Bilateral Uterine Artery Ligation: An Effective Low-Technology Option in the Management of Symptomatic Uterine Fibroids*

Oluwarotimi I. Akinola; T. Abimbola Ottun; Adetokunbo O. Fabamwo and A. Olusola Akinniyi
Department of Obstetrics and Gynaecology, Ayinke House, Lagos State University Teaching Hospital, Ikeja.

Abstract

Objective: This pilot study was designed to determine the efficacy of uterine artery ligation by the vaginal route as a low-technology alternative to uterine artery embolisation in the management of symptomatic uterine fibroids.

Methods: Both nulliparous and multiparous women who had symptoms of uterine leiomyomata such as menorrhagia, dysmenorrhoea and abdominal swelling were informed about a new approach for the treatment of fibroids and, after giving consent, were recruited for the study. Ultrasonic measurements of uterine and fibroid volumes were determined pre-operatively and at two, six, twelve and eighteen weeks after the procedure. The severity of menorrhagia, dysmenorrhoea and pelvic pain were documented pre-and post-operatively. All the patients had bilateral uterine artery ligation using the vaginal route.

Results: Ten patients aged between 31 and 49 years of age were studied. The mean duration of surgery was 64 minutes. Mean duration of hospital stay was 48 hours. Mean estimated intraoperative blood loss was 262 millilitres. A 20.5% reduction in mean uterine volume was noted at six and twelve weeks post-surgery. The mean duration of menstrual flow was reduced from 23 days before surgery to 17.3 days at the immediate next cycle postoperatively. Subsequently, most patients noted more reductions, although one had a rebound increase. All patients had reduction in perceived pelvic pain and an improved sense of well-being.

Conclusion: It is suggested that the favourable results documented from studies using uterine artery embolisation can be replicated using uterine artery ligation, which is a low-technology alternative. This is an ongoing study.

Key Words: Uterus, Leiomyoma, Menstrual Loss, Artery Ligation. [Trop J Obstet Gynaecol, 2003, 20: 4-6]

****This article won the Majekodunmi Award for the best paper presented by a Young Investigator at the 6th International Congress of SOGON in Abuja, November 2002***

Introduction

Uterine fibroids are some of the commonest tumours found in the human body. When symptomatic, they take a significant toll on the health, economic and social life of sufferers. Fibroids are commoner in women of African descent who live predominantly in resource-poor communities [1], a factor that accentuates their negative effects on the well-being of affected women. They are also the commonest indication for major gynaecological surgery such as total hysterectomy and abdominal or vaginal myomectomy [1,2,3].

The significant morbidity and other consequences of surgery have inspired the development of other treatment options. These include drug treatment with gonadotropin-releasing hormone analogues, which induce a temporary menopausal state. The drugs have several adverse side effects and cause only a transient shrinkage of the fibroids in spite of their prohibitive cost.

More recently, embolisation of the uterine artery, an interventional radiological procedure has been developed with very promising results [5]. It is a minimally invasive procedure and patients are less prone to the complications of major surgery. Post procedure recovery is usually short, with duration of hospitalisation averaging about 48 hours [2]. More important, however, is the absence of scarring and the preservation of the uterus which is considered of paramount importance in many an African culture [5]. The procedure however requires expensive fluoroscopy machines, angiographic catheters, polyvinyl alcohol particles and experienced interventional radiologists [7]. These are not often commonly available in developing countries.

Since uterine artery embolisation and per vaginal ligation had been used interchangeably in the management of obstetric haemorrhage [5,7,8,9,10,11] with comparable results, it was considered worthwhile to try the latter in the management of uterine fibroids. The procedure of uterine artery ligation is relatively simple, requires no special equipment, avoids skin and ovarian radiation hazards, and can be performed on an out patient basis.

This pilot study was designed to determine the efficacy of uterine artery ligation by the vaginal route as a low technology alternative to uterine artery embolisation in the management of the symptomatic uterine fibroids.

Correspondence: *Dr A.O. Fabamwo, Department of Obstetrics & Gynaecology, Lagos State University Teaching Hospital, Ikeja, Lagos State, Nigeria.* **E-mail:** legiree@yahoo.com

Subjects and Methods

A total of 10 patients aged between 31 and 49 years of age were recruited. The Hospital Research and Ethics Committee approved the study design. Inclusion criteria included lack of desire for future childbearing, heavy menstrual bleeding, menstrual pain, pressure symptoms and uterine size not exceeding 16 weeks.

