Article original

Gyneco obstetrical outcomes after abdominal myomectomy in a Congolese setting population, in the Democratic Republic of the Congo

Devenir gynécologique et obstétrical après myomectomie dans une population congolaise, en République démocratique du Congo

Patrick Sendeke Mogwo[1], Justin Esimo Mboloko[1], Eloge Mbaya Ilunga[1], Arsène Lobota Mputu[1]

Auteur correspondant
Patrick Sendeke Mogwo, MD
Courriel: pmogwosen@gmail.com
Gyneco-obstetrical Department, University of Kinshasa, Democratic Republic of the Congo

Résumé

Contexte et objectifs. Bien que la myomectomie soit connue l'intervention la plus pratiquée en infertilité, les données sur son impact sur la conception sont fragmentaires. La présente étude avait pour objectif de décrire le profil clinique des patientes myomateux ayant consulté pour infertilité et le devenir post myomectomie. Méthodes. C'était une étude documentaire d'une série des patientes avec myome ayant subi une myomectomie aux Cliniques universitaires de Kinshasa et au Centre Médical Edith, entre janvier 1999 et décembre 2018. *Résultats.* La fréquence de myomectomie était de 45,4 %. Leur âge moyen était de 35,8 ± 5,3 ans. Après myomectomie, le taux de conception était de 16 % ; les primipares et les grandes multipares avaient 2 fois plus de chance de concevoir que les nullipares (OR 2,1 [IC 95% : 1,2 – 3,6] p=0,006) et (OR 1,5 [1,2 – 14,4] p=0,007). Comparée à celles qui n'avaient qu'un seul noyau, l'énucléation de 2, 3 et 4 à 10 noyaux conférerait une chance de conception respectivement de 5, 9 et 17 fois plus élevée (OR 5,1 [1,2 - 21,8] p = 0,025) (OR 9,2 [1,9 – 45,02] p = 0,006) (17,8 [4,7 - 66,7] p < 0,0001). Les patientes chez qui les noyaux avaient pesé entre 501 et 1000 grammes avaient 3 fois plus de chance de concevoir (OR 3,1 [1,8 – 5,3] p< 0,0001) que celles chez les myomes pesaient moins de 500 grammes. Les accouchements étaient réalisés par césarienne donnant des nouveau-nés vivants. *Conclusion*. La myomectomie améliore le taux de conception.

Mots-clés : Infertilité, Kinshasa, Myomectomie, Conception

Summary

Context and objectives. Although myomectomy is still the most frequent surgery for infertility, data on its impact on pregnancy rate is scarce in Kinshasa, Democratic Republic of Congo (DRC). The present study aimed to describe the clinical profile and the outcome of patients after myomectomy in the context of infertility.

Methods. This was a retrospective serial cases study including patients that sought care for infertility and underwent myomectomy at the Kinshasa University Hospital and Edith Medical Center from January 1999 to December 2018.

Results. The frequency of myomectomies was 45.47 %. The mean age of the patients was 35.84 ± 5.32 years; the majority (67.5 %) was nulliparous. No significant relationship was noted between the number and weight of myomas with age. After myomectomy, the rate of conception was 16%; primiparous and large multiparas were twice more likely to conceive than nulliparas (OR 2.1385 [CI 95%: 1.2477 - 3.6653] p = 0.006) and (OR 1.5833 [1.232 - 14.467] p = 0.007).

Compared to those with one myoma, the removal of 2, 3 and 4 to 10 myomas was associated with 5, 9 and 18 times more chance to conceive (OR 5.1929 [CI 95%: 1.2333 - 21.8652] p = 0.025) (OR 9.2499 [1.900 - 45.0237] p = 0.006) (17.8147 [4.753 - 66.7658] p < 0.0001 respectively. Patients for whom myoma weighed between 501 and 1000 grams were 3 times more likely to conceive (OR 3.1388 [95% CI: 1.8326 - 5.3760] p = 0.000) than those with less than 500 grams. Births at term were perfomed by cesarean section. Conclusion. Myomectomy improves the rate of conception.

