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GYNAECOLOGY

Evaluation of perioperative morbidity associated with single and multiple myomectomy

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Summary

The aim of the study was to evaluate the risk of intraoperative and postoperative complications associated with single and multiple myomectomy. The sample was a retrospective cohort study of 206 women undergoing abdominal myomectomy at a teaching hospital in the UK between 1999 and 2003. Means of continuous variables were compared using *t*-tests with Satterthwaite's correction for unequal variance. It was found that menorrhagia was the presenting symptom in 72% of the women. Estimated blood loss was significantly more in multiple myomectomy compared with single myomectomy. Preoperative use of GnRH analogue and intraoperative tourniquet was used in both groups at the surgeon's discretion. Major complications were rare and three patients needed hysterectomy. There was no significant difference in hospital stay: 5.73 vs 5.98 days. It was concluded that myomectomy is a relatively safe operation with low incidence of serious morbidity. Haemorrhage is the commonest complication and more likely during multiple myomectomy.

Keywords

Gynaecological surgery, intraoperative and postoperative complications, single and multiple myomectomy

Introduction

Myomectomy for uterine fibroids has stood the test of time and is the commonest conservative surgical procedure performed for symptomatic uterine fibroids. The incidence of fibroids in asymptomatic women has been shown to be over 50% (Baird et al. 2003) but not all seek medical treatment. As more women delay their childbearing for various reasons, an increasing number of women request conservative surgery for fibroids to preserve their reproductive potential. Many studies have attempted to address the ongoing debate about the effects of fibroids on fertility and have shown that the presence of relatively small intramural fibroids can affect the success of IVF/ICSI treatment (Eldar-Geva et al. 1998; Surrey et al. 2001; Hart et al. 2001). More women are therefore offered a myomectomy to optimise their chances of successful pregnancy following ART. There is also another group of parous women, who despite having completed their families, prefer to conserve their uterus due to their cultural beliefs and a symbolic association between uterus and femininity.

Historically, myomectomy has been described as an operation that carries increased risk of serious complications such as intraoperative haemorrhage and hysterectomy (Bonney 1937). We undertook a retrospective review of women who underwent abdominal myomectomy for various indications over a 4-year period. The aim was to study the clinical features of patients presenting with fibroids and to assess the morbidity in women undergoing single and multiple myomectomy. The data could be used to counsel women with regard to intraoperative and postoperative complications when they opt for myomectomy.

Materials and methods

Hospital case records of 206 patients who had abdominal myomectomy as a primary procedure at St Thomas' Hospital from January 1999 to December 2003 were reviewed. The patient's names were identified by a computerised search of medical records using the procedure code 'myomectomy'. St Thomas' Hospital is an inner London university teaching hospital and a tertiary referral centre, where a large proportion of patients are Afro-Caribbean or from other ethnic minority groups. Patients were excluded if myomectomy was performed as part of a more extensive operation, and if it was performed as an emergency procedure. The information collected included patient characteristics, previous myomectomy, uterine size, mean diameter of the largest fibroid on ultrasound scan, pre- and postoperative haematocrit, preoperative use of gonadotropin-releasing hormone (GnRH) agonists, operating time, estimated blood loss, intraoperative complications, febrile morbidity, blood transfusion, postoperative complications, length of hospital stay and re-admission to the hospital. The preoperative uterine size was measured in terms of weeks of pregnancy and the mean diameter of the largest fibroid on ultrasound scan was recorded. Surgical time was defined as the time of skin incision to the time of skin closure. Estimated blood loss as observed by the operating team was measured by adding the volume of the

blood in the suction bottle to the amount of blood in the sponges as determined by weight. A Foley catheter including the uterine and ovarian vessels was used for reducing blood loss at myomectomy. The number of fibroids removed, as documented in the operation notes or from the pathology report, was also noted and were categorised into two groups, namely single and multiple fibroids.

The morbidity was assessed from the intraoperative and postoperative complications as well as from the re-admission rates.

Statistics usage

The primary outcome of this study was incidence of perioperative morbidity in patients undergoing abdominal myomectomy. The patient characteristics, ethnicity, presenting symptoms, as well as preoperative assessment, intraoperative details and postoperative outcome were studied.

Data analysis was conducted using Stata Version 8.2 (StataCorp, College Station, Texas). Standard statistical analysis methods were used. Results are given with 95% Confidence intervals (CI) and exact p values. Means of continuous variables were compared using t-tests with Satterthwaite's correction for unequal variance. In comparing percentages, odds ratios with Cornfield's correction to the CI and p values by Pearson's χ^2-test are given. A log transformation was used on the blood loss data before performing a t-test and the differences between the groups expressed as percentages.