After counselling, ultrasonic measurements of uterine and fibroid volumes were determined. These indices were subsequently checked two, six, twelve weeks and three monthly till one year after the procedure. All patients had endometrial biopsy done and were included in the study only after the first post biopsy menstruation, which was recorded as baseline.

The severity of menorrhagia was documented pre and post-operatively by assessing duration of menstrual flow, number of soaked specific sanitary pads per day and the haemoglobin concentration. This was graded by applying a pictorial blood loss assessment chart. The degrees of dysmenorrhoea and pelvic pain were subjectively determined using the visual analogue scale scoring from 0-10 at the time of inclusion and at predetermined intervals afterwards.

Procedure

Under general anaesthesia, the patients were cleaned and draped in lithotomy position. The uterine cervix was displayed with an Auvard's speculum introduced into the vagina. The anterior and posterior lips of the uterine cervix were grasped with Vulsellum forceps.

The urinary bladder was catheterised. An annular incision was made at the vesico-cervical junction. The vaginal skin and the underlying fascia were reflected anteriorly and posteriorly by sharp and blunt dissection to expose the uterine arteries, ensuring that the ureters were avoided. Using an aneurysm needle, the uterine arteries were ligated together with the cardinal ligaments with size 2 silk sutures. Vaginal wall was reconstituted and haemostasis maintained.

They were all given Amoxycillin and Metronidazole at the onset of surgery and acetaminophen tablets for post-operative pain. All patients were discharged home 48 hours after the procedure.

Statistical Analysis

The means and standard deviation (SD) were calculated for the continuous variables and the paired t-test was used to determine statistically significant differences.

Results

The mean duration of surgery was 64 minutes, the mean duration of hospital stay was 48 hours and the mean estimated intraoperative blood loss was 262 millilitres. Three of the 10 patients dropped out from follow up after six weeks, claiming to be cured.

The uterine volume at the baseline ranged from 186 to 731 ml (Mean 456; SD 175.1). At 12 weeks after the procedure, the uterine volume ranged from 162 to 582 ml (Mean 363; SD 154.8). This difference was statistically significant ($t = 4.62$; $df = 6$; $p = 0.0036$). A reduction ranging form 10.8% to 40.2% with a mean of 20.6% was observed at 12 weeks.

The volume of the dominant fibroids ranged between 70 and 330 ml at the baseline (Mean 177.7; SD 84.1) while at 12 weeks, it ranged from 62 to 256 ml (Mean 122; SD 63.3), a statistically significant reduction ($t = 4.05$; $df = 6$; $p = 0.0067$). The change observed in the volume of fibroids at 12 weeks after surgery ranged from 11.4% to 43% the mean reduction being 29.6%.

The mean haemoglobin concentration increased from 10.43 grams percent (SD 2.1) at baseline to 12.53 grams percent (SD 1.3 at 12 weeks, an average increase of 24.3%. The difference failed to reach the level of statistical significance ($t = 2.13$; $df = 6$; $p = 0.07$). One patient showed no change in her haematocrit level at 12 weeks after the procedure compared to baseline.

The duration of menstrual bleeding at the baseline ranged from a low 8 days to a reported 104 days (Mean 36.4; SD 41.7). At the second menstrual bleed after surgery, it ranged from 4 to 20 days (Mean 9.7; SD 5.8). The difference was not statistically significant ($t = 1.73$; $p = 0.13$). The duration of bleeding had no direct correlation to the volume of menstrual loss. For instance a patient who had a bleeding duration of 6 days reported only light bleeding (spotting), whereas another patient with 4 days of bleeding described it as moderate.

One patient was yet to menstruate at the 3rd month assessment. Severe dysmenorrhoea before surgery was present only in 3 patients, and all reported significant reduction in perceived menstrual pain without any need for analgesic medications. All patients experienced satisfaction with the results and were enthusiastic to recruit other patients for the study.

