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Original Research Article

Choice of Anaesthesia for Huge Fibroid Surgeries: How Appropriate?

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Abstract: Huge fibroids are common presentations in our institutions. Abdominal myomectomy is the commonest method of treatment for those women. Preoperative anemia from menorrhagia and hemorrhage during myomectomy increases the need for perioperative homologous blood transfusion with its potential complications and risk for perioperative morbidity and mortality. The anesthetic technique that can reduce perioperative blood loss should be considered because of the reported association between anaesthesia type and risk of perioperative blood loss. All patients who had elective abdominal myomectomy for huge fibroids using the two main methods of anaesthesia (Regional (RA) and General (GA)) from January 2012 - December 31 2016 were retrospectively studied for type of anaesthesia, blood loss, need for blood transfusion and number of units of blood transfused. The technique was considered appropriate if it was a RA technique and was associated with a lesser blood loss, transfusion requirement and lower total number of units of transfused blood. Three hundred and fifty three (353) patients met the study's inclusion criteria. One hundred and fifty (42.5%) patients had GA, while 203(57.5%) had RA. Mean blood loss was higher in the GA group compared to the RA group 593.2±486.6 and 410.8±316.7 respectively. Forty two patients in the GA group had a total of 57 units of blood while 23 patients in the RA group received a total of 29 units of blood preoperatively. Regional anesthesia was associated with significantly less blood loss and blood transfusion. Its use for myomectomy for huge uterine fibroids is very appropriate and should to be sustained.

Keywords: Huge fibroid, Blood transfusion, General anesthesia, Regional anesthesia, Perioperative period, Blood loss, Combine Spinal Epidural.

INTRODUCTION

Uterine fibroids are the most common benign pelvic tumours in women. In Nigeria, it occurs in over 80% of women over the age of 25years (Mairiga, Bako & Kawuwa 2006; Adegbesan-Omilabu,Okunade & Gbadegesin, 2014). There is no uniform size of fibroid presentation and huge fibroids extending up to the xiphysternum have been seen. Treatment options vary depending on the size, location, number, and symptomatology (Ikaeko, Ezegwui, Okeke, Ezenyeaku, Umeobika & Ezebialu 2012). Abdominal myomectomy is the commonest technique used in the West African sub region according to studies by Geidam *et al*., and Ezeama *et al*., (2011; 2012). In Nigeria, the abdominal route is commonly employed because abdominal myomectomy remains the only option in the case of large multiple fibroids, which is the commonest presentation (Geidam, Lawan, Chama & Bako, 2011; Obuna, Umuora, Ejikime & Eqwuatu, 2008) at the University of Maiduguri Teaching Hospital and in South Western Nigeria, abdominal myomectomy was the treatment of choice for 64% and 54.7% of cases of uterine fibroid seen respectively (Geidam et al, 2011; Kikelomo, Owolabi, Raji & Olarinoye, 2017). Abdominal myomectomy is associated with large degree of blood loss and this increases the need for perioperative blood transfusion (Geidam *et al*., 2011; Ikechebelu, Ezeama & Obiechina, 2010). Huge fibroids (>16 weeks) are a major predictor of perioperative bleeding requiring blood transfusion (Kikelomo *et al*., 2010). In a study of 91 women who underwent open abdominal myomectomy for uterine size greater than 16 weeks, the operative blood loss ranged between 50 to 3000 mL and 12% of the women were transfused with homologous blood (West, Ruiz & Parker, 2006). In the study by Kikelomo *et al*., (2017), fibroids with uterine size of>16 weeks gestation was seen in half of the patients, and this was a major predictor of intraoperative hemorrhage and blood transfusion. In another series (Pundir, Walawalkar, Seshadri, Khalaf, & El-Toukhy, 2013), in an analysis of 200 abdominal myomectomies, found that uterine size of 20 weeks or more was a major predictor of perioperative bleeding

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requiring blood transfusion. Ngichabe *et al*., (2015) in a randomized trial similarly reported on the correlation between myoma volume and blood loss at open myomectomy. West and his colleagues (West, Ruiz & Parker, 2006) in their study reported that 77 out of the 91 cases of abdominal myomectomy required blood transfusion for perioperative blood loss. One feature common to these reports is the operation of large uterine fibroids, defined as uterine size of 16 weeks or more.