Keywords: Infertility, Kinshasa, Myomectomy, Conception

Introduction

The influence of uterine leiomyomas (ULM) on reproduction has been established by several studies; they are present in up to 30% in patients consulting for infertility (1-2). Uterine myoma impacts the fertility by compression of genital tract causing the distortion of the cavity, tubal obstruction, abnormal myometrium contractility and impairment of endometrium vascularization that can cause myometrium atrophy, ulceration and diffuse inflammatory reaction. Therefore, it is implicated in implantation failure and pregnancy loss. In addition, obstetrical complications of uterine myoma also are well-known: spontaneous abortions, premature deliveries, abnormal presentation and placentation, postpartum hemorrhages and sepsis (3). For those reason, according to the location (FIGO's classification) and the size of uterine myomas, some patients need to be managed medically and others surgically, mainly by myomectomy, i.e. laparoscopic or abdominal myomectomy. Abdominal Myomectomy, which is a surgical procedure to remove one or more myomas from the uterus, is one of the most frequent surgeries for infertility patients (4), especially in Sub-Saharan setting, where uterine myoma is highly prevalent (5). Myomas are frequently numerous and of large size, requiring abdominal myomectomy as treatment of choice. Uterine myomas are the most frequent gynecological tumors in the world in general, even more so in black women (1). Myomectomy increases clinical pregnancy rate by up to 68 % in previously infertile patients (6). Some studies such as that by Sangha et *al.* in America (Detroit) found that regardless of the technique used, myomectomy enabled a quarter of infertile patients to have a child (7). In Europe (France), Rakotomahenina et *al.* had found from 85 patients operated on for myomectomy, 40 (47%) became pregnant and 33 (38.8%) gave birth to a live newborn (8). In Asia (Korea), Kim et *al.* reported 16 % of infertile patients achieved pregnancy and had alive newborns (9).

carried their pregnancies and delivered at term (11).

However, some complications are associated with myomectomy during, per and post-surgery, namely: hemorrhagic shock, lesions of surrounding organs, synechiae, pelvic adhesions and death of the patients. In our setting, the frequency of those complications climbed up to 41.74 % (12).

Despite the importance of myoma in our area in regard of the evolution of the diagnosis equipment and protocols of management, little is known on the outcome of patients after myomectomy in the context of infertility in Kinshasa, Democratic Republic of Congo (DRC). The objectives of the present study were to describe clinical profile of patients who had undergone myomectomies for infertility care, and to determine the impact of myomectomy on pregnancy rate.

Methods

Nature, setting and Period

This was an analytic retrospective serial case study including the patients that sought care for infertility and undergone abdominal myomectomy in the Kinshasa University Hospital and Edith Medical Center from January 1999 to December 2018.

Sampling and selection criteria

Our sampling was exhaustive, consisting of 537 records of patients who underwent myomectomy during the study period. All files were for patients followed for infertility and operated on for myomes.

Variables of interest

Variables of interest were anamnestic and socio demographic (age of patients, parity, type and duration of infertility, medico-chirurgical history), clinical (BMI), paraclinical characteristics (Ultrasound, Hysterosalpingography and endometrium biopsies findings), number and weight of myomas, gynecological (getting pregnancy and lost pregnancies) and obstetrical (deliveries) outcomes.

In Senegal, during a period of 26 months, among the 79 patients operated on for myomas with desire to conceive, Niang et *al.* had found that 19 of them (25 %) were pregnant and 84.6 % delivered by cesarean section (10). In Gabon, Bang et *al.* had found that for a total of 67 cases of myomectomy

Statistical analyses

The Data were recorded in Microsoft Access® 2000 software and analyzed by Stata / IC 15.1 software. Quantitative variables were summarized as mean and standard deviation, and qualitative variables as proportion with their confidence intervals.

Pearson's Chi-Square Test was used for comparison of proportions and Logistic Regression to determine the strength of association between different variables.

The test was considered statistically significant for p-value less than 0.05.