Discussion

Uterine fibroids are by far the most common indication for hysterectomy [1,2]. The introduction of

uterine artery embolisation as a treatment option for uterine fibroids has been embraced by many women who object to hysterectomy [2]. The operation seeks to obstruct blood perfusion to the fibroid.

Uterine artery ligation has been employed in the control of obstetric haemorrhage [5,7,8,9,10,11] based on the same principle of reducing uterine blood perfusion as embolisation. Uterina artery ligation however has the advantage of simplicity, not requiring any expensive technology or specially trained interventional radiologists.

This study in the short run has shown a significant reduction in the total uterine volume and dominant fibroid volume at 12 weeks after surgery. The magnitude of the reduction, 20.6% and 29.6% respectively, are a bit lower than the 36% and 49% obtained for uterine artery embolisation in units starting the embolisation procedure [2,12], but brought measurable relief to the patients.

These preliminary results demonstrate considerable reduction in menstrual blood loss after uterine artery ligation, together with a corresponding rise in mean haemoglobin level. This is even more remarkable because all but one of the patients had attained the baseline haemoglobin levels only after multiple blood transfusions on anaesthetists' pre- operative insistence.

The euphoria of cure probably accounts for the 3 patients that defaulted from follow-up as they were the patients with the most severe symptomatology prior to surgery.

The menstrual loss was assessed by the pictorial method, as this has been found to correlate closely with the more cumbersome alkaline ferritin method of assessing blood loss [13], and it encouraged patient compliance. The short duration of hospitalisation and low morbidity recorded can be further improved with more practice.

Early results of uterine artery ligation in the treatment of uterine fibroids in this study recommend it as a safe, cheap and effective therapeutic option. A longer follow up period with a greater number of patients is in progress to confirm this preliminary experience.

References

1. Whitfield CR. Benign tumours of the uterus: In Whitfield CR (ed) *Dewhurst's Textbook of Obstetrics and Gynaecology for Postgraduates.* 5th edition. Carlton Victoria, Blackwell Scientific Publications Ltd. 1995; 738 – 746.
2. Klein AJ, Schwartz ML. Uterine artery embolisation for treatment of uterine fibroids; an outpatient procedure. *Am J Obstet Gynecol,* 2001; 184: 1556-1563.
3. Wilcox LS, Koonin LM, Pokras R, Strauss L T *et al.* Hysterectomy in the United States 1988-1990. *Obstet Gynecol* 1994; 83: 549-555
4. Al-Took S., Platt R, Tulandi T. Adhesions related small-bowel obstruction after gynecologic operations. *Am J Obstet Gynecol,* 1999, 180: 313-315.
5. Ravina JH, Herbreteau D, Graru-Vigneron, *et al.* Arterial embolisation to treat uterine myomata. *Lancet* 1995; 346: 671-672.
6. Ogunbode O. Enviromental factors in the management of uterine fibroids. *Trop J Obstet Gynaecol,* 1981; 2: 119-120.
7. Jaraquemada JM, Palacios. Surgical training in selective pelvic arterial ligation or use of embolisation only. *Am J Obstet Gynaecol* 2000; 182: 1
8. Waters E. Surgical Management of post-partum haemorrhage with particular reference to ligation of uterine arteries. *Am J Obstet Gynecol,* 1952; 64:1143-1148
9. Hansch E, Chitkara Usha, McAlpine J *et al.* Pelvic arterial embolisation for control of obstetric haemorrhage: A five year experience. *Am J Obstet Gynecol,* 1999; 180: 1454-1459
10. O'Leary J. Uterine artery ligation in the control of postcesarean haemorrhage. *Am J Reprod Med,* 1995; 40: 920-924
11. Obineche IN. The role of antepartum and postpartum haemorrhage in maternal mortality. In Akuse JT (ed) *Safe Motherhood at the Local Government Level in Nigeria.* Lagos, SOGON Nigeria. 1999; 19-23.
12. Spies JB, Scialli AR, Jha RC, Imaoka I *et al.* Initial results from uterine fibroid embolisation for symptomatic leiomyomata. *J Vasc Interv Radiol,* 1999; 10:1149-1157
13. Higham JM, O'Brien PMS, Shaw RW. Assessment of menstrual blood loss using a pictorial chart. *Br J Obstet Gynaecol,* 1990; 97: 734-739