



台灣婦產科醫學會 110年 年會

Laparoscopic myomectomy in females with plans for conception

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婦產部 童寶玲

2021.9.25



Jin-Chung Shih

2019年10月18日 · 🌐

[預備懷孕前，先切除子宮腺肌症或肌瘤？]

簡單先說結論，

不建議！

特別是用腹腔鏡或達文西。（轉述時，請勿斷章取義，前後文並載才有意義）

我知道這樣說可能會得罪很多人，但是我已經看到太多悲劇。特別是子宮腺肌症，在懷孕前做部分子宮切除。

子宮肌瘤可沿包囊剝開，傷害較小。

子宮腺肌症切除，卻完全沒有解剖構造的定位，懷孕中子宮破裂機會可能更高。

除非症狀嚴重到會影響受孕（其實機會不高），不然我真的不認為切除會更好。

我已經看到好幾個，反覆懷孕中子宮破裂的悲劇。有的只為了切除一個小小的腺肌症，做了昂貴的達文西，卻導致孕中子宮破裂機會大大增加。

我有一個高齡的親戚，孕前做腹腔鏡子宮肌瘤切除，懷孕到34週子宮破裂，小孩沒了，後來想要再懷孕也已經不可能。

如果預備懷孕，非得作腺肌症或子宮肌瘤的切除，請用傳統開腹手術。做最穩當的子宮縫合。因為無論如何，懷孕時，還是必須要做剖腹生產（怕產中子宮破裂），肚子少不了那一道疤。做腹腔鏡反倒增加更多疤痕。

（以上論點雖未有共識，但已有許多文獻支持）



動態時報 關於 朋友 74位共同朋友 相片 更多 ▾



Outlines

- Myomectomy (LM) before pregnancy ?
- Uterine rupture during pregnancy after LM !!!
- Types of myomectomy: Open, LSC or Robotic ?
- Good technique for LM.

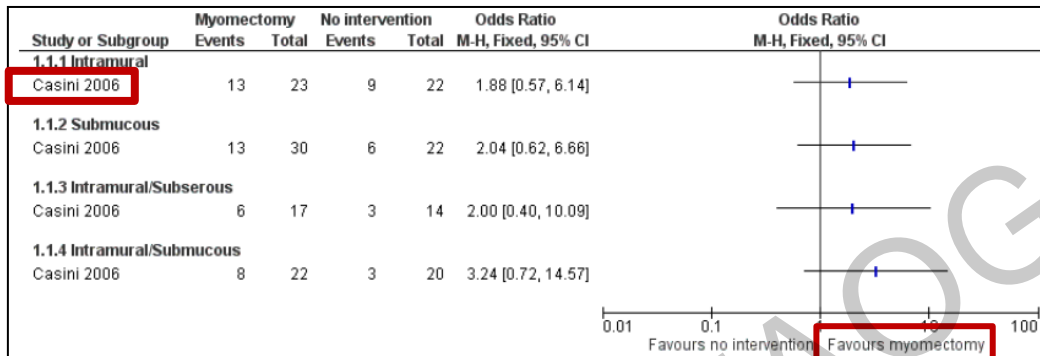
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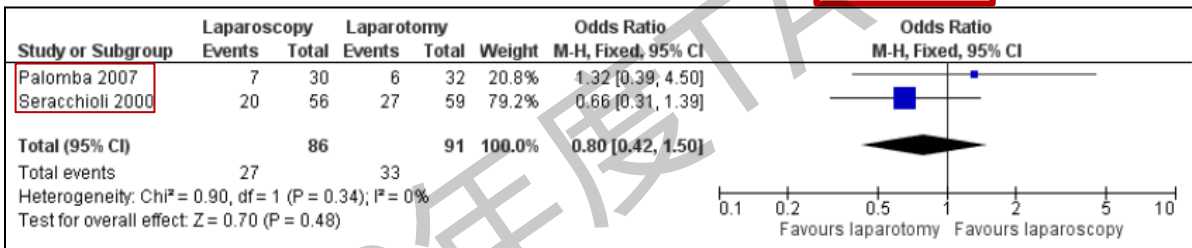
Surgical treatment of fibroids for subfertility (Review)

Metwally M, Raybould G, Cheong YC, Horne AW

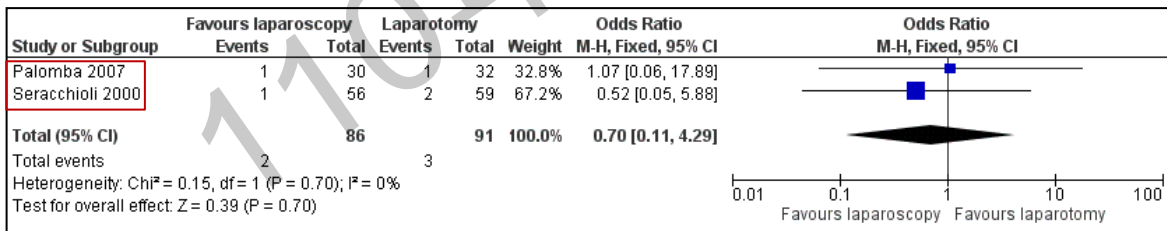
This review included four studies with 442 participants. One study compared myomectomy to no treatment. The remaining three studies compared different surgical methods of performing a myomectomy. The evidence is current to February 2019.



Favours myomectomy
Very low quality of evidence



Lapa better than LSC
1 2



LSC better than mini-lapa
3

Effects of the position of fibroids on fertility

MARIA LUISA CASINI¹, FEDERICA ROSSI², RICCARDO AGOSTINI², & VITTORIO UNFER³

¹Department of Human Physiology and Pharmacology 'Vittorio Erspamer', University of Rome 'La Sapienza', Rome, Italy, ²First Institute of Obstetrics and Gynecology, University 'La Sapienza', Rome, Italy, and ³AGUNCO Obstetrics and Gynecology Centre, Rome, Italy

1998~2005, 193 women with infertility due to myoma (excluded all other cause of infertility: blood test, PC test, HSG, SA) ≤ 35 y/o, sonar: 1 myoma, ≤ 4 cm, randomized study: op or no-op regular fertility orientated intercourse, (op group started 3m after op), F/U 1 yr

Table II. Effect of fibroid location and treatment on pregnancy rate.

Group	Treatment	No. of patients	No. of pregnancies	Pregnancy rate (%)	<i>p</i> Value
SM (<i>n</i> = 52)	With surgery	30	13	Op 43.3	< 0.05
	Without surgery	22	6	No-op 27.2	
IM (<i>n</i> = 45)	With surgery	23	13	56.5	NS
	Without surgery	22	9	40.9	
SS (<i>n</i> = 11)	Without surgery	11	7	No-op 63.6	
IM-SS (<i>n</i> = 31)	With surgery	17	6	35.3	NS
	Without surgery	14	3	21.4	
SM-IM (<i>n</i> = 42)	With surgery	22	8	Op 36.4	< 0.05
	Without surgery	20	3	No-op 15.0	

SM, submucosal; IM, intramural; SS, subserosal; IM-SS, mixed intramural-subserosal; SM-IM, mixed submucosal-intramural; NS, not significant.

SS: not randomized, no op, SM: randomized: op better

Utility of Laparoscopic Uterine Myomectomy as a Treatment for Infertility with No Obvious Cause Except for Uterine Fibroids

Suzuki Memorial Hospital, 2010.6~2014.8, intramural or subserosal myoma
LM group: 46 (>4#, >4 cm); non-LM group: 14.

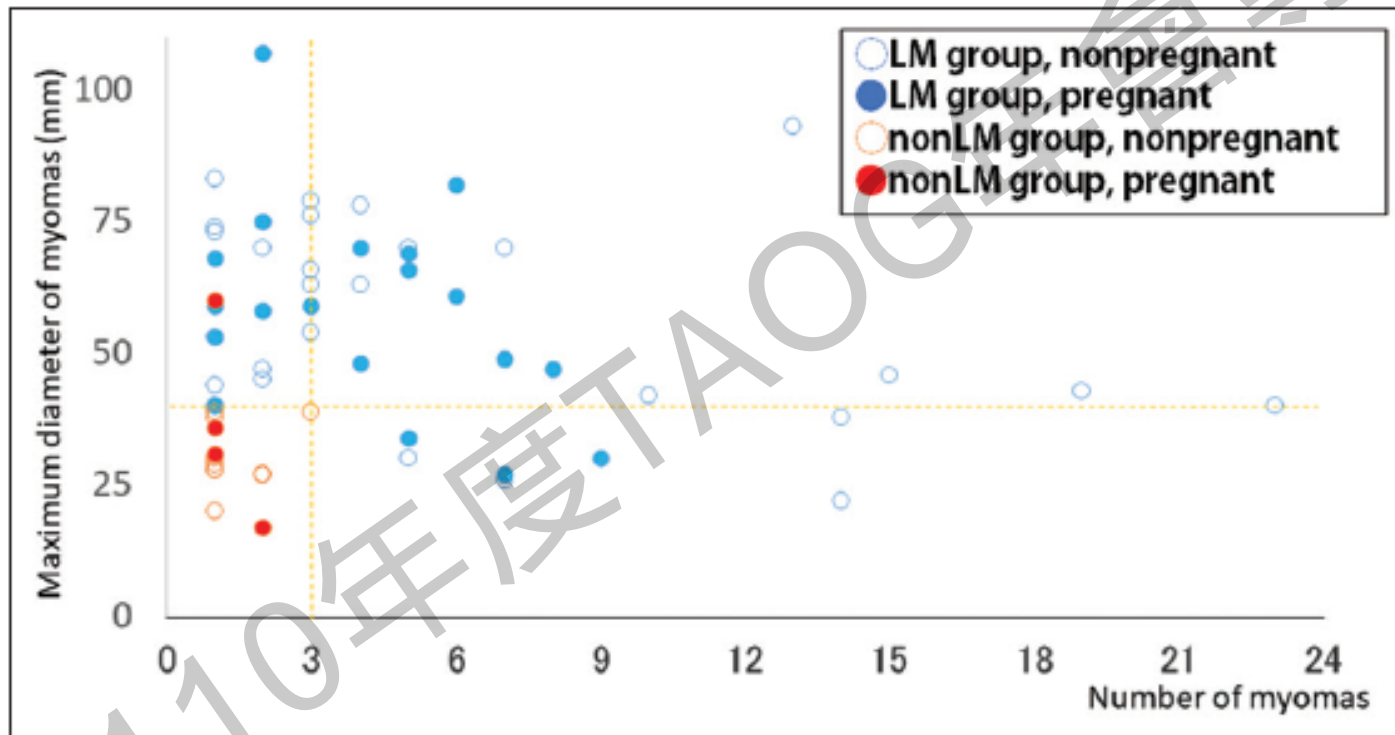


Figure 1: Scatter plot of maximum diameter and number of myomas

Utility of Laparoscopic Uterine Myomectomy as a Treatment for Infertility with No Obvious Cause Except for Uterine Fibroids

Suzuki Memorial Hospital, 2010.6~2014.8

LM group: 46 (>4#, >4 cm); non-LM group: 14

Table 2: Comparison of pregnant or nonpregnant cases in the laparoscopic uterine myomectomy group

	Pregnant (n=21)	Nonpregnant (n=25)	P
Age (years)	35.8±2.7	38.1±3.4	0.021
Duration of infertility before first visit (m)	44.5±34.1	65.7±49.3	0.111
Number of myoma removed	3.8±2.5	6.6±6.0	0.053
Maximum diameter (mm)	56.9±18.2	57.4±18.9	0.93
Operative time (min)	119.8±28.2	140.5±43.5	0.064

LM: Laparoscopic uterine myomectomy

Table 3: Pregnancy details in the laparoscopic uterine myomectomy and the nonlaparoscopic uterine myomectomy group

	LM group (n=21)	Non-LM group (n=4)
Natural pregnancy	11	4
ART	10	0
Interval from LM (m)	10.2±6.7	N/A
Natural delivery	1	2
C/S	13	1
Abortion	3	1
Unknown	4	0

ART: Assisted reproductive technology, C/S: Cesarean section, LM: Laparoscopic uterine myomectomy, N/A: Not available

1. LM is appropriate, except when ≥ 10 uterine fibroids
2. Spontaneous pregnancy occurred without ART after LM

Outlines

- Myomectomy (LM) before pregnancy ?
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- Good technique for LM.

