

Spontaneous Fertility after Myomectomy for Pregnancy Desire in Reference University Maternities of Benin from 2016 to 2020: Contributing Factors and Pregnancies Outcome

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ABSTRACT

Introduction: Spontaneous fertility after myomectomy for pregnancy desire remains a concern.

Objective : Appreciate spontaneous fertility after a myomectomy for pregnancy desire.

Methods: This was a descriptive and analytical study to collect retrospective data on cases of myomectomy pregnancy desire realised between 2016 and 2020 in the university maternity wards of Cotonou. All myomectomy records for desire for pregnancy were identified. The post myomectomy fertility related data and the clinical characteristics influencing the occurrence of pregnancy and its outcome after myomectomy were analyzed with regard to the rules of professional conduct and ethics.

Results: On 188 myomectomies performed for desire of pregnancy, 102 had been analyzed. The mean age was 34 years \pm 5.7. Nulligest and nulliparous were the most numerous in the respective proportions of 39.2% and 71.6%, and 16.7% (n=17) had a history of polymyomectomy. Fertility after myomectomy was observed in 16.7% (n=17) of cases. The mean time to return to fertility (pregnancy) after myomectomy was 27 months. Alcohol addiction (p=0.00), gestality (p=0.01), myoma size (p=0.00) and adenomyosis (p=0.00) had an negative impact on the time to onset pregnancy after myomectomy. Of 17 pregnancies recorded after myomectomy, 11 (64.7%) progressed normally with term delivery and 5 spontaneous abortions (29.4%) were recorded. One (1) pregnancy was ongoing at the time of the survey. Planned caesarean section (n=9) was the most frequent mode of delivery. Eleven (11) newborns were welcomed and the diaper suites were simple.

Conclusion: Spontaneous fertility after myomectomy remains low in our series. Factors with a negative impact on fertility must be taken into account.

Keywords

Myomas, Myomectomies, Fertility, Pregnancy, Cotonou.

Introduction

According to the World Health Organization (WHO), infertility is a real public health problem throughout the world in general and particularly in Africa, because of its high frequency and its consequences both on the couple concerned. than on the family and society [1].

It affects approximately 15% of couples worldwide, i.e. 48.5 millions [2]. In developed countries, the prevalence of couple infertility is about 10% [3]. In 2008, it concerned 24% of couples in France [4], whereas the rates recorded in developing countries are much higher. Despite the high fertility rate, sub-Saharan Africa records a frequency of infertility varying between 15 and 30% [2]. The highest frequencies were recorded in Cameroon and Nigeria in the respective proportions of 30% and 30.3% [5].

The consequences of infertility are numerous and sometimes dramatic. For the African, infertility is a tragedy because having children is the *raison d'être* of marriage [6]. Childless women face discrimination, stigma, ostracism, stress, isolation, physical and mental abuse. In Mali it is a social drama, the first cause of marital disagreement or divorce, infertility is considered a fatality, a fate or a curse inflicted on it. According to Marta Bornstein in Malawi in 2020, infertile women were perceived as “the incapable”, “useless” [1].

From the etiological point of view, the causes of couple infertility are numerous and can relate to both the man and the woman. Sometimes they are of mixed origin. In 21.36% of infertility cases, both sexes were affected, while 10.4% of infertility causes were unexplained. The cumulative prevalence of the most frequently reported causes of male infertility was 31% (oligospermia), 19.39% (asthenozoospermia) and 19.2% (varicocele). The most frequently identified causes of female infertility were pelvic inflammatory disease, tubal factors and abortion with a cumulative prevalence of 39.38%, 39.17% and 36.41% respectively and uterine obstructions particularly myomas [7].

Myomas are the most common tumors of the female genital tract. They affect 20–25% of women of childbearing age and are 3–9 times more common in black women than in white women [8]. These myomas are most often sources of several morbid states and infertility by reducing the potential for egg implantation in the uterine mucosa. Myomas occur in different parts of the uterus and can vary in size and shape. It is estimated that myomas are present in 5 to 10% of women suffering from subfertility, and may be solely responsible for impaired fertility in 2 to 3% of cases [3]. In developing countries the treatment of myomas is dominated by myomectomy. This myomectomy can be performed by open surgery (laparotomy) or hysteroscopic surgery depending on the location and size of the fibroid [9]. Myomectomy is one of the most common gynecological procedures [10]. In Lomé its prevalence was 60% in 2012 [11] and 53.65% in Abidjan in 2013 [12].