Anaesthesia for open abdominal myomectomy can be in the form of general, spinal, epidural, combined spinal epidural anaesthesia and occasionally general anaesthesia combined with spinal anaesthesia.

Safe anesthesia and surgery initiative focuses on reducing the morbidity and mortality associated with surgery, thus improving outcome. Homologous transfusion is not without risks as; labelling errors, allergic reactions, infections, Transfusion Associated Circulatory Overload (TACO) and Transfusion Associated Acute Lung Injury (Rhode, Dimcheff & Blumberg, 2014). It is pertinent therefore to opt for a technique of anaesthesia that can reduce perioperative blood loss because of the reported association between anaesthesia type and risk of perioperative blood loss. While GA is more commonly used for abdominal myomectomy it is not without challenges necessitating the increasing use of RA which is thought to be more beneficial for the patient. Aside from serious complications and death, evidence is emerging in support of better perioperative outcome with RA compared with GA in terms of perioperative blood loss and allogeneic blood transfusion (Rashiq & Finegan, 2006). The use of RA has also been found to protect against the need for blood transfusion (Rodgers, Walker, Schug, Mckee, Kehlet, & Zundert 2000). The study by Moir indicates that blood loss at major vaginal surgery was reduced by two factors, one of which is Epidural (Moir, 1968). This study aims to find out the appropriateness of our choice of anesthetic technique for huge fibroids done using abdominal myomectomy in our institution.

MATERIALS AND METHODS

The study was conducted following approval by the Institution's Research Health and Ethics Committee. The Doctors and nurses theatre records of patients who had surgeries for huge fibroid at the University of Abuja Teaching Hospital (U.A.T.H) from January 1st 2012 to December 31st 2016 were retrospectively reviewed for Socio demographics, type of anaesthesia, type of surgery, uterine size, intraoperative blood loss, need for blood transfusion, the number of units of blood transfused and the preoperative packed cell volume. Fibroids of ≥ 16 weeks size were considered as huge. Only patients who had abdominal myomectomy done under RA or GA were included in the study while patients who had repeat myomectomy were excluded from the study. The preoperative packed cell volume was categorized into groups. 1) ≤30% 2) 31-35%, 3) 36- 40% and 4) >40%. Data was analyzed using Statistical Package for Social Science (SPSS) version 20. Summary of statistics was done using percentages, means and standard deviations. Categorical variables were compared using the Chi-square test. A P-value of <0.05 was considered statistically significant. Result is presented using tables and graphs as appropriate.

RESULTS

A total of 525 patients had fibroid surgeries during the study period. Of these 85.7% (450) had abdominal myomectomy Table 1. Three hundred and seventy one 82.4% (371/450) were for huge fibroids. Fibroid sizes 0f 16-22 weeks constituted about sixty three percent of the various fibroid sizes as seen in Table 2. Twenty two patients had RA that was converted to GA and were excluded from the study. Of these 18 patients had huge fibroids. Three hundred and fifty three patients (353/371), 95% met the study's inclusion criteria of huge fibroid done using open abdominal myomectomy. Of these 42.5% (150/ 353) patients had GA, while 57.5% (203/353) had RA as seen in Table 3. Blood loss ranged between 150-3000mL as seen in Table 4. Mean blood loss was higher in the GA group compared to the RA group 593.2±486.6 and 410.8±316.7 respectively as seen in Table 5. Forty three (28.7%) patients in the GA group had a total of 57 units of blood while 24 (11. 8%) patients in the RA group received a total of 29 units of blood peri-operatively as seen in Tables 6 and 7. Figure 1 shows that except for PCV greater than 40%, for each category of PCV, there were consistently less patients in the GA group compared to the RA group.

Table 1: Surgeries Performed for Fibroid

Type of surgery	**Fibroid size**		**Total N=525**
	<16 n=96 N (%)	**≥16 n=427 N (%)**	
Abdominal myomectomy	79(82.3)	371(86.9)	450(85.7%)
Total Abdominal Hysterectomy	14(14.6)	52(12.2)	68(13%)
Vaginal hysterectomy	3(3.1)	4(0.9)	7(1.3%)

