

## Should Laparoscopy and Dye Test be a First Line Evaluation for Infertile Women in Southeast Nigeria?

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### ABSTRACT

**PURPOSE:** Laparoscopy and dye test is an important investigation in the evaluation of infertile women which has been underutilised in our practice. This review is aimed at determining whether the findings of this procedure are substantial enough to make it a first line evaluation for infertile women.

**METHODS:** A review of the laparoscopic findings in infertile women who presented for evaluation and treatment at a private fertility centre was carried out. A total of 253 day-case laparoscopy and dye test procedures were reviewed, 115 (45.0%) were done for primary infertility, 137 (54.5%) for secondary infertility and 1 (0.4%) for primary amenorrhoea and infertility.

**RESULTS:** The mean period of infertility was 4.5 years with a range of 2 - 10 years and the women were aged between 19 and 52 years. Analysis of the result showed that 100 (39.5%) women had normal patent tubes while 153 (60.4%) had tubal pathologies like bilateral tubal occlusion in 97 (38.3%) and unilateral tubal occlusion in 56 (22.1%) women. Pelvic adhesion of varying degrees of severity was present in 108 (42.7%) women. Bilateral tubal occlusion was more common in nulliparous women and those aged between 30 - 39 years. One or both ovaries were normal (functional) in 189 (74.7%) women. Altogether, only 43 (17.0%) women were "normal" (had patent tubes, functional ovary and no pelvic adhesion).

Additional pelvic pathology was present in 142 (56.1 %) women. The commonest was uterine fibroid (leiomyomata) of various sizes in 100(39.5%) of the women, followed by ovarian cyst in 56 (22.2%) and endometriosis in 11 (4.4%) women. Other pathologies observed include uterine abnormalities and unruptured ectopic pregnancy. Only 16 (37.2%) of the 43 "normal" women had no additional pelvic pathology.

**CONCLUSION:** The high prevalence of tuboperitoneal factor and additional pelvic pathology in these infertile women reveal the importance of laparoscopic evaluation. We recommend the use of laparoscopy and dye test as a first line investigation in our environment to detect these conditions early enough when treatment modalities like assisted reproduction will still be beneficial.

**KEY WORDS:** Laparoscopy, Dye test, Infertility, Leiomyomata, Nigeria.

### INTRODUCTION

Infertility is one of the most common reasons for

gynaecological consultation in our environment<sup>1</sup> and indeed the world over<sup>2</sup>. It's incidence in Nigeria as well as other sub-Saharan Africa has continued to rise due to tubal damage and male factor infertility<sup>3,4</sup>. The incidence was found to be 14.8% in Ile Ife<sup>5</sup> with a world wide range of 10-25%<sup>6</sup>. Tuboperitoneal disease accounts for 30-50% of those with infertility.

Reproductive tract infection particularly sexually transmitted diseases are leading preventable cause of infertility<sup>7</sup>. Chlamydia and Nisseria gonorrhoea poses special problem because they are frequently asymptomatic and therefore go untreated. Post partum and post abortal infections also may lead to pelvic inflammatory disease. These are special problems in our environment where most deliveries take place in unhygienic condition and unsafe abortion is common<sup>8-10</sup>. Endometriosis and previous surgery predispose to adhesion which is also associated with infertility. An important aspect of infertility evaluation therefore is assessment of tuboperitoneal pathology which laparoscopy and dye test has been found to be the gold standard.

In few centres in our environment, laparoscopy is offered as a first line investigation in the evaluation of infertile women. However, the vast majority only refer an infertile woman for laparoscopy when every other assistance has failed and the woman advanced in age. This may be because of non availability of the service in their centre or the doctors limited knowledge of the benefits of laparoscopic evaluation. Laparoscopy allows the gynaecologists to detect presence of pathologies such as adhesions, endometriosis, abnormalities of the uterus, ovaries and presence of small pelvic tumours which other basic tests may not confirm. The dye test assesses the tubal morphology and patency and localizes the site of tubal blockage.