In search of the effectiveness of myomectomy for the desire for pregnancy, we have more to analyze the spontaneous fertility post myomectomy performed by laparotomy in two university maternities of Cotonou from 2016 to 2020.

Patients and Study Methods

This was a descriptive and analytical study with retrospective data collection on cases of myomectomy performed between January 2016 and December 2020 in the two national reference university maternity wards in Cotonou, Benin. These were the University Hospital Center for Mother and Child Lagune (CHU-MEL) and the University Clinic of Gynecology-Obstetrics (CUGO) of the National University Hospital Center – Hubert Koutoukou Maga (CNHU-HKM) of Cotonou.

The target population consisted of women followed for infertility in the context of uterine myomas whose original date remains the date on which the myomectomy was performed, then the date of the latest news was July 31, 2021. The source population consisted of records of women operated on for infertility.

The patient inclusion criteria were:

- myomectomy performed in the context of the couple's infertility
- patient having performed hysterosalpingography before myomectomy
- the husband's spermogram had been carried out.
- histology of the surgical specimen confirming the leiomyoma

The non-inclusion criteria were:

- Record of women followed for infertility who had not had myomectomies
- Files of women having benefited from a myomectomy whose husband's spermogram had not been carried out
- Cases of myomectomies converted to hysterectomies
- Folder of postmenopausal women

The exclusion criteria were :

- Records of lost patients

Sampling was non-probability with a systematic inventory of all files meeting the selection criteria. It was not necessary to calculate a sample size. The files were analyzed according to the pre-established and previously validated sheet.

All the patients whose records were retained were contacted by telephone for additional information.

The variables studied were:

- Dependent variables: fertility
- Independent variables were: the socio-demographic and clinical characteristics of the patients and of the myomas operated on, the approach to the myomectomy, the postoperative course, the data relating to conception after the myomectomy, the evolution of the pregnancy, prenatal follow-up and obstetric outcome. Data analysis was done using EpiData 3.1 and SPSS 25 software.

Ethical considerations

The various authorizations were obtained before the start of this study. Verbal consent from patients was obtained

Results

Fertility rate at 60 months after myomectomy

Of 188 myomectomies performed for desire of pregnancy, 102 (54.3%) met the inclusion criteria. Only 17 (16.7%) pregnancies were recorded 60 months after myomectomy.

Patient Characteristics

Sociodemographic and obstetrical characteristics of patients

The average age of the patients was 34 with extremes of 25 and 45 years and $\pm 5,7$ ans 52% were over 35 years old.

On the whole, 80.4% (n=82) had a gainful occupation and they were in couple in 66.7% (n=68) of the cases.

The nulliparous were the most numerous in the proportion of 71.6%.

Table 1 presents the characteristics of the patients

Table 1: Sociodemographic and obstetrical characteristics of patients.

Characteristics	Number (n=102)	Percentage (%)
Age (years)		
< 25	04	3.9
25 – 34	45	44.1
35 – 44	50	49.0
≥ 45	03	2.9
Earning tenure status		
Yes	82	80.4
No	20	19.6
Marital status		
In a relationship with	68	66.7
Divorcee	01	1.0
Single	33	32.4
Parity		
Nulliparous	73	71.6
Primiparous	22	21.6
Pauciparous	7	6.9
Multipara	33	32.4

Clinical characteristics of patients

The desire for pregnancy was the circumstance of discovery of the myomatous uterus in 97.1% (n=89).

The patients had reported no complaint in consultation other than the desire for pregnancy in 78.4% (n=80) of the cases and in the event of a complaint, metrorrhagia was the most frequent symptom in 11.8% (n=12).

The size of the uterus was comparable to a pregnancy of 4 to 6 months in 21.6% (n=38) and all the uteri were polomyomatous. The nuclei were submucosal in 12.7% (n=13) and other position (\geq type 1 FIGO) in 86.3% (n=89).

At least one sign of complication was noted in 45% (n=46) of the patients. Metrorrhagia on myomas were the most frequent complications in a proportion of 22.5% (n=23) (Table 2).

Table 2: Distribution of patients according to clinical characteristics.

