East African Medical Journal Vol. 84 No. 11 November 2007
TOTAL LAPAROSCOPIC HYSTERECTOMY AT THE AGA KHAN UNIVERSITY HOSPITAL, NAIROBI
R.B. Parkar, MBBS, MMed, Consultant Obstetrician and Gynaecologist, P.O. Box 520-00606, Nairobi, Kenya, W.J. Kamau, MBChB, MMed, Consultant Obstetrician and Gynaecologist, P.O. Box 19794-00200, Nairobi, Kenya, D. Otieno, MBChB, MMed, Consultant Anaesthetist, P.O. Box 19990-00202, Nairobi, Kenya and R. Baraza, MBChB, FRCS, Consultant Surgeon, P.O. Box 20713-00202, Nairobi, Kenya

Request for reprints to: Dr. R.B. Parkar, P.O. Box 520-00606, Nairobi, Kenya

TOTAL LAPAROSCOPIC HYSTERECTOMY AT THE AGA KHAN UNIVERSITY HOSPITAL, NAIROBI

R.B. PARKAR, W.J. KAMAU, D. OTIENO and R. BARAZA

ABSTRACT

Objective: **To determine the outcomes of total laparoscopic hysterectomy at the Aga Khan University Hospital, Nairobi. To create awareness on the availability of the procedure and to recommend the procedure as a suitable option to total abdominal hysterectomy.**
Design: **A retrospective case analysis.**
Setting: **Private practice in a private hospital set up.**
Subjects: **One hundred and twelve laparoscopic hysterectomies were performed at the Aga Khan University Hospital, Nairobi. These cases have been reviewed, analysed and presented between May, 2000 and May, 2007.**
Interventions: **Total laparoscopic hysterectomies done.**
Exclusions: **All cases performed at other hospitals in Nairobi and Mombasa, and all cases where the author was not the principal surgeon.**
Results: **The ages ranged from 36 to 74 years, the mean age being 48 years. The patients parity ranged from 0 to 9. Fifty seven point one percent of the patients presented with heavy prolonged periods with clots. Of all the cases performed 54.4% gave a history of a previous laparotomy or Caesarian section. The uterine size by clinical assessment ranged from bulky to 28 weeks. The operating times ranged from 25 to 240 minutes, scope in to scope out. The average hospital stay for patients undergoing total laparoscopic hysterectomies was 2.1 days. There were no intraoperative complications encountered. The majority of the uteri weighed between 101–300g (50.8%).**
Conclusions: **Laparoscopic surgery is now well accepted by specialists and patients. Where facilities allow advocating total laparoscopic hysterectomy for benign uterine pathology can be considered as a suitable option to abdominal hysterectomy.**

INTRODUCTION

Removal of the uterus (hysterectomy) for benign uterine conditions is one of the most common operations performed by gynaecologists and for many years total abdominal hysterectomy (TAH) was the gold standard. This remains the method used by the majority of gynaecologists in Kenya. With introduction of the laparoscopy, many gynaecologists are increasingly adopting this technology which has distinct advantages over the open surgery and is preferred by patients. There is less trauma and post-operative pain, minimal bowel manipulation leading to less ileus, and early ambulation with lessened risk of thromboembolism. Costs are saved by early discharge and minimal use

of analgesics and antibiotics. Patients return to work faster. Limiting factors for adoption of laparoscopy have been discussed elsewhere (1).

For gynaecologists who practice laparoscopy, the main drawback with this method is how to remove the uterus from the abdominal cavity once it has been resected, and secondly how to close the vaginal vault. Removal of the laparoscopically resected uterus via the anterior abdominal wall would leave a large scar and negate part of the reason for laparoscopy, which is to maintain minimal trauma. Because of these difficulties the method used by the majority of gynaecological laparoscopists is laparoscopic assisted vaginal hysterectomy (LAVH). In this operation, only the initial part of the operation, that of resecting the triple folds of the fallopian tube, round and ovarian (infundibulo-pelvic) ligaments, is performed laparoscopically. The rest of the operation which consists of division of the uterine vessels, the cardinal and utero sacral ligaments are performed vaginally. The vault of the vagina is also closed by this route. This method poses its own challenges, both technical and aesthetic. It entails a lengthy non-laparoscopic operation vaginally which removes some of the advantages of laparoscopy and causes trauma to the perineum. Often the surgeon and the assistant are crowded in the perineum for a long time causing strenuous and ergonomically demanding poses. Surgery on obese patients and those with adhesions can be tricky while those who have had previous surgery are particularly difficult in this regard. Extraction and delivery of a large uterus full of large fibroids vaginally can be demanding.