Table 2: Fibroid Sizes Performed Using the Different Types of Anaesthesia

		Types of Anaesthesia Techniques				Total
Fibroid Sizes		**GA**	**SPINAL**	**COMBINE SPINAL/ EPIDURAL**	**REGIONAL**	
	16	20 (26.7)	30	25	55(73.3%)	75 (21.2)
	18	20 (39.2)	16	15	31 (60.8)	51 (14.4)
	20	19 (33.3)	17	21	38(66.7)	57(16.1)
	22	19 (44.2)	9	15	24(55.8)	43 (12.2)
	24	14(53.8)	5	7	12(46.2)	26(7.4)
	25	1 (100)	0	0	0 (0)	1 (0.3)
	26	13 (61.9)	2	6	8 (38.1)	21 (5.9)
	27	1 (100)	0	0	0 (0)	1 (0.3)
	28	10 (66.7)	3	2	5 (33.3)	15(4.2)
	30	8(47.1)	4	5	9 (52.9)	17(4.8)
	32	8(50)	3	5	8 (50)	16(4.5)
	34	8(44.4)	4	6	10 (55.6)	18(5.1)
	36	8(88.9)	0	1	1(11.1)	9(0.3)
	37	0 (0)	1	0	1 (100)	1(0.3)
	38	0 (0)	0	1	1 (100)	1 (0.3)
	40	1 (100)	0	0	0 (100)	1(0.3)
Total		150	94	109	203	353

Table 3: Technique of Anaesthesia for Abdominal Myomectomy for Huge Fibroid

	Frequency (N=(353)	**Percent (%)**
COMBINED SPINAL/EPIDURAL ANAESTHESIA	94	26.6
SPINAL	109	30.8
REGIONAL TOTAL	203	57.5
GENERAL ANAESTHESIA	150	42.5

Table 4: Blood loss for Huge Fibroids Performed Using the Different Types of Anaesthesia

Blood loss		**TYPES OF ANAESTHESIA TECHNIQUE**				**Total**
		GA (%)	**SPINAL**	**COMBINE SPINAL/ EPIDURAL**	**TOTAL REGIONAL (%)**	
	150	0 (0)	6	3	9 (100)	9 (2.5)
	200	1 (4.3)	6	16	22 (95.7)	23 (6.5)
	250	4(16.7)	11	9	20 (83.3)	24 (6.8)
	300	17 (28.3)	26	17	43 (71.7)	60 (17.0)
	350	19 (42.2)	13	13	26 (57.8)	45 (12.7)
	400	26 (53.1)	10	13	23(46.9)	49 (13.9)
	450	19 (65.5)	5	5	1034.5)	29 (8.2)
	500	16 (50.0)	6	10	16 (50.0)	32 (9.1)
	550	2 (100.0)	0	0	0 (0)	2 (0.6)
	600	7 (35)	5	8	13 (65)	20 (5.7)
	650	4 (100.0)	0	0	0 (0.0)	4(1.1)
	700	7 (53.3)	2	3	5(41.7)	12 (3.4)
	800	10 (55.6)	3	5	8(44.4)	18(5.1)
	900	2(33.3)	1	3	4(66.7)	6(1.7)
	1000	6(75.0)	0	2	2(25.0)	8 (2.3)
	1200	3(100.0)	0	0	(0.0)	3(0.8)
	1500	2(100.0)	0	0	0(0.0)	2(0.6)
	1700	1(100.0)	0	0	0 (0.0)	1(0.3)
	2000	2 (100.0)	0	0	0(0.0)	2(0.6)
	2500	2 (100.0)	0	0	0(0.0)	2(0.6)
	3000	0 (0.0)	0	2	2(100.0)	2(0.6)
Total		150	94	109	203	353

Table 5: Mean Blood Loss for Huge Fibroids Performed Using the Different Modes of Anaesthesia

Surgery type	Mean	Std. Deviation	t	P-value
GA	593.2	486.8	3.959	<0.001
Regional	410.8	316.7		

Table 6: Transfusion Requirements for Huge Fibroids Using the Different Modes of Anaesthesia

GA		Regional	
Yes N (%)	No N (%)	Yes N (%)	No N (%)
43(28.7)	107(71.3)	24(11.8)	179(88.2)

Table 7: Units of Blood Transfused

	0	1	2	3	Total
GA	107(71.3)	30(20)	12(8)	1(0.7)	150
RA	179(88.2)	20(9.6)	3(1.5)	1(0.5)	203