Clinical features	Number (n=102)	Percentage (%)
Circumstances of discovery		
Exploration of pregnancy desire	72	70.6
Exploration of abortion disease	27	26.5
Menstrual disorders	02	2.0
Other	01	1.0
Symptoms of uterine myoma		
Any	80	78.4
Metrorrhagia	12	11.8
Pelvic pain	08	07.8
Limb disorders	01	01.0
Uterine size (cm)		
0-15	55	71.6
16-24	38	21.6
Number of nuclei on ultrasound		
< 10	67	65.7
10 – 19	24	23.5
20 – 29	07	6.9
30 – 39	03	2.9
40 – 49	01	1.0
Seat of myomas		
Sub mucosal	13	12.7
Intra-mural or interstitial	14	13.7
sub serous	12	11.8
Hybrid	58	56.9
Blood count results		
Anemia	76	74.5
Normal	26	25.5
Complications of myomas		
Necrobiosis	09	8.8
Metrorrhagia	23	22.5
Compression	02	1.9
Pain	11	10.8
No complications	56	54.9

Prenatal follow-up after myomectomy and pregnancy outcome

The 16.7% (n=17) of pregnancies obtained in our series were of spontaneous conception and followed by an obstetrician-gynecologist.

It had been recorded 5 abortions (29.5%) and 12 pregnancies (70.5%) of normal evolution with a term delivery for 11 pregnancies. The mean term at delivery was 37 SA and 5 days. Caesarean section was the most common delivery route (9/11) after myomectomy and excellent adaptation to extrauterine life (APGAR 9-10-10) was noted regardless of the delivery route.

Table 3 illustrates prenatal follow-up and pregnancy outcomes.

Factors associated with the onset of pregnancy after myomectomy

Influence of age and dietary habits on the occurrence of pregnancy after myomectomy

The factor that could influence the onset of pregnancy after myomectomy was alcohol consumption (p=0.004).

The patient's age at the time of the myomectomy did not influence the onset of pregnancy (p=0.299).

Table 3: Prenatal follow-up and pregnancy outcome.

Characteristics	Effective	Percentage
Conception of pregnancies after myomectomy		
Spontaneous	17	17/17
LDCs	00	00
Evolution of pregnancies after myomectomy		
Abortion	05	5/17
In progress	01	1/17
Eventually	11	11/17
Prenatal follow-up		
Obstetrician gynecologist	12	12/12
SFE	00	00/12
Pathologies detected during pregnancy		
Urinary tract infection	01	1/17
Other	00	00
Term at delivery (SA)		
28 (in progress)	1	1/12
37	2	2/12
37 +4D	2	2/12
37 +5J	1	1/12
38	5	5/12
38 +3D	1	1/12
Childbirth		
caesarean section	9	9/11
low way	2	2/11
APGAR 9-10-10	11	11/11

Table 4 shows the influence of age and dietary habits on the occurrence of pregnancy after myomectomy.

Table 4: Influence of age and dietary habits on the occurrence of pregnancy after myomectomy.

Influence of age and dietary habits on the occurrence of pregnancy after myomectomy			
	Mean (CI~95%)	Median (95% CI~)	P value
Age			
< 25	20.8 (5.37-36.13)	13(7.12-18.88)	
25 – 34	25.60 (19.89-31.32)	21(11.71-30.29)	0.299
35 – 44	29.58 (24.59-34.57)	25(20.01-29.99)	
≥ 45	17 (5.19-28.81)	12(8.8-15.2)	
Tobacco			
No	27.11 (23.51-30.71)	22(19.1-24.9)	
Yes	25(-)	-	0.765
Alcohol			
No	14.13 (10.53-17.73)	12(9.23-14.77)	0.004*
Yes	28.37 (24.59-32.16)	24(20.89-27.11)	

Influence of obstetric history and the characteristics of operated myomas on the occurrence of pregnancy

Gestation influenced the onset of pregnancy after myomectomy ($p=0.01$).

The number of nuclei did not influence the occurrence of pregnancy ($p = 0.288$) but rather the size of the myomatous nucleus. Myomas measuring between 11-20cm were more likely to become pregnant within 60 months after myomectomy ($p=0.000\%$)

Table 4 shows the influence of obstetrical history and the characteristics of operated myomas on the occurrence of pregnancy.

Table 4: Influence of obstetric history and characteristics of operated myomas on the onset of pregnancy.