Surgeons would prefer a method of removing the uterus totally laparoscopically without using the vaginal route, hence the so called total laparoscopic hysterectomy (TLH). This is associated with less trauma and has other potential benefits for the surgeon and the patient. However it requires more expertise and training and availability of a morcellator to break up the uterus into small pieces which can be delivered via the abdominal ports or vaginally. The vaginal incision is closed laparoscopically using intra-corporeal sutures, a skill which takes time to acquire. Total laparoscopic hysterectomy was initially performed by Harry Reich in 1988, and since then at least eight different variations of the technique have been reported (2). In Kenya, our group is the first to practice total laparoscopic hysterectomy as opposed to LAVH. In this communication, we report our experiences with the method and how it compares with the traditional techniques of removing the uterus.

MATERIALS AND METHODS

A retrospective case analysis of all total laparoscopic hysterectomies undertaken at the Aga Khan University Hospital, Nairobi, between May 2000 and May 2007 was conducted.

All cases that were performed at the Nairobi Hospital, Avenue Hospital, M P Shah Hospital, Kenyatta National Hospital, Nairobi Women's Hospital, Coast Province General Hospital, Aga Khan Hospital, Mombasa, the Mombasa Hospital, and the Nyahururu Private Hospital, were excluded since they were occasional and follow-up and record retrieval was a constraint.

Patients whose records were incomplete or were not obtained and those who were lost to follow up were not included in the study. All cases performed by trained consultants who have performed cases on their own have also been excluded in this study.

At the Aga Khan University Hospital, Nairobi, a standard Karl Storz tower consisting of two 15 inch flat screen monitors, an image 1 camera system, a xenon 300 light source, an electronic thermoflator, and an autocon 450 high frequency diathermy unit were used for all the cases. Specialised personal equipment such as the harmonic scalpel, and the Rotocut morcellator (Karl Storz, GmbH) were also used.

In theatre, once the patients were anaesthetised, they were cleaned and adequately draped, and aseptically catheterised. An examination under anaesthesia was then performed to determine the size, position, mobility and regularity of the uterus. The adnexia and the pouch of Douglas were also examined for any pathology. A Clermond Ferrand uterine elevator (Karl Storz, GmbH) was subsequently inserted through a dilated cervix to facilitate uterine manipulation.

Intraabdominal entry was standard for all the cases. Through an intraumbilical stab incision (or a supraumbilical entry in relatively large uteri), a verres needle was inserted to create the initial pneumoperitoneum. The carbon dioxide insufflation pressure was maintained at 15mmHg with a flow rate of 1 litre per minute. After obtaining sufficient distention evident by a tense abdomen, a 10mm Trochar was inserted, replacing the verres needle.

The flow rate was subsequently increased and maintained at 20 litres per minute. The static intra abdominal pressure was retained at 15mmHg. A 30°, 10mm laparoscope was then inserted through the primary port. All secondary, 5mm, ports were introduced under direct vision, approximately 2cm above and lateral to the anterior superior iliac spine on both sides or higher in the left and right lumbar region in cases of larger uteri.

Initially, the right paracolic gutter, (appendix), the upper abdomen (liver, gall bladder) splenic fossa, left para colic gutter and the pelvis were inspected, for any pathology. Any adhesions that would hinder the progress of the surgery were dissected using bipolar coagulation and sharp dissection or the harmonic scalpel. The presence and absence of any pelvic endometriosis was also noted, so too was bilateral ureteric peristalsis displayed for identification.

With the uterus manipulated to the left side, the right round ligament, fallopian tube and ovarian ligament (if the ovaries were to be preserved) were cauterised using bipolar coagulation and dissected with sharp curved scissors and/or the harmonic scalpel. In the event a salpingo oopherectomy was performed, the infundibulopelvic ligament was cauterised and dissected. Subsequently, the two leaves of the broad ligaments were resected using the harmonic scalpel, upto the level of the uterine arteries. This process was repeated on the left side with the uterus, being moved to the right with the Clermond Ferrand manipulator. Occasionally a myoma spiral applied onto the uterus was used to provide additional traction and access.

The uterovesicle fold of peritoneum was then identified and lifted using an atraumatic forceps, dissected and the bladder adequately reflected caudally. This process also ensured adequate caudal and lateral displacement of the ureters, bilaterally. The posterior peritoneum was then reflected off the uterus using the harmonic scalpel, and both the uterosaccral ligaments were transacted.

