

Pregnancy following laparoscopic myomectomy: preliminary results

Ceana H.Nezhat^{1,2,3,4}, Farr Nezhat^{1,2,3,4},
Michael Roemisch², Daniel S.Seidman¹,
Salli I.Tazuke¹ and Camran R.Nezhat^{1,2,3,4,5,6}

¹Department of Gynecology and Obstetrics, Stanford University School of Medicine, Stanford, ²Center for Special Pelvic Surgery, Atlanta and Palo Alto, ³Department of OB/Gyn, Mercer University School of Medicine Macon, Georgia, ⁴Stanford Endoscopy Center for Training and Technology, Palo Alto and ⁵Department of Surgery, Stanford University School of Medicine, Stanford, USA

⁶To whom correspondence should be addressed at: Stanford Endoscopy Center for Training and Technology, 900 Welch Road, Suite 403, Palo Alto, CA 94304, USA

The objective of this study was to assess the outcome of pregnancy in a series of women who underwent laparoscopic myomectomy. A total of 115 women underwent laparoscopic myomectomy for pressure and pain (76.5%), abnormal bleeding (52.2%) and/or infertility (29.6%). Follow up data were obtained either by reviewing the patient's chart or returned questionnaire. Of the 115 women, there were 42 pregnancies in 31 patients. Two women were lost to follow-up. Of the remaining 40 pregnancies, six ended with vaginal delivery at term. Caesareans were performed in 22 cases, including 21 at term and one at 26 weeks gestation. Two pregnancies were associated with a normal delivery, but the mode of delivery is unknown. Eight resulted in first trimester pregnancy loss, one was an ectopic pregnancy, and one patient underwent elective termination. Spontaneous uterine rupture was not noted during pregnancy or at term in any of the cases. Average length of follow-up from the date of surgery was 43 months, with a range of 9-99 months. Our series did not confirm the hypothesis that laparoscopic myomectomy is associated with an increased risk for uterine dehiscence during pregnancy. However, a larger series is needed to make a conclusive judgement.

Key words: laparoscopic myomectomy/pregnancy complications/uterine dehiscence

Introduction

In selected cases, laparoscopic myomectomy has been reported to be an effective technique that is associated with a low rate of patient morbidity (Nezhat *et al.*, 1991; Hasson *et al.*, 1992; Dubuisson *et al.*, 1996; Stringer, *et al.*, 1996). Because myomectomy is often performed to preserve the uterus for future pregnancy, maintaining the integrity of the uterine wall is of utmost importance. However, three case reports of spontaneous uterine rupture during pregnancy after laparo-

Table I. Number, size and type of myomas in patients

	Patients who became pregnant
Mean (\pm SD) age (years)	34.5 \pm 3.85
Mean number of myomas	3.04 \pm 2.79
Mean size (cm)	5.94 \pm 3.18
Maximal size per patient (cm) (mean \pm SD)	6.27 \pm 2.94
Type of most infiltrating myoma	10.53
pedunculated (%)	
subserosal (%)	47.36
intramural (%)	42.11

scopic myomectomy have raised questions concerning the safety of this technique for women who desire future pregnancy that is associated with a low rate of patient morbidity (Nezhat *et al.*, 1991; Hasson *et al.*, 1992; Dubuisson *et al.*, 1996; Stringer *et al.*, 1996). Because myomectomy is often performed to preserve the uterus for future pregnancy, maintaining the integrity of the uterine wall is of utmost importance (Harris, 1992; Dubuisson *et al.*, 1995; Friedman *et al.*, 1996). We assessed the outcome of pregnancy in a series of women who underwent laparoscopic myomectomy.

Materials and methods

The study population consisted of 115 consecutive women who underwent laparoscopic myomectomy. The main indications for surgery were pressure, pain, and enlarging myoma (76.5%); abnormal bleeding (52.2%); and infertility (29.6%).