Influence of obstetrical history and the characteristics of operated myomas on the occurrence of pregnancy			
	Mean (CI~95%)	Median (95% CI~)	P value
Gesture			
Nulligest	23.16 (18.02-28.3)	19 (9.22-28.78)	
Primigest	25.51 (18.55-32.47)	22 (12.44-31.56)	0.010*
Paucigeste	35.94 (29.03-42.85)	29 (20.91-37.09)	
Multigesture	16.33 (10.37-22.29)	11 (0-24.2)	
Number of cores			
< 10	25.79 (21.16-30.41)	22(17.9-26.1)	
10 – 19	30.86 (24.18-37.55)	27(21.04-32.96)	0.288
20 – 29	21 (6.29-35.71)	11(0.2-21.8)	
≥ 30	26.14 (12.03-40.26)	21(3.04-38.96)	
Core size (cm)			
[0.5-10]	27.67(23.11-32.22)	23(20.04-25.96)	
[11-20]	28.24(22.18-34.29)	24(17.11-30.89)	0.000*
[21-30]	9.5(6.91-12.09)	8(5.06-10.94)	
Myoma seat			
Sub mucosal	27.5(19.88-35.12)	24(20.65-27.35)	
Intramural/interstitial	29.64(19.66-39.63)	29(16.04-41.96)	0.957
sub serous	26.99(17.58-36.4)	26(13.94-38.06)	
Hybrid	26.98(21.92-32.04)	21(15.56-26.44)	

Influence of post myomectomy complications on the occurrence of pregnancy

Most post myomectomy complications had no influence on the probability of pregnancy occurring in the 60 months following this intervention ($p > 0.5$). Adenomyosis influenced the occurrence of pregnancy after myomectomy ($p = 0.000$)

Table 5 shows the influence of post myomectomy complications on the occurrence of pregnancy.

Table 5: Influence of post myomectomy complications on the occurrence of pregnancy

Influence of post myomectomy complications on the occurrence of pregnancy			
	Mean (CI~95%)	Median (95% CI~)	P-value
Cavity breach			
No	28.17(23.71-32.62)	24(19.12-28.89)	
Yes	24.61(18.85-30.36)	21(14.72-27.28)	0.444
Hemorrhage			
No	26.26 (22.72-29.81)	22(19.19-24.81)	
Yes	37(18.18-55.82)	35(0-81.81)	0.401
Adenomyosis			
No	9.3(7.7-10.9)	10(6.88-13.12)	0.000*
Yes	27.86(24.23-31.48)	24(20.59-27.42)	
Cystectomy			
No	27.82(24.02-31.61)	23(19.99-26.02)	
Yes	20.44(10.76-30.13)	13(4.24-21.77)	0.143
Adhesiolysis			
No	28.35(24.05-32.65)	23(18.95-27.06)	
Yes	23.84(17.55-30.13)	21(9.58-32.42)	0.271

Discussion

Sociodemographic and clinical characteristics of patients

The average age of the patients in our series was 34 with extremes of 25 and 45 years and $\pm 5,7$ ans 52% were over 35 years old. Lönnerfors, C. et al. [13] noted 35 years in their series with extremes of 28 and 42 years. According to the series of Zhang Y. et al. in northern Europe [14], the average age was 30.0 ± 3.7 years. This age group is that of most patients wishing to have offspring before the high-risk pregnancy age of around 36 years. Meseret J. et al. in 2021 in Addis Ababa, Ethiopia had shown that women aged over 35 were 0.31 times less likely to become pregnant after surgery than those aged 20 to 25 [15]. Our population like that of Lönnerfors, C. et al. had an average age of 35 years. Most of the patients in Africa south of the Sahara have traditional medicine as their first recourse when faced with the couple's infertility, which would explain the average age of recourse to modern medicine which is advanced in our series compared to that of Zhang Y et al. in Northern Europe [14].

Fertility rate after myomectomy

The fertility rate after myomectomy in our study was 16.7%. This rate remains lower than that of Meseret J. et al. in 2021 which found 52.2% in Addis Ababa in Ethiopia [15]. Roux et al. [12] in France in 2011 had found 20% pregnancy spontaneously, Niang et al. [16] in Senegal in 2018 had found 25% (n=19) Bang N. et al. [17] in Gabon in 2009 obtained 21.8% (n=22) after myomectomy. Lönnerfors, C. et al in 2011 in Scandinavia in Northern Europe [13] found a 68% fertility rate after myomectomy. This difference is explained by the fact that it is a mixture of spontaneous pregnancies and those obtained by medically assisted procreation and the operating technique for myomas was not the same. We used laparotomy in our series whereas Lönnerfors, C. et al. [13] had used a mixed technique (laparoscopy and laparotomy). The multifactorial nature of infertility could explain this difference in the fertility rate between the different series.