110年度AOG年會專用

Uterine rupture after laparoscopic removal of a pedunculated myoma

Journal of Minimally Invasive Gynecology (2007) 14, 362–364

William H. Parker, MD, Karla Iacampo, MD, and Toni Long, MD

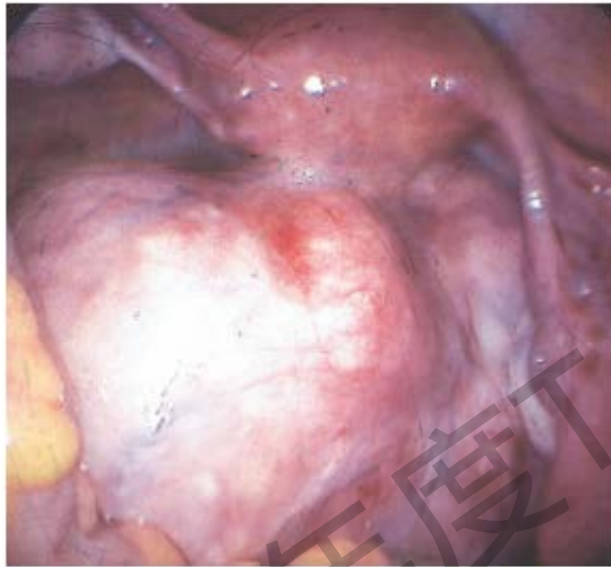


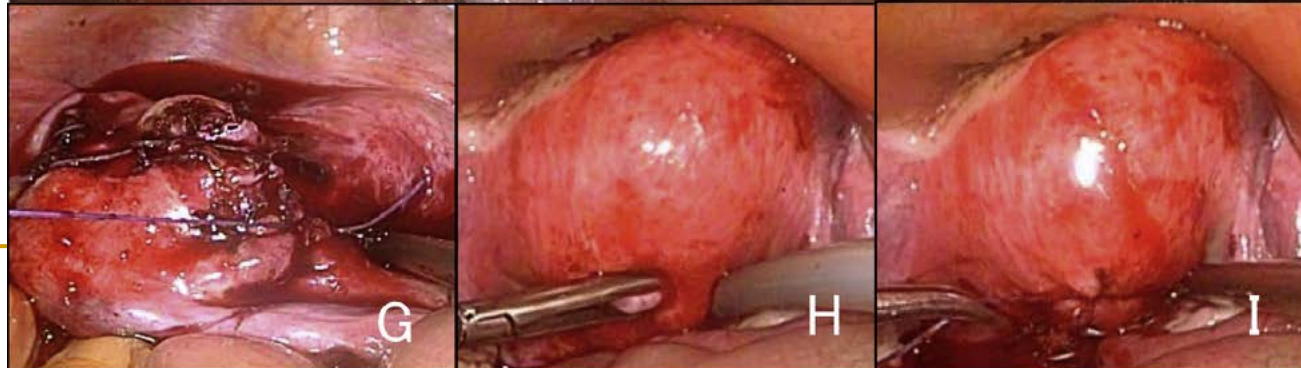
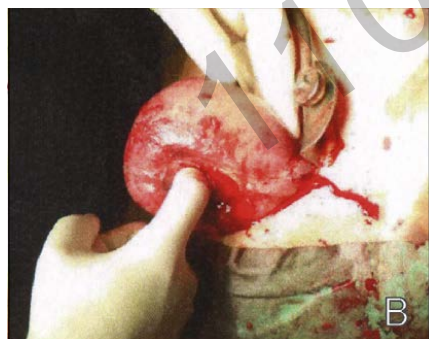
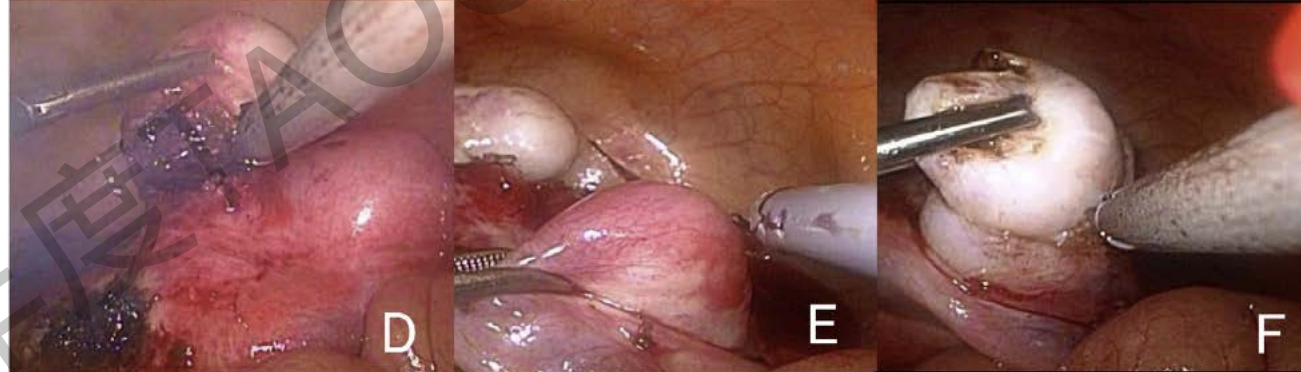
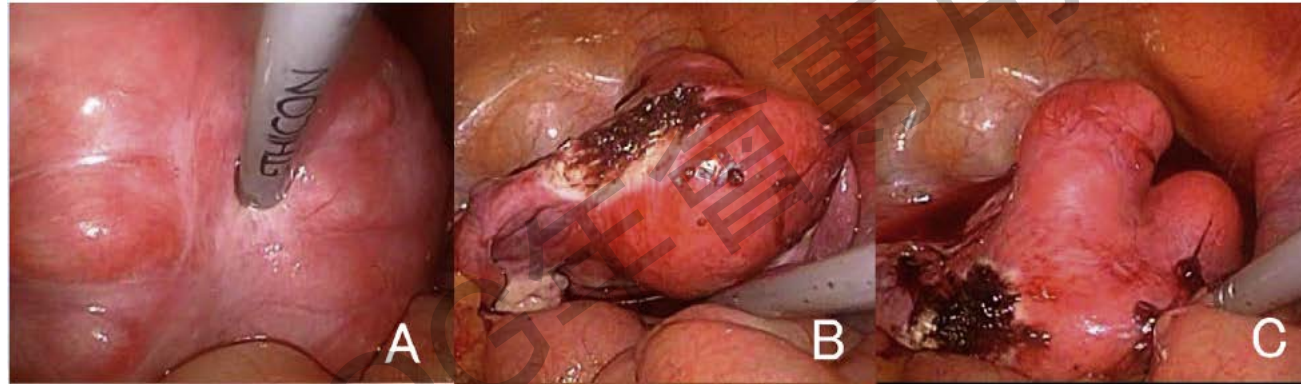
Figure 1 An 11 cm myoma on a 2.5 cm (width) × 1 cm (length) pedicle arising from the posterior uterine fundus.



Figure 2 Wide area of blanching of the posterior fundus where modulated current was widely applied.

7 years later, uterine rupture at GA: 34 weeks → Emergent C/S

Uterine rupture at 33rd week of gestation after laparoscopic myomectomy with signs of fetal distress. A case report and review of literature



Uterine Rupture after LM during subsequent pregnancy

Review Articles: J minim Invasive Gynecol 2010;17:551-4
Taiwan J Obstet Gynecol 2009;48:335-41

21 cases reports
Year of study: 1992-2005
4 fetal expired

Number of myoma: 1 (18/19, 94.7%)

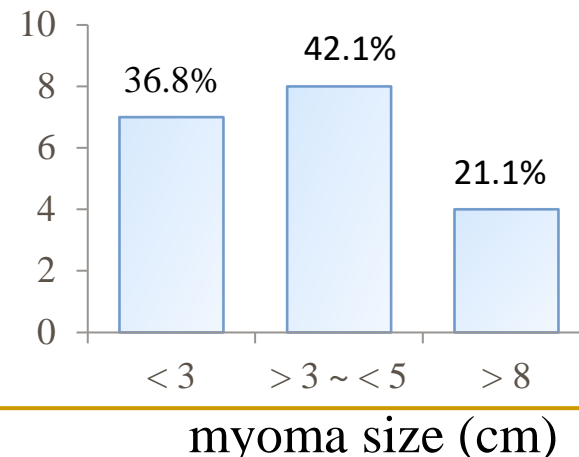
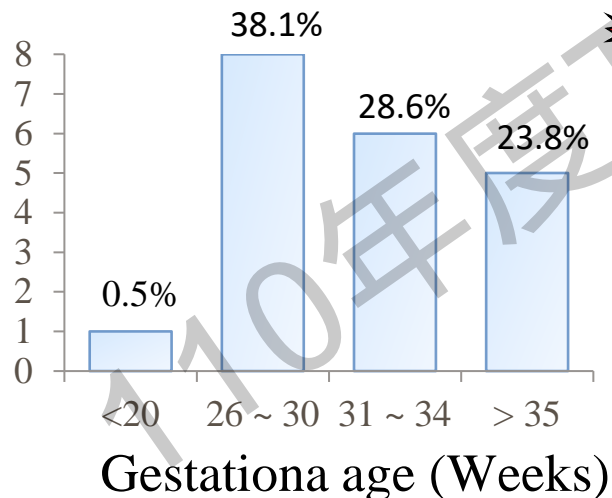
Pedunculated: 4/20 (20%)

Cavity entered: 5/20 (25%)

No suture: 7/18 (38.9%)

★ Multilayer closure: 3/18 (16.7%)

★ Hemostasis: electrocoaguation 17/19 (89.5%)