The files were treated confidentially and the data base was accessible only to the research team.

Results

From a total of 5,975 patients who sought care for infertility, 1,181 (19.7 %) had a myomatous uterus among which 537 (45.47 %) had undergone abdominal myomectomy.

General characteristics of patients

Anamnestic, socio demographic, clinical and paraclinical characteristics of the patients were described on table 1.

The average age was 35.84 ± 5.32 years with extremes of 22 to 50 years. Half of them (50.85%) were above 35 years old.

The majority of patients were nulliparous (67 %).

The mean duration of infertility was 6.18 ± 1.29 years and 3/4 (73 %) of patients consulted after 3 to 5 years.

Eighteen percent (17.33 %) had undergone myomectomy in the past.

The average BMI was 27.35 ± 4.40kg/m²; most patients were overweight (47.06 %).

Ultrasound confirmed the presence of myomas and HSG revealed tubal obstruction in 37.76 % of patients.

Based on endometrium biopsy, 23.09 % of patients had an offset endometrium.

Table 1. Socio demographic, clinical and paraclinical characteristics of the patients

Variables	N	%	Mean± DS	Min	Max
Age/year (n=533)			35.84 ± 5.32	22	50
20 – 24	5	0.94			
25 – 29	88	16.51			
30 – 34	169	31.71			
35 – 39	165	30.96			
≥ 40	106	19.88			
Parity (n=521)				0	5
Nulliparous	352	67.56			
Primiparous	103	19.77			
Pauciparous	47	8.96			
Multiparous	19	3.65			
Duration of infertility/ years (n=412)			6.18 ± 1.29	1	25
1	48	11.65			
2	64	15.53			
3 – 5	151	36.65			
6 – 25	149	36.17			
History (n=525)					
Nothing	268	51.05			
Appendicectomy	76	14.48			
Kystectomy	18	3.43			
Appendicectomy and Kystectomy	47	8.95			
Myomectomy	91	17.33			
Abdominal emergencies	6	1.14			
Cesarian Section	7	1.33			
Synechia Cure	12	2.29			
BMI (Kg/m²) (n=272)			27.35 ± 4.40	16.33	33
< 18.5	4	1.59			
18.5 – 24.9	88	32.47			
25 – 29.9	132	48.38			
30 – 34.9	48	17.56			
Ultrasound (n=537)					
Myoma	537	100			
Hysterosalpingography (n=535)					
Normal	104	19.44			
Bilateral Tubal Obstruction	146	27.29			
Unilateral Tubal Obstruction	56	10.47			
Pelvic Adhesions	7	1.31			
Synichae	13	2.43			
Endometriosis suspicion	34	6.36			
Undone	175	32.71			
NOVAK (n=524)					
Compatible Secretory Endometrium	59	11.26			
Offset Endometrium	121	23.09			
Proliferative Endometrium	19	3.63			
Endometritis	10	1.91			
Undone	315	60.11			

Characteristics of myomas

Characteristics of myomatous were described on table 2. The average number of myomas was 8.10±3.64 years; the majority of patients (64.62%) had more than 4 myomas. The weight of all the myomas removed during myomectomy ranged from 100 to 3200 grams

with an average of 790.50 ± 59.89 grams. For ten percent (9.64%) of the patients, myomas weighed more than 1000 grams.

Table 2. Characteristics of myomatous

Variables	n	%	Mean ± DS	Min	Max
Number (n=237)			8.10±3.64	1	45
1	41	17.47			
2	28	11.79			
3	15	6.11			
4 – 7	46	19.21			
8 – 10	23	9.61			
11 – 15	49	20.53			
16 – 45	35	15.28			
Weight (grams) (n=529)			790.50 ± 59.89	100	3200
100 – 500	387	73.16			
501 – 1000	91	17.20			
1001 – 1500	39	7.37			
1501 – 3200	12	2.27			

Gyneco obstetrical outcomes after myomectomy

After myomectomy, 88 patients out of 537 (16.39 %) became pregnant of whom 65 gave birth (73%); the chance to conceive was reduced by ninety-five times for the patients above 41 years (OR 0.0588 [95% CI: 0.0075-0.4565] p = 0.007). Compared to nulliparous, the ones who had delivered at least once and grand-multiparous were twice more likely to conceive (OR 2.1385 [95% CI: 1.2477 - 3.6653] p = 0.006) (OR 1.5833 [95% CI: 1.232 - 14.467] p = 0.007).

