses a new problem for the surgeon, for unawares he opens an abdomen and finds out that no surgery can be done in the presence of tuberculosis.

Four cases presented with signs and symptoms of acute abdomen. Three cases were diagnosed as ectopic gestation and one as twisted ovarian cyst.

TABLE II
Pelvic Findings

Details	No. of Cases
Fixed retroverted uterus	28
Normal pelvic findings	19
Unilateral tubo-ovarian mass ..	11
Bilateral tubo-ovarian mass ..	8
Prolapse	10
Fibroids	8
Bilateral cystic ovaries	6
Unilateral & bilateral ovarian cysts ..	5
Thickening in the fornices	3
Congenital abnormalities	2
Total	100

Fixed retroverted uterus seems to be a fairly frequent finding. There were many more cases of retroversion but since they were mobile and asymptomatic they were grouped in the heading as normal pelvic findings.

Nineteen cases presented normal pelvic findings on clinical examination. This does not, however, preclude pelvic pathology from this group. A large number of these cases subsequently showed some abnormality. Several patency tests revealed blocked tubes.

Indications

For the sake of discussion, these cases were divided into 2 groups:

Group I —Fully investigated for sterility—48%

Group II—Primary indication for laparotomy—52%

The indications in the 2 groups differ markedly.

In the first group, during the course of their investigation, some abnormality was discovered. Laparotomy was then performed to correct that abnormality. In a fair number (19) no abnormality was found on investigation. Laparotomy was performed on these cases after waiting for a period of three months to one year. The aim in undertaking a laparotomy was to diagnose any condition which may have been missed in spite of the investigations, which are all indirect methods, and also to undertake some corrective surgery, check the patency of tubes and suspend the uterus.

Various indications in this group include blocked tubes 14, fixed retroverted uterus 9, anovulatory cycles 5, tubo-ovarian masses 3 and congenital malformations 3.

Group II comprises of 52 cases who had a laparotomy for some other cause. Incidentally, they were all sterile and so were included in this series. They were fully investigated but not from the point of view of sterility. In all these cases, there was definite pelvic pathology which was found to be responsible for the sterility in a few cases.

Indications in this group were, tubo-ovarian masses 11, prolapse 11, chronic abdominal pain 6, fibroids 5, lump in abdomen 5, and ovarian tumour 6. Out of the emergency laparotomies performed, 4 were for ectopic and 2 for acute abdomen.

Repeat laparotomies

Four patients had to undergo a second laparotomy and one patient had two subsequent laparotomies for repeat ectopic gestations.

Inspection of pelvic viscera

Table III gives the findings at laparotomy and the operative techniques used.

Retroverted uterus was found in 64 cases. These included mobile and fixed retroversions. Excluding the 28 cases in whom the retroversion was fixed, there were 36 cases of mobile retroversion which were corrected.

Apart from the 36 cases of mobile retroversion, 6 of anteverted uterus and 5 of hypoplastic uteri (Total 47 cases) there were 53 cases where a definite *uterine factor was present* which required correction. The uterine factor may not have a definite

TABLE III

	Laparotomy findings		Operative procedures	
1. Uterus	i. R. V.	64	i. V. S.	55
	ii. Hypoplasia	5	ii. Plication	28
	iii. Fibroids	13	iii. Modified ventri-fixation	3
	iv. Congenital abnormality	2	iv. Cervicopexy	3
			v. Myomectomy	12
			vi. Metroplasty	1
			vii. Excision of septum ..	1
			viii. Hysterectomy ..	2
2. Tubes	i. Hypoplasia	14	i. Salpingolysis	14
	ii. Adhesions	12	ii. Salpingectomy ..	16
	iii. T. O. mass	15	iii. Partial salpingectomy	4
	iv. Thickened	5	iv. Salpingostomy ..	11
	v. Hydrosalpinx	7	v. Implantation	9
	vi. Blocked	17		
	vii. Congenital abnormality	4		
	viii. Ectopic	4		
3. Ovaries	i. Cystic	36	i. Puncturing of cysts ..	11
	ii. Thick capsule ..	14	ii. Scarification	10
	iii. Atrophy	5	iii. Cystectomy	15
	iv. T. O. mass	15	iv. Oophorectomy ..	11
	v. Hypoplasia	1	v. Wedge resection ..	5
			vi. Extroversion	1
4. Peritoneum and other	i. Adhesions	12	i. Appendicectomy ..	22
	ii. Adherent colon ..	4	ii. Cauterisation	2
	iii. Tubercles	4	iii. Cotte's operation	1
	iv. Endometrial implants	2	iv. Amp. of Cx.	1
			v. Ant and post repair ..	4

