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Male Infertility, Its Aetiologic and Therapeutic Angle at the Luxembourg University Teaching Hospital, Bamako

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Abstract

Introduction: Infertility is defined as the inability to conceive a child after at least 12 months of normal, regular, complete and unprotected sexual intercourse. It affects around 180 million people worldwide. This study focuses on the aetiological and therapeutic aspects of male infertility at the Luxembourg University Teaching Hospital in Bamako. In order to avoid having fragmented results on infertility, we initiated this work. Methodology: This was a prospective cross-sectional study over a 12-month period (January 1st 2021 to December 31st 2021). The study was conducted in the Urology Department of the Luxembourg University Teaching Hospital of Bamako. It focused on men who consulted for childbearing during the study period. Results: The most represented age group was the 30 - 39 year olds at 56%, with merchants being the most represented at 32%. Primary infertility accounted for the majority of cases (72%) compared with 28% with secondary infertility. Smoking, exposure to pesticides and heat were the main risk factors. The main history of urogenital infection was urinary schistosomiasis (36%), followed by orchitis (28%). Varicocele was the main cause of occurrence and the sperm profile was that of oligoasthenoteratozoospermia.

Keywords

Infertility, Varicocele, Spermogram

1. Introduction

According to the World Health Organization (WHO), infertility is defined as the absence of conception after at least 12 months of normal, regular, complete and

unprotected sexual intercourse [1]. Infertility affects around 180 million people worldwide, and approximately one couple in six experiences primary or secondary infertility [2]. The infertility rate varies from country to country, ranging from 5% to 8% in developed countries and from 5.8% to 44.2% in developing countries [3]. In Africa, infertility affects between 25% and 40% of the population in Southern Sahara [3]. In Mali, a study has shown that men are responsible for 30% to 50% of the infertility rate. This study will focus on the etiological and therapeutic aspects of male infertility at the Luxembourg University Teaching Hospital in Bamako, Mali.

We initiated this study in order to obtain fragmented results on infertility.

2. Material and Methods

Our study took place in the urology department of the UTH of Luxembourg, located near the Prosper KAMARA high school in Hamdallaye in the 4th rural council of Bamako-Mali.

This was a prospective, descriptive, cross-sectional study. It covered a 12-month period from 1 January 2021 to 31 December 2021.

The study concerned men who had consulted a doctor about their desire to have a child during the study period. All patients who presented and signed a free and informed consent form were included in our study. Our study did not include patients whose medical records were incomplete, or who were consulted outside the study period or for other reasons.

Male infertility in our study was defined by the combination of:

1) The couple's failure to procreate for at least 12 months of normal, regular, complete and unprotected sexual intercourse.

2) The absence of major factors for female infertility, defined during gynaecological treatment and on the basis of at least two spermograms, the most recent of which was at least 3 months old.

A hormonal work-up, including serum levels of testosterone, FSH and LH, was carried out in all patients, in order to rule out hypogonadism as a cause of infertility, and a scrotal Doppler ultrasound was requested from all patients in order to identify permanent venous reflux and venous dilatation.

Evaluation of the results of treatment after at least three months was based on the spermogram, comparing pre- and post-treatment sperm parameters.

An infectious work-up was requested when clinical signs were suggestive.

Our data were collected using a pre-established individual survey form containing the variables and contact details for our study (see appendix), CIZAN software and CS Pro 7.3. Several variables were studied:

1) Socio-demographic parameters: age, marital status.

2) Clinical samples: consultation period after the marriage, sexual encounters per week, type of fertility, infectious cause, past medical history, elements of urogenital examination.

3) Biological and morphological samples: urogenital examination, spermo-

gram.

4) Type of surgery and becoming fertile.

We entered and analysed our data using SPSS Statistics 25, Excel and Word.

We conducted our study in strict compliance with the fundamental principles of medical research. We obtained ethical authorisation to carry out this work.

3. Results

We compiled a list of 1382 male patients, including 25 patients with a desire to have a child, that is 1.80% of all male patients.

Table 1. Distribution of patients by age group.

Age	Number of patients	Percentage (%)
[20 - 29]	3	12
[30 - 39]	14	56
[40 - 49]	8	32
Total	**25**	**100**

The mean age of the sample was 37, with extremes ranging from 20 to 49. The largest age group (Table 1) was 30 - 39 (14 patients, 56%), followed by 40 - 49 (8 patients, 36%).

Table 2. Distribution of patients by profession.