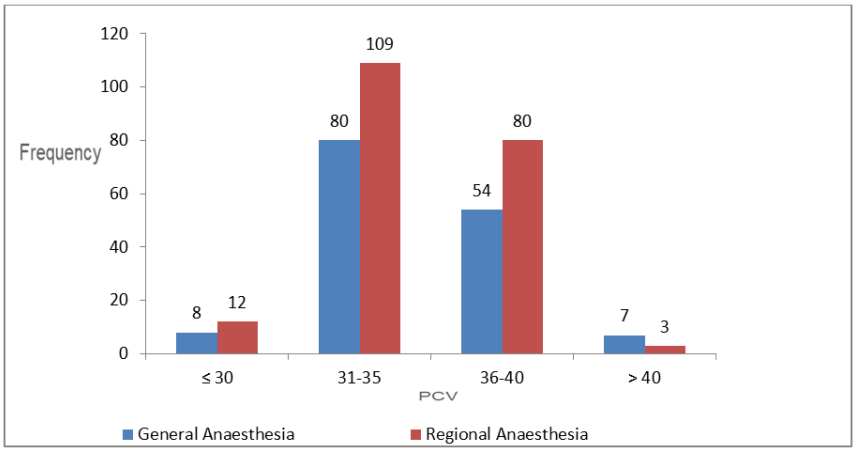

Figure 1: Preoperative Packed Cell Volume and Technique of Anaesthesia

DISCUSSION

Open abdominal myomectomy was the commonest (85.7%) surgical intervention performed for fibroids in our center. This is similar to the findings in most Nigerian settings (Kikelomo *et al*., 2017; Ekine, Lawani, Iyoke, Jeremiah & Ibrahim, 2015). Surgical management in the form of hysterectomy and myomectomy offer long-term relief of symptoms with hysterectomy being the definitive treatment for uterine fibroid (Garba, Ayyuba, Adewale & Abubakar, 2016). However, in Nigeria, like in many developing countries, there is a strong desire among women to have children as reproductive failure is attributed to women who are childless. This makes hysterectomy a less desirable option for some patients as seen in this study where only 14% had hysterectomy (Garba *et al*., 2016). Most women present late with huge fibroids mainly as a result of fear of the complications of surgery, fear about the possible poor reproductive outcome following surgical removal, the link of fibroid to infertility, ignorance and poverty which often render the patients unable to pay for needed surgical treatment resulting in the recourse to alternative medical practices. Late presentation with consequent huge fibroids make the application of newer therapies like laparoscopic myomectomy difficult even when they are available. Other modern therapies and technologies which are independent of the fibroid size (use of gonadotrophic releasing hormone analogs and uterine artery embolization (UAE) reduce the blood supply to the uterus and fibroids, making them to shrink. These are procedures that should be extremely popular in developing countries, where the culture often makes women resent undergoing major surgery or losing their uterus. However, the expensive equipment and cost of the procedures make them out of reach of most developing countries thus making abdominal myomectomy an important treatment modality in our environment as seen in our study (Ekine *et al*., 2016; Garba *et al*., 2017; Otokwala & Ebirim 2018). In a contrary study from Kano Nigeria, abdominal hysterectomy was performed in 58.1% of the cases, while 41.9% had abdominal myomectomy with an odd ratio of using abdominal hysterectomy being about twice that of myomectomy (OR = 1.92. CI = 1.07–3.46, P<0.05) (Ekine *et al*., 2015). This could be attributed to the fact that most of the women were ≥40 years, parous, with low probability of further pregnancies at that age. For women aged 40 years and above with infertility and those that wish to become pregnant, myomectomy is the recommended treatment of uterine fibroids except if there is no need for further fertility preservation when hysterectomy should be offered (Obed, Bako, Kadas, Usman, Kullima & Moruppa, 2011). Myomectomy and recourse to in vitro fertilization and embryo transfer

(IVF-ET) is a possibility that is currently being explored in the management of uterine fibroids in older women with primary infertility (Garba *et al*., 2016; Dattakumar & Yakoub, 2004).

