

Tubal Infertility at The Yaounde Gynaecological Endoscopic Surgery and Human Reproductive Research Teaching Hospital

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Abstract

Introduction: Tubal infertility affects 25% of infertile couples in Cameroon and is the leading cause of female infertility.

Methods: We carried out a case-control study at the Yaounde Gynaecological Endoscopic Surgery and Human Reproductive Research Teaching Hospital, from the period of March to May 2021. Women with tubal infertility were grouped as cases and women with no fertility problems were grouped as the controls. Data of interest were sociodemographic, reproductive, surgical, medical, paraclinical, and therapeutic. Chi-square and Fischer's exact tests were used to compare variables. Odds ratios were calculated to determine the association between variables. A p-value of less than 0.05 was considered significant. Logistic regression analysis was performed to eliminate confounding factors.

Results: Of the 205 patients recruited for the study, 67 had tubal infertility representing the cases and 138 with no fertility problems, representing the controls. After multivariate analysis and logistic regression, tubal infertility was associated in our study, with a history of sexually transmitted infections (aOR: 9.4; 95% CI [3.2-27.8]; $p < 0.001$) and ectopic pregnancy (aOR: 13.5 95% CI [1.9-91]; $p = 0.009$). The main diagnostic tools used were: hysterosalpingography alone (55.2%), hysterosalpingography followed by laparoscopy (40.3%). The main therapeutic approaches used were medically assisted reproduction (82.1%) and laparoscopic surgery (44.8%).

Conclusion: The independent risk factors for tubal infertility were a history of sexually transmitted infections and ectopic pregnancy. The diagnosis was mainly by hysterosalpingography. Treatment was mainly by medically assisted reproduction.

Keywords: Tubal infertility, Ectopic pregnancy, Hysterosalpingography, Laparoscopy, Medically assisted reproduction.

Introduction

More than 70 million couples suffer from infertility worldwide with fallopian tube abnormalities accounting for up to 40% [1]. The infertility rate ranges from 15% to 30% worldwide, in Africa, it has been previously reported that the burden of infertility is more among the low-income countries of sub-Saharan Africa and an infertility belt has been described extending from Angola to Sudan including countries like Cameroon, Gabon, Nigeria [2, 3].

Infertility is of particular concern in Africa because of the extent of the problem and the social stigma attached to it [4]. One in seven couples will consult a physician at least once for suspicion of infertility whereas one couple in 10 will consult for treatment of infertility [2]. In Cameroon, this prevalence has been underestimated because infertile patients do not readily seek medical attention for various reasons including lack of awareness or

knowledge, lack of resources as well as cultural and religious reasons [2, 5].

This lack of knowledge and awareness on infertility is mainly due to very few studies on the relationship between associated risk factors and tubal infertility as well as therapeutic modalities available on the management of infertility in our setting. The purpose of this study was to identify local determinants of tubal infertility to raise awareness, help in the prevention, and improve the identification of patients at risk and their management. We also sought to give the current trend regarding the therapeutic modalities available in our setting for its management.

Methodology

We carried out a hospital-based, unmatched, prospective case-control study at the Gynaecological Endoscopic Surgery and Human Reproductive Teaching Hospital (GESHRTH). Our

study extended over a period of 02 months. From March 09, 2021, to May 10, 2021. Sampling was consecutive and exhaustive after institutional authorization, and ethical committee approval to carry out the study. We had two groups of participants; patients with diagnosed tubal infertility were grouped as cases and patients with no past or present fertility issues were grouped as controls.

We included in our study, all female patients with diagnosed tubal infertility by HSG or laparoscopy, patients without any concern or prior treatment for infertility with prior informed consent to participate in the study. We excluded patients with other causes of infertility, patients with tubal sterilization as well as patients who did not consent to the study.

Data Collection

Data collection started by identifying patients diagnosed with tubal infertility at the GESHRTH as well as patients without any concern or prior treatment for infertility. Collection of data was done with the use of a pre-tested, validated datasheet by consulting the patients' records and interview (one on one or by telephone) if additional information was needed. Information pertaining to the socio demographic characteristics of the patients, reproductive health characteristics, surgical history, para-clinical data and treatment were recorded. The sample size was calculated from a pilot study. The minimum number of patients with tubal infertility needed was 54. One patient with tubal infertility was matched to 2 patients with no fertility problems, which gave a final sample size of 162 patients.

Statistical Analysis

The variables were compared using the Chi-Square and

Mann-Whitney tests. All factors potentially associated with tubal infertility were identified using bivariate logistic regression, all of which were adjusted for each other's effect in a multivariable logistic regression model. The significance of all the above tests was set at 5%.

Results

General characteristics of study population

A total of 205 patients were enrolled for the study, among them, 67 women had tubal infertility (cases), and 138 women who came for antenatal care, postpartum consultation, and routine gynaecologic consultation were enrolled in the control group. The age of participants ranged from 20 to 64 years. The mean age of the general population was 34.6 ± 8.5 years; 40.3 ± 9 years for cases and was 31.9 ± 6.7 years for controls. The most represented age group was [30-39] with 37.3% for the cases and 52.8% for the controls.

With regards to the cases, most of them were married (46.3%), self-employed (35.8%), had a previous pregnancy before the diagnosis of tubal infertility (76.1%), and mean duration of infertility of 10.5 years across the group.

Identifying risk factors for tubal infertility

Sociodemographic Characteristics

In our study, the age group [30-39] were more likely to have tubal infertility (OR=1.09, $p=0.001$). Self-employed women were 7.8 more times likely to have tubal infertility ($p<0.001$), as well as married women, were 2.1 times more likely to have tubal infertility. On the other hand, the age group [20-29] appeared to be protective to tubal infertility (OR=0.04, $p<0.001$) as shown in Table 1.

Table 1: sociodemographic characteristics associated to tubal infertility.

Variables	Cases N=67	Controls N=138	OR (95%CI)	p-value
Age groups (Years)				
[20-29]	8	55	0.04 (0.0-0.17)	<0.001*
[30-39]	25	73	1.09 (1.02-1.36)	<0.001*
[40-49]	23	7	0.89 (0.19-4.14)	0.888
50+	11	3	Ref	1
Profession				
Student	5	26	Ref	1
Civil servant	23	34	6.08 (1.68-23.4)	0.523
Private	9	33	1.41(0.42-4.74)	0.571
Self-employed	24	16	7.8 (2.47-24.6)	<0.001*
Housewife	6	29	1.07 (0.29-3.94)	0.912
Marital status				
Single	18	55	Ref	1
Cohabitation	17	35	1.48 (0.67-3.28)	0.325
Married	31	46	2.05 (1.02-4.14)	0.043*
Divorced	1	2	1.52 (0.13-17.8)	0.735
OR: odd ratio, N: number; CI: confidence interval.				

Reproductive health characteristics

The use of barrier contraceptives was found to be a protective factor against tubal infertility (OR=0.19), while a history of STI

was significantly increasing the risk of tubal infertility (OR=8.3, $p<0.001$). Chronic pelvic infection increases 2 times the risk for tubal infertility ($p=0.04$) as shown in Table 2.

Table 2: Reproductive health characteristics of participants.

Variables	Cases N=67(%)	Controls N=138(%)	OR (95%CI)	P-value
Age at 1st sexual intercourse (years)				
<16	2(13.3)	13(86.7)	0.36(0.75-1.79)	0.216
16-18	42(35.9)	75(64.1)	1.30(0.68-2.09)	0.393
19-21	23(31.5)	50(68.5)	Ref	1
Sexual Partner				
1	56(31.8)	120(68.2)	Ref	1
≥2	11(39.3)	17(60.7)	1.38 (0.60-3.15)	0.436
Barrier Contraception	8(12.1)	58(87.9)	0.19 (0.08-0.42)	<0.001*
Chronic pelvic pain	19(54.3)	16(45.7)	3.0 (1.4-6.4)	0.04*
History of STI	50(58.1)	36(41.9)	(4.3-16.4)	<0.001*
Induced abortion	29(42)	40(58)	9 (1.0-3.4)	0.43
OR: odd ratio, N: number; CI: confidence interval.				

Past medical and surgical characteristics associated with tubal infertility:

Women with a history of ectopic pregnancy and abdominal-pelvic surgery were 7.9 and 2.7 times more likely to have tubal

infertility respectively ($p < 0.001$).

Endometriosis and uterine fibroids were found to increase the risk of having tubal infertility by 6.4 and 4.5 times respectively ($p < 0.001$) as shown in Table 3.

Table 3: past medical and surgical characteristics associated to tubal infertility

Variables	Cases N=67(%)	Control N=138(%)	OR (95%CI)	P-value
Ectopic pregnancy	10 (76.9)	3 (23.1)	7.9(2.1-2.9)	<0.001*
Endometriosis	13 (72.2)	5 (2.7.8))	6.4 (2.2-18.9)	<0.001*
Uterine fibroids	38 (55.1)	138 (67.3)	4.5 (2.4-8.5)	<0.001*
Abdominal-pelvic surgery	37 (46.3)	43 (53.8)	2.7 (1.5-5.0)	0.001*
OR: odd ratio, N: number; CI: confidence interval.				

Multivariate Analysis

History of sexually transmitted infections and ectopic pregnancy were statistically significant with tubal infertility [aOR= 9.4, $p < 0.001$] and [aOR= 13.5, $p = 0.009$] respectively.

History of contraception use, as well as chronic pelvic pain and voluntary (induced) abortion, did not show any association with tubal infertility.

Diagnosis of lesions and diagnostic procedures:

A total of 55.2% (n=37) of the case group were diagnosed with tubal infertility with hysterosalpingography only, 40.3% (n=27) with both hysterosalpingography and laparoscopy, while 4.5% (n=3) with laparoscopy only. Hysterosalpingo contrast sonography was not used as a diagnostic procedure.

About 40.3% of cases had grade 4 tubal lesions, while 37.3% had grade 3 tubal lesions following MAGE tubal score. The most common tubal lesion was bilateral distal tubal obstruction with 44.8% (n=30), followed by unilateral distal tubal obstruction 23.9% (n=16) and bilateral proximal tubal obstruction 20.9% (n=14).

Adhesions were the most common finding with 32% of the associated findings, followed by endometriosis with 14.9%

Treatment Modalities

ART was used in 82.1% of cases, surgery in 44.8%, and expectant management in 4.5% of cases. Amongst the patients who had surgical treatment, 73% had a conservative surgery and 27% underwent radical surgery. Amongst women who had ART, 54.5% (n=30) had IVF/donation, 45.5% had IVF/ICSI. IVF/ET was not used.

Discussion

The role of sexually transmitted infections, as well as untreated STIs, in the genesis of fertility impairment, is a well-documented risk factor associated with tubal infertility [6-8]. Tubal damage or obstruction is often reported as a risk factor for ectopic pregnancy in literature as damages of the ciliated mucosa of tubes can impair the zygote journey to the uterus [9, 10]. However, infertility may be attributable to tubal damage resulting from previous ectopic pregnancy, ruptured or not, and its surgical treatment. Thus, there is an undeniable association between ectopic pregnancy and tubal factor infertility.

Endometriosis as a risk factor for tubal infertility can be explained by the fact that endometriosis is characterized by an oestrogen-dependent stroma and endometrial glands found predominantly, but not exclusively, in the pelvic compartment which further causes pelvic inflammation hence infertility.

Concurrent with data in literature that show an association be-

tween uterine fibroids and tubal infertility. Infertility can be explained by the mechanism of local compression or obstruction of the tubal ostium. Furthermore, a history of abdominopelvic surgery is significantly associated with tubal infertility and can be explained by the fact that the inflammatory process or infection after surgery may result in fibrosis and tubo-peritoneal adhesions. Amongst diagnostic options of tubal infertility, hysterosalpingography was most used concurrent with some authors. Many treatment options are possible but, in our setting, assisted reproductive techniques was most preferred contrary to those may use laparoscopy to increase fertility especially for patients with a history of abdomino-pelvic surgery. In fact, many patients opted for assisted reproductive technique to expect immediate conception [11, 12].

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