Compared to the patients with one myoma, the ones from whom 2 myomas were extracted were 5 times more likely to conceive (OR 5.1929 [95% CI: 1.2333 - 21.8652] p = 0.025), those with 3 had 9 times (OR 9.2499 [95% CI: 1.900 - 45.0237] p = 0.006) and those with 4 to 10 nuclei had 18 times (17.8147 [95% CI: 4.753 - 66.7658] p = 0.000) (17.8147 [95% CI: 4.1728 – 76. 547] p < 0.0001).

Patients whose myomas weighed between 501 to 1000 grams had 3 times more chances to conceive than the ones with less than 500 grams (OR 3.1388 [95% CI: 1.8326 – 5.3760] p < 0.0001) (table 3).

Table 3. Association between clinical characteristics and myomas in univariate analysis

Variables	OR	IC 95 %	P
Age (years)			
20 – 24	1		
25 – 29	0.4999	0.0783 – 3.1898	0.463
30 – 34	0.3107	0.0496 – 1.9434	0.211
35 – 39	0.3333	0.0533 – 2.0829	0.240
≥40	0.0588	0.0075 – 0.4565	0.007
Parity			
Nulliparous	1		
Primiparous	2.1385	1.2477 – 3.6653	0.006
Pauciparous	1.9791	0.9140 – 4.285	0.083
Multiparous	1.1875	0.3334 – 4.2290	0.791
Grand-Multiparous	1.5833	1.232 – 14.467	0.007
Number of enucleated myomas			
1	1		
2	5.1929	1.2333 – 21.8652	0.025
3	9.2499	1.900 – 45.0237	0.006
4 – 7	17.8147	4.753 – 66.7658	0.000
8 – 10	17.8147	4.1728 – 76. 547	0.000
11 – 15	2.9210	0.7327 – 11.6438	0.129
16 – 45	3.6543	0.8863 – 15.0670	0.073
Weight (grams)			
<500	1		
501 – 1000	3.1388	1.8326 – 5.3760	0.000
1001 – 1500	2.1187	0.9483 – 4.7337	0.067
1501 – 3200	0.6420	0.1046 – 0.1915	0.675

Factors associated with conception following myomectomy in multivariate analysis

In multivariate analysis, after adjustment for other variables, primiparous and pauciparous had 4 times more chances to conceive (adjusted OR 4.3397 [95% CI: 1.4649 - 12.8562] p = 0.008) (aOR 4.0567 [95% CI %: 1.0896 - 15.1025] p = 0.037) than nulliparas; and those for whom myomectomy had removed between 2 and 3 myomas were respectively 7 times and 22 times more likely to conceive (aOR 7.3684 [95% CI: 1.0758 - 50.4663] p = 0.042) (aOR 22.0110 [95% CI: 3.9837 - 121.6149] p < 0.0001) (table 4).

Table 4. Variables associated with design in multivariate analysis.

Variables	Adjusted OR	IC 95 %	P
Age (years)			
< 25	1		
25 – 29	1.5132	0.1660 – 1.37941	0.713
30 – 34	1.2304	0.1623 – 9.3279	0.841
35 – 39	0.7228	0.8737 – 5.9793	0.763
≥40	0.07649	0.0056 – 1.0268	0.052
Parity			
Nulliparous	1		
Primiparous	4.3397	1.4649 – 12.8562	0.008

