Lessons learned from infertility investigations in the public sector

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Objectives. To determine the main factors causing infertility in an urban, tertiary hospital population. To establish if any such major causal factor could be used to rationalise and improve the service for infertile couples in the public sector.

Design. A retrospective analysis of the hospital records of 206 women who had a tubal patency test (hysterosalpingogram) performed and the results of the investigations performed in the couples with infertility.

Results. Of the 206 women 38 (18.5%) had normal fallopian tubes on hysterosalpingogram; 33 (16%) had unilateral obstruction and 135 (65.5%) had bilateral tubal obstruction. Of the latter group 81 (60%) had significant hydrosalpinges.

Semen analysis results in 148 partners (71.8%) demonstrated a normal count in 85 (62%), normal motility in 70 (51%) and normal morphology in only 25 (18%). Testing for ovulation (mid-luteal phase progesterone) was positive in 91 of 124 women tested (73%).

Compliance, technical and logistical problems were encountered with both semen analysis and mid-luteal phase progesterone tests.

Conclusions. Infertility is a major problem in South Africa, with limited resources for investigation and treatment in the public sector. Tubal factor infertility was the most common cause of infertility demonstrated in this study.

In the presence of bilateral tubal obstruction with hydrosalpinges the prognosis is so poor that unless assisted reproductive techniques are available and affordable, further infertility investigations do not seem justified.

Recommendations on an approach to the infertile couple in the public sector is outlined.

S Afr Med J 2003; **93**: 141-143.

Infertility is a major problem in public sector hospitals in South Africa. At Johannesburg Hospital one in every five (20%) of all females attending the gynaecological outpatient department presents with infertility. In previous South African studies from Durban[1] and Cape Town[2] tubal factors causing infertility were identified in 77% and 57% of women respectively. In addition, male fertility was a factor in 21% and 36% of cases, while anovulation was a factor in 21% and 29% of women respectively. With the present financial and staffing constraints in the public health sector, infertility investigation and treatment is very limited and in some instances has been abandoned.

In this study we identified the causal factors of infertility in our population in an attempt to rationalise investigations and to develop a practical and reasonable approach to the infertile couple.

Patients and methods

This was a retrospective study of the hospital records of 206 women (and their partners where possible) who presented for infertility investigation at the Johannesburg Hospital gynaecological outpatient department in 1999. Only couples where the female was found to have no clinical abnormality and had had a hysterosalpingogram (HSG) performed were included in the study. The HSGs were performed by a registrar or trained medical officer together with a radiology registrar or consultant. Other investigations performed included cervical cytology, semen analysis, human immunodeficiency virus (HIV) testing after counselling and written consent, syphilis serology, rubella testing and a mid-luteal serum progesterone for evidence of ovulation.

The women (or their partners if attending) were given verbal instructions and a short information sheet explaining the details of semen specimen collection. Follow-up visits were scheduled for 3 months after the initial visit to evaluate the results.

Results

The women's ages ranged from 18 to 43 years (mean 27 years). Primary infertility occurred in 79 women (38.4%) and secondary infertility in 127 (61.6%).

HSG analysis

Of the 206 women who had HSGs, only 38 (18.5%) had normal fallopian tubes with bilateral spill of dye. In 135 women

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Table I. Hysterosalpingogram results (206 patients)

		Tubal pathology			
		Unilateral obstruction (*N* = 33, 16%)		Bilateral obstruction (*N* = 135, 65.5%)	
	Normal	Hydrosalpinges absent	Hydrosalpinges present	Hydrosalpinges absent	Hydrosalpinges present
Number	38	19	14	54	81
Percentage	18.5	9.2	6.8	26.2	39.3

(65.5%) bilateral tubal occlusion was present, with hydrosalpinges in 81. In 33 women (16%) unilateral occlusion was present, 14 with hydrosalpinges (Table I).

Semen analysis and ovulation testing

Semen analysis was performed on 148 partners (71.8%). Oligospermia was the least common abnormality (14.5%), motility was abnormal in 49% and morphology abnormal in 82% of specimens.

Mid-luteal progesterone assays were done on 124 women (60.2%). Over 70% had progesterone levels in the ovulation range.

Other tests

Although positive HIV testing was an exclusion criterion in the protocol, 5 women were HIV-positive (2.9%) and 36 (17.4%) were not tested for HIV.

Of 172 women tested for syphilis, 34 (19.7%) were positive. One hundred and ninety cervical cytology results were retrieved. Women with high-grade squamous intraepithelial lesions (SIL) (10 - 5.3%) were referred for treatment before continuing infertility investigations.

Of only 42 women who had rubella antibody testing performed 35 (83%) were rubella immune.