Huge uterine fibroid as a result of delay in presentation is a common occurrence in developing countries like Nigeria and open abdominal myomectomy especially for huge uterine fibroids is a common practice in i Nigeria (Garba *et al*., 2016; Ijeoma, 2019) As seen in our study 82.5% of the abdominal myomectomy done was for huge fibroids. In the study from Orlu, South Eastern Nigeria, 95% of the 100 patients studied had fibroid sizes that ranged between 14-40weeks size and they all had abdominal myomectomy (Ndububa, 2016). Similarly in a study from the University of Ilorin Teaching Hospital, Nigeria, over half of the patients studied had fibroid sizes of greater than 16 weeks' gestation and they all had abdominal myomectomy as the modality of management. Laparoscopic and hysteroscopic myomectomy are less invasive and most widely used surgical interventions for myomas in developed climes. However expensive equipment, cost, and the huge and giant fibroids that these women present with in our environment preclude their routine use. Alternatives to surgical intervention include uterine artery embolization (UAE), high-frequency magnetic resonance-guided focused ultrasound surgery (MRgFUS) and vaginal occlusion of uterine arteries are hampered by expertise and cost in our environment (Ijeoma, 2019). Hysterectomy which is a major procedure that removes the uterus is the definitive treatment for uterine fibroid (Garba *et al*., 2016). Hysterectomy either through the vaginal or abdominal route is also not commonly employed as most women desire to preserve their reproductive function (Kikelomo *et al*., 2015; Ekine *et al*., 2015 & Garba *et al*., 2016). Thus myomectomy which removes only the fibroids and leaves the healthy areas of the uterus in place is usually reserved for women under the age of 40 years, who are of low parity and desire to maintain their fertility, when the procedure is surgically feasible and there is a reasonably good chance of subsequent pregnancy irrespective of the size of the fibroid as seen in our study (Garba *et al*., 2016).

Open abdominal myomectomy especially for huge fibroids is a common practice in Nigeria (Otokwala & Ebirim, 2016; Ndububa, 2016; Ezeama, Ikechebelu, Obiechina & Ezeama, 2012). Various anesthetic techniques have been described for the surgical removal of uterine fibroids and can be in the form of general, spinal, epidural, or combined spinal epidural anaesthesia (Otokwala & Ebirim, 2016; Bharati, Chowdhury, Gupta, Schaller, Cappellani & Maguire, 2014; Nnaji & Chekwe, 2017). Both GA and RA were used in our study for abdominal myomectomy for huge fibroids with a significantly higher use of RA compared to GA, 58.2% versus 41.8%. The use of GA for abdominal myomectomy has been demonstrated in several studies (Geidam *et al*., 2011; Kikelomo *et al*., 2017; West, Ruiz & Parker, 2006; Nnaji & Chekwe, 2017) In the study by Nnaji and Ckikwe (2017) that did a five year (2009-2013) retrospective audit of anaesthesia service for abdominal myomectomy, the use of GA ranged from 71.4%-82.0% with spinal being the only RA technique either alone or in combination with GA. This is similar to the study by Ndububa and colleagues (2016) that presented their experience with 100 myomectomies in Orlu, South East Nigeria, a resource poor region. Studies from other parts of Nigeria also indicate a higher use of GA compared to RA (Geidam *et al*., 2011; Bharati *et al*., 2014; Nnaji & Chewe, 2017). This may be due to lack of expertise, equipment and drugs for the performance of RA. The use of ketamine anaesthesia or other drugs as propofol, opioids and clonidine as sedatives to supplement RA have been reported (Otokwala & Ebirim, 2018). Huge fibroid sizes in excess of 16 weeks and occasionally in multiples and sometimes presenting as a re-occurrence have the tendency to prolong the perioperative period beyond the limits of single shot analgesia thus requiring the administration of ketamine and analgesics like pentazocine and sedatives. In rural practice without the presence of an anesthetist, it is a readily available option but airway protection is necessary as these techniques pose some danger for an unprotected airway given that these medications are often administered with the airway unprotected. This is unlike what obtains in our center and indeed in most tertiary institutions in Nigeria where GA is given with tracheal intubation (Geidam *et al.*, 2011; Kikelomo *et al*., 2017). General anaesthesia with tracheal intubation and muscle relaxation provides excellent perioperative condition but runs the risk of morbidities like airway mishap, awareness, pain, cardiovascular collapse and respiratory depression especially in resource limited centers (Nnaji & Chekwe, 2017).With huge fibroids, there is also the risk of increased bleeding from GA and the duration of surgery may be prolonged. These are potential risk factors for perioperative morbidity and mortality (Otokwala & Ebirim 2018; Bouslama, Echehoumi, Smairi, & Ben, 2013). All these may have influenced the higher use of RA in our center. In addition our residents are highly skilled in the performance of RA (Asudo & Abdullahi, 2020). However, unlike our study that focused mainly on huge fibroids alone these other studies analyzed anaesthesia for all sizes of fibroids and did not differentiate between huge and non-huge fibroids.