Myomectomy by operative laparoscopy was performed using techniques previously described (Nezhat *et al.*, 1991). Briefly, dilute vasopressin is injected into multiple sites between the myometrium and the fibroid capsule. An incision is made on the serosa overlying the myoma using a CO₂ laser, and the incision extended until it reaches the capsule. Two grasping tooth forceps hold the edges of the myometrium, and a suction-irrigator probe is used to shell the myoma from its capsule. A myoma screw is then inserted into the fibroid to apply traction while continuing with blunt dissection. Once unencapsulated, the myoma is removed abdominally using a morcellator. If the uterine defect is deep or large, the myometrium and serosa are approximated using 4-0 polydioxanone or 1-0 polyglactin.

Because the treatment and the study end-points followed our usual clinical practice, no human subjects internal review board approval was necessary. Patients were subsequently followed in prospective fashion regarding fertility and pregnancy outcome during their routine follow-up visits and/or by questionnaire. Follow-up ranged from 9-99 months, with an average of 43 months.

Results

A total of 115 women underwent laparoscopic myomectomy, with a mean operative time of 2.3 \pm 9 h. Surgical complications

Table II. Literature review

Author	No. of patients	Average number of myomas removed (approximate)	Average size of myomas (approximate)	No. of pregnancies achieved	Delivery information
Hasson <i>et al.</i> (1992)	56	144 total (range 1-9)	range 3-16 cm	15	11 normal (including 2 CS), 2 now pregnant, 2 abortions
Dubuisson <i>et al.</i> (1996)	21	2	6.2 cm	7	4 CS, 1 VD, 2 miscarriages
Stringer and Strassner	5	2	3.6 cm	5	3 CS, 1 (1996) miscarriage, 1 TOP
Seinera <i>et al.</i> (1997)	54	1	4.16 cm	5	5 CS
Darai <i>et al.</i> (1997)	143	1.5	5.4 cm	19	3 CS, 8 VD, 4 miscarriages, 3 TOP, 1 ectopic
Nezhat (present)	115	3	5.94 cm	42	19 CS, 6 VD, 3 now pregnant, 8 SAB, 1 ectopic, 1 TOP, 2 term of unknown mode, 2 lost to follow-up

CS = Caesarean section; VD = vaginal delivery; TOP = termination of pregnancy; SAB = spontaneous abortion.

were limited to two cases of postoperative fever greater than 100.5°F after the first 24 h, which were treated with antibiotics, and one case of bladder perforation, which was repaired laparoscopically (Nezhat *et al.*, 1996).

During the follow-up of up to 99 months, there were 42 pregnancies in 31 patients. Two pregnancies were lost to follow-up. Of the remaining 40 pregnancies, six (15%) ended with vaginal delivery at term, 22 (55%) underwent delivery by Caesarean section (21 at term and one at 26 weeks), and two others had term births, but the mode of delivery is unknown. Patients who delivered vaginally all had either pedunculated or subserosal myomas; all of those patients with intramural myomas were delivered by Caesarean. There were eight (21.6%) pregnancies that resulted in first trimester miscarriage and one (2.7%) that was an ectopic pregnancy. Additionally, one patient underwent elective first trimester termination of pregnancy. Spontaneous uterine rupture was not noted during any of the pregnancies or at delivery.

The type and number of myomas removed in patients who had pregnancies is summarized in Table I. Patients who became pregnant were younger (34.5 ± 3.85 versus 37 ± 4.37 years of age), had more myomas (3.04 ± 2.79 versus 2.2 ± 1.8) and had larger myomas removed (5.94 ± 3.18 versus 4.5 ± 2.98 cm) than patients who did not subsequently achieve pregnancy. In patients who had intramural myomas removed and subsequently delivered, the size range of myomas was from 2.0-11.5 cm.