relation to sterility. Perhaps if conception had occurred in such patients, the uterine factor might have prevented the pregnancy going to term normally.

In 50 cases, the tubes were normal. The *tubal factor* can be said to be present in 50 per cent. This incidence is as high as that reported by others. In 27 per cent of cases one tube was found to be patent and apparently functioning. In 23 per cent both tubes were sufficiently damaged to give a positive cause for sterility.

In 34 cases the ovaries were normal. It is not possible to evaluate the *ovarian factor* as cystic ovaries or thickened capsule need not be a cause of sterility. Pathology of the ovaries is bound to be noted as very high on laparotomy as compared to routine investigations for sterility. The peritoneal factor is incidental and is rarely related to sterility. In one case, where the peritoneum was studded with tubercles, pregnancy occurred within six months.

Discussion

A. *Uterine Factor:*

1. *Retroverted uterus:* This includes 9 cases from Group I and 3 cases from Group II, and all other cases where retroversion was associated with other pelvic pathology.

The recognition and surgical correction of retrodisplacement of the uterus has a long and an interesting history. In Howard Kelly's review of the subject, he calls the early part of the 19th century, as the "Pessary Period". It was then that retrodisplacement became recognised in the non-pregnant state and many ingenious instruments and techniques were devised to bring forward the uterus and hold it there.

Pendleton Tompkins (1956) has written in defence of suspension of the uterus in the treatment of infertility. He says "the surgeon who performs a ventrisuspension, or a hospital which reports many suspensions, risks censure. Nevertheless, I suspect that suspension of the uterus is sometimes indicated and when performed for proper indications is a valuable procedure".

The incidence of suspension in his series was 12 in 700 infertile patients i.e. 2%.

In our series, out of a total of 83 suspensions performed 17 were primary. The rest were associated with myomectomies, tubal or ovarian surgery or surgery for the relief of pelvic inflammatory adhesions.

When bilateral salpingo-oophorectomy was performed the raw area was covered by bringing the round ligaments over it and suturing to the posterior surface.

2. *Prolapse:* Out of 11 cases of prolapse, 3 had abdominal cervicopexy, 3 had modified ventrifixation and 5 had ventrisuspension with associated vaginal repair. Purandare's abdominal cervicopexy has been found very useful in nulliparous prolapses of 1st and 2nd degrees.

A modified method of ventrifixation of the uterus was done on 3 patients. The recognised method of ventrifixation by the Olshausen, Kelly and Leopold technique is only possible in patients in whom future child-bearing has been eliminated. The modified method used during the child-bearing period is to fix the anterior surface of the uterus at the level of the internal os. By this method there is no interference with pregnancy and during labour. This was the method used in this series. All the 3 patients conceived and delivered normally.

3. *Fibroids:* There were 3 cases where a single myoma was removed and 9 cases where multiple myomata were removed.

4. *Congenital malformation:* In one case of bicornuate, unicolles uterus Strassmann's utriculoplasty was performed. One case who had a complete central septum required excision of the septum.

5. *Hysterectomy:* One case was of pelvic tuberculosis. At first laparotomy tuberculosis was discovered. The abdomen was closed without any interference. She was put on antituberculous treatment. After one year, there was no relief and she failed to improve. A total abdominal hysterectomy and bilateral salpingo-oophorectomy was performed. She

responded to anti-tuberculous treatment thereafter.

