

Aetiological Diagnosis of Infertility at Conakry University Hospital: Role of Hysterosalpingography and Pelvic Ultrasound

Diallo Mamadou^{1*}, Bah Ousmane Aminata¹, Sow Ibrahima Sory², Baldé Alpha Abdoulaye¹, Traoré Sekou¹, Diallo Fatoumata Binta², Tchaou Mazamaesso³, Sonhayé Lantam⁴, Agoda Koussema Lama-Kègdigoma⁴, Adjenou Victor⁴

¹Department of Radiology, Faculty of Health Sciences and Techniques, Gamal Abdel Nasser University, Conakry, Guinea

²Department of Gyneco-Obstetrics, Faculty of Health Sciences and Techniques, Gamal Abdel Nasser University, Conakry, Guinea

³Department of Radiology, Faculty of Medicine and Health Sciences, University of Kara, Kara, Togo

⁴Department of Radiology, Faculty of Medicine and Health Sciences, University of Kara, Lomé, Togo

Email: *mamadiallo126@yahoo.fr

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Abstract

Objective: The objective of this study was to investigate the etiologies of infertility and to determine the contribution of hysterosalpingography coupled with ultrasound in the exploration of female infertility at Donka University Hospital. **Methodology:** This was a prospective descriptive cross-sectional study carried out in the Radiology Department of Donka National Hospital over a period of ten (10) months. It involved 78 women who came to the department for hysterosalpingography and/or pelvic ultrasound examinations, as part of the exploration of infertility. Data collection involved the use of pre-established survey forms to gather information on the parameters studied. Sociodemographic parameters, ultrasound and hysterosalpingography results were studied. A correlation was made between age at marriage and infertility to determine whether early marriage has an impact on primary infertility, with a statically significant result for p value greater than 0.05. **Results:** The mean age of our patients was 33.7 ± 5.6 years, with extremes of 18 and 35 years. The 18 - 35 age group was the most represented, with a frequency of 80.7%. The 34% of our patients were married before the age of 18, with a marriage duration ranging from 6 months to 15 years. The indication for investigations was dominated by secondary infertility, with a frequency of 65%, followed by primary infertility (35%). All our women underwent ultrasound-hysterosalpingography, *i.e.* 100%, in search of the cause of infertility.

Ultrasound was pathological in 35.8%. The most common ultrasound lesions were myomas and ovarian dystrophies, with 12.8% each. However, hysterosalpingography was pathological in 35%. Tubal obstructions affected almost a third of our women (29.5%), followed by phimosis and tubo-peritoneal adhesions. **Conclusion:** Diagnostic evaluation of infertility requires a multidisciplinary approach, including collaboration between infertility gynecologists, radiologists and other infertility specialists. Medical imaging remains indispensable in the evaluation of female infertility.

Keywords

Infertility, Female, Etiology, Hysterosalpingography, Pelvic Ultrasound

1. Introduction

Infertility is defined as a couple's inability to procreate or carry a pregnancy to term after one year of regular unprotected intercourse [1] [2]. It is a frequent reason for consultation, affecting 10% to 20% of couples in France [2] and 10% to 15% of couples in the United States [1]. According to the WHO [2], the female infertility rate is 30% in sub-Saharan Africa. Infertility is a preoccupation for African couples, and deserves to be treated with care, as it is often the reason for divorce in Africa, and for psychological problems in the West [3].

In Cotonou, according to a study by S. Gandj et Coll [4], bilateral proximal tubal obstructions accounted for 19.35% of the causes of female infertility.

N'goran Kouamé et Coll [5] in Abidjan reported in their study of infertility that the causes were dominated by uterine pathology (50.3%), followed by tubal pathology (25.2%).

Medical imaging plays a vital role in the diagnosis of lesions of both the male and female reproductive tracts. At present, endoscopy (hysteroscopy and laparoscopy) and MRI are at the forefront of investigations into female infertility. In our countries, where resources are limited, hysterosalpingography (HSG) and ultrasound are still used as the only imaging methods available for the investigation of female infertility, and are considered to be of secondary importance [6].

At the end of this study, we'll have a clearer idea of the real problem faced by infertile couples, in the interest of guiding their treatment, in particular by exchanging information with prescribing physicians, and ensuring therapeutic follow-up if necessary. In addition, we will be making recommendations to the relevant authorities to provide the necessary resources, notably endoscopy, to restore tubal permeability. So, the aim of this study would be to investigate the true etiologies of female infertility using the resources available in our department.

2. Methodology

This was a prospective descriptive cross-sectional study carried out in the Radi-

ology Department of the Donka National Hospital over a period of ten (10) months. It involved 78 women who came to the department for hysterosalpingography and/or pelvic ultrasound examinations, as part of the exploration of infertility. Data collection involved the use of pre-established survey forms to gather information on the parameters studied.

Sociodemographic parameters and the results of ultrasound and hysterosalpingography were studied. A correlation was made between age at marriage and infertility to determine whether early marriage has an impact on primary infertility, with a statically significant result for p value greater than 0.05.

Ethical considerations: Consent was obtained from each woman before the survey form was sent to her. In accordance with the requirements of medical ethics, anonymity was requested with regard to the information collected from the women.

3. Result

The mean age of our patients was 33.7 ± 5.6 years, with extremes of 18 and 35 years. The 18 - 35 age group was the most represented, with a frequency of 80.7% (**Figure 1**). The 34% of our patients were married before the age of 18, with a marriage duration of between 6 months and 15 years (**Table 1**).

The indication for investigations was dominated by secondary infertility with a frequency of 53.84%, followed by primary infertility (46.16%).

Miscarriages were non-negligible with a frequency of 28.20% (n = 22 cases). More than half the patients had a history of gynaecological infections (n = 48 cases, 66.67%).

All women (100%) underwent hysterosalpingography coupled with ultrasonography in search of the cause of infertility.

Ultrasound was pathological in 35.8%. Among the lesions found were myomas and ovarian dystrophies with 12.8% each. Functional and organic ovarian cysts accounted for 19.28% (15 cases) and 15.33% (12 cases) respectively (**Table 2**).

Hysterosalpingography was pathological in 35% of cases, the most common lesions being unilateral and bilateral tubal obstructions (29.5%), followed by synechiae (n = 7 cases) (**Figure 2**) and phimosis (n = 6 cases) (**Figure 3**). Unilateral tubal obstructions were the most frequent with 17.9% (**Figure 4**).

Table 1. Distribution of patients according to age at marriage and miscarriage.

	Number	Pourcentage
Age of marriage		
<18	34	43.6 %
≥18	44	56.4.3 %
Miscarriage		
0	56	71.79
1	15	19.23
2	7	8.97

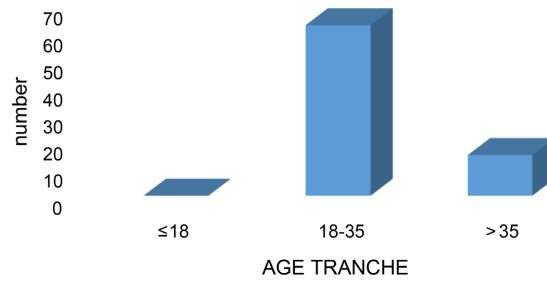


Figure 1. Patient distribution by age group.



Figure 2. Hysterosalpingography of a 30-year-old patient showing a right hydrosalpinx (→) and synechia (↪).

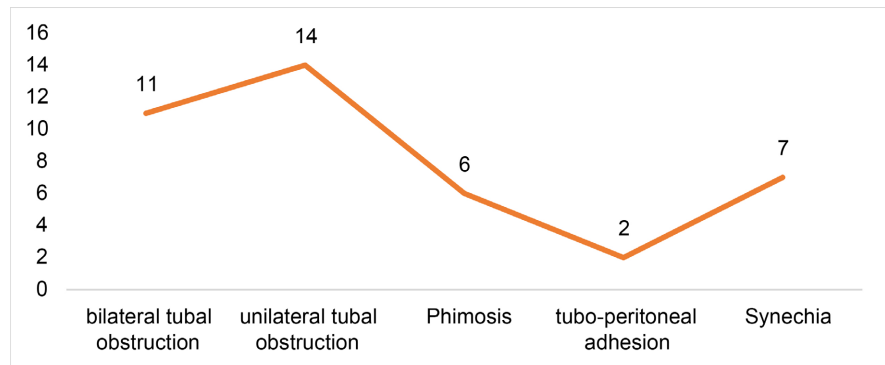


Figure 3. Distribution of patients according to hysterosalpingography results.



Figure 4. Hysterosalpingography of a 35-year-old female patient signalling fundic lacunar images (→) related to myomas associated with proximal left tubal obstruction (★).

The correlation between primary infertility and age at marriage was non-significant (p Value = 0.135) (**Table 3**).

4. Discussion

The majority of patients were young, 34% of whom were married before the age of 18. More than half of our patients had a history of genital infections. Miscarriage was not negligible, with a frequency of 28.20%.

The indication for investigations was dominated by secondary infertility (65%), followed by primary infertility (35%).

The strength of this study lies on two levels: firstly, the study approach, from the performance to the interpretation of the examinations, was carried out by the same radiologist. Secondly, once consent had been obtained from our patients, the necessary information was collected without intermediaries, thereby avoiding certain biases.

Ultrasound was first performed via the suprapubic approach, then completed by the endocavitary probe in the majority of cases. However, some patients refused the endocavitary probe, probably due to custom and lack of information. This could be a limitation of our study, given the precision that this examination could provide. Possible reasons for the results found could be explained by the small sample size.

The prevalence of infertility has been increasing over the past 30 years, mainly due to the late age of mothers at first pregnancy and the rise in sexually transmitted diseases [7]. This difference with our study can be explained by early marriage, a phenomenon that is difficult to curb because it is linked to the population's customs.

Until recently, the success rate of couples undergoing infertility tests was only

Table 2. Distribution of patients according to ultrasound result.

Ultrasound results	Résult	Pourcentage (%)
Ovarian dystrophy	10	12.82
Functional cyst	15	19.23
Organic cyst	12	15.38
Myoma	10	12.82

Table 3. Correlation between infertility and age at marriage.

	Primary infertility (+)	Primary infertility (-)
<18 ans	13	22
≥18 ans	23	20
	36	42

P value: 0.135.

50% - 60%. The evolution of technology, with a better understanding of reproductive physiology and the development of medically-assisted reproduction (MAP), has considerably increased some patients' hope of achieving pregnancy.

There are 2 categories of infertility: primary and secondary. Primary infertility is defined by the absence of any previous pregnancy, whereas in secondary infertility the couple has had a previous pregnancy.

The diagnostic work-up for both types of infertility is similar, involving questioning [7] and a thorough clinical examination.

The woman's age is an important factor, as fertility declines sharply after the age of 35, and is impossible after the age of 40 [8]. Prognosis also depends on the duration of infertility and additional medical factors.

The role of imaging varies according to the causes of female infertility.

Ultrasound plays a key role in the management of patients undergoing ovulation induction and in vitro fertilization.

Hysterosalpingography remains the main imaging modality for the fallopian tubes. It is used to assess both tubal architecture and patency [9] [10]. What's more, the literature has shown that fertility rates increase by 30% - 50% in the six months following hysterosalpingography. This could be due to the dispersion of small intra-luminal adhesions, or to the expulsion of mucous plugs by the contrast. It has even been postulated that contrast may have an immunological effect, or may stimulate tubal cilia activity [11]. The hystero-graphy was performed between J9-12. This was in line with the literature, and also enabled us to carry out the examinations before ovulation, thereby avoiding early pregnancies.

We used water-soluble contrast media for all our patients, as they are safer, provide better anatomical definition and are rapidly absorbed into the peritoneal cavity.

Factors predisposing to tubal infertility include septic abortion, post-partum infection, suppurative appendicitis, peritonitis of any cause and endometriosis.

According to S. Gandji *et al.* [4] in their Cotonou study, bilateral proximal tubal obstructions accounted for 19.35%. This difference with our results can be explained by the size of the study sample.

In Cotonou [4], the authors reported that the uterine lesions most frequently detected on HSG were uterine myomas in 71.4% of cases. This result, compared with our own, can be explained by the overly advanced age of the patients in their study.

Leiomyomas can interfere with reproduction, either by blocking the fallopian tube or cervical canal, or by impeding implantation. It should be noted that they are rarely the sole cause of infertility [12] [13]. Leiomyomas are classified according to their topography: submucosal, intradural or subserosal.

Hysterosalpingography cannot be used to evaluate intramural or subserous fibroids. The characteristic appearance of a submucosal leiomyoma on hystero-graphy is that of a regular, well-limited subtraction image protruding into the lumen of the endometrial cavity.

Ultrasound allows rapid detection of leiomyomas. Sonographic aspects include increased uterine volume, contour deformation and altered echostructure.

5. Conclusions

Diagnostic evaluation of infertility requires a multidisciplinary approach, including collaboration between infertility gynecologists, radiologists and other infertility specialists. Medical imaging remains indispensable in the evaluation of female infertility.

Hysterosalpingography is a basic examination for determining tubal permeability and the internal morphology of the uterine cavity and fallopian tubes. Ultrasound can be used to study the morphology of the internal genitalia and to monitor follicular development and guide follicular aspiration procedures.

MRI is not used in our study. However, it can be used in the pre-therapeutic assessment of leiomyomas, to distinguish leiomyoma-adenomyosis, to evaluate genital malformations and, above all, to detect and assess all aspects of endometriosis.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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