Our study shows a 26.6% CSE utilization rate for open abdominal myomectomy for huge fibroids. The study by Otokwala and Ebirim (2018) similarly focused on huge fibroids using mainly CSE. In their prospective study, they analyzed the outcome for women who presented with huge uterine fibroids and for whom the CSE technique was used for open abdominal myomectomy. They concluded that the CSE

technique is safe, cost effective with minimal perioperative complications and can be used in resource limited environments as ours for abdominal myomectomy. The CSE technique is also valuable in our environment where patients present late with huge uterine fibroid, refuse hysterectomy and have increased chances of surgery being prolonged (Mairiga, Bako & Kawuwa, 2006; Obuna *et al*., 2017) However, this technique requires elevated level of training and skill to perform it. Our center has the requisite expertise, equipment and regular supply of drugs for CSE and other forms of RA. The study by Otokwala & Ebirim (2018) is an indication for us and other tertiary institutions to increase our use of CSE for abdominal myomectomy for huge fibroids for the benefits it confers. The use of the CSE technique combines the shorter onset time of the spinal component with the feasibility of administering and extending the epidural component should there be complications that may result in prolongation of surgery. It can also be used to provide good postoperative analgesia. It obviates the need for endotracheal intubation with its antecedent complications. The skills required for use of the CSE technique may not be available in all of the surgical centers within our sub-region. However early acquisition of this skill by anaesthesia trainees is necessary and it can be done with determination and frequent practice (Otokwala & Ebirim, 2018). Another techniques of RA that has been described for the management of open myomectomy is the single shot spinal anaesthesia (Geidam *et al*., 2011; Otokwala & Ebirim, 2018; Sule, Isamade & Ekwempu, 2005). While studies have reported low use of spinal anaesthesia, our study reported a 30.8% single shot spinal utilization (Ndububa, 2016). Spinal anesthesia has the advantage of preventing airway related morbidities associated with GA, and it's cost effective. However, it can be associated with some complications like hypotension, bradycardia, headache, and urinary retention. Single shot spinal anaesthesia has a limited duration of action and the alternative options include the use of either continuous spinal anaesthesia (CSA) or the CSE technique. The CSA technique with intra-theca catheters can be used to titrate the level of sensory blockade to the desired dermatome level with great precision. This allows for better control of the hemodynamic consequences of sympathetic blockade associated with spinal anaesthesia compared to epidural or single shot spinal technique. This is however at the risk of a high rate of Post dura puncture headache (Otokwala & Ebirim, 2018).

Abdominal myomectomy for large uterine fibroids may be associated with the risks of intraoperative hemorrhage with consequent undesired hysterectomy for uncontrollable hemorrhage in women who undergo the procedure because of their desire to bear children (Kikelomo *et al*., 2017; Obed *et al.*, 2011). This blood loss is said to be more with GA compared to RA (Kikelomo *et al*., 2017).Intraoperative blood loss is variable, depending on the uterine size, number and location of myoma, skill of the surgeon, technique of anaesthesia and duration of surgery(Kikelomo *et al*., 2017; Ngichabe, Obura & Stones, 2015). This study also looked at the impact of anesthetic technique on blood loss, and found that blood loss was higher in the GA group compared to the RA group 593.2±486.6 and 410.8±316.7 respectively. Blood loss for the GA group is lower than the value of 794mL seen in the study by West, Ruiz & Parker (2006) on abdominal myomectomy in women with uterine size (>16weeks) despite their use of intramural Pitressin as a surgical hemostat in their surgeries done under GA. The higher value may be due to the high number and aggregate weight of myomas, long duration surgery and variable skill of the surgeons (Ngichabe, Obura & Stones, 2015). Similarly Frederick *et al*., (Frederick, Hardie, Reid, Fletcher, Wynter & Frederick, 2002) in their study got a median blood loss of 700mL in patients who had secondary myomectomy by the abdominal route for uterine size of 12–36 weeks (median 16 weeks) despite the use of vasopressin as a hemostatic agent. The mode of anaesthesia was however not stated in their study. Abdominal-pelvic adhesions reflective of the previous surgery was the most significant finding in their study. This may have been responsible for this high blood loss unlike our study that did not include patients coming for repeat myomectomy. In the study by Kikelomo *et al*., (2018) where fibroids caused uterine sizes of greater than 16 weeks' gestation in half of the clients included in the study, the mean blood loss was also high (630.9 ± 392.4 mL) compared to ours though the mode of anaesthesia was also not stated. The mean blood loss for the patients who had RA in our study is similar to that by Otokwala and Ebirim (2018) of 400mL for huge fibroids. Similar to the patients in our study all the patients in the Otokwala study had routine use of the uterine tourniquet around the cervical–isthmic junction of the uterus to minimize blood loss and thus give a better patient outcome (Kikelomo *et al*., 2017; Garba *et al*., 2016; Otokwala & Ebirim, 2018; Ijeoma, 2019). Very few gynecological studies directly compare RA with GA in terms of blood loss, however our study supports the fact that RA for various types of surgery offer advantages over GA by decreasing blood loss (Rashiq & Finegan, 2006; Moir, 1968). The lower arterial blood pressure, lower central venous blood pressure, and most importantly lower peripheral venous blood pressure in the surgical field seems to explain the lower blood loss seen both intra- and post-operatively in patients given regional anaesthesia. Another benefit of reduced intra-operative bleeding is that it greatly facilitates the surgeon's work as it gives a clearer surgical field.