Results

Table I shows the demographic and preoperative characteristics of the patients in the two groups. The mean uterine size in the single fibroid group was 17.6 weeks, compared with a mean size of 19.5 weeks in the multiple fibroids group. The presenting symptoms were grouped under five main categories, namely, menorrhagia, dysmenorrhoea, subfertility, pelvic pain and bulk symptoms. Menorrhagia was the commonest presenting symptom observed in 75.2% patients followed by subfertility (40.7%), dysmenorrhoea (36.9%), bulk symptoms (30.5%) and pelvic pain (25.7%). These symptoms were more common in patients with multiple fibroids. However, in no case was the difference large enough to form the basis of a useful test (Table II).

GnRH analogue and use of a tourniquet to reduce intraoperative blood loss

The use of preoperative GnRH analogue varied depending on the size of the uterus, presence or absence of anaemia and surgeon's preference. Overall, 53.8% of patients with multiple fibroids and 28.6% of patients with a single fibroid had up to three doses of GnRH analogues prior to surgery. Tourniquet was used in 78% patients with multiple fibroids and 47% with single fibroid. Four patients had a preoperative haemoglobin less than 10g/dl and required intraoperative blood transfusion. After excluding these patients, the difference in haematocrit levels pre- and postoperatively was analysed in the two groups to see if the use of GnRH analogues or use of a tourniquet made any difference to the change in haematocrit levels. Interestingly, no significant change was seen in the two groups. Other surgical techniques used to reduce the blood loss at the time of myomectomy were pitressin (two subjects), syntocinon (one subject) or none of these (58 subjects, 28%).

Operation time

The mean operation time was 69.8 min (95% CI, 59.4–80.4) for single myomectomy and 93.6 min (95% CI, 87.6–99.6) for multiple myomectomy. There was no significant difference in the operating time and this could be due to trainee grade surgeon doing the simpler single myomectomies under direct supervision whereas a consultant grade surgeon did the multiple myomectomies.

Intraoperative findings

Associated pathology in the form of tubal disease, filmy and dense adhesions, ovarian cysts, endometriosis and adenomyosis was noticed in 30% of the cases.

In 22% of the single myomectomy and 48% of the multiple myomectomy the endometrial cavity was opened during the procedure.

Estimated blood loss

There was significantly more blood loss in multiple myomectomy compared with single myomectomy. The median (quartiles) were 300 ml (200 to 600 ml) in single myomectomy and 400 ml (250 to 840 ml) in multiple

Table I. Demographics.

Patient characteristics	Single fibroid, Group A ($n = 49$)		Multiple fibroids, Group B ($n = 157$)		Mean difference	95% CI	p value
	n	(%)	n	(%)			
Age (years) (mean $\pm$ SD)	36 $\pm$ 5.1		37 $\pm$ 4.7		1.4	-3.0 to 0.3	
Uterine size (weeks) (mean $\pm$ SD)	17.6 $\pm$ 6.3		19.5 $\pm$ 5.6		1.9	-0.1 to 3.9	0.06
Previous myomectomy	4	8.2	12	7.6	0.1	-0.09 to 0.8	0.91
Largest fibroid (cm)*	8.4 $\pm$ 3.4		7.5 $\pm$ 3.3		0.89	-0.3 to 2.0	0.16
Ethnic group							
Caucasian	15	34	28	65	1.0	Reference	
Afro-Caribbean	28	19	118	81	1.24	1.0 to 1.5	0.03
Asian	4	45	5	55	–		
Other	2	25	6	75	–		

*Mean diameter of the largest fibroid on ultrasound scan.

myomectomy. Figure 1 depicts the estimated blood loss in the two groups.

Complications

Intraoperative haemorrhage, defined as blood loss >500 ml was the commonest complication and was more common in multiple myomectomy (15.29%) than single myomectomy (8.16%). The incidence of other major complications such as bowel and bladder injury was low (Table III). The commonest postoperative complication was pyrexia and occurred in 36.9% of multiple myomec-

tomies and 22.5% of single myomectomies. Table IV shows the incidence of various postoperative complications in the two groups.