Discussion

Our results are similar to those previously reported in South Africa.[1,2] In those studies the predominant aetiological factor was tubal in 77% and 57% of women respectively. In our study 81.5% of women had tubal pathology and 65.5% had bilateral tubal obstruction with or without hydrosalpinges.

The HSG is a simple, cheap and reliable test for tubal patency, with a specificity and sensitivity of detecting tubal obstruction of 83% and 65% respectively.[3] The procedure is relatively painless (especially if local anaesthesia is used), and can be performed in 15 - 30 minutes, with a short learning curve enabling medical and nursing staff to be trained in a short period of time. The reliability of the HSG can be improved by continuous monitoring of the contrast medium flow during the procedure so as not to get a series of 'snapshots' of a dynamic event.[4] In a meta-analysis of 20 studies by Swart *et al.*[5] of the accuracy of HSGs in diagnosing tubal pathology they concluded that a high specificity makes HSG a useful test for diagnosing tubal obstruction but of less value in detecting tubal patency. De Muylder[6] has argued that in a developing world situation, the HSG is the test of choice for tubal status because it is quick, simple and reliable, with concordance with laparoscopic assessment of 85% for tubal pathology and 75% for detecting tubal abnormalities.

Hysterosalpingo-sonography with saline[7] or contrast medium[8,9] gives similar results to hysterosalpingography. The main limitation of this method is the cost of ultrasound equipment and the long learning curve to learn the procedure. Laparoscopic assessment of tubal status is the most reliable method but requires hospital admission and general anaesthesia, and the cost and expertise make it impractical and unaffordable in public sector hospitals.

Criteria for semen analysis in our study and in several centres in South Africa follow those of the Tygerberg group.[10] Although our study and previous South African studies[1,2] show semen problems as a major contributing factor to infertility, it is not a practical screening method to exclude couples from further infertility investigations. Compliance, technical and logistical problems in collection and delivery of samples were considerable. Mid-luteal phase progesterone measurements were also problematical in terms of attendance and timing of collection.

In our study a positive HIV test was an exclusion criterion. This is a difficult ethical problem and departments will have to draw up their own guidelines.

As a result of this study we have reached the following conclusions and recommendations for the investigation of couples with infertility in the public sector.

Conclusions

Infertility is a major problem in South Africa. Resources of cost and staffing are increasingly relegating the investigation and

treatment of infertility to a low priority in health care provision in the public sector. Investigations for infertility are time consuming for both patients and medical staff and are expensive. Women are more likely than their male partners to seek assistance, and although male infertility is an important factor in infertile couples[11] it is difficult to obtain suitable samples for semen analysis. Treatment is also difficult without assisted reproductive technology.[12]

Tubal pathology is very common, and was found in 81.5% of women in this study. The time, cost and expertise required to perform HSGs is minimal compared with laparoscopy.

Backup assisted reproduction is extremely limited or non-existent in the public sector.

Recommendations (in the public sector)

For the public service to be able to continue to offer a reasonable and affordable service to infertile couples, health care centres (regional and tertiary) should consider the following recommendations.

A dedicated infertility clinic should be held at regular intervals depending on the demand and staffing in the particular department. Women (and their partners where possible) should be seen on the morning of the clinic day most closely following their last menstrual period. A full clinical history and examination must be done and a cervical smear taken.

In clinically normal patients, counselling and rapid HIV and rapid plasma reagin (RPR) tests should be done immediately. If HIV-negative (depending on the protocol) the first dose of doxycycline, metronidazole and ciprofloxacin must be given (if there is a high prevalence of sexually transmitted infections (STIs) in the population). In the afternoon of the same day an experienced medical officer or registrar should perform the HSG (preferably with continuous imaging), with appropriate intermittent radiographs. The report of the findings must be written up at the time of the procedure. If unequivocal tubal obstruction with hydrosalpinges is present the couple must be counselled in detail regarding the problem and the prognosis thereof. If they wish to proceed with assisted reproduction, details of centres offering the service and a referral letter should be given to the couple. No further investigations are indicated, but counselling about alternatives such as adoption should be discussed and couples referred to appropriate health care workers.

If the HSG is equivocal with regard to tubal status, semen analysis and tests for ovulation should be performed and if normal, laparoscopic chromopertubation performed. If the HSG is normal then a full infertility workup should be performed.

In our clinic we have calculated that following these guidelines will reduce patient visits by over two-thirds and reduce the cost per couple investigated by more than half. Unless services for the infertile couple are rationalised and more widely offered, this major problem in the public sector will be marginalised in order to cope with other urgent priorities, to the detriment of a large section of our population.

This article forms part of a dissertation for the MMed degree awarded to Dr Stewart-Smythe by the University of the Witwatersrand.

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Accepted 23 July 2002.