Discussion

One of the concerns regarding laparoscopic myomectomy has been adequate reconstruction and healing of the uterine defect with subsequent ability for the uterus to withstand the elements associated with pregnancy and labour. Pregnancy related uterine dehiscence is an uncommon sequela of myomectomy by laparotomy and has been reported in the literature only sporadically (Garnet, 1964; Schinsky and Benson, 1978; Golan *et al.*, 1980, 1990; Georgakopoulos and Berci, 1981; Pelorme and Friedman, 1996). Its precise incidence remains unknown, as several reports investigating the follow-up of myomectomy failed to document any case of uterine dehiscence (Brown *et al.*, 1956; Davids, 1959; Smith and

Uhlir, 1990). At laparotomy, closure of the excision site is usually accomplished by a multilayered suture. With operative laparoscopy, suturing can be cumbersome and tedious, and restoration of the uterine wall integrity to an equivalent manner may be difficult. Furthermore, extensive use of thermal energy to achieve haemostasis laparoscopically may also compromise uterine tissue.

Three cases of spontaneous uterine rupture during pregnancy after laparoscopic myomectomy have been reported (Harris, 1992; Dubuisson *et al.*, 1995; Friedman *et al.*, 1996). Two of the cases were similar in that the dehiscence occurred following the removal of a 3 cm single intramural fibroid in the posterior uterine wall and closure with absorbable suture (Harris, 1992; Dubuisson *et al.*, 1995). In the third case, a 5 cm intramural fundal myoma was removed, the uterine cavity was entered, and the uterus was repaired laparoscopically (Friedman *et al.*, 1996). Additionally (Dubuisson *et al.*, 1995), a uterine fistula (Nezhat *et al.*, 1994) was found in one woman after second look laparoscopy. The attempt to close the defect with a single figure-of-eight suture without excising the necrotic tissue surrounding the fistula failed to prevent rupture during pregnancy (Dubuisson *et al.*, 1995). The uterine rupture occurred during each of the three pregnancies at either 28.5 weeks (Friedman *et al.*, 1996) or 34 weeks (Harris, 1992; Dubuisson *et al.*, 1995). Fortunately, all of the babies survived with no apparent sequelae and the uteri were repaired.

Aside from the dehiscence case reports, few studies have evaluated pregnancy rate after laparoscopic myomectomy (their results are summarized in Table II). Hasson *et al.* (1992) conducted a series involving 56 patients who underwent laparoscopic myomectomy. Dubuisson *et al.* (1996) performed a similar study of 21 infertile patients who underwent laparoscopic myomectomy for myomas measuring ≥ 5 cm in diameter, and Stringer and Strassner (1996) reported five cases of pregnancy after laparoscopic myomectomy with the harmonic scalpel. Seinera *et al.* (1997) retrospectively evaluated the outcomes of 54 patients with myomas > 3 cm in size. Darai *et al.* (1997) conducted a larger study of 143 patients.

The observed frequency of miscarriages, ectopic pregnancies and preterm deliveries in our series was within normal limits. The present 19% miscarriage rate matches the 19% reported after myomectomy at laparotomy (Buttram and Reiter, 1981).

The increased incidence of Caesareans is not surprising, since this is the recommended method of delivery for women in whom the uterine wall has been deeply penetrated. All of the patients who delivered vaginally had pedunculated or subserosal myomas.

Although the present series did not show any cases of uterine rupture, the three occurrences mentioned above should serve as a warning. These three cases of uterine rupture occurred regardless of the fact that the patients underwent surgery performed in the hands of skilled surgeons with a great deal of experience. Considering that the procedure of laparoscopic myomectomy is rather new, it may not be efficacious for patients who desire future pregnancy, especially when performed by the novice endoscopic surgeon. In any case, laparoscopic myomectomy should be performed cautiously. Excess thermal damage should be avoided and adequate uterine repair must be assured using multiple layer suturing techniques. In some cases where the leiomyoma is deeply embedded in the myometrium and/or is greater than 6–7 cm in size, Gomel suggested a combination of laparoscopy and mini-laparotomy (personal communication), and we have replaced laparoscopic myomectomy with laparoscopically assisted myomectomy (Nezhat *et al.*, 1994). This technique combines the advantages of increased exposure, visibility, and magnification provided by the laparoscope (especially for evaluation of the posterior cul-de-sac and under the ovaries) with the ease of adequate uterine repair and removal of specimen that is associated with mini-laparotomy.

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