This enabled the uterine arteries to be adequately skeletonised and exposed. They were then cauterised using bipolar coagulation and resected so as to lateralise the uterine stumps in a few cases the uterine arteries were ligated using intracorphoeal sutures.

After placing the ceramic cup of the Clermond Ferrand elevator in the posterior fornix, the vaginal vault was opened using a monopolar hook electrode or the harmonic scalpel. This was extended laterally above the uterine stumps. Finally the anterior vault was opened over the ceramic cup placed anteriorly. The uterus was then delivered vaginally, and the pneumoperitoneum being maintained by the silastic rings of the Clermond Ferrand and a moist vaginal pack. The vaginal vault was closed using interrupted intracorporhoeal sutures. In cases where the uterii were larger than 18 weeks, the uterus was delivered using a Rotocut morcellator (Karl Storz, GmbH). A good lavage was undertaken to ensure adequate haemostasis. Ureteric peristalsis were also confirmed bilaterally.

The secondary ports were removed under vision, the carbon dioxide gas released and the umbilical trochar removed under vision. The bladder was catheterised and a rectal examination was routinely performed. The small port sites were closed with a single stitch while all ports of 10mm and larger the rectus sheath was closed separately.

The records and clinical data for all procedures including indications, operating times, post operative follow up and complications were maintained on a Mecer desktop computer.

RESULTS

From May, 2000 to May, 2007, a total 132 total laparoscopic hysterectomies were undertaken at various hospitals in Kenya of which 112 were undertaken at the Aga Khan University Hospital, Nairobi (Table 1).

During the period under review 2,069 cases of laparoscopic surgery were undertaken at various hospitals in Kenya, of which 231 laparoscopic assisted vaginal hysterectomies, 22 laparoscopic subtotal hysterectomies and 132 total laparoscopic hysterectomies. Of these cases, 112 total laparoscopic hysterectomies were performed at the Aga Khan University Hospital, Nairobi. None of these cases were converted to abdominal hysterectomy.

In Table 1, three laparoscopic assisted vaginal hysterectomies and one total laparoscopic hysterectomy was undertaken in 2000, by 2003, the laparoscopic assisted vaginal hysterectomy procedure peaked at 78, while twelve total laparoscopic hysterectomies were performed. By 2006, the number of laparoscopic assisted vaginal hysterectomies being performed showed a decline (12 cases) and the number of laparoscopic subtotal hysterectomies (four cases) and total laparoscopic

hysterectomies (41 cases) increased (Figure 1). The other explanation for the decline in the laparoscopic assisted vaginal hysterectomies is that several consultants, who initially provided patients for" pool "of all cases undertaken at the Aga Khan University Hospital, Nairobi, have now gradually acquired sufficient skills to perform these procedures on their own, at various other hospitals, and these are not included in the figures.

Table 2 depicts the patients' details. The ages ranged from 36 to 74 years, the mean age being 48 years. The patients parity ranged from 0 to 9. 57.1% of the patients presented with heavy prolonged periods with clots. The other presenting complaints included severe dysmenorrhoea (16.9%), postcoital bleeding (7.1%), and postmenopausal bleeding (5.3%). Of all the cases performed 54.4% gave a history of a previous laparotomy or Caesarian section. The uterine size by clinical assessment ranged from bulky to 28 weeks. The operating times ranged from 25 to 240 minutes, scope in to scope out, 62.5% of the cases being performed in between 25 to 110 minutes.

Table 1

Total cases: Hysterectomies by laparoscopic assistance at various hospitals in Kenya

Year	Total cases of laparoscopic surgery performed	Laparoscopic assisted vaginal hysterectomy (LAVH)	Laparoscopic subtotal hysterectomy (LSH)	Total laparoscopic hysterectomy (TLH)
2000 (May-Dec)	56	3	–	1
2001	309	32	–	3
2002	349	54	–	6
2003	397	78	–	12
2004	301	21	2	16
2005	299	29	7	18
2006	224	12	4	41
2007 (Jan-May)	134	2	9	20
Total	2069	231	22	132