One case had a total hysterectomy for fibroids. She was 35 years old and had suffered for several years from dysmenorrhoea and menorrhagia. She desired a hysterectomy and was not keen on future child-bearing.

B. *Adnexal Disease:*

1. *Tubo-ovarian masses:* The 3 cases in Group I are those which developed the masses as a result of investigations for sterility. In Group II, 11 cases had a laparotomy for chronic masses which persisted in spite of conservative treatment.

Chronic tubo-ovarian masses require laparotomy for the signs and symptoms that they cause. All acute pelvic inflammations leave behind some chronic pathology which only surgery can correct.

The indications for surgery in pelvic inflammation revolve round relief of symptoms and of sterility. Palpable adnexal masses, as found in all cases grouped here, were taken up for the symptoms that they caused.

The problem arises when a patient complaining of sterility is found to have both tubes and ovaries irreparably damaged. Is the surgeon justified in doing a bilateral salpingo-oophorectomy? As far as the patient is concerned, the result of the operation is permanent sterility. Many patients are willing to put up with the symptoms and are satisfied with symptomatic relief, in the hope that one day they might conceive. It is very difficult for a patient to accept the fact that she is sterile. She is under social pressures and is threatened to be thrown out of the house if proved sterile. The surgeon has to consider each case individually and use his utmost skill and tact in outlining the correct therapy.

Having decided that operative interference is necessary, the question of the proper procedure is to be decided upon. Final decision can never be made till the abdomen is opened. It is, therefore, particularly necessary to explain to the patient that the operation may necessitate some interference which may lead to permanent sterility.

Our incidence of 11 per cent laparotomies for chronic pelvic inflammation with palpable adnexal masses is reasonably high. This is explained in part by the fact that our patients do not take adequate treatment during the acute phase. Their general health being low, the response to treatment is unsatisfactory.

2. *Lump in abdomen:* There were 4 cases where no definite diagnosis could be made. All these cases had a unilateral mass of restricted mobility. The mass appeared distinct from the uterus. A differential diagnosis of sub-peritoneal fibroid, twisted ovarian cyst, unilateral tubo-ovarian mass or a chronic ectopic gestation was thought of.

3. *Acute abdomen:* In 2 cases a vague diagnosis of acute abdomen was made and the laparotomy performed as emergency. Ectopic gestation was thought of in view of unilateral mass in the fornix and tenderness. The diagnosis could not however be pinned down. One case revealed an ovarian abscess on the right. The other turned out to be of multiple fibroids for which myomec-

tomies were done. One fibroid had got impacted in the pouch of Douglas and was responsible for the acute symptoms.

4. *Ectopic gestation:* Repeated patency tests and hysterosalpingograms, as also antibiotics and cortisone therapy, leave behind partially damaged and patent fallopian tubes. These are ideal for ectopic implantation of the fertilised ovum. When such a patient comes with pain, tenderness and a unilateral mass, it is quite difficult to assess whether it is an inflammatory mass or an ectopic. Since ectopic is more serious, the patient should be given the benefit of the doubt.

The operative treatment for cases of ectopic has to be modified in view of the patient's sterility. If an ectopic is found on one side and the other tube is irreparably damaged, the surgeon must try and save a portion of the healthy tube so as to give the patient a chance for subsequent conception.

C. *Tubal Factor:*

1. *Blocked tubes:* This was diagnosed on routine air insufflation test. In 6 cases, either the patency test or hysterosalpingography had indicated a block, but on laparotomy the tubes were found patent. In all these cases, the uterus was heavily retroverted with both tubes prolapsed posteriorly.

Apparent blockage due to kinks is well recognised. Pendleton Tompkins firmly believes that a patency test should be performed only on correcting a retroverted uterus. If the retroversion is fixed and cannot be corrected, then the results of patency test must be accepted with some reserve.

Pendleton Tompkins goes further to say that if the tubes are found patent on insufflation, they can still cause enough block to a sperm trying to ascend upwards. He compares it with a kinked garden hose pipe. "A kinked garden hose pipe lying on the lawn may be patent if a jet of water is turned on, but is it patent to the ant trying to crawl through?"