Five patients required a midline incision due to a preoperative estimated uterine size above 28 weeks. There were three hysterectomies, all in patients with multiple fibroids causing uterine enlargement of 32–36 weeks. Two patients underwent intraoperative conversion to hysterectomy due to intractable bleeding and one patient developed postoperative sepsis and intraperitoneal bleeding requiring a laparotomy and hysterectomy on the third postoperative day.

Table II. Presenting symptoms.

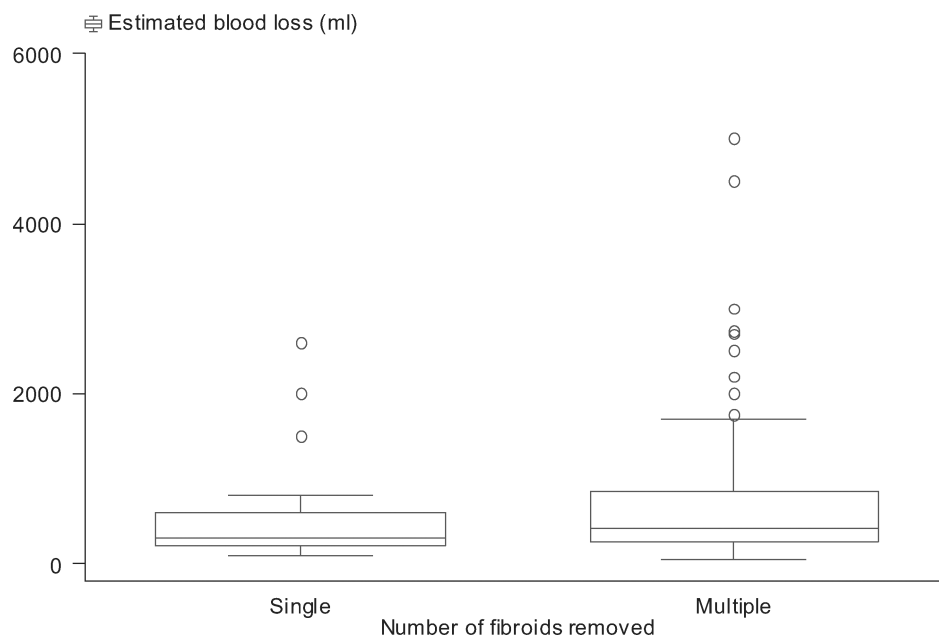|	Symptom absent		Symptom present				
	n	(%)	n	(%)	Odds ratio	95% CI	p value
Menorrhagia	37/51	73	120/155	77	1.30	0.64–2.64	0.478
Dysmenorrhoea	97/130	75	60/76	79	1.27	0.65–2.50	0.481
Subfertility	89/122	73	68/84	81	1.57	0.80–3.07	0.185
Bulk symptoms	105/143	73	52/63	82	1.71	0.81–3.50	0.547
Pelvic pain	115/153	75	42/53	79	1.26	0.59–2.66	0.156

Figure 1. Estimated blood loss was significantly higher in women with multiple fibroids when compared with single fibroid regardless of the use of the GnRH analogues or intraoperative tourniquet (Wilcoxon test $p = 0.017$).

Table III. Intra-operative complications.

	Single		Multiple		Total	
Intraoperative complications	n	(%)	n	(%)	n	(%)
Anaesthetic	0		3	1.91	3	1.46
Bladder injury	1	2.04	0		1	0.49
Bowel injury	0		3	1.91	3	1.46
Haemorrhage*	4	8.16	24	15.29	28	13.59
Broad ligament haematoma	0		1	0.64	1	0.49
Round ligament tear	1	2.04	0		1	0.49
None	43	87.76	126	80.25	169	82.04

*Odds ratio 2.41 (0.84–7.0) $p = 0.01$.

Table IV. Postoperative complications.

Postoperative complications	Single		Multiple		Total	
	n	(%)	n	(%)	n	(%)
Haemorrhage	0		5	3.18	5	2.43
Ileus	0		2	1.27	2	0.97
Medical complications	5	10.2	10	6.37	15	7.28
Pyrexia*	11	22.5	58	36.9	69	33.5
Wound complications	2	4.08	9	5.73	11	4.85
None	31	63.27	73	46.5	104	50.49

*Odds ratio 2.0 (0.92–4.7) $p = 0.061$.

Postoperative stay

The mean hospital stay for single myomectomy (5.73 days; 95% CI, 5.11–6.35, was not significantly different from multiple myomectomy (5.98 days; 95% CI, 5.60–6.35). The overall re-admission rates were low (two patients in single and five patients in multiple myomectomy). The commonest indication was wound infection, but two patients had pelvic infection of which one patient responded to intravenous antibiotics and the other patient required a laparotomy and drainage of pelvic abscess.