Report of 7 Uterine Rupture Cases After Laparoscopic Myomectomy: Update of the Literature

Cases reported to the Board of Endoscopic Gynecologic Surgery (Athens, Greece) from 1998 to 2011

Table 1

Patient characteristics and surgical details of uterine rupture cases

Variable	Patient						
	1	2	3	4	5	6	7
Age (yr)	36	34	33	32	40	32	33
Year of surgery	1998	2002	2008	2008	2009	2009	2008
Myoma site	Subserosal	Subserosal	Intramural	Subserosal	Subserosal	Subserosal	2 Subserosal + 1 pedunculated
Myoma size (cm)	5	4	3	5	8	6	2.5 + 2 + 2
Uterine incision	Monopolar scissors	Bipolar scissors	Monopolar scissors	Bipolar scissors	Monopolar scissors	Monopolar scissors	Monopolar scissors
Cavity opened	No	No	No	No	No	No	No
Hemostasis type	Bipolar diathermy + stitches	Bipolar diathermy + stitches	Bipolar diathermy	Bipolar diathermy + stitches	Bipolar diathermy + stitches	Bipolar diathermy + stitches	Bipolar diathermy
Diathermy use	Normal	Excessive	Excessive	Excessive	Excessive	Excessive	Excessive
Stitches	2 Layers	1 Layer	None	1 Layer	1 Layer	1 Layer	None
Anti-adhesion agents	No	No	Yes	No	No	No	Yes
Interval from surgery to pregnancy (yr)	1	1	2	2	2	1	1
Gestational week of rupture	35	34	34	38	24	35	36
Time of rupture	Pregnancy	Pregnancy	Pregnancy	Labor	Pregnancy	Pregnancy	Pregnancy
No. of fetuses	1	1	1	1	2	1	1
Fetal survival	Yes	Yes	Yes	Yes	No	Yes	Yes
Maternal survival	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Laparoscopic myomectomy should be performed by adequately trained and experienced surgeons.

Characteristics of uterine rupture after laparoscopic surgery of the uterus: clinical analysis of 10 cases and literature review

¹Department of Obstetrics and Gynecology, Obstetrics and Gynecology Hospital of Fudan University, Shanghai

2003-2016 ,10 uterine rupture: 6 LM

J Int Med Res 2018;46:3630–9.

Table 2. Intraoperative findings and related data of previous laparoscopic myomectomy in six patients with uterine rupture

Variables	Case					
	1	2	3	4	5	6
Characteristics of myomas removed						
Number	3	2	1	1	1	1
Size, cm	2.5–5	3–10†	6	5.5	8	3
Type	IM	IM	IM	IM	SS	IM
Location	AW/PW*	AW/PW*	AW	PW	PW	PW
Cavity entered	No	No	Yes	Yes	No	No
Method for incision, closure, and hemostasis						
Uterine incision	MP	MP	MP	MP	MP	MP
Suture layers	2	1–2#	2	2	No	1
Use of bipolar electrosurgery	Yes	Yes	Yes	Yes	Yes	Yes
Time interval to LMP, months	14	11	24	26	7	13
Gestational week	33	32	34	38	34	32
Gravidity	2	1	1	2	1	1
Parity	0	0	0	0	0	0

†Myoma of 10 cm in diameter located at the anterior wall. *Location of the rupture site in the subsequent pregnancy.

#One layer for posterior wall and two layers for anterior wall.

IM, intramural; SS, subserosal; AW, anterior wall; PW, posterior wall; MP, monopolar electrosurgery; LMP, last menstrual period.

Characteristics of uterine rupture after laparoscopic surgery of the uterus: clinical analysis of 10 cases and literature review

Table 4. Obstetric outcomes of 10 patients with uterine rupture

Variables	
Fetal outcome	
Intrauterine fetal death	4
Perinatal asphyxia	1
No specific findings	5
Maternal outcome	
Transfusion	7
Hysterectomy	0
Survived	10
No specific findings	3
Surgical findings	
Full-thickness rupture	7
Silent rupture	3*
Other obstetric complications	
Placental abruption	1
Placenta accreta	1
Uterine atony	1

*The three cases of silent rupture included **Cases 1 and 3 (laparoscopic myomectomy)** and Case 2 (laparoscopic salpingectomy).

Pregnancy Outcomes and Risk Factors for Uterine Rupture After Laparoscopic Myomectomy: A Single-Center Experience and Literature Review

Koo YJ (Korea), et al. JMIG 2015;22:1022–8

1994 ~ 2012

523 pregnancy after LM,

Age: 31.7 y/o,

multiparous : 8.4%

35.2% multiple Myoma

50.7% subserosal,

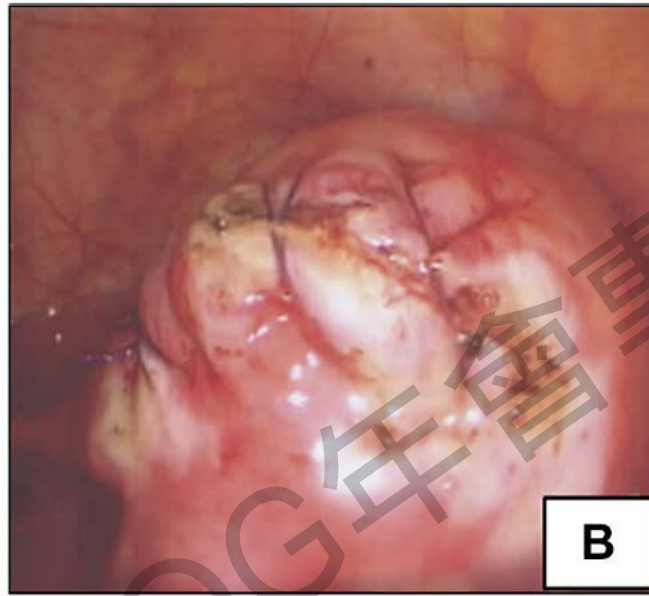
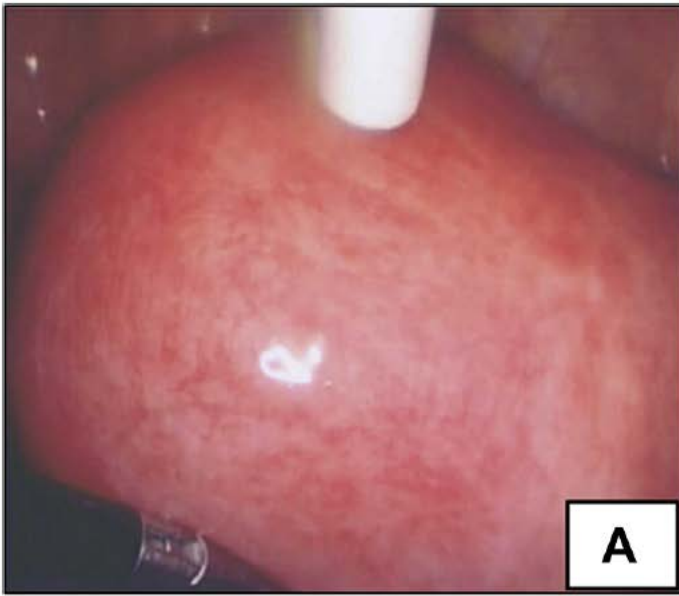
46.5% intramural

31.5% no suture

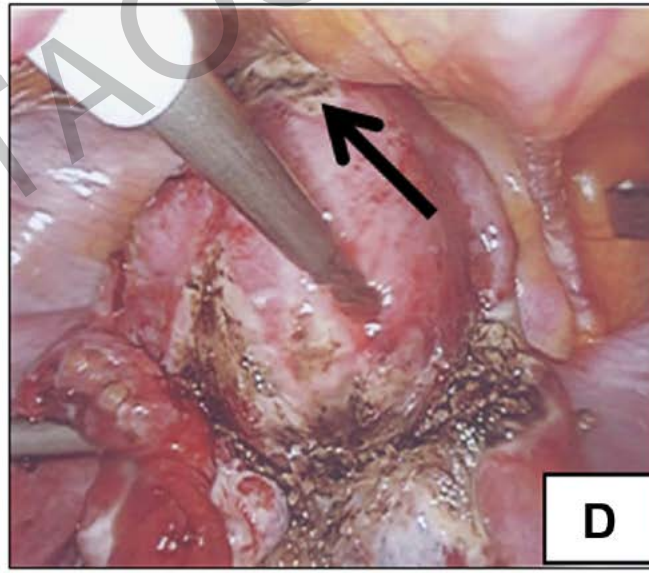
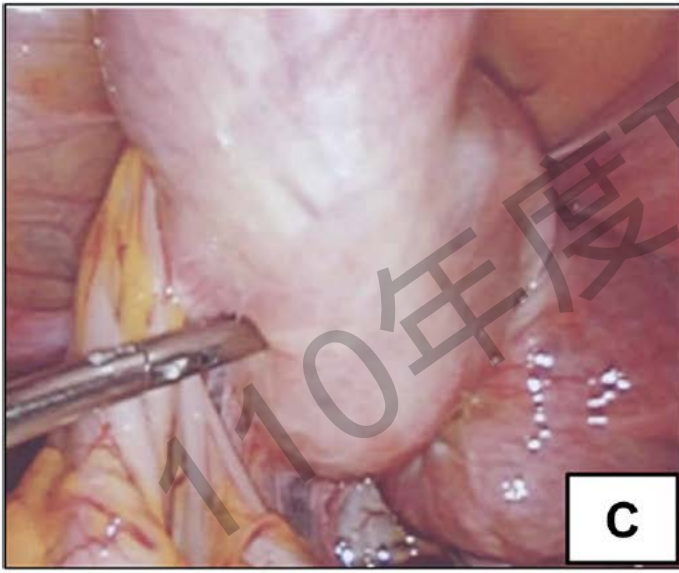
IVF: 26.8%