2. *Tubal plastic surgery:* A very significant contribution to the relief of female infertility has been made by the recent advances in tubal plastic surgery. An excellent review of the evaluation of the operative treatment of organic tubal occlusion and suggestions of avenues of study to improve prospects of success was presented by Alvin Siegler in 1960.

3. *Results with modern techniques:* The use of antibiotics and cortisone and the use of inert artificial agents to maintain patency heralded in a new era. The medical literature on tubal reconstructive surgery contains inconsistent results and comparisons are difficult.

The following table analyses the results as reported by various authors.

D. *Ovarian Factor:*

1. *Anovulatory cycles:* Surgical treatment of anovulatory menstruation has been recommended recently. Meaker, as early as 1934, emphasised the correction of pelvic pathology and restoration of normal anatomy of the ovary so as to allow it to resume its normal function of ovulation. Hormonal stimulation can only be of help in cases of hypoplasia and disturbed endocrinology. It has no place in organic pelvic pathology.

	No. of cases	Pregnancy rate	Patency rate	Special techniques
Margaret Moore White 1960		30-35% 50% for implantation	75%	No polyethelene tube used.
L. P. Puigmacia Collected cases 1960	3018 collected cases.	22.3% 19.6 N 2.7 *ectopic*		Polyethelene used in 57.2%.
Palmer 1960	396 Personal series.	13% Normal 5% Ectopic	40%	65 cases of treated. T.B. No polyethelene tube used.
Green Armytage 1960		46% Normal		Prednisolone and antibiotics Pre. and Post. op.
		2% Ectopic		Injected Procaine Streptomycine and cortisone solution, along the tube.
Syzganova 1960	50 cases	26% Normal		
Roca 1960	12 cases	41%		
Hellman and Siegler 1963	43 cases	68%	33%	Polyethelene used.
Shirodkar 1962		20% Grade II 40% Grade I		Polyethelene used.
Present series 1963	9 cases			Polyethelene used.

Standard surgical procedures employed are, suspending the ovaries by plication of ovarian ligaments, scarification of the capsule, extroversion of the capsule and wedge resection.

Stimulating doses of x-rays to the pituitary and ovaries have been recommended strongly by Kaplan.

2. *Ovarian tumours:* If an ovarian tumour is larger than 3″ x 3″ and one is reasonably sure that it is not a dysfunctional cyst, it should be removed. This is particularly true because of the high incidence of malignant ovarian tumours in younger age group of patients.

3. *Cystic ovaries:* Cystic ovaries were the commonest laparotomy findings. Puncturing of the cysts and scarification was done in 21 cases. Amongst the 13 ovarian cysts removed, 4 were dermoid cysts. Three out of four of these patients conceived after the operation.

Oophorectomy: In six cases unilateral and in five cases bilateral oophorectomies were performed. They were all associated with chronic pelvic inflammatory masses.

Wedge resection: In 2 cases unilateral and in 4 cases bilateral wedge resection was done. Only one case conceived within three months of the operation.

Extroversion: The only patient who had extroversion has not conceived yet. Intestines sometimes get adherent to the extroverted ovary. Bayley reported normal ovarian cyclicity in 13 out of 17 patients.

Immediate post-operative period: It was uneventful in all cases. Routine post-operative antibiotics were given to all patients. Overall results of the convalescence were satisfactory.

The ultimate results can be judged if pregnancy were to occur and the outcome of that pregnancy. The results in the present series are thus far unsatisfactory.

A total of 19 patients are known to have conceived. Out of these 100, only in 89 cases reconstructive surgery was undertaken and pregnancy was possible. Pregnancy was not possible in 8 cases due to bilateral total salpingectomy and in 3 cases due to unsuitable male factor. That gives a pregnancy rate of 22.2%. Out of 19 cases who conceived, in 5 the outcome of pregnancy is not known and in 2 ectopic gestation occurred; 8 women delivered normally, out of which 2 were premature babies. One case required a caesarean section and one had low forceps application.

Many of these laparotomies were performed this year. The results are yet awaited. One hopes for better results than the ones reported at the moment.