Profession	Number of patients	Percentage (%)
Shopkeeper	8	32
Teacher	6	24
Liberal profession	5	20
Engineer	2	8
Other*	4	16
Total	**25**	**100**

Note: *: Farmer, Imam, Computer expert, Policeman.

Shopkeepers were the most represented, with a prevalence of 32% (Table 2), followed by teachers (24%). The majority of our patients were monogamous (60%), followed by the polygamous (40%).

The majority of patients (72%) consulted their doctor after 5 years of married life, the remaining 28% consulted between 2 and 5 years. The frequency of 2 to 4 sexual encounters per week was majority, with a percentage of 68%. Primary infertility was the most common type of infertility (72%). Bilharzia was the most common history of urogenital infection (36%), followed by orchitis (28%). The majority of our patients had no medical history (80%). The most frequently mentioned medical history was peptic ulcer disease (16%). On urogenital examination,

a bilateral varicocele (Grade II) was found in 64% of patients, followed by unilateral left varicocele in 32%. Clinical and ultrasound causes appeared to be either isolated or associated. Varicocele was found in all our patients (100%). Testicular hypotrophy was demonstrated in 1 patient (4%), and this hypotrophy was on the left side.

Table 3. Distribution of patients according to preoperative and postoperative cytospermiological abnormalities.

	Preoperative spermogram		Postoperative spermogram	
	Number of patients	Percentage (%)	Number of patients	Percentage (%)
OAT	20	80	16	64
Azoospermia	2	8	2	8
OATN	1	4	1	4
Oligospermia	2	8		
Normospermia			6	24
Total	**25**	**100**	**25**	**100**

Note: OAT: Oligoasthénotératozoospermia, **OATN:** Oligoasthenoteratonécrozoospermia.

Oligoasthenoteratozoospermia (OAT) was found in 80% of the infertile male patients (Table 3). The MARMAR varicocele technique, the sub-inguinal approach, was used in all patients (100%). After surgical intervention, we found a normalization of the spermogram in 6 patients (24%) during an average follow-up of 3 months (Table 3).

At the end of our study, 1 of the 6 patients with normal spermogram (17%) was successful in having a child (Figure 1).

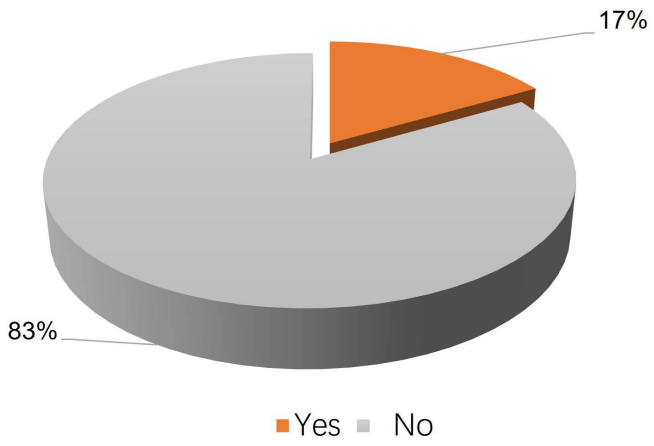

Figure 1. Number of pregnancies obtained.

4. Discussion

In terms of socio-demographic characteristics, the age group most represented

was 30 - 39 years, *i.e.* 56%, with extremes [from 20 to 49 years] and an average of 37 years. This predominance was also found by Traore M *et al.* [4]: 56.7%; Samake S [5] with 58% in Mali and Ouedraogo A.R *et al.* [5] with 50% in Burkina Faso.

Consultations for infertility in couples generally took place after marriage. This may be due to the fact that men only consult after a negative exploration of the women, generally after 3 years of living together. And they hope that they can have a child as long as their virility is genuine. On the other hand, most resort to traditional medicine before consulting a doctor. These results could explain why men are increasingly blaming themselves for the couple's infertility.

In terms of profession, shopkeepers were the most represented with a prevalence of 32%, followed by teachers with 26%. This result is lower than that of Samake S [5]: 52%, and higher than that of Kontao I [6]: 23%. This could be explained by their ability to finance the cost of analysis and their level of study and understanding of male infertility. Socio-economic problems in polygamous families and the high cost of living in urban areas such as Bamako mean that men are obliged to remain monogamous.

In our study, monogamy was the most common (60%), and primary infertility was present in 73% of monogamous patients. This result is lower than those of: Samake S [5]: 84%; Cisse IK [7]: 89% and Diarra F A [8]: 86.7%. These results could be explained by the fact that it is the young couples who consult the most and also the men's awareness of their share of responsibility in the couple's infertility.