Figure 1

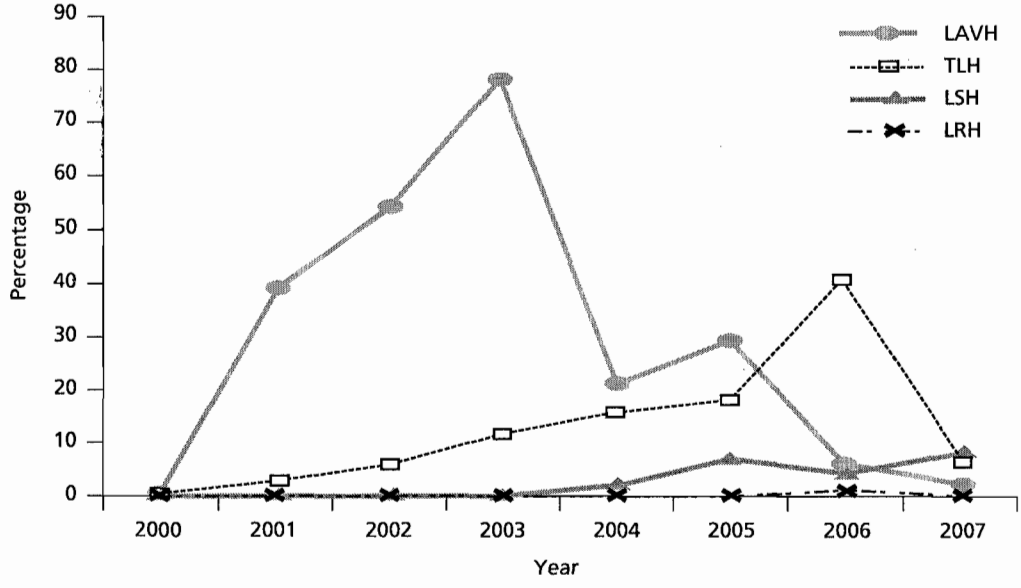

Table 2

Subjects (n = 112)

Age (years)	No.	(%)
30–39	3	
40–49	66	58.9
50 – 59	39	
above 60	4	
(Range: 36 to 74)		
Parity: (living children)		
0–2	21	
3–5	79	70.5
6–8	6	
above 8	6	
(Range 0 – 9 living children)		
Presenting complaints		
Menorrhagia	64	57.1
Severe dysmenorrhoea	19	
Intermenstrual bleeding	11	
Post coital bleeding	8	
Abnormal pap smear	3	
Postmenopausal bleeding	7	
Previous abdominal scars		
No previous scars	51	45.5
1–2	48	
3–4	9	
5–6	1	
More than 6	3	
(range: 0–7 previous scars)		
Uterine size		
Bulky	7	56.25
12–14 weeks	63	
16–18 weeks	25	
20 – 24 weeks	7	
More than 24 weeks	6	

In our series, the average intraoperative blood loss was minimal, and no patients were transfused.

Table 3 indicates the hospital stays and complications encountered. The average hospital stay for patients undergoing total laparoscopic hysterectomies was 2.1 days. In addition, 76 patients (67.8%) were discharged on the 2nd post operative day and 31 patients on the 1st postoperative day. One patient (0.89%) was readmitted on day 10, and treated with deep vein thrombosis.

Table 4 indicates the pathology of the uterine specimens. The uterine weights ranged from 74g – 1029g, the majority of the uteri weighing between 101 – 300g (52.6%). Although delivery of the uterus was preferably effected vaginally, in cases when the uterus was larger than 18 weeks morcellation was undertaken to debulk and deliver the uterus.

Table 3

Hospital stay and complications

Hospital stays:	4 patients discharged the same day of surgery 31 patients on the 1st postoperative day 76 (67.8%) patients on the 2nd post operative day 1 patient stayed for 4 days
One	Patient readmitted on day 10 with Deep vein thrombosis (0.89%)

Table 4

Pathology of uterine specimens (n = 112)

Uterine weight (grams)		
Less than 100g	21	
101 – 300g	59	(52.6%)
301–600g	23	
More than 600g	9	(largest 1029 grams)
	(range: 74g – 1029g)	
Dominant fibroids: (on ultrasound)		
Less than 2cm	3	
3–4cm	65	(58.0%)
5–6cm	31	
More than 6cm	13	
	(largest dominant fibroid on ultrasound 9.2 cm)	
Number of Fibroids		
Nil	17	
0–4	53	(47.3%)
5–8	31	
9–12	7	
More than 12	4	

Table 5

Histology

Adenomyosis	11	
Uterine fibroids	73	(65.1%)
Submucous fibroids	4	
Endometrial polyp	4	
Endometrial hyperplasia	15	
Endometrial carcinoma	4	
CIN	5	

In 58.0% of the cases the dominant fibroid on preoperative pelvic ultrasound ranged from 3–4cm, and the largest dominant fibroid being 9.2cm. The number of fibroids in the uterine specimen varied greatly, majority of specimens (47.3%) having up to 4 fibroids. The various histology encounters are indicated in Table 5, with multiple fibroids being the most common (65.1%).