The time to conception after myomectomy in our series was between 10 and 60 months and seemed long compared to that found by Bang N. al. [16] in Gabon in 2009 and Niang et al. [17] in Senegal in 2018 who had found 22.9 ± 11 months, 7 months, 16 months and 18 months respectively.

Outcome of pregnancies conceived after myomectomy

During the study period, 17 pregnancies were recorded after myomectomy including 5 spontaneous abortions in the first trimester (29.4%) of pregnancy. A total of 11 pregnancies (64.7%) had progressed normally with delivery at term and 1 (one) pregnancy was in progress (5.9%) at the time of the study. The mean term at delivery in our series was 37 SA and 5 days and 12/17 (70.5%) had come to term. Niang et al. [17] in Senegal in 2018 found that 76 patients (63.3%) had a desire to conceive, 19 of them (25%) were pregnant.

Caesarean section was the most frequent mode of delivery in case of pregnancy after myomectomy. Nine (09) caesarean sections

were performed and two (2) natural births recorded. Diapers were simple and 11 healthy new ones were born. The birth rate after myomectomy in our series was 11.8% in our series. Sudip K. et al. found in their series in 2018 dHigh pregnancy rates (up to 70%) and birth rates (up to 86%) after myomectomy, regardless of the surgical approach taken [18]. The size of the uterus and the number of myomas removed could be a determinant for fertility after myomectomy. Also the pregnancies were spontaneous in our study which is not the case in the study of Sudip K.

Factors influencing the occurrence of pregnancy after myomectomy

The number of nuclei did not influence the onset of pregnancy ($p = 0.288$) after myomectomy in our series, but rather the uterine size. The size of the polymyomatous uterus in our series was comparable to a pregnancy of 4 to 6 months in 21.6% (n = 38). The delay in the consultation for desire of pregnancy, the fact of taking an increase in abdominal volume as an external sign of pregnancy can favor the sizes of the polymyomatous uterus treated in our series. Myomas measuring between 11-20 cm were more likely to become pregnant within 60 months after myomectomy ($p = 0.000\%$). Zhang Y et al. in Northern Europe in 2011 found lower heights to positively influence fertility. According to this study, the diameter of the largest myoma had a positive relationship with the pregnancy rate when it was less than 10 cm ($rs = 0.095$, $P = 0.039$). The type of operation, number, location, classification of myomas, penetration into the uterine cavity and uterine volume did not seem to influence the pregnancy rate ($P > .05$) [14]. In our series, the patient's age at the time of the myomectomy and the number of nuclei did not impact the onset of pregnancy in the 60 months following the intervention ($p > 0.5$). The location of the myoma may influence the live birth rate after myomectomy ($rs = +0.198$, $P = 0.002$). Anterior and posterior myomas were associated with higher live birth rates than other locations ($P = 0.001$) [14]. According to Sudip K. et al. there is aNo statistically significant negative correlation observed with respect to the association between the size of the largest extracted myoma and the pregnancy rate ($p = 0.02$). A statistically significant correlation between the number of myomas removed and the pregnancy rate was observed in patients who wanted to have children ($p = 0.010$) [14].

In our study, alcohol addiction ($p = 0.004$), gestation ($p = 0.010$), nucleus size ($p = 0.000$) and adenomyosis ($p = 0.000$) influenced the occurrence of pregnancy after myomectomy in the direction of lengthening the delay. These results were comparable to those of MM. Niang et al. [17] in Senegal in 2018 who found that nulliparity ($p = 0.004$), patient age ($p = 0.042$) and fertility before myomectomy ($p = 0.012$), to those of Bang N. et al. [16] in Gabon in 2009, for whom only age appeared as a determining factor ($p = 0.001$). These factors had a negative impact on fertility after myomectomy. From this diversity of factors influencing the onset of pregnancy after myomectomy, it emerges that the age of the patient.

Through its results we find that fertility in our population was not only linked to the presence of myomas. Our results differ from those of

This study has limitations because the operational classification of myomas did not respect the international recommendations of FIGO 2011 (PALM-COEIN).