Diagnostic laparoscopy is best performed by a reproductive specialist as surgical treatment can often be done during diagnostic evaluation. It will also help in the prognostication of the couple's infertility problem. Diagnostic Laparoscopy is traditionally done in operating theatre under general anaesthesia<sup>11</sup>. The procedure takes between 20 minutes to 30 minutes and the patients are usually discharged from the hospital the same day. The complications associated with

laparoscopy procedure include damage to other abdominopelvic organs. Unexpected conversion to open surgery is always a possibility although very uncommon. Like any other surgery it can also be complicated by anaesthetic problems and post operative infection<sup>12</sup>.

## SUBJECTS AND METHODS

In this review, the records of the women presenting with infertility who had diagnostic laparoscopy and dye test at Life Specialist Hospital Limited Nnewi Anambra state, Nigeria (a private fertility centre) over a five year period (Jan. 2002 to Dec. 2006) were analysed. Infertility of various durations was the main presenting complaint. A few presented with amenorrhoea and pelvic pain. All the patients had basic haematological investigations (including haemoglobin level, white blood cell count, platelet count, blood group) and Urinalysis.

The procedure was commonly done in the luteal phase because of the advantage of observing the ovaries for functionality. The single puncture technique (infra umbilical transverse incision) was used under general anaesthesia using ketamine hydrochloride. Carbondioxide was used to create pneumoperitoneum for most of the patients. Air was only used for some patients during our study on the use of air or when there was a stock out for carbondioxide. The same format of reporting laparoscopy findings was used for all the cases. All the procedures were done as a day case by the lead author and patients went home the same day.

Life specialist hospital limited is one of the few centres offering regular laparoscopic services in the southeast region of Nigeria. The clients are drawn from the 5 states of the southeast Nigeria namely Abia, Anambra, Ebonyi, Enugu and Imo including neighbouring towns like Asaba and Port Harcourt.

The data were entered into personal computer using SPSS (Version 11.0)<sup>13</sup> for analyses. Missing data was excluded from the analysis.

## RESULTS

Of the 253 laparoscopy cases reviewed 252 cases were primarily done for infertility and one was done for primary amenorrhoea and fertility evaluation. Among the cases evaluated 115(45%) had primary infertility, 137(54.5%) had secondary infertility and 1(0.4%) had primary amenorrhoea and infertility. The mean infertility period was 4.5 years with a range of 2-10years.

Table I shows the age and parity distribution of the women. The age range was 19-52 years and most of the patients 129 (51.1 %) were at their fourth decade of life. Majority of the women 168 (66.4%) were nulliparous.

Table I. Age and Parity distribution of the infertile women

Age	Frequency	Percent	Cumulative Percent
<20	1	0.4	0.4
20 - 29	67	26.5	26.9
30 - 39	129	51.0	77.9
40 - 49	54	21.3	99.2
≥50	1	0.4	99.6
Not recorded	1	0.4	100.0
Total	253	100.0	
Parity			
0	168	66.4	66.4
1 - 4	82	32.4	98.8
5 and above	3	1.2	100.0
Total	253	100.0	

Table II assesses the peritoneal status and the condition of the fallopian tubes and ovaries. Pelvic adhesion of varying degrees of severity was noted in 108 (42.7%) women, pelvic congestion in 4 (1.6%) and clean peritoneum in 141 (55.7%) of the women (see table IIa). Bilateral tubal blockage was found in 97(38.3%), unilateral tubal blockage in 56(22.1%) and bilateral spillage of dye (patent tubes) in 100(39.5%) women (see table IIb). Hydrosalpinx with or without tubal occlusion was present in 82 (32.4%) of the women. One or both ovaries were normal (functional) in 189 (74.7%) women as shown in table IIc. Altogether, only 43 (17.0%) women were normal (patent tubes, functional ovary and no pelvic adhesion).