DISCUSSION

Hysterectomy is the second most frequent surgical procedure in Obstetrics and Gynaecology after Caesarian section. Several descriptions of laparoscopic assistance in hysterectomies have been reported. The most commonly used classification system was

that by Garry *et al* (3), and included a diagnostic laparoscopy with vaginal hysterectomy (DLVH), and a laparoscopically assisted vaginal hysterectomy (LAVH), where the fallopian tubes, round, utero-ovarian and infundibulopelvic ligaments are handled laparoscopically. The uterine vessels, cardinal and uterosacral ligaments were subsequently approached vaginally and the uterus is delivered through the vagina. The vaginal vault was closed vaginally. In the total laparoscopic hysterectomy (TLH), a complete laparoscopic dissection is undertaken until the uterus lies free of all attachments in the peritoneal cavity. The uterus is morcellated within the abdominal cavity or removed vaginally. The vaginal incision is closed laparoscopically using intracorporhoeal sutures (3).

Koh, in 1998 reported that most gynaecologists have shied away from performing any form of laparoscopic hysterectomy due to the technical challenges and the initial prolonged operating times associated with the newer interventions (4). Koh recommended the total laparoscopic hysterectomy as a potential method of choice particularly in cases where the pubic angle was narrow, the vagina small or the uterus high, large and relatively immobile (4). Koh also recommended the laparoscopic assistance in patients presenting with possible adhesions from previous infection, surgery and endometriosis (4).

Perino *et al* presented a randomised study to compare the results between total laparoscopic hysterectomy and abdominal hysterectomy, 102 women aged between 44–71 years were randomly assigned either total laparoscopic hysterectomy (n = 51 patients) or abdominal hysterectomy (n = 51 patients) (5). The demographic characteristics of both groups were similar. The average time employed for total laparoscopic hysterectomy was 104.1 ± 26.98 mm. The mean length of hospital stay was 2.38 ± 0.30 days in the total laparoscopic hysterectomy group versus 6.23 ± 1.85 days in the total abdominal hysterectomy groups ($p<0.001$) (5). In the series presented, our operating times ranged from 32 to 240 minutes, and the patients were 36 to 74 years of age.

The average hospital stay in our series was 2.1 days with 67.8% of the patients being discharged on the second post-operative day. Perino *et al* concluded that total laparoscopic hysterectomy can be effectively performed within reasonable time limits provided that the operators are experienced surgeons in operative laparoscopy, and that the operating times were comparable with those of total abdominal hysterectomy (5). In our series five patients were nulliparous (4.4%). Chapron *et al* (6), in a retrospective study on 66 nulliparous women who were scheduled for total laparoscopic hysterectomy, reported a conversion rate of 19.7% in nulliparous women. In our series no cases were converted to abdominal hysterectomy. In the 80.3% who underwent laparoscopic hysterectomy the average operating time was 152.2 ± 45.7 mm, and the uterine average weight was 238.3 ± 154.1g (6).

Several energy sources have been used by surgeons performing total laparoscopic hysterectomy. In our series, the use of the harmonic scalpel was combined with the use of bipolar coagulation. Winter *et al*, in a study involving 22 cases of total laparoscopic hysterectomy reported no complications following the use of the harmonic scalpel. The average hospital stay for the total laparoscopic hysterectomy group was 1.8 days, compared to 1.9 days for the laparoscopic assisted vaginal hysterectomy, 2.3 days for the vaginal hysterectomy and 2.8 days for the total abdominal hysterectomy patients respectively (7). In our series the average hospital stay was 2.1 days.

In a large scale observational study on hysterectomies, involving 10,110 hysterectomies, Makinen *et al* (8) stressed on the need for adequate training and experience to reduce complications in laparoscopic hysterectomies. The overall rate of complications in the abdominal hysterectomy groups was 17.1%, 23.3% in the vaginal hysterectomy group and 19.0% in the total laparoscopic hysterectomy group. It was also noted that ureteric and bladder injuries were significantly commoner in the laparoscopic hysterectomy group, while bowel complications had a significant predominance in the vaginal hysterectomy group (8). In our series the incidence of complications was 0.89% and no bowel complications were encountered.