Obstetric outcomes after 523 LM

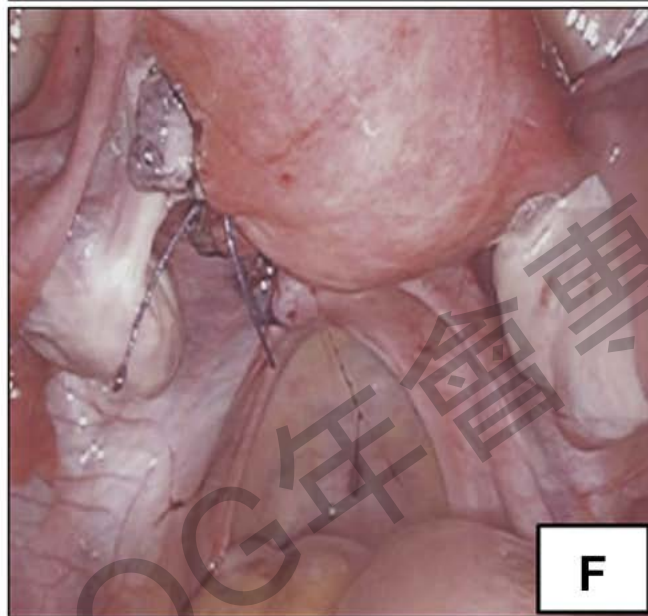
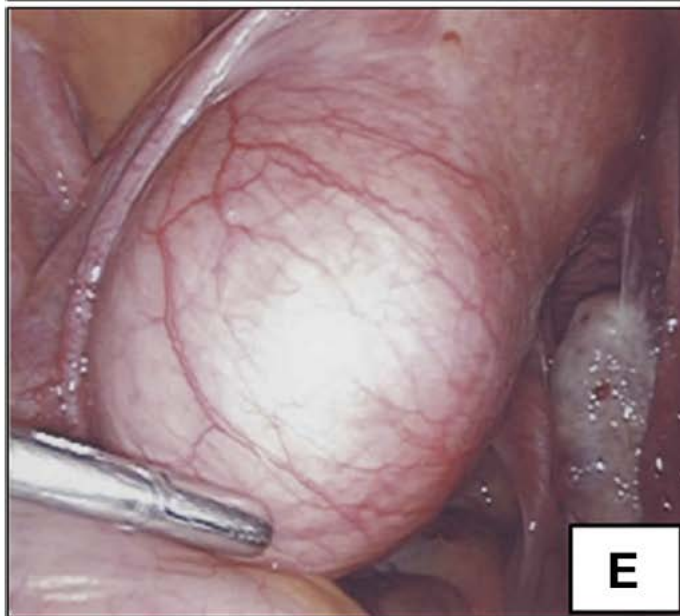
Pregnancy outcome	
Miscarriage (<20 wks)	68 (13.0%)
Preterm delivery [†] (20 ≤ X <37 wks)	54 (10.3%)
Full term delivery (≥37 wks)	401 (76.7%)
Delivery mode	
Spontaneous abortion [†]	59 (11.3%)
Vaginal delivery	100 (19.1%)
Cesarean section	350 (66.9%)
Obstetric complications	
Uterine rupture	3 (0.6%)
Preterm premature rupture of membrane	14 (2.7%)
Cervical incompetence	17 (3.3%)
Placental abnormalities (previa, abruptio, accreta, percreta)	22 (4.2%)
Fetal malpresentation at delivery	23 (4.4%)
Preterm labor	54 (10.3%)



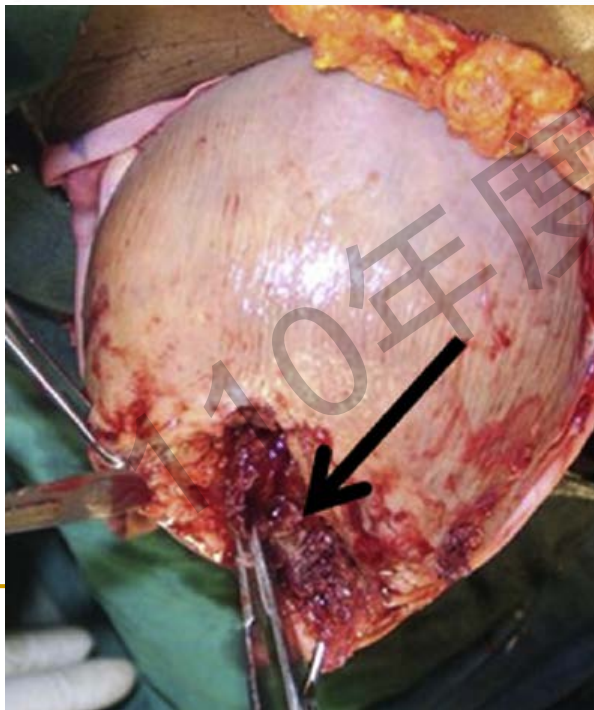
2 layer suture
13 m time interval
Rupture at 37 w



1 layer suture
6 m time interval
Twin pregnancy
Rupture at 36 w
Previous (6y)
myomectomy



1 layer suture
5 m time interval



5 cm uterine rupture at GA 21 weeks
Placenta accrete (+)
Fetal demise

Table 4

Clinical characteristics in uterine rupture from the cases of published studies (n = 34) and the present study (n = 3)

Variables	Total 37 cases
Age, yrs	32.5 (24–41, 26 cases)
Multiparous women	6.3% (1/16)
No. of myomas removed	
Single	90.6% (29/32)
Multiple	9.4% (3/32)
Myoma size, cm	4 (1.2–11, 30 cases)
Small myoma (≤ 3 cm)	32.4% (11/34)
Type of myoma	
Intramural	47.2% (17/36)
Subserosal or pedunculated	52.8% (19/36)
Intraligamentary	0
Location of the myoma	
Uterine anterior wall	23.5% (4/17)
Uterine posterior wall	47.1% (8/17)
Other	29.4% (5*/17)
Cavity entered	20% (7/35)
Suture of the uterine defect	63.3% (19/30)
Time between myomectomy and pregnancy, mo	12 (6 wks–8 yrs, 25 cases)
Time of rupture (gestational wks)	34 (17–40, 37 cases)
Rupture during labor	8.3% (3/36)

Clinical characteristics in cases with uterine rupture

nulliparous
Single myoma

52.8% subserosal or pedunculated

20% cavity entered
(41.2% for intramural)

8.3% rupture during labor

Pregnancy Outcomes and Risk Factors for Uterine Rupture After Laparoscopic Myomectomy: A Single-Center Experience and Literature Review

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Placenta accreta spectrum in subsequent pregnancy following myomectomy

Aya Mohr-Sasson^{a,b} , Idan Timor^a, Raanan Meyer^{a,b} , David Stockheim^{a,b}, Raoul Orvieto^{a,b} and Roy Mashiach^{a,b}

^aDepartment of Obstetrics and Gynecology, Sheba Medical Center, Tel-Hashomer, Israel; ^bSackler School of Medicine, Tel Aviv University, Tel Aviv, Israel

2011 ~ 2019,
pregnancy after myomectomy: 241 → complete F/U: 199

Table 2. Placental characteristics at subsequent pregnancy.

	Surgical approach			p Value
	Laparoscopy (n = 82) n, (%)	Laparotomy (n = 89) n, (%)	Hysteroscopy (n = 28) n, (%)	
Placenta accreta spectrum	1 (1.2)	1 (1.1)	1 (3.6)	.63
Placenta previa	2 (2.4) 3.6%	1 (1.1) 2.2%	0 (0) 3.6%	.61
Manual lysis	51 (62.2)	62 (69.7)	11 (39.3)	.01
Vaginal delivery	11 (36.3%)	5 (6.1%)	4 (4.5%)	p<.001

Subsequent pregnancy following surgical myomectomy is **not associated** with higher prevalence of placental abnormality

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Fertility after Laparotomic/LSC/Robotic myomectomy

	Palomba et al 2007	Campo et al 2002	Flyckt et al 2016	Dubuisson et al 2000	Huberlant et al 2019
Study	Randomized control Multicentric	Retrospective Unicentric	Retrospective Unicentric	Prospective. Unicentric	Retrospective. Unicentric
Surgery	Laparotomy and laparoscopy	Laparotomy and laparoscopy	Laparoscopy and robot	Laparoscopy	Robot
Follow-up (months)	12	65	96	40	32
Number of patients desiring pregnancy (n)	30	41	67	263	49
Pregnancy rates (%)	26	60	66% laparotomy group. 50% laparoscopy group	37.2	51
Significant difference on fertility ^a	yes ^b	no	No	NA	NA
Mean time to pregnancy (months)	5	NR	NR	NR	18
Uterine rupture rate (%)	NR	0	0	1	0

Int J Med Robot. 2019;e2059.

<https://doi.org/10.1002/rcs.2059>

Fertility after Laparotomic/LSC/Robotic myomectomy

	Pitter et al 2015	Lönnfors et al 2011	Cela et al 2013	Bernardi et al 2014	Seracchioli et al 2000
Study	Retrospective Multicentric	Prospective Unicentric	Retrospective Unicentric	Retrospective Unicentric	Randomized Comparative
Surgery	Robot	Robot	Robot	Laparoscopy	Laparotomy and laparoscopy
Follow-up (months)	36	30	6	73	32
Number of patients desiring pregnancy (n)	344	22	9	56	66
Pregnancy rates (%)	50.8	68.2	77.8	68	53
Significant difference on fertility ^a	NA	NA	NA	NA	no
Mean time to pregnancy (months)	10	10	16	25	NR
Uterine rupture rate (%)	1.1	0	0	10	0



Int J Med Robot. 2019;e2059.

<https://doi.org/10.1002/rcs.2059>

Uterine rupture in pregnancy after **robotic** myomectomy

Robotik myomektomi sonrası gebelikte uterus rüptürü

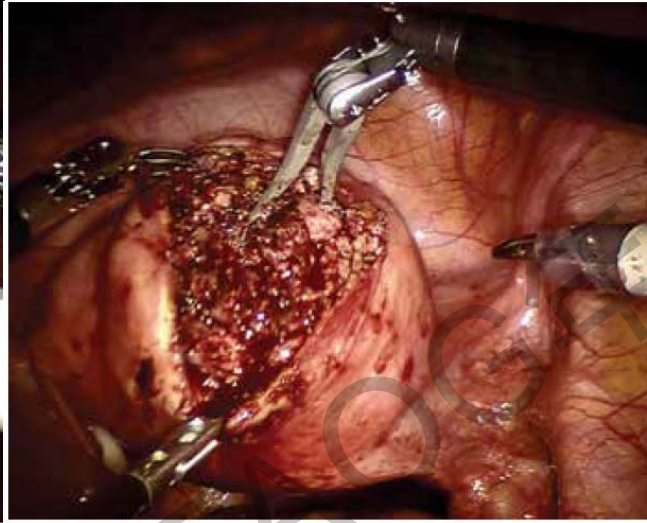
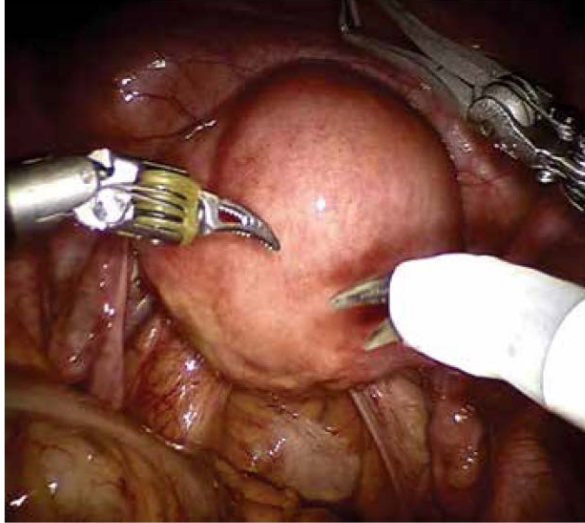
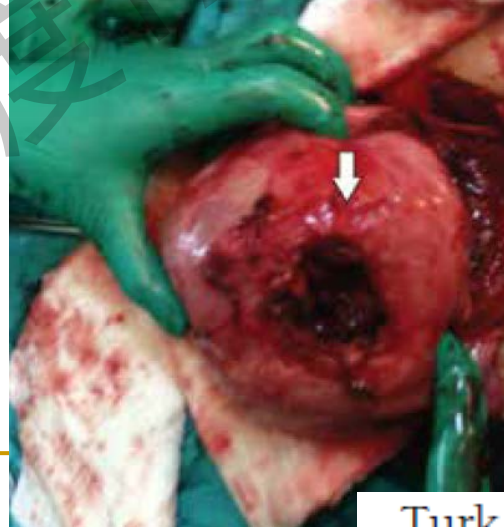
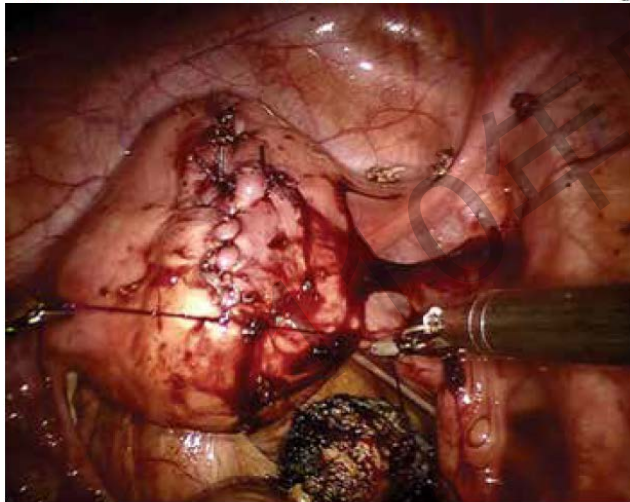