Table IIa. Peritoneal status of the infertile women at laparoscopy

Peritoneal status	Frequency	Percent	Cumulative Percent
Adhesion present	108	42.7	42.7
No Adhesion	141	55.7	98.4
Pelvic congestion	4	1.6	100.0
Total	253	100.0	

Table IIb. Condition of the fallopian tubes at laparoscopy

Tubal patency	Frequency	Percent	Cumulative Percent
Patent Tubes	100	39.5	39.5
Bilateral occlusion	97	38.3	77.9
Unilateral occlusion	56	22.1	100.0
Total	253	100.0	

Table IIc. Condition of the ovaries at laparoscopy

Ovaries	Frequency	Percent	Cumulative Percent
Active (functional)	189	74.7	74.7
Non active (non functional)	50	19.8	94.5
Not visualised (covered by adhesions)	14	5.5	100.0
Total	253	100.0	

Further analyses in tables III, IV, V assesses the relationship between the peritoneal status, age and parity, and also the condition of the tubes and peritoneal status. Of the 108 women that had adhesions, 41(38.0%) had normal tubes, 29(26.8%) had unilateral tube blockage while 38(35.2%) had bilateral tubal blockage. There was significant occurrence of bilateral tubal occlusion in 58(41.1 %) of 141 women without pelvic

**Table III. Peritoneal status at laparoscopy in relation to the Tubal patency of the infertile women.**

Peritoneal status	Condition of the Tubes			Total
	Patent	Bilateral occlusion	Unilateral occlusion	
Adhesion present	41	38	29	108
No Adhesion	58	58	25	141
Pelvic congestion	1	1	24	4
Total	100	97	56	253

Pearson Chi-Square value is 4.850 (df= 4) Asymp. Sig. (2-sided) is 0.303  
Linear-by-linear Association value is 0.635 (df= 1) Asymp. Sig. (2-sided) is 0.426

**Table IV. Peritoneal status laparoscopy in relation to the age of the infertile women**

Peritoneal status	Age					Total
	< 20	20-29	30-39	40-49	≥50	
Adhesion present	0	22	61	24	0	107*
No Adhesion	1	43	67	29	1	141
Pelvic congestion	0	2	1	1	0	4
Total	1	67	129	54	1	252*

\*The age was not recorded in one woman.

Pearson Chi-Square value is 6.409 (df= 8) Asymp. Sig. (2-sided) is 0.601  
Linear-by-linear Association value is 1.962 (df= 1) Asymp. Sig. (2-sided) is 0.161

**Table V. Peritoneal status laparoscopy in relation to the parity of the infertile women**

Peritoneal status	Parity			Total
	0	1-4	5-10	
Adhesion present	69	38	1	108
No Adhesion	97	42	2	141
Pelvic congestion	2	2	0	4
Total	168	82	3	253

Pearson Chi-Square value is 1.497 (df= 4) Asymp. Sig. (2-sided) is 0.827  
Linear-by-linear Association value is 0.191 (df= 1) Asymp. Sig. (2-sided) is 0.662

adhesion. Bilateral tubal occlusion had the highest frequency among women of the age range 30-39 (54.0%) years and nulliparous women. Peritoneal adhesion occurred at equal frequency among women with primary and secondary infertility (table V). Altogether, only 43 (17.0%) women were "normal" (patent tubes, functional ovary and no pelvic adhesion).

At laparoscopy 142 (56.1%) women were found to have additional pelvic pathology as shown in table VI. The commonest additional finding was uterine fibroid (leiomyomata) of various sizes in 71(28.1%) of the women. This was followed by ovarian cyst 30(11.9%). Double uterus, Rudimentary uterus and ectopic pregnancy had same frequency of 1 (0.4%). Endometriosis was found in 8 (3.2%) women. Uterine fibroid coexisting with ovarian cyst was found in 26 (10.3 %) while uterine fibroid coexisting with endometriosis was found in 3 (1.2%) of the women. Only 16 (37.2%) of the 43 normal women had no additional pelvic pathology. Uterine fibroid was also the commonest additional pathology occurring in 18 (41.9%) of the 43 normal women (see table VII).