Conclusion

Myomectomy by laparotomy is the most used surgical technique in the national reference maternities of Cotonou in case of infertility on polymyomatous uterus. Spontaneous fertility after myomectomy for pregnancy desire was 16.7% after 60 months. Alcohol addiction, gestality, size of myomas and adenomyosis were influencing factors that must be taken into account for indications and prognosis after myomectomy.

References

1. Bornstein M, Gipson JD, Doors F, et al. Individual and community impact of infertility stigma in Malawi. *Soc SciMed*. 2020; 251.
2. Mascarenhas MN, Flaxman SR, Boerma T, et al. National, Regional, and Global Trends in Infertility Prevalence Since 1990: A Systematic Analysis of 277 Health Surveys. *PLoS Med*. 2012; 9: e1001356.
3. Meng Q, Ren A, Zhang L, et al. Incidence of infertility and risk factors of impaired fertility among newly married couples in a Chinese population. *Reproductive BioMedicine Online*. 2015; 30: 92-100.
4. Brzakowski M, Lourdel E, Cabry R, et al. Epidemiology of the infertile couple. *Journal of Obstetrics Gynecology and Reproductive Biology*. 2009; 38: F3-F7.
5. Leke RJI, Oduma JA, Bassol-mayagoitia S, et al. Regional and Geographical Variations in Infertility: Effects of Environmental, Cultural, and Socioeconomic Factors. *Environmental Health Perspectives*. 2014; 2: 73-80.
6. Leke RJI, Robert JI. Preventing infertility: infectious and viral pathologies, interception of pregnancy. *Human Reproduction and Hormones*. 2013; 3: 13-18.
7. Abebe MS, Afework M, Abaynew Y. Primary and secondary infertility in Africa: systematic review with meta-analysis. *Fertil Res Pract*. 2020; 6: 20.
8. Okogbo FO, Ezechi OC, Loto OM, et al. Uterine Leiomyomata in South Western Nigeria: a clinical study of presentations and management outcome. *Afr Health Sci*. 2011; 11: 271-278.
9. Metwally M, Cheong YC, Horne AW. Surgical treatment of fibroids in cases of subfertility. *Cochrane Database of Systematic Reviews Intervention Authors' declarations of interest* Version. 2012; 11: CD003857.
10. Chaker A, Ferchiou M, Lahmar M, et al. Uterine fibroids: fertility after myomectomy apropos of 41 cases. *Tunis Med*. 2004; 82: 1075-1081.
11. Akpadza K, Wonegou K, Aboubakari A, et al. Epidemiological and surgical aspects of uterine fibroids operated on in the hospital of district III of Lome. *AJOL, Journal of Scientific Research of the University of Lomé*. 2012; 1.
12. Roux I, Faivre E, Trichot C, et al. Fertility after myomectomy by laparotomy for women over 38 years old. *J Gynecol Obstet Biol Reprod*. 2011; 40: 123-129.
13. Lönnerfors C, Persson J. Pregnancy after robot-assisted laparoscopic myomectomy in women with deep intramural myomas. *Acta Obstet Gynecol Scand*. 2011; 90: 972-977.
14. Zhang Y, Hua QK. Age, size of myoma, location of myoma, and interval between myomectomy and pregnancy can influence pregnancy rate and live birth rate after myomectomy. *J Laparoendosc Adv*. 2014; 24: 95-99.
15. Jeldu M, Asres T, Muluken AT, et al. Pregnancy rate after myomectomy and associated factors among women of reproductive age who underwent myomectomy at Saint Paul Millennium Medical College Hospital, Addis Ababa: a retrospective cross-sectional study. *Int J Reprod Med*. 2021.
16. Bang Ntamack JA, Mayi-Tsonga S, Sima Ole B, et al. Pregnancy after myomectomy in Libreville, Gabon. *Clin Mother Child Health*. 2009; 2: 1101-1106.
17. Niang MM, Sene Badji BN, Diop B, et al. Desire of Pregnancy and Fertility after Myomectomy: about 76 Patients Operated at Ouakam Military Hospital (Dakar, Senegal) between 2009 and 2013. *J Gynecol Women's Health*. 2018; 9: 55-57.
18. Kundu S, Iwanuk C, Staboulidou I, et al. Morbidity, fertility and pregnancy outcomes after myoma enucleation by laparoscopy versus laparotomy. *Arch Gynecol Obstet*. 2018; 297: 969-976.