Abdominal myomectomy for large uterine fibroids may be associated with the risks of intraoperative hemorrhage with consequent blood transfusion (Kikelomo *et al*., 2017; Obed *et al*., 2011;

Ijeoma, 2019) Data from our study indicates that transfusion requirement as well as the total units of blood consumed was higher in patients who had GA compared to those who had RA. The use of RA has been found to reduce the risk of blood transfusion in hip arthroplasty (Rashiq & Finegan, 2006). A total of 18.7% (12% GA and 6.7%RA) had blood transfusion in this study. This is higher than the rate of 11.6% and 12.0% seen in other studies from Nigeria (Fredrick *et al*., 2002; Oladapo & Akinsanya, 2011) Our transfusion rate is comparable to that from the Pundir *et al*., (2013) study while higher rates have also been documented (Kikelomo *et al*., 2017; West, Ruiz & Parker, 2010). In the study by West and colleagues (2006) where a total of 77 of 91 (84.6%) had blood transfusion only 8% had homologous blood transfusion compared to our study where all patients who needed blood transfusion had homologous blood. The other patients in the West study had reinfusion of blood from the cell saver. The use of the cell saver device minimizes the need for preoperative autologous blood donation or intraoperative homologous blood transfusion thus reducing the risk of infection and transfusion reaction from homologous blood transfusion (West, Ruiz & Parker, 2006). Febrile morbidity after myomectomy has been well documented in the literature (Kikelomo *et al*., 2010; West, Ruiz & Parker, 2006). Blood transfusion is thought to be a major contributor to this as fever is a common blood transfusion reaction.

Open myomectomy remains a surgical option for women of low parity with large myomata desiring fertility. Intraoperative hemorrhage necessitating blood transfusion is the most common and significant complication that can follow abdominal myomectomy thus the use of various agents to reduce blood loss is vital. Several interventions to reduce blood loss and therefore blood transfusion have been explored and these are well documented in the literature (Kikelomo *et al*., 2017; Ngichabe, Obura & Stone, 2015). Additional efforts that can be adopted preoperatively include optimizing hemoglobin levels using oral or parenteral hematinic, use of gonadotropin agonists and use of auto donation of blood to avoid risks of homologous blood transfusion as transfusion may be inevitable when an initial hemoglobin level is already low. Only 20 (5.7%) women had borderline preoperative pack cell volume (PCV < 30%) in our study. This may be a contributing factor to the low transfusion rate seen in our study (Ngichabe, Obura & Stones, 2015).

CONCLUSION

Regional anaesthesia for various types of surgery offer advantages over general anaesthesia by decreasing blood loss and transfusion requirements as seen in this study. Regional anaesthesia offers a lower arterial blood pressure, lower central venous blood pressure, and the lower peripheral venous blood pressure in the surgical wound results in less venous oozing from the surgical area with consequent lower blood loss intra- and post-operatively in patients given regional anaesthesia. The reduction in blood loss and consequently the reduced transfusion requirements in RA are beneficial in decreasing the hazards and costs of homologous blood transfusion. Reduced bleeding at the site of operation also greatly facilitates the surgeon's work. The use of RA should be encouraged and sustained.

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