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Pauciparous	4.0567	1.0896 – 15.1025	0.037
Multiparous	10.8421	0.8941 – 131.4618	0.061
Grand-multiparous	11.1616	0.3784 – 329.1918	0.162
BMI			
Overweight	0.4929	0.1967 – 1.2349	0.131
Obesity	0.6391	0.1994 – 2.0476	0.451
Surgery story			
Appendicectomy	0.9770	0.3468 – 2.7526	0.965
Kystectomy	1.7437	0.6208 – 4.8976	0.291
Myomectomy	0.5133	0.1287 – 2.0473	0.345
Number of myomas			
1	4.0058	0.6094 – 26.3323	0.149
2	7.3684	1.0758 – 50.4663	0.042
3	22.0110	3.9837 – 121.6149	0.000
≥4	4.4179	0.9261 – 21.0746	0.062
Weight of myoma			
501 – 1000	1.1411	0.4448 – 2.9276	0.784
1001 – 1500	0.8025	0.2235 – 2.8806	0.736

Outcome of pregnancy with BMI and characteristics of myomas
According to association between the BMI, the number and the weight of myomas, there were no significant associations (table 5).

Table 5. Pregnancy outcome with BMI and characteristics of myomas

Outcome	Abortion	Normal delivery	C/S with live newborns	Maternal Death	Ectopic Pregnacy	Uterine Rupture	p
BMI							0.793
Smalless	0.00	0.00	0.00	0.00	0.00	0.00	
Normal	11.54	26.92	46.15	15.38	0.00	0.00	
Overweight	12.50	30.00	45.00	5.00	2.50	5.00	
Obesity	10.00	30.00	60.00	0.00	0.00	0.00	
Myoma's Number							0.778
1 (n=2)	0.00	50.00	50.00	0.00	0.00	0.00	
2 (n=6)	33.33	50.00	16.67	0.00	0.00	0.00	
3 (n=6)	16.67	50.00	33.33	0.00	0.00	0.00	
4 (n=24)	0.00	33.33	62.50	0.00	0.00	4.17	
>4 (n=29)	6.90	27.59	55.17	3.45	3.45	3.45	
Myoma's Weight							0.424
1 – 500 (n=43)	16.28	32.56	39.53	6.98	2.33	2.33	
501 – 1000 (n=26)	7.69	30.77	57.69	3.85	0.00	0.00	
1001 – 1500 (n=8)	0.00	25.00	50.00	15.50	0.00	12.5	
1501 – 3200 (n=1)	100.00	0.00	0.00	0.00	0.00	0.00	

Discussion

Epidemiological aspects of myomectomy

In the current study, a fifth of patients (19.7 %) who sought care for infertility had a myomatous uterus; the frequency of myomectomies among women treated for infertility was estimated at 45.4 %. Average age was 35.84 ± 5.32 years with a half over 35 years. These findings are consistent with those in the same area by Ingala et *al* (13), and Mboloko et *al.* (11). The mean time elapsed before the consultation was 6.18 ± 1.29 years. These results are similar to those by Bang and *al* who found an average duration of infertility of 7.9 ± 2.9 years (9) and Niang with an average of 6 years (8).

ULM is a more frequent pathology among infertile and elderly patients. The relatively advanced age of our patients is justified by the long preparation for life, delayed marriage, delayed consultations and after seeking care to traditional care providers before consulting gynecologists. This may explain the gradual increase over time, of the average age of infertile patients in our environment (14).

Furthermore, myomectomy is a more frequent surgery among infertile women in subSaharan environment. Niang and *al.* (10) had found a myomectomy frequency of 58.8% with an average age of 37.2 years and duration of infertility of 6 years, Bang and *al.* (9) in Gabon a frequency of 66.3% and an average age of 34 years. Zhang et *al.* in China found a mean age of 30 ± 3.7 years (15) and Kikelomo and *al.* a mean age of 34.3 ± 5 years in Nigeria (16).

Clinical and paraclinical aspects

The operated patients had an average BMI of 27.35 ± 4.40 Kg / m². Therefore, the majority of patients were overweight and obese. Findings of Mboloko showed that the mean BMI of patients getting pregnant after infertility management without Assisted Reproductive Technology in a Low-Income Setting was 25.23 ± 4.3 and Obesity was more frequent; in comparison with the normoweighted group, the rate of conception was low in thinness category and decreased with the BMI above 30 kg/m^2 (17).

Paraclinical investigations of the patients had shown that in 49 % of patients, there were HSG abnormalities including tubal obstructions in 37.61 % of cases and the diagnosis of infection made in 10% of cases. This is in accordance with findings of Roux and Niang, respectively 42 and 44.4% of tubal obstructions (4, 8). As for the diagnosis of infections, Niang et *al.* found *Gardnerella vaginalis* and *Candida albicans* in 67 % of patients (8).

Myomectomy

During the myomectomy, 35% of the patients had more than 10 myomatous nuclei and 10% of the patients had myomas weighed more than 1,000 grams. This is in accordance with the known statement that the black sub-Saharan or African American people are more susceptible to grow myomas of high number and weight (1). Therefore, laparotomy for myomectomy is the first approach with its consequences in terms of long hospital stay and pre- and post-operative complications (17).

During the present study, nearly 6% of patients had presented complications, the most frequent of which were eventration (47%) followed by infection (43%) including parietal infection, pelvi peritonitis, adnexitis, infectious toxic, shock and hemoperitoneum; death occurred in 3% of cases.

Kikelomo et *al.* in Nigeria found that hemoperitoneum was the major complication in 28.8% (16). This confirms the reputation of myomectomy as being an operation punctuated by serious complications (18).

A significant association was noted between complications and myoma weights, in particular between eventration and myomas of weight varying between 501 and 1000 grams.

Within the limits of our results, we cannot explain them. However, in the contingency table, there are several cells with less than 5 statistical units, which affect the validity of this result.

Conception after myomectomy and pregnancy outcome

After myomectomy, 16 % of patients had conceived of whom 73 % gave birth. This is higher than the rate of Mboloko et *al.* in 2019 (9 %) in the same environment (19), but lower than that found by Roux (20%) in Paris (4), than that of Rakotomahenina (47.05 %) in Bordeaux in 2016 (6), than that of Zhang (50.3%) in Shanghai in

2012 (15). According Cassini ML (2006), myomectomy improves conception rates (20).

In the current study, most of patients were aged from 20 to 45 years. In comparison with younger patients (20 - 24 years), the patients over 41 had only 5% the chance to conceive after myomectomy. Furthermore, primiparous and multiparous had 4 times more chance to conceive than nulliparous after myomectomy. This indicates that having already given birth gave a better chance of conception after myomectomy in patients seeking care for infertility (6).

Removing two to 10 myomas was associated with a high chance of conception compared to one myoma. Normally, myomectomy for single, myoma means that it was too large and distorts the anatomy of uterus and its environment (uterus, tubes and ovaries). Likewise, for a number greater than 10 myomas, the risk of adhesions formation is great. This could explain the reduction in fertility in these situations.

Our study showed that almost half (45 %) had given birth by caesarean section with the main indications being a scarred uterus followed by placenta praevia. This cesarean section rate is similar to that found by Kim et *al.* (7) in Korea in 2013 and Rakotomahenina in France (6) but higher than that of Zhang (15).

The scarred uterus as the main indication was consistent with the current medicine protocols, to avoid any uterus rupture risk during childbirth.

Strenghts and weaknesses

1. Strengths

Our study is the first in our field to describe the future state of patients operated on for myoma in the context of infertility; The sample size and the study period allowed us to extend the understanding of the problem.
2. Weaknesses

This is a descriptive study that is observational.

Conclusion

The current study found that myomectomy is the most common surgical procedure for infertility patients, which are elderly, obese and consulting late. Removing myoma improves pregnancy rate. Post operative complications can occur at any time. The delivery being preferentially by caesarean section was performed for scarred uterus.

Conflict of interest
Authors declared they have no conflict of interest
Contribution for authors
Conception, drafted, performed statistical analysis, revised the paper: PSM, JEM
Collected data, interpreted results and revised the paper: EMI, ALM
All authors read and approved the final and revised version of the manuscript.

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