Figure 3. Six cm intramural myoma on the anterior wall of uterus Figure 4. Myoma extirpating using arms

Figure 5. Suturing inner layer of wall defect



2 years later, uterine rupture at GA: 33 weeks → fetal death

Figure 6. Suturing outer layer of wall defect

Fertility and Symptom Relief following Robot-Assisted Laparoscopic Myomectomy

Nashville Fertility Center, GW + Newark Beth Israel Medical Center, MP
+ California Pacific Medical Center, KL

2005 ~ 2013 RM, N = 426, post op F/U: 2.5 y (7.5y~ 1 m)

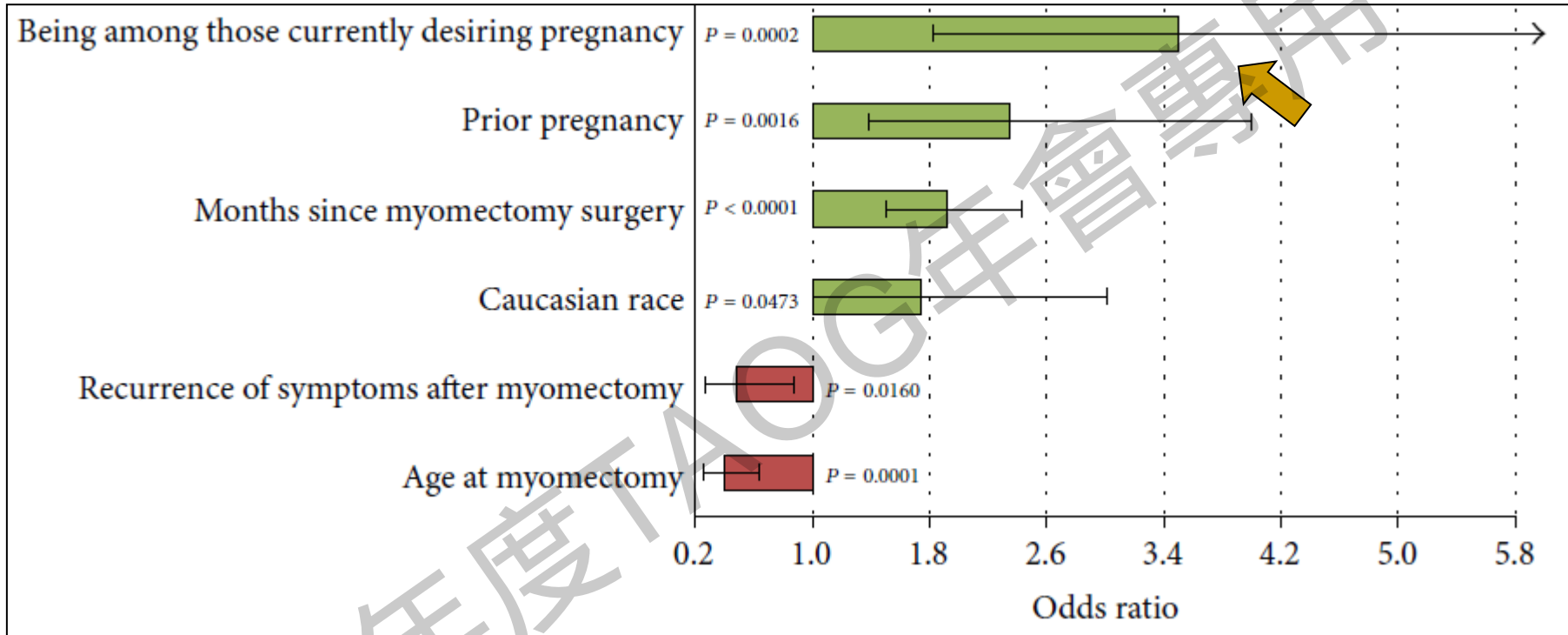
Group 1: (N=82) for symptoms,

Group 2 (N=281) for symptoms and pregnancy preservation, Group 3 (N=63) for pregnancy

TABLE 2: Characteristics of women who achieved pregnancy after myomectomy.

Characteristics	Group 2 ^a N = 281	Group 3 ^b N = 63	Total
Months to achieve pregnancy after starting to attempt			
Number of patients	N = 77	N = 31	N = 108
Mean ± SD	8.2 ± 10.1	7.3 ± 7.5	7.9 ± 9.4
Range	(1-60)	(1-32)	(1-60)
Months to achieve pregnancy after myomectomy			
Number of patients	29.2% N = 82	N = 32 50.8%	N = 114
Mean ± SD	13.0 ± 11.1	10.6 ± 8.3	12.3 ± 10.3
Range	(2.5-64.5)	(2.5-33.5)	(2.5-64.5)
Used medications or procedures to achieve pregnancy, n (%)	16/80 (20.0)	15/32 (46.9)	31/112 (27.7)
Age at pregnancy, yrs	35.7 ± 5.0 ^c	37.7 ± 5.3	36.3 ± 5.1
Age at pregnancy for women with a complication, yrs	34.5 ± 6.2	33.5 ± 0.0	34.4 ± 5.9
Complications during pregnancy, n (%) ^d	12 (15.6)	1 (3.2)	13 (12.0)
Premature delivery <37 wks	10 (13.0)	1 (3.2)	11 (10.2)
Abnormal placentation	4 (5.2)	0	4 (3.7)
Uterine rupture	1 (1.3)	0	1 (0.9)
Miscarriage during pregnancy, n (%)	25/82 (30.5)	12/32 (37.5)	37/114 (32.5)

Factors independently associated with achieving pregnancy.



Higher complication rate during pregnancy in women in group 2 (who request for symptoms and pregnancy preservation) (not significant difference)  why ?

Outlines

- Myomectomy (LM) before pregnancy ?
- Uterine rupture during pregnancy after LM !!!
- Types of myomectomy: Open, LSC or Robotic ?
- **Good technique for LM/RM:**
 - Suture technique
 - preservation of vascularity
 - no endometrial penetration

Pregnancy outcomes following laparoscopic myomectomy and single-layer myometrial closure

Human Reproduction Vol.21, No.12 pp. 3278–3281, 2006

P.G.Paul, Aby K.Koshy¹ and Tony Thomas

Center for Advanced Endoscopy and Infertility Treatment, Paul's Hospital, Cochin, Kerala, India

1993–2003 LM
506 questionnaire
115 Pregnancy

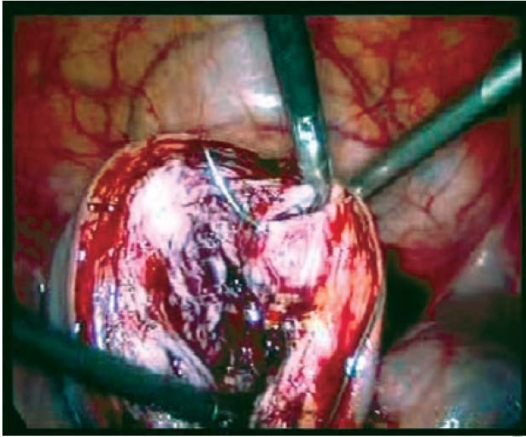


Figure 1. Suturing the cut edges after myomectomy.

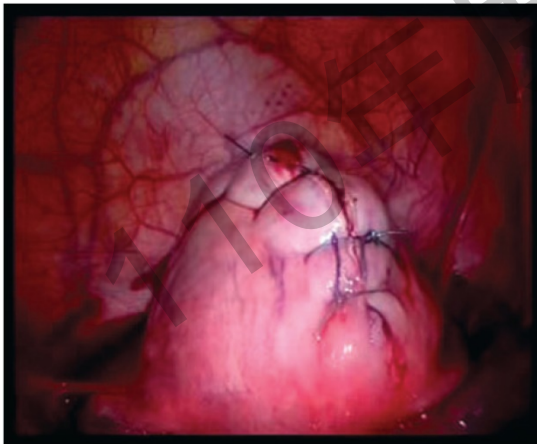


Figure 2. After single-layer closure of myometrium.

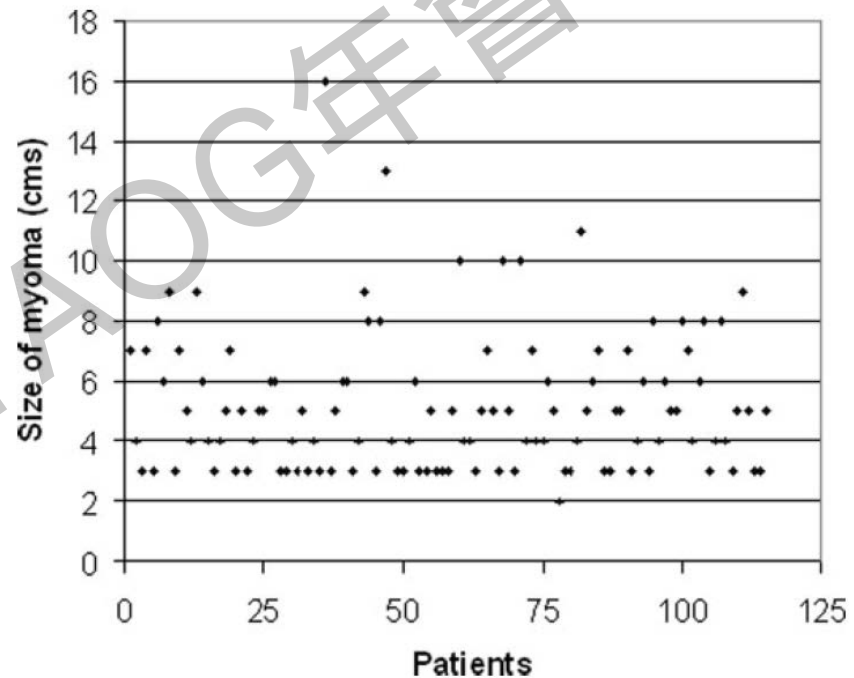


Figure 3. Diameter of largest myoma enucleated.