Discussion

To our knowledge, this is the first large series of abdominal myomectomy reported in the literature which assesses the perioperative complications of the procedure and puts into context the risks associated with the operation in relation to single or multiple myomectomy. It is well recognised that myomectomy, like any other major surgery, is not without major complications however many of the risks are exaggerated. There is paucity of good quality data derived through well-designed trials and in clinical practice historical data is often used to counsel women prior to myomectomy. However, more recent data has clearly shown that the morbidity of myomectomy compares favourably with hysterectomy, as far risks of complications are concerned (LaMorte et al. 1993; Iverson et al. 1996). Sawin et al. (2000) reported an excellent study which aimed to put the morbidity of myomectomy into context by comparing it with hysterectomy using five major indicators of morbidity derived from the collaborative review of sterilisation study namely febrile morbidity, haemorrhage, unintended procedure, life-threatening event and read-mission. This study was adequately powered to demon-strate a 15% absolute increase or decrease in morbidity to achieve clinical significance. Demographically, patients who had a myomectomy were younger, weighed less, were of lower parity and had a smaller preoperative uterine size than those who underwent hysterectomy. A similar mor-bidity was observed with the two procedures, however interestingly, there were significantly lower occurrence of haemorrhage and performance of unintended procedure among women who underwent myomectomy than among those who had hysterectomy. However, febrile morbidity was more common among women with myomectomy. Based on these observations and our own data myomec-tomy can be offered as a treatment option to women in their 40s who may have completed their families but still wish to retain their uterus for cultural and other reasons.

As haemorrhage is the commonest complication, a number of strategies have been devised to reduce the intraoperative blood loss but there is very little evidence to suggest superior efficacy of one technique over another (Kunde et al. 2005) and they are largely based on the operator choice. Although our observations suggest that use of a tourniquet does not reduce intraoperative blood loss, this was not a randomised trial and therefore it is quite likely that patients in whom the tourniquet was not used may have been at lower risk of bleeding and operator choice played a major role in adoption of the technique for reducing intraoperative blood loss. Fletcher et al. (1996), have demonstrated in a randomised trial that the use of tourniquet was associated with greater blood loss compared with vasopressin, but their technique did not involve occlusion of infundibulopelvic ligaments (Kunde et al. 2005) and the tourniquet was released every 20 min during surgery. More recently, Taylor et al. (2005) have reported the benefits of a triple tourniquet technique in reducing blood loss and their technique involved separate occlusion of IP ligaments with polythene tourniquets and the use of a number 1 polyglactin suture that was tied around the cervix and left *in situ* at the end of the procedure. There is therefore a need for a randomised trial with well-defined end-points using a standardised technique to establish the role of tourniquets in surgical haemostasis during myomectomy.

Postoperative pyrexia is a well recognised complication of myomectomy and is believed to be due to release of prostaglandins from the tissues or the occurrence of small haematomas in the sutured myoma bed and consequent release of pyogenic substances during autolysis (Iverson et al. 1996). In our study, pyrexia was observed in 36.95 cases after multiple myomectomy and 22.5% cases after single myomectomy. (Odds ratio 2.0 (0.92 to 4.7) $p = 0.06$) The presence of persistent pyrexia beyond 48 h should be further investigated, to rule out presence of sepsis and appropriately treated.

Hysterectomy during myomectomy is the most feared complication, as it defeats the very purpose of surgery and can cause considerable emotional trauma to the patient, particularly when surgery is undertaken to enhance the patient's fertility. Fortunately, the incidence of hysterec-tomy is low as shown from our data and its likelihood is increased only in cases with very large uterus with increased 'fibroid load'. Nevertheless, all patients having myomectomy need to be counselled about this complica-tion before consent is obtained.

In both groups of patients, the re-admission rates were low and no significant difference was observed in the two groups.

Our study shows no significant difference in the morbidity associated with single and multiple myomectomy but has its limitations due to the retrospective nature of this study. Nevertheless, the data form a useful benchmark against which the standard of care delivered to patients undergoing myomectomy can be assessed. It has also proved to be a useful tool in counselling women with regard to risk of complications associated with myomectomy at our institution. Given the common prevalence of uterine fibroids in clinical practice and the impact it can have on the women's lives as well as healthcare resources, further research in this field should be considered a priority.

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