N.B.—Since the time of completion of this dissertation, 5 more patients have conceived, giving a total of 24. This gives a pregnancy rate of 27.5%.

Conclusions

To conclude, the present analysis has revealed many an interesting aspect in the problem of sterility.

A large number of sterile women seem to undergo major abdominal surgery for either some gross pelvic pathology or some suspected pathology. The indications have been varied and have embraced all branches and topics in gynaecology.

The pelvic pathology as found at laparotomy has been significant. Even in a few cases where no pathology was suspected, the incidental findings have had a large bearing on the infertility. Analysis emphasises the very high incidence of pelvic inflammation. Residual damage left by a gonococcal, tubercular and non-specific infection has been responsible for most of the sterility.

A significant number of cases have shown congenital developmental defects. Very little has so far been mentioned in the literature on this subject.

Neoplastic lesions have been few, except for fibroids of the uterus. The particularly low incidence of endometriosis and adenomyosis is worth noting.

An attempt has been made in each case to overcome the existing disability and give a chance for conception. The operative techniques used in the present series have been evaluated. The technique has generally improved in recent years and the results the world over have been encouraging.

Our results at present are not impressive; 47% of these laparotomies were performed in the current year, and we are awaiting the results most hopefully.

Acknowledgments

I wish to thank, most sincerely, my teacher, Dr. W. Fernandes, without whose guidance and constant encouragement this work would never

have been completed. The idea of studying the pathology as discovered at laparotomies in sterile women was originally hers. The operative work has been either undertaken or supervised by her.

I also wish to thank the Superintendent, Cama and Albless Hospitals for allowing me to use the hospital records.

Finally, I wish to thank all my friends particularly Drs. Devbala Patel, Sheila Prasada, M. N. Bhagwat and R. G. Banatwalla for helping me with the preparation of this dissertation.

References

1. Andrews, M. C. and Andrews, W. C.: Am. J. Obst. & Gynec. **70:** 1232, 1955.
2. Bailey, K. U.: J. Obst. & Gynec. Brit. Emp. **44:** 637, 1937.
3. Castallo, M. A.: Fertil. & Steril. **1:** 435, 1950.
4. Comnios, A. C.: Fertil. & Steril. **5:** 334, 1954.
5. Estes: Surg. Gynec. & Obst. **38:** 394, 1924.
6. Green Armytage, V. B.: B.M.J. **1:** 1222, 1952.
7. Green, Blatt: Fertil. & Steril. **12:** 5, 1961.
8. Greenhill, J. P.: Am. J. Obst. & Gynec. **72:** 516, 1956.
9. Halbrecht & Blinick: Fertil. & Steril. **11:** No. 5, 1960.
10. Hellmann, L. M.: Fertil. & Steril. **2:** 498, 1951.
11. Kaplan, I. I.: Am. J. Obst. & Gynec. **76:** 447, 1958.
12. Mazer, C. & Baer, G.: Am. J. Obst. & Gynec. **37:** 1015, 1939.
13. Mulligan, Rock Easterday: Fertil. & Steril. **4:** 428, 1953.
14. Palmer, R.: Gynec. & Obst. **4:** 497, 1952.
15. Rock, John: Fertil. & Steril. **8:** No. 6, 1957.
16. Shirodkar, V. N.: Contributions to Gynecology.
17. Shirodkar, V. N.: Abstr. in Yearbook of Obst. & Gynec., Chicago 1962-63, Yearbook Publishers, Inc.
18. Siegler, A. M.: Obst. & Gynec. Surv. **15:** 680, 1960.
19. Siegler & Hellmann: Fertil. & Steril. **14:** 300, 1963.
20. Stallworthy, John: Fertil. & Steril. **14:** No. 3, 1963.
21. Stein, . F.: Fertil. & Steril. **6:** 189, 1955.
22. Tompkins, P. Fertil. & Steril. **7:** No. 4, 1956.
23. White, M. M.: Abstr. in Yearbook of Obst. & Gynec., Chicago, 1962-1963, Yearbook Publishers, Inc.