Median diameter: 5 cm (range 3–16 cm)
intramural (151, 84.8%)

Pregnancy outcomes following laparoscopic myomectomy and single-layer myometrial closure

115 Pregnancy

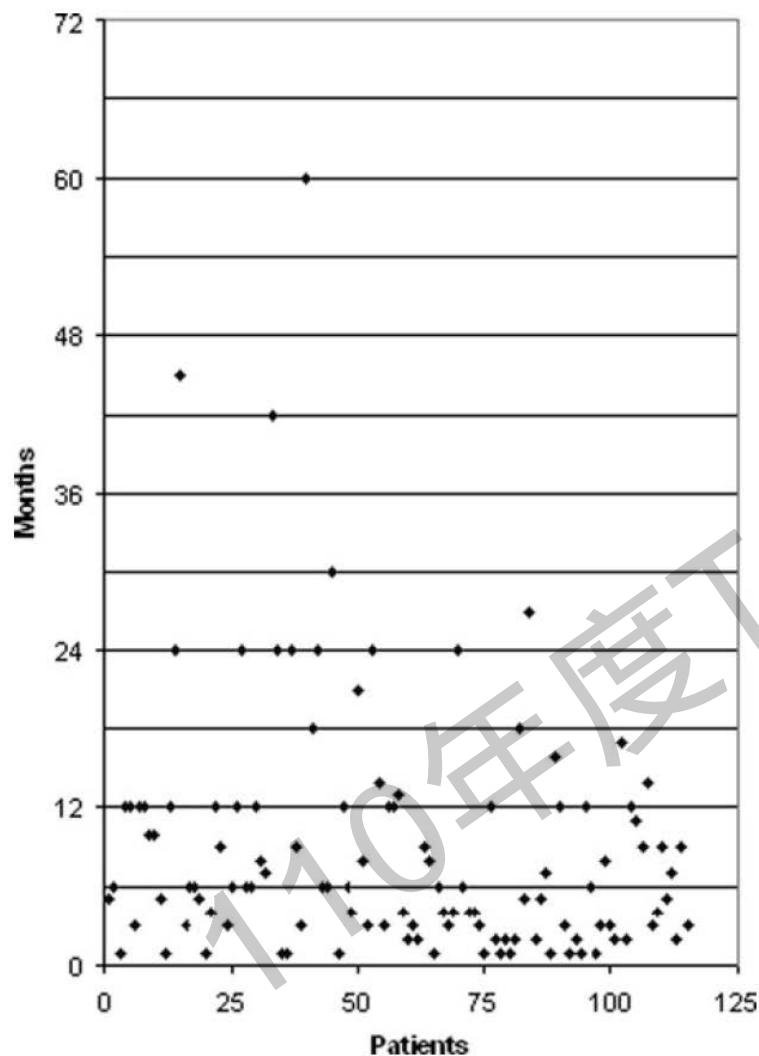


Table I. Pregnancy outcomes following myomectomy

Pregnancy outcomes	Number
Women who became pregnant	115
Total number of pregnancies	141
LSCS	85
Preterm LSCS	2
Term vaginal delivery	17
Preterm vaginal delivery	1
Vaccum	1
Abortion	28
Termination for fetal anomalies	1
Ectopic pregnancy	6

17.9%

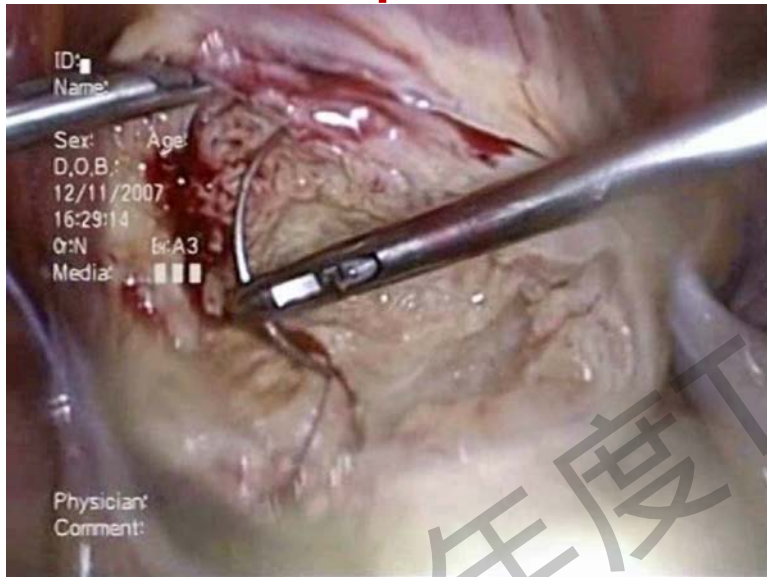
Uterine Rupture: 0

Interval: 8.9 ± 9.4 m (range 1–60 m)

Figure 4. Interval between myomectomy and conception.

子宮縫合:

Interrupted

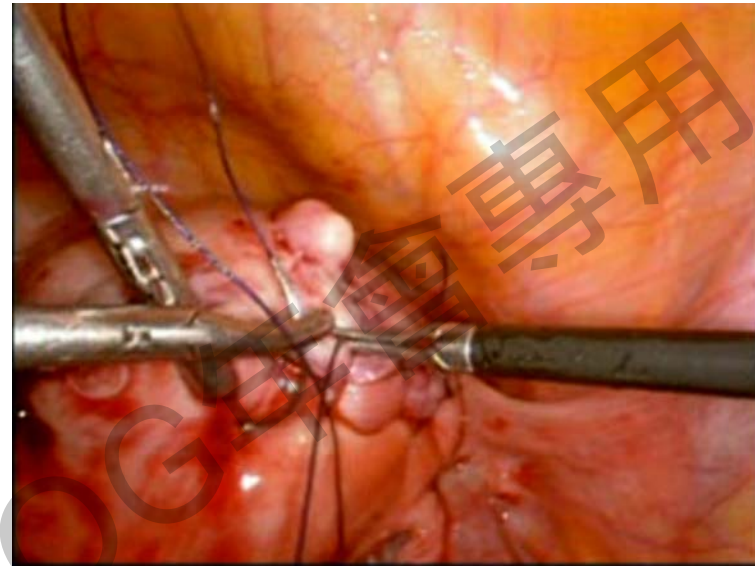


Adenomyosis, NTUH

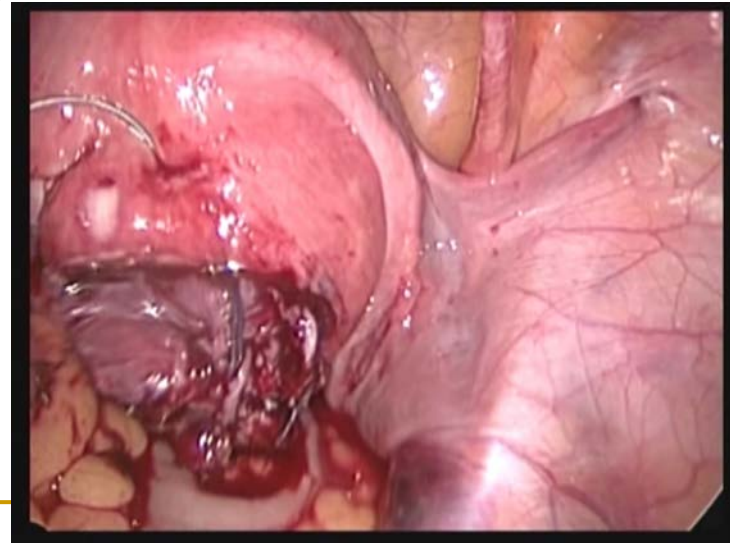
2 layers

Lembert Suture

Continuous

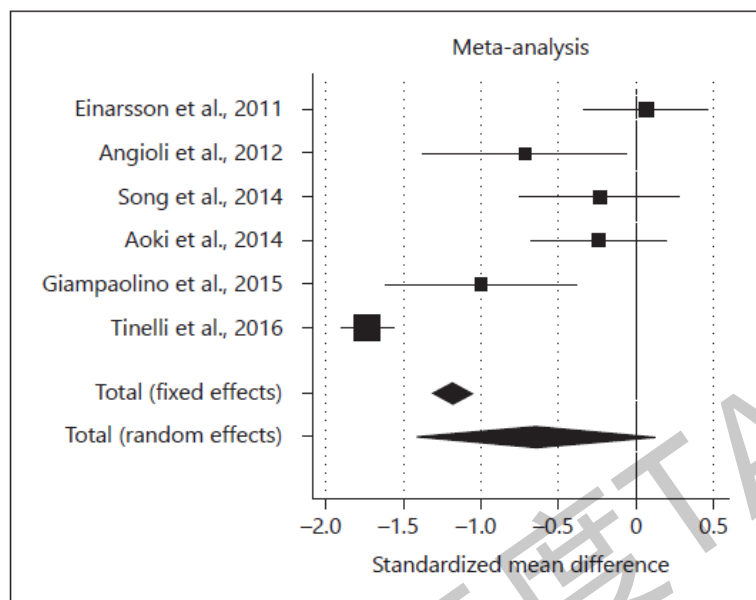


Koo et al., Korea Surg Endosc 2011;25:2382

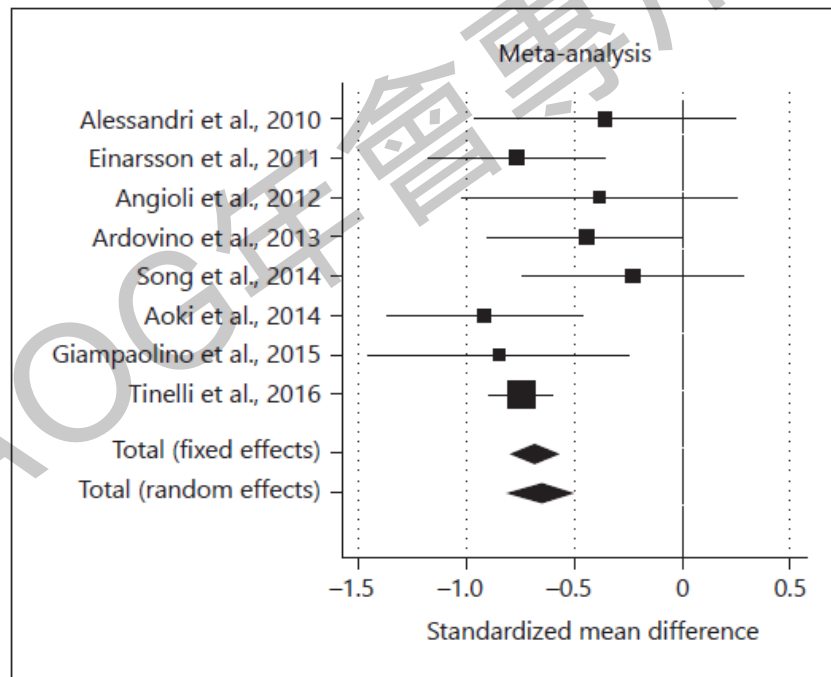


Torng et al., NTUH SILS-port V-Loc™

What Is the Role of **Barbed Suture** in Laparoscopic Myomectomy? A Meta-Analysis and Pregnancy Outcome Evaluation



blood loss



total operative time

Barbed suture significantly facilitates LM by reducing the total operative/suturing time, estimated blood loss/Hb drop, and reduction of perioperative complications.

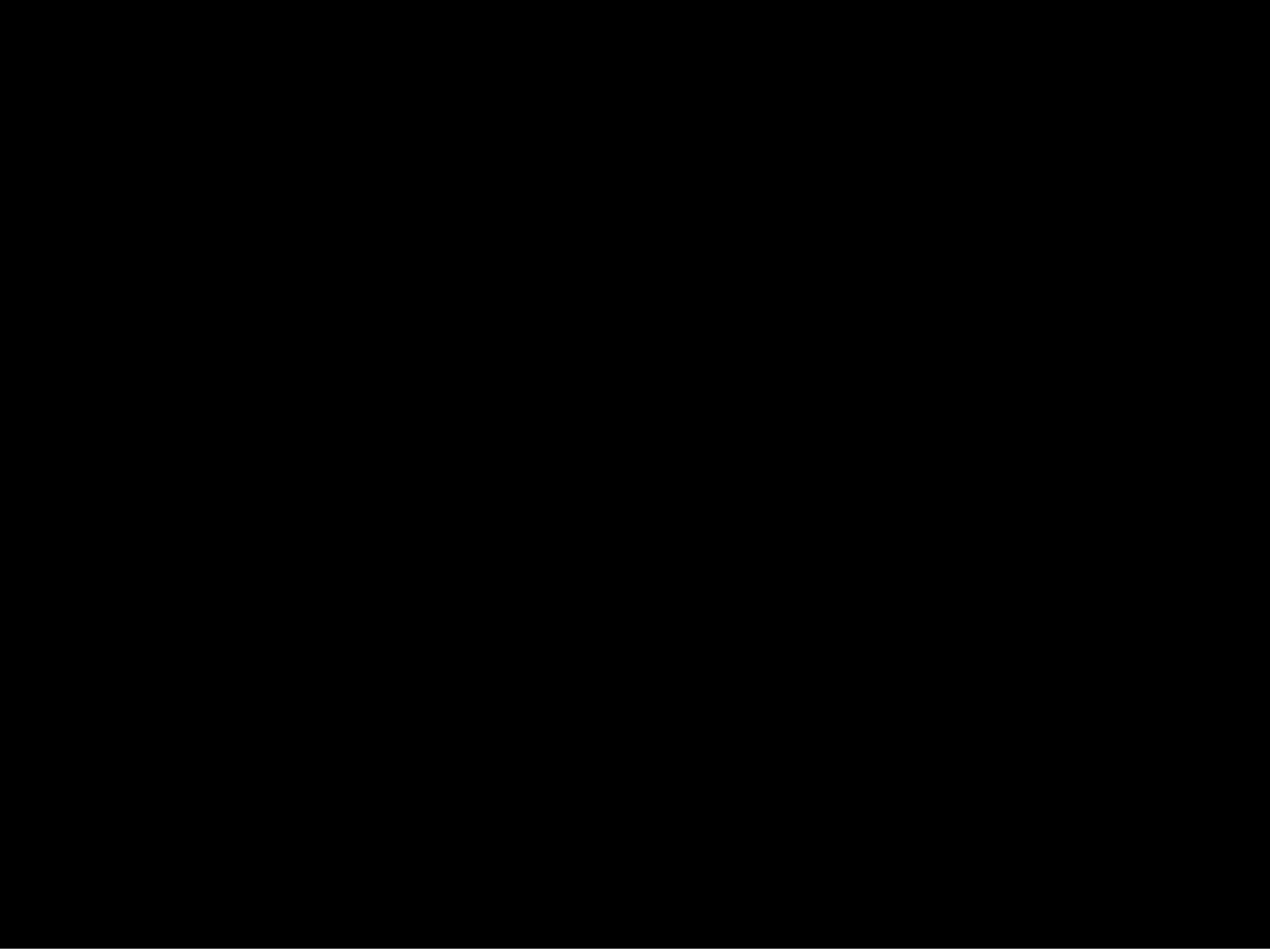
Table 3. Studies of laparoscopic myomectomy with or without barbed suture peroperative complications data

Authors and year of publication	Complications barbed group, <i>n</i>	Complications control group, <i>n</i>
Alessandri et al. [19], 2010	0	0 22 vs 22
Einarsson et al. [20], 2011	1 blood transfusion, 1 ileus, 2 incision site infection, 4 urinary tract infection	1 intraoperative complication, 2 urinary tract infection 107 vs 31
Angioli et al. [6], 2012	1 fever, 1 urinary infection	1 fever 19 vs 20
Ardivino et al. [15], 2013	0	0* 0° 36 vs 81
Song et al. [30], 2014	0	0 30 vs 30
Aoki et al. [29], 2014	0	0 41 vs 42
Giampaolino et al. [31], 2015	1 fever, 1 urinary infection	2 fever 24 vs 23
Tinelli et al. [32], 2016	1 blood trasfusion, 5 port site haematoma, 13 post opertaive haematoma, 22 fever	27 fever, 3 blood trasfusion, 9 port site haematoma, 22 post operative haematoma 360 vs 360

* Extracorporal knots.

° intracorporal knots.

The authors reported an haematoma in post-operative time without specifying in which group of patient it was occurred.

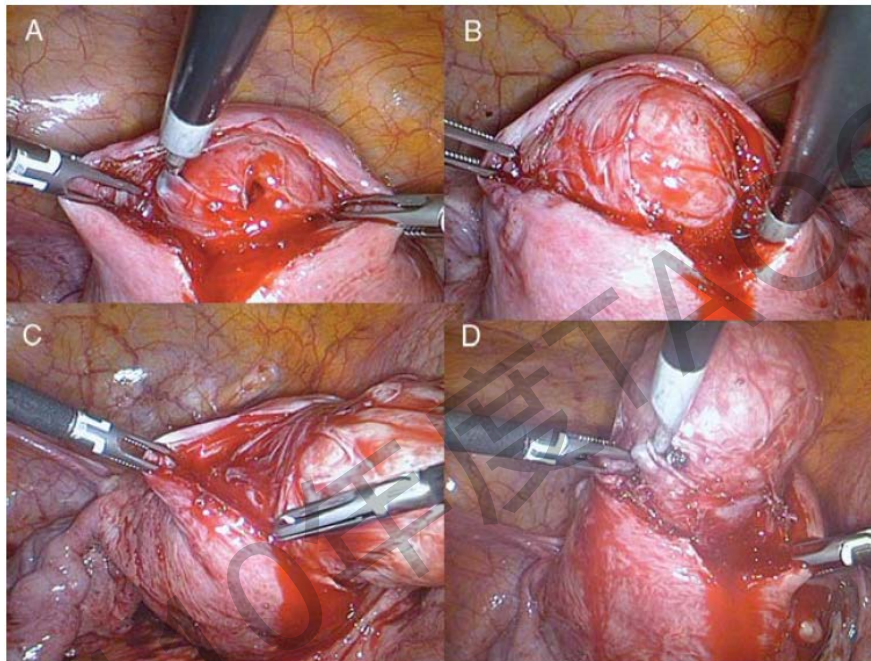


Outlines

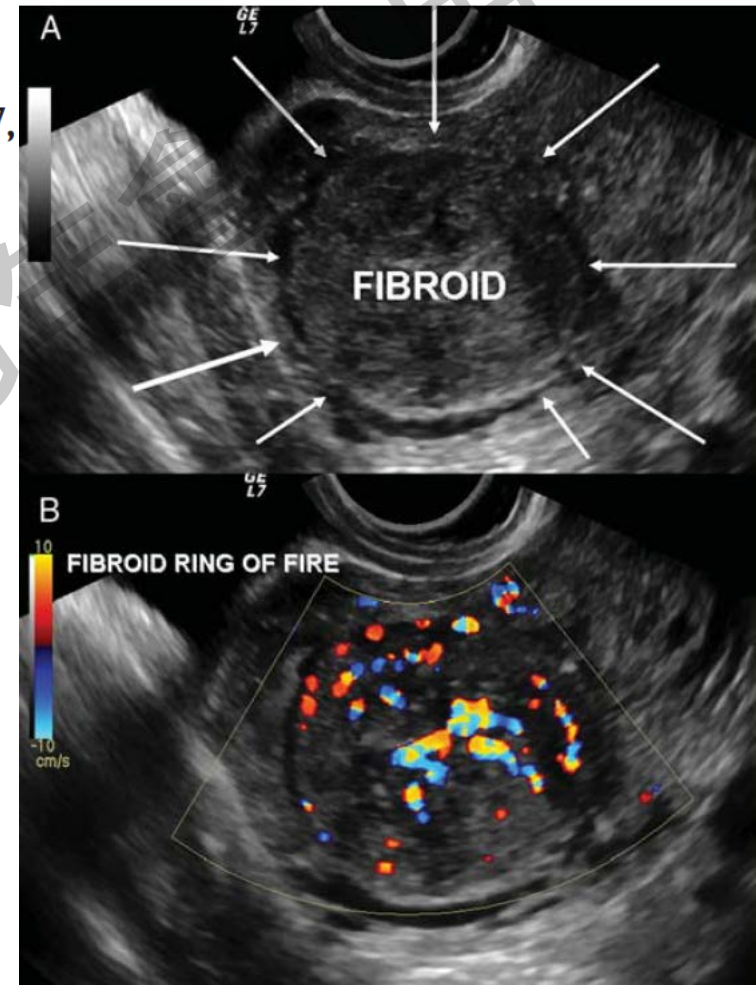
- Myomectomy (LM) before pregnancy ?
- Uterine rupture during pregnancy after LM !!!
- Types of myomectomy: Open, LSC or Robotic ?
- **Good technique for LM:**
 - Suture technique
 - preservation of vascularity
 - no endometrial penetration

Laparoscopic myomectomy focusing on the myoma pseudocapsule: technical and outcome reports

Andrea Tinelli^{1,*}, Brad S. Hurst², Gernot Hudelist³, Daniel Alberto Tsin⁴, Michael Stark^{5,6}, Liselotte Mettler⁷, Marcello Guido⁸, and Antonio Malvasi⁹



Myoma with peripheral “ring of the fire” of the pseudocapsule bundle



Laparoscopic myomectomy focusing on the myoma pseudocapsule: technical and outcome reports

Andrea Tinelli^{1,*}, Brad S. Hurst², Gernot Hudelist³, Daniel Alberto Tsin⁴, Michael Stark^{5,6}, Liselotte Mettler⁷, Marcello Guido⁸, and Antonio Malvasi⁹

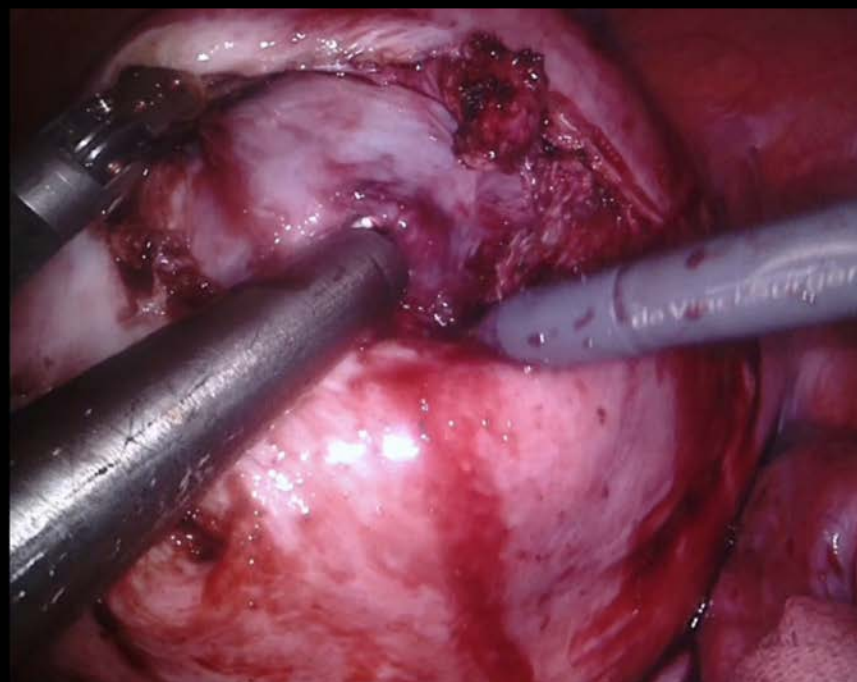
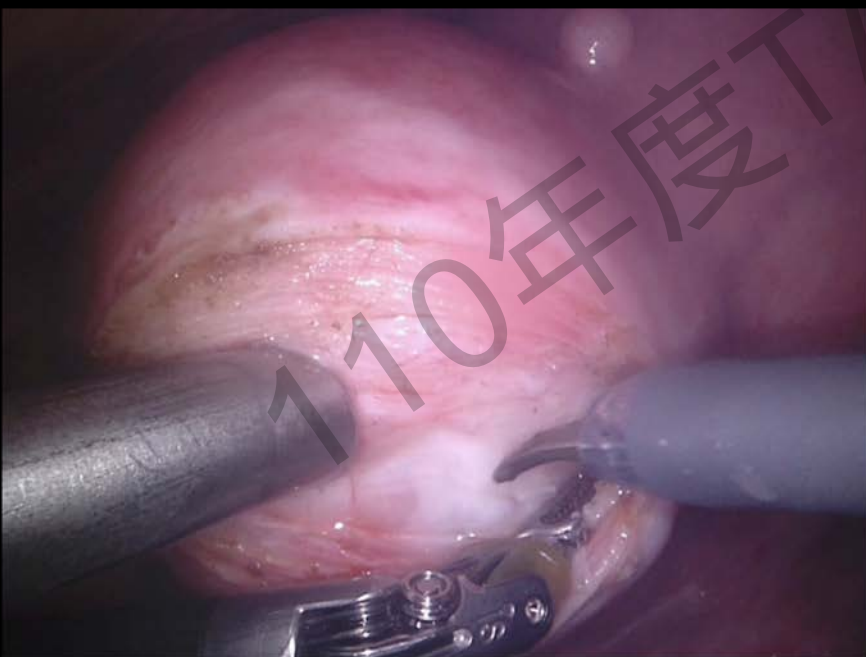
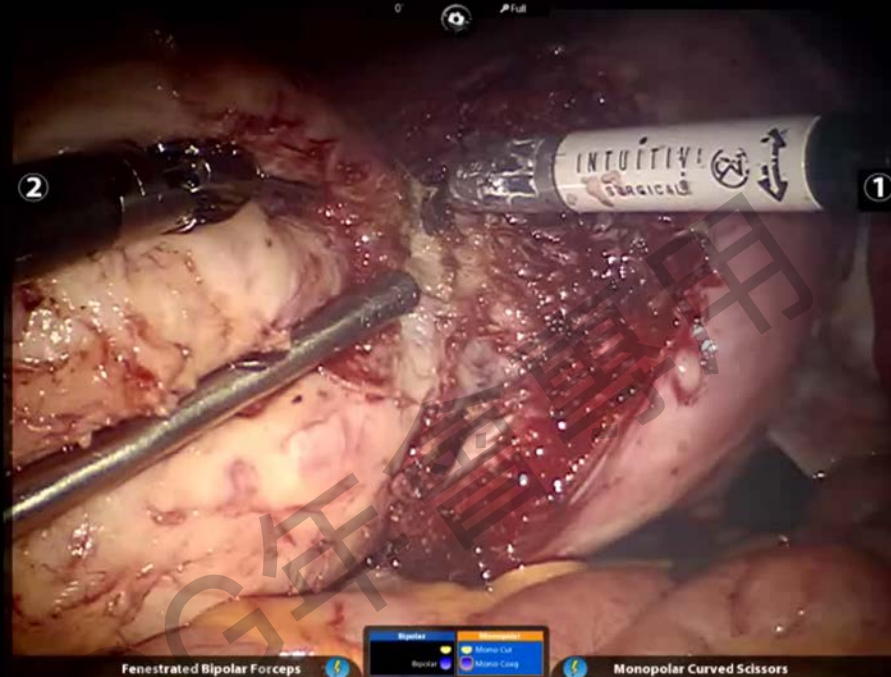
2005~2010, 235 cases
 Women with LM for infertility, 74% (n=97) conceived.
No uterine rupture

Table III Data of 97 pregnancies after myomectomy, delivered by Caesarean section (CS), OVD or VD.

No. of patient for type of delivery	No. of multiple myomas for patients	No. of single fibroid for patients	Type of fibroid	No. of women	Myoma diameter in cm
32/CS C/S	32.9% 20	12	2-5	22	7 ± 1.3
			3	7	9 ± 1.8
			4	3	8 ± 1.5
24/OVD Vacuum	24.8% 15	9	4	12	7 ± 1.4
			5	9	8 ± 1.7
			6	3	6 ± 1.2
41/VD NSD	42.2% 28	13	5	27	6 ± 1.2
			6	14	5 ± 1.5

Intracapsular subserous and intramural myomectomy saving the fibroid pseudocapsule enhanced healing by preserving myometrial integrity and allowed a good fertility rate and delivery outcome.

Pseudocapsule “ring of the fire”



Outlines

- Myomectomy (LM) before pregnancy ?
- Uterine rupture during pregnancy after LM !!!
- Types of myomectomy: Open, LSC or Robotic ?
- **Good technique for LM:**
 - Suture technique
 - preservation of vascularity
 - no endometrial penetration**

Endometrial penetration and uterine synechia after laparotomic/LSC/Robotic myomectomy

TABLE 7 Studies concerning uterine adhesions after laparotomic myomectomy

	Asgari et al 2015	Tixier et al 2010	Capmas et al 2018	Conforti et al 2014	Pitter et al 2013
Number of patients	40	43	98	36	108
Surgery type	Laparotomy and laparoscopy	Laparotomy and laparoscopy	Laparotomy	Laparotomy	Laparotomy-robot
Laparoscopy	19	28	NA	NA	108
Laparotomy	21	15	98	36	NA
Endometrial breach (%)	20	NR	37.80	52.80	20.60
Synechia rate (%)	20	9	25	50	NA
Risk Factor	non	non	Endometrial breach rate	Number of resected myomas	NA

American fertility society classification of intrauterine adhesions. American Fertility Society (1988) [11].

Cavity involved	<1-3 1	1/3-2/3 2	>2/3 3
Type of adhesions	Filmy 1	Filmy and dense 2	Dense 3
Menstrual pattern	Normal 0	Hypo-menorrhea 2	Amenorrhea 4
Prognostic classification		HSG score	Hysteroscopy score
Stage I (mild)	1-4		
Stage II (moderate)	5-8		
Stage III (severe)	9-12		

Int J Med Robot. 2019;e2059.
<https://doi.org/10.1002/rcs.2059>

Breach: 破裂, 裂痕, 缺口

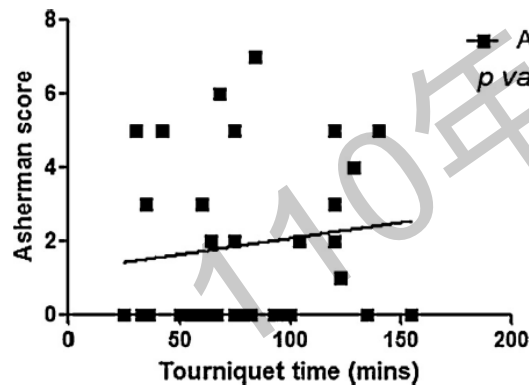
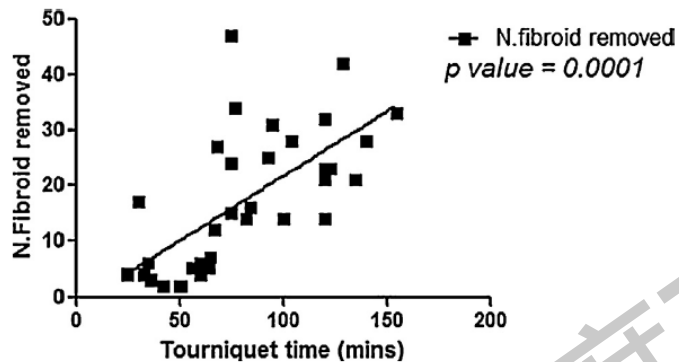
Yahoo字典

Intrauterine adhesions after open myomectomy: an audit

Alessandro Conforti*, Geeta B. Krishnamurthy, Christos Dragamestianos, Sotirios Kouvelas, Alison Micallef Fava, Ioannis Tsimpanakos, Adam Magos

University Department of Obstetrics and Gynecology, Royal Free Hospital, Pond Street, Hampstead, London NW3 2QG, UK

Prospective study: 36 patients, open myomectomy
 → 3 m OPD HSC: IU adhesion rate 50% (mild to mod)



Characteristic of Group A (adhesion +ve) and Group B (adhesion -ve).

	Group A (n=18)	Group B (n=18)	p
Age (years)	41.23 ± 5.5	38.4 ± 5.6	0.13 ^a
Body mass index (kg/m ²)	24.75 (209–372)	25.3 (202–391)	0.78 ^b
GnRHa pre-treatment	7	7	1 ^c
Uