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Place of Selective Tubal Catheterization in the Management of Female Infertility in Togo

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Abstract

Objective: To determine the effectiveness of selective tubal catheterization in the management of female infertility due to proximal tubal obstruction. **Method:** This was a longitudinal descriptive study, conducted over a period of 24 months, which included 73 patients presenting with objectified bilateral proximal tubal obstruction after standard HSG. The intervention was performed on an outpatient basis, during the follicular phase with negative β-hCG assay the day before, in the interventional radiology room and under antibiotic coverage. Confirmatory hysterosalpingography was performed as the first step followed by selective tubal catheterization after the failure of spontaneous tubal opacification. The parameters studied related to socio-epidemiological, clinical and radiological data. **Results:** The age of our patients was between 24 and 42 years with an average of 33.97 years. The average duration of infertility was 3.95 years, with a predominance of primary infertility in 83.56% of cases. Voluntary termination of pregnancy (38.89%) and fibromyomas (33.33%) were the most represented gynecological-obstetrical antecedents. Selective tubal catheterization was successful in 92.14% of cases (129/140 tubes). It was possible bilaterally in 93.02% of cases and unilaterally in 6.98% of cases. The confirmatory HSG allowed a spontaneous opacification of 4.10% of the fallopian tubes. At the end of the procedure, all the recanalized tubes were opacified; 62.01% of them were normal, against 37.99% pathological with a preponderance of inflammatory tubes 26.61% followed by hydrosalpinx in 5.03% of cases. No major complications were encountered. The fertility rate was 23.29%. **Conclusion:** Selective tubal catheterization is a simple technique, without major complications with an efficiency close to natural fertility. It should be proposed as the first intention before any other procedure in the treatment of infertility by proximal tubal obstruction.

Keywords

Female Infertility, Selective Tubal Catheterization, Togo

1. Introduction

Infertility is the inability to achieve pregnancy in a woman with normal sexual activity, without any notion of contraception, for a period of one year [1]. It represents a real public health problem and spares no country in the world. In Africa, although underestimated due to the refusal of consultation for many patients who suffer from it, its prevalence seems to be increasingly high. In Togo, female infertility represents 12% of consultations [2]. Its consequences on the viability of the couple are enormous and women are the most indexed in most African societies. The causes of female infertility are dominated by tubal pathologies [3]. In 10% to 25% of cases, it is a proximal tubal obstruction, the management of which depends on the etiology [4]. In Africa south of the Sahara, selective salpingography has been proposed by some authors as the first-line therapeutic method [5]. It may or may not be followed by tubal catheterization, which is a now well-codified interventional radiology technique, aimed at evaluating proximal tubal obstructions revealed by conventional hysterosalpingography, and if necessary, attempting to repermeabilize the uninjected tubes. Tubal catheterization is therefore both a diagnostic and a therapeutic act, and is an effective part of the therapeutic regimen for tubal infertility [6] [7]. In the literature, reversal rates between 40% and 87% have been reported [8]. In France, 75% clearance was achieved in a study of 100 cases of proximal tubal obstruction A similar study in Mali recorded a 92.7% success rate for tubal reversal [9]. No publication has been found on selective tubal catheterization to date in Togo. However, since 2019 an interventional radiology table has been introduced there with the aim of contributing to the improvement of the management of this condition. The need for the present study was therefore necessary in order to determine the effectiveness of selective tubal catheterization in the management of female infertility by proximal tubal obstruction.

2. Methodology

Our longitudinal descriptive study was conducted over a period of 24 months, from June 2019 to May 2021. The study included 73 patients aged 42 years or less, presenting bilateral proximal tubal obstruction with a uterine cavity of normal morphology or partially deformed by uterine lesions (partial synechia or fibroid) observed on a standard HSG previously performed and dating from less than 06 months. It took place at the interventional radiology center of the "AUTEL d'ELIE" clinic, the only structure for the whole country. This center began its activities in Lomé in the Togolese capital in June 2019. It has a SHIMADZU brand CATH LAB interventional radiology device (**Figure 1(a)**), a

remote-controlled interventional table (Figure 1(a)), a scope, a control room (Figure 1(b)), an interpretation station with aInternet connection and a printer. The examination was scheduled between day 6 and day 12 of the last menstrual period with a negative β-hCG assay the day before. Diagnostic HSG was required to study uterine position and anatomy. Broad-spectrum antibiotic prophylaxis, such as cyclins, was started 48 hours before the procedure and continued 72 hours later. A vaginal toilet with Betadine was also prescribed 48 hours before the examination. The procedure, performed on an outpatient basis, did not require sedation.

Taking an antispasmodic was proposed just before the procedure, for analgesic purposes. The intervention took place in two stages: the first consisted in the realization of a HSG of confirmation which made it possible to confirm the PTO (proximal tubal obstruction) and to avoid unnecessary gestures; the second consisted of the actual catheterization. The specific equipment consisted of a 9F caliber carrier catheter, a 5F caliber pre-curved probe, a 3F caliber flexible mini probe and a flexible, ultra-thin 0.03-inch caliber micro-guide. The data were collected after a minimum follow-up of 3 months from the interrogation of the patients, reports of HSG and tubal unblocking carried out remotely from the preliminary HSG. The parameters studied related to socio-epidemiological, clinical and radiological data.

3. Results

The average age of our patients was 33.97% with extremes of 24 and 42 years. The age group of 26 to 30 years was the most represented (Table 1). The majority of patients (86.30%) were married women, the rest of the sample (13.70%) being single people living together. The average duration of infertility was 3.95 years, with a predominance of primary infertility in 83.56% of cases. Voluntary termination of pregnancy (38.89%) and myomas (33.33%) were the most represented gynecological-obstetrical antecedents (Table 2).

Standard hysterosalpingography was indicated in 98.63% of cases (n = 72) as part of an infertility assessment. It had objectified a homogeneous uterine cavity in 84.93% of cases (n = 62), fibroids and partial synechiae respectively in 12.33% and 2.73% of cases. The uterine contours were regular in 95.89% of cases (n = 70) and deformed in 4.11% of cases (n = 3). The tubal obstruction was bilateral in all cases. The HSG confirmation allowed a spontaneous opacification of 4.10% of the tubes. Selective tubal catheterization was successful in 92.14% of cases (129/140 tubes). It was possible bilaterally in 93.02% of cases and unilaterally in 6.98% of cases (Table 3). At the end of the procedure, all recanalized tubes were opacified (Figure 2); 62.01% of them were normal, against 37.99% pathological with a preponderance of inflammatory tubes (26.61%) followed by hydrosalpinx in 5.03% of cases (Table 4). Overall the intervention lasted an average of 38.31 min ± 6.06 min with extremes of 15 min and 56 min. The average radiation dose of the pelvis in our patients was estimated at 3.2 mGy.

No major complications were encountered (Table 5). Pregnancies were ob-

tained by 23.29% of our patients (n = 17). In 70.59% of them (n = 12), they occurred between 6 and 10 months after the unblocking, against 29.41% of cases between 1 and 5 months. The mean time to onset of pregnancy was 6.64 months ± 1.9 months with extremes of 3 and 10 months.

(a) (b)

Figure 1. (a) & (b) CATH LAB 2 interventional radiology device, control room.

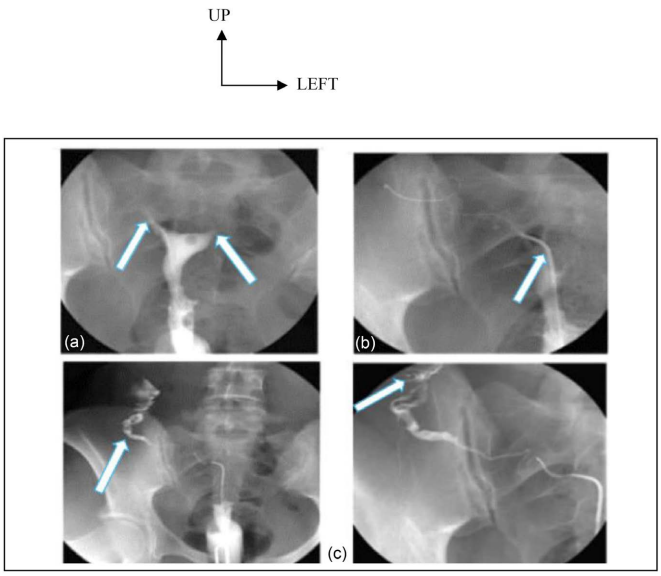

Figure 2. Right proximal tubal obstacle recanalized by tubal catheterization. (a) Bilateral PTO with confirmatory HSG; (b) Right tubal catheterization; (c) Right effective tubal opacification.

Table 1. Distribution of patients according to age groups.

	Effective	%
21 - 25	3	4.11
26 - 30	24	32.88
31 - 35	20	27.40
36 - 40	15	20.55
41 - 45	11	15.07
Total	**73**	**100**

Mean age = 33.97 years ± 5.23 years; Extremes: 24 and 42.

Table 2. Distribution of patients according to gyneco-obstetrical and surgical history.

	Effective	%
Gyneco-obstetric history	**18**	**100**
Abortion	7	38.89
Fibroids	6	33.33
Spontaneous abortion	4	22.22
Salpingitis	1	5.56
Surgical history	**7**	**100**
Myomectomy	6	85.71
C-sections	1	14.29

Table 3. Distribution of tubes according to results of tubal catheterization (n = 140 tubes).

	Pass		Fail	
	Effective	%	Effective	%
Bilateral	120	93.02	2	18.18
Right	6	4.66	3	27.27
Left	3	2.32	6	54.55
Total	**129**	**100**	**11**	**100**

Table 4. Distribution of the tubes according to their appearance after tubal catheterization.

	Effective	%
Normal tubes	80	62.01
Inflammatory tubes	37	28.70
Hydrosalpinx	7	5.42
Phimosis	5	3.87
Total	**129**	**100**

Table 5. Distribution of patients according to complications after catheterization.

	Effective	%
Complications (N = 69)		
Abdomino-pelvic pain	55	75.34
Vascular invasion	13	17.81
Post procedure bleeding	1	1.73

4. Discussion

Our study took place in a context marked by the recent start (less than 3 years) of the activities of the interventional radiology center of the "Autel d'Elie" clinic equipped with an adapted interventional table, the skills and the equipment ne-

cessary to the realization of a tubal unblocking. This justifies the choice of the study framework and allows our results to be representative of data from the general population. She was interested in tubal infertility, which is the main cause of sterility in Africa south of the Sahara [10] with all its known repercussions on marital stability. Given the small size of our sample, linked to the relatively short duration of recruitment in a practically nascent center, this study, which aims to be a pioneer in the field, has the merit of bringing new results to the scientific community on a practice less common in our black African context.

The patients concerned by our study were mostly married and on average in the third decade of life, as in most African series dealing with female infertility [11] [12]. The duration of infertility was long and approached 10 years in some patients. The primary type of infertility found in a dominant way seems to present a contrast with this previous result, insofar as the conception of a childless marriage remains unclear in African societies. At the same time, these data highlight, on the one hand, the endogenous beliefs that tend to victimize women in the absence of conception in our societies [13] and on the other hand, the use of traditional therapists due to the low purchasing power of patients faced with the high cost of laboratory tests and drugs in pharmacies, which lead to late consultations.

The antecedents of our patients were dominated by abortions, salpingitis and a notion of pelvic surgery. A set of phenomena could have been responsible for the obstruction of the tubes in some of them. Indeed, these past health conditions are identified as contributing to the installation of inflammatory processes in the pelvis, which have been reported as risk factors for infertility by tubal obstruction [14]. Gandji *et al.* reported that 46.4% of patients with secondary couple infertility had declared having voluntarily terminated their pregnancy at least once [12].

Our patients had in all cases, a hysterosalpingography performed mainly in the context of an initial consultation for the desire to conceive. In only one, hysterosalpingography had been performed for post-surgical control of hydrosalpinx previously diagnosed as well, in a follow-up process for the desire to conceive. This brings all of the indications for this examination in our study to female infertility as mentioned in the literature. Indeed, hysterosalpingography remains the main indication for exploring tubal pathology and permeability as part of the assessment of primary or secondary infertility [15]. However, it remains of interest during the exploration of certain uterine pathologies and also plays a role in the event of repeated miscarriages (isthmic open bite, malformation). Its formal contraindications in the face of the notion of genital infection and the possibility of early pregnancy, justifies the specific measures for the preparation of patients and the systematization of the dosage of b-HCG before tubal catheterization.

Confirmatory hysterosalpingography was the first step in tubal catheterization as conventionally reported in the technique. It revealed bilateral tubal obstruc-

tion in all our patients, irregular uterine contours with lesions dominated by synechiae and fibroids. The pressure of the contrast product allowed a spontaneous unblocking of 6 tubes, which revives the debate on the limits of hysterosalpingography in terms of detection of proximal tubal obstructions. False positives are attributed to it in proportions ranging from 15% to 32% in relation to the existence of mucous plugs but also cornual spasms caused by pain on injection of the contrast product [16] [17] [18].

The selective tubal catheterization itself constituted the second stage of the unblocking in our patients. It focused on the tubes not cleared spontaneously during the previous step and allowed a successful recanalization of 94.17% of the tubes. All the unobstructed tubes were opacified, thus making it possible to attest to the effective proximal unobstructing, to study the ampulla and to assess the quality of the peritoneal circulation. The entire procedure took an average of less than 39 minutes with an average radiation dose of 3.1 mGy.

The post-catheterization follow-up made it possible to record an occurrence of pregnancy in 23.29% of our patients within an average period of 6.64 months after the intervention. 70.59% of them became pregnant within a period of between 6 and 10 months after the unblocking against 29.41% of cases in which the pregnancy occurred between the first and the 5th month. In the literature, the pregnancy rate varies between 6% and 55% depending on the series with an average of 25%. This rate is close to that of natural fertility for a normal couple and also close to that obtained by medically assisted procreation (25%). It varies according to the patient selection criteria, the salpingographic aspects (pathological tubes or not), and the duration of patient follow-up after tubal recanalization.

Our data allow us to conclude that selective tubal catheterization has an objective and satisfactory therapeutic value. In a context where its indications are only shared with other techniques with subjective results such as hydrotubation, it remains the first-line treatment of infertility by proximal tubal obstruction. Admittedly, laparoscopy remains the "gold standard" in this area because of its therapeutic interest and the advantage it has of directly visualizing the tubes and adhesions [19] [20]. Although minimally invasive, the complications described to him [21] have led some authors to believe that selective tubal catheterization can be offered as first-line therapy after hysterosalpingography [22].

5. Conclusion

Selective tubal catheterization has improved fertility in patients with the onset of pregnancy in proportions close to natural fertility for a normal couple. This technique could therefore be popularized in Togo in order to improve female fertility.

Conflicts of Interest

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

References

[1] Collège National des Gynécologues et Obstétriciens Français (CNGOF) (2015) Item 37-UE 2: Stérilité du couple: Conduite de la 1ere consultation. 49 p.

[2] Sonhaye, L., Tchaou, M., Agoda-Koussema, L.K., Adjenou, K., Amadou, A., Adambounou, K., Ahonsou-Toussa, S. and N'dakena, K. (2011) Exploration de la stérilité tubaire par l'hystérosalpingographie à Lomé (Togo). *Journal de la Recherche Scientifique de l'Université de Lomé*, **13**, 75-80.

[3] Allahbadia, G. and Merchant, R. (2010) Fallopian Tube Recanalization: Lessons learnt and Future Challenges. *Women's Health*, **6**, 531-549. https://doi.org/10.2217/WHE.10.34

[4] Billet, P. and Ardaens, Y. (2017) Chapitre 12—Hystérosalpingographie et cathétérisme tubaire selectif. In: Ardaens, Y., *et al.*, Eds., *Echographie et imagerie pelvienne en pratique gynécologique*, Elsevier, Masson, 381-412.

[5] Ba, S.D., Badiane, M., Ba, A.A., Niang, E.H., Ba, A.L., Ba, A. and Agaïcha, A. (1999) La salpingographie sélective dans le traitement des infertilités par obstacle tubaire proximal: À propos de 122 cas traités à Dakar. *Cahiers d'Études et de Recherches Francophones/Santé*, **9**, 81-84.

[6] IRIS (2018) Cathétérisme tubaire: Principe de l'examen. Radiologie interventionnelle.

[7] Ajavon, Y., Seror, O., Amrane, H., Haddar, D., Poittevin, X., Dordea, M., Ghenassia, C., Coderc, E. and Sellier, N. (2004) Cathétérisme tubaire sélectif: Indications, Faisabilité et Précautions. *Journal de Radiologie*, **85**, 1338. https://doi.org/10.1016/S0221-0363(04)77096-1

[8] Garbin, O. and Faller, E. (2013) Chapitre 19—Catheterisme tubaire retrograde: Niveau de difficulte. In: Fernandez, H., Garbin, O. and Gervaise, A., Eds., *Hystéroscopie et Fertiloscopie*, Elsevier, Masson, 159-164. https://doi.org/10.1016/B978-2-294-71521-1.00019-8

[9] Bakayoko, C.O. (2009) Place du cathétérisme tubaire sélectif dans le traitement des stérilités par obstruction tubaire proximale. Thèse de'Médecine, Universite de Bamako, Bamako, 65-66.

[10] Fiadjoe, M.K., Adjenou, V., Kolani, J.C. and Egah, K.K. (2012) Les recommandations pour la pratique clinique du CNGOF. Infertilité tubaire en Afrique. CNGOF, 641-656.

[11] Nana, P.N., Wandji, J.C., Fumulu, J.N., Mbure, L., Leke, R.J.I. and Woubinwou, M.J. (2011) Aspects psycho-sociaux des patients infertiles à la maternité principale de l'Hôpital Central de Yaoundé, Cameroun. *Clinics in Mother and Child Health*, **8**, 1-5.

[12] Gandji, S., Adisso, S., Atrevi, N., Dougnon, T.V., Bankole, H.S., Hontonnou, F., Biaou, O. and Loko, F. (2013) Diagnostic des lésions étiologiques de l'infertilité secondaire à Cotonou: Rôle de l'hystérosalpingographie et de l'échographie pelvienne. *Journal of Applied Biosciences*, **68**, 5349-5355. https://doi.org/10.4314/jab.v68i0.95059

[13] Priso, E.B., Nguefack, C.T., Nguemgne, C., Njamen, T.N., Taila, W. and Banag, E. (2015) L'infertilité féminine à l'Hôpital Général de Douala: Aspects épidémiologiques et radiologiques (à propos de 658 cas). *Journal Africain d'Imagerie Médicale*, **2**, 16-23.

[14] He, X., Hou, G. and Jiang, H. (2009) A Case-Control Study on the Risk Factors of Female Infertility. *Chinese Journal of Epidemiology*, **30**, 352-355.

[15] Kehila, M., Hmid, R.B., Khedher, S.B., Mahjoub, S. and Channoufi, M.B. (2014) Con-

cordance et apports de l'hystérosalpingographie et de la cœlioscopie dans l'exploration tubaire et pelvienne en cas d'infertilité. *Pan African Medical Journal*, **17**, Article 126. https://doi.org/10.11604/pamj.2014.17.126.3567

[16] Maubon, A., Pouquet, M., Piver, P., Mazet, N., Viala-Trentini, M. and Rouanet, J.P. (2008) Imagerie de l'infertilité féminine. *Journal de Radiologie*, **89**, 172-183. https://doi.org/10.1016/S0221-0363(08)70391-3

[17] Canis, M., Mage, G., Pouly, J.L., Manhes, H., Wattiez, A. and Bruhat, M.A. (1991) Laparoscopic Distal Tuboplasty: Report of 87 Cases and a 4-Year Experience. *Fertility and Sterility*, **56**, 616-621. https://doi.org/10.1016/S0015-0282(16)54589-0

[18] Kalume, M.A.J. (2014) Techniques modernes d'exploration de l'infertilité tubo-pelvienne. *Kisangani Médical*, **5**, 59-65.

[19] Yazbeck, C., Le Tohic, A., Koskas, M. and Madelenat, P. (2010) Pour la pratique systématique d'une coelioscopie dans le biland'une infertilité. *Gynécologie Obstétrique & Fertilité*, **38**, 424-427. https://doi.org/10.1016/j.gyobfe.2010.04.015

[20] Diouf, A., Diallo, M., Ndiaye, M., Niass, A., Guèye, M., Tchindebe, G., Dia, A., Mbaye, M. and Diouf, A. (2021) Is Laparoscopy Still Necessary in the Management of Tubal Infertility? *Open Journal of Obstetrics and Gynecology*, **11**, 63-69. https://doi.org/10.4236/ojog.2021.112008

[21] Chapron, C., Pierre, F., Querleu, D. and Dubuisson, J.B. (2001) Complications of Gynecology Laparoscopy. *Gynécologie Obstétrique & Fertilité*, **29**, 605-612. https://doi.org/10.1016/S1297-9589(01)00193-X

[22] De Graef, M., Juhan, V., Kassem, Z., Guillon, R., Villeval, J., Maubon, A. and Rouanet, J.P. (2005) Hystérosalpingographie et cathétérisme sélectif des trompes. *EMC-Radiologie*, **2**, 43-75. https://doi.org/10.1016/j.emcrad.2004.07.002