We also found that 61% of our patients with primary infertility were between 30 and 39 years of age; similar to the case of Samake S [5]: 69%. This rate can be explained by the fact that marriages generally take place in urban areas between the ages of 30 and 39.

Bilharzia was the most common infectious antecedent in our study (36%). And 55% of patients with a history of bilharzia had a left varicocele. This result is lower than those of: Samake S [5]: 42%; Kontao I [6]: 44%; Diarra F [8]: 50%; Sissoko S B [9]: 44%. This high rate can be explained by the fact that most young people like to bathe in river or marsh water during the hot season. Urinary bilharziasis is a pandemic in Africa, but with mass treatment campaigns, the rate is tending to fall as part of the neglected tropical diseases programme.

In our study, 80% of patients had no medical history. This result is higher than those of Samake S [5]: 62% and Kontao I [6]: 56%. The most common pathology was gastric ulcer (16%). A study conducted by Huijgen *et al.* [10], over a period of 6 to 12 months, showed that antiulcer drugs such as cimetidine and proton pump inhibitors altered sperm quality.

In our study, varicocele was incriminated in all our patients. Testicular hypotrophy was found in 1 patient (4%), and this hypotrophy was more marked on the left than on the right. According to the literature, there is a correlation between the severity of the varicocele and the occurrence of testicular hypotrophy: up to 20% of grade 3 cases are accompanied by testicular atrophy [6].

This high rate may be explained by the fact that the frequency of this pathology

is increasing. It is found in 15% to 20% of the general male population, 35% of men with primary infertility, and over 70% with secondary infertility in a recent study published by the Andrology and Sexual Medicine Committee of the French Urology Association on the management of varicocele [7].

In 2007, Bah *et al.* [8] found that varicocele was the leading cause of male infertility, accounting for 16.24%. In the literature, it varies from 4% to 22% in the general population and from 10% to 44% in infertile men [9] [11]. Sakamoto *et al.* [12] reported a frequency of 49.30% in a population of 432 hypofertile men. Schill WB *et al.* [13] describe the anomalies most frequently found during the spermogram, with oligoasthenoteratozoospermia being the most frequent finding. This result is in line with the results found in our study.

The preoperative spermogram revealed oligoasthenoteratozoospermia in 80% of cases. This result is consistent with the literature, according to which the sperm profile of a patient with a varicocele most often corresponds to oligoasthenoteratozoospermia [13].

From a therapeutic point of view, it should be noted that great progress has been made in the treatment of varicocele over the last decade, from simple scrotal resection to other techniques: surgical, radiological and now laparoscopic [14]. However, all our patients were treated by conventional surgery, and the Marmar technique was the one used with 32% of short-term post-operative complications (wall infection and reactive hydrocele).

It has been used because of the better results compared with the high retroperitoneal approach [15].

It also allows surgery to be performed under local anaesthetic.

After surgical treatment, during an average follow-up of 3 months, we noted normalisation of sperm parameters in 6 patients (24%), 3 patients (12%) who remained stationary and 16 patients (64%) who improved. We also noted that among the 6 normospermic patients, 1 was lucky enough to have a child (17%). However, the results obtained are in line with numerous studies and meta-analyses published in the literature: In the recommendation of the Andrology and Sexual Medicine Committee of the French Urology Association concerning the management of varicocele, varicocele cure leads to an improvement in sperm parameters and recent data seem to confirm that it increases the rate of natural pregnancy. These results appear after 3 to 9 months [7]. A.B. Diallo noted a notable improvement in sperm quality in 67 patients, with normalisation of the spermogram in 33 out of a total of 113 patients after an average follow-up of 17 months in Conakry, Guinea [9].

From a therapeutic point of view, it should be noted that great progress has been made in the treatment of varicocele over the last decade, from simple scrotal resection to other techniques: surgical, radiological and now laparoscopic [14]. However, all our patients were cured by conventional surgery, and the Marmar technique was the one used with 32% of short-term post-operative complications (wall infection and reactive hydrocele).

It was used because of the better results compared with the high retroperitoneal approach [15].

It also allows surgery to be performed under local anaesthetic.

The limitations of this study remain its small size.

5. Conclusions

Varicocele is a pathology that is becoming more and more frequent in our daily practice and male infertility is the most frequent form of its manifestation.

The sperm profile in our study was that of oligoasthenoteratozoospermia.

Surgical cure of the varicocele significantly improves the sperm profile of our patients, and the MARMAR technique, a sub-inguinal approach, is the surgical technique used.

However, a study on a larger sample is required.

Conflicts of Interest

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

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