**Table VI. Additional pelvic pathology discovered at diagnostic laparoscopy in the infertile women.**

Additional pathology	Frequency	Percent	Cumulative Percent
None	111	43.9	43.9
Uterine Fibroid*	71	28.1	71.9
Ovarian cyst (unilateral)	30	11.9	83.8
Fibroid* & Ovarian cyst	26	10.3	94.1
Endometriosis	8	3.2	97.2
Fibroid & Endometriosis	3	1.2	98.4
Double uterus	1	0.4	98.8
Rudimentary Uterus**	1	0.4	99.2
Unruptured Ectopic pregnancy	1	0.4	99.6
Cervical Polyp	1	0.4	100
Total	253	100.0	

\* Asymptomatic and less than 16 weeks uterine size.

\*\* Patient with primary amenorrhoea.

**Table VII. Additional pelvic pathology discovered at diagnostic laparoscopy in the 43 "normal" women.**

Additional pathology	Frequency	Percent	Cumulative Percent
None	16	37.2	37.2
Uterine Fibroid*	14	32.6	69.8
Ovarian cyst (unilateral)	7	16.3	86.1
Fibroid* & Ovarian cyst	4	9.3	95.4
Endometriosis	2	4.6	100.0
Total	43	100.0	

\* Asymptomatic and less than 16 weeks uterine size.

## DISCUSSION

This study shows that tuboperitoneal factor is an important cause of infertility in our environment. The preponderance of bilateral tubal occlusion among those with primary infertility supports this assertion. The fact that secondary infertility is the commonest presentation is in keeping with previous finding in sub-Saharan Africa as against the western world where primary infertility is commoner<sup>14</sup>. Inappropriate or poor obstetric/gynaecological surgical practices, reproductive tract infection, post partum infection and unsafe abortion could be responsible for this finding.

The time of presentation for fertility evaluation is important because success from most assisted conception procedures is age related. The women in this review presented for laparoscopy evaluation at a mean duration of 4.5 years of infertility after other methods of evaluation like hysterosalpingogram, hydrotubation and sonohysterosalpingogram had failed. Also only one quarter presented before 30 years of age and another quarter after 40 years. There is therefore every need to educate our clients and care givers on the benefits of early laparoscopy evaluation since it has been shown that advanced age and long duration of infertility adversely affect treatment outcome especially for those who require assisted conception procedure<sup>15</sup>.

This study gives us a picture of 60% of women with affected fallopian tubes and 40% with normal fallopian tubes i.e. 40, 40, 20 (40% normal, 40% bilateral tubal



occlusion and 20% unilateral tubal occlusion). Also 74.7% of the women had normal functioning ovary/ovaries and only 17.0% of the women were "normal" (patent tubes, functional ovary and no pelvic adhesion). It supports the report that tubal factor is a major cause of female infertility. Laparoscopy and dye test when done by experienced/trained gynaecologist is a reliable tool for tubal/ovulatory/peritoneal factors assessment and is associated with minimal complications. This is our experience in this study which is similar to the experience of other workers<sup>16</sup>.

Uterine fibroid was the commonest additional pelvic pathology being present in 100 (39.5%) of the women. This is similar to the report from Shagamu in Nigeria<sup>7</sup> but differs from the study from Thailand<sup>17</sup>. Even among the 43 (17%) "normal" women who could be categorised as having unexplained infertility by virtue of having patent tubes, functioning ovary and no pelvic adhesion; 18 (41.9%) had uterine fibroid. This finding is similar to the report of our previous study on unexplained infertility<sup>18</sup>. The presence of the uterine fibroid could have contributed to their infertility, though this is still unresolved<sup>17,18</sup>.

The 4.4% incidence of endometriosis in this study highlights the growing concern on the contribution of endometriosis to infertility in our environment. Endometriosis is an important cause of chronic pelvic pain and subfertility in women and diagnosis in most practices in Nigeria is based on clinical features. This only picks the advanced cases where treatment outcome with reference to fertility is poor. This again is another indication for early laparoscopic evaluation of our infertile women.

## CONCLUSION

Laparoscopy is an invaluable diagnostic tool for evaluation of infertile women in communities like ours where the risk of tuboperitoneal factor is great and should be used early in their evaluation, when other treatment modalities like assisted reproduction could still be beneficial.

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