Garry *et al* (9) in the evaluate study, compared the outcomes of laparoscopic hysterectomy with abdominal hysterectomy, and the other comparing laparoscopic hysterectomy with vaginal hysterectomy. In this double parallel, multicentre, randomised trial, 1380 women were recruited, 1346 underwent surgery and 937 were followed up for one year. The primary outcomes indicated severe haemorrhage following laparoscopic hysterectomies (4.6%) compared to 2.4% in the

abdominal hysterectomy arm. In the abdominal trial significantly more patients undergoing laparoscopic hysterectomy had major complications, including ureteric injuries and unintended conversions to laparotomy (9). There was however no difference in complication rates between vaginal hysterectomy and laparoscopic hysterectomy.

Overall abdominal hysterectomies were more painful than laparoscopic hysterectomies, with no difference in pain scores in the vaginal hysterectomy trials. In conclusion, laparoscopic hysterectomies was associated with a higher incidence of major complications, took longer to perform and were offset by more patient friendly benefits of less pain, shorter hospital stay, quicker recovery and improved quality of life indicators (10). In our series complication rates were low, operating times were short, conversions were nil and hospital stays averaged 2.1 days.

In conclusion, the debate regarding the validity of laparoscopic Hysterectomy continues ever since its first description in 1989.

As Gynaecologists continue to learn laparoscopic hysterectomy, it is mandatory to achieve an acceptable level of competence so as to minimise complications and provide patients with the safest possible surgery.

Chaparon *et al* (6), in an assessment of total laparoscopic hysterectomy reported a cumulative three year experience in 222 patients. The overall complication rate was 10.0% with 1.8% of the patients being readmitted to hospital. Two of these required subsequent surgery one for a vesico vaginal fistula and one for a cuff wound separation (10). They concluded that provided surgeons had adequate experience in laparoscopic surgery, total laparoscopic hysterectomy appears not to have a higher rate of complications when compared to abdominal and vaginal hysterectomies.

Finally, more publications and randomised trials are warranted in Kenya, to compare the efficacy of laparoscopic hysterectomy in various institutions. The limitation of this publication is that it is a retrospective case analysis.

ACKNOWLEDGEMENTS

To our colleagues who have embraced laparoscopic surgery and have made a difference in how surgery is practiced in Kenya. The administration and staff of the Aga Khan University Hospital, Nairobi, and to our patients who have made their contribution in making this publication a reality.

REFERENCES

1. Parker R.B., Thagana N.G., Baraza R. and Otieno D. Experience with laparoscopic surgery at the Aga Khan Hospital, Nairobi. *East Afr. Med. J.* 2003; **80:** 44-50.
2. Reich H., Decaprio J. and McGlynn F. Laparoscopic hysterectomy. *J. Gynecol. Surg.* 1989; **5:** 213-216.
3. Garry R. and Reich H. Laparoscopic hysterectomy. In: Garry R., Reich H., eds. Laparoscopic hysterectomy, Isted, Oxford: Blackwell Scientific Publications, 1993; 79-117.
4. Koh C.H. A new technique and system for simplifying total laparoscopic hysterectomy. *J. Amer. Ass. Gynecol. Laparosco. Surg.* 1998; **5:** 187-192.
5. Perino A., Cucinella G., Venezia R., *et al.* Total laparoscopic hysterectomy versus Total abdominal hysterectomy: An assessment of the learning curve in a prospective randomized trial. *Human Reprod.* 1999; **12:** 2996-2999.
6. Chaparon C., Dubuisson J.B. and Yann A. Hysterectomy for patients without previous vaginal delivery: Results and modalities of laparoscopic surgery. *Human Reprod.* 1996; **10:** 2122-2126.
7. Winter M.L. and Mendelsohn S.A. Total laparoscopic hysterectomy using the harmonic scalpel. *Obstet. Gynecol.* 1997; **2:** 304-311.
8. Makinen J., Johansson J., Tomas C., *et al.* Morbidity of 10,110 hysterectomies by type of approach. *Human Reprod.* 2001; **7:** 1473-1478.
9. Garry R., Fountain J., Mason S., *et al.* The evaluate study: Two parallel randomized trials, one comparing laparoscopic with abdominal hysterectomy, the other comparing laparoscopic with vaginal hysterectomy. *Brit. Med. J.* 2004; **328:** 129.
10. Chapron C.M., Dubuisson J.B. and Ansquer Y. Is total laparoscopic hysterectomy a safe surgical procedure? *Human Reprod.* 1996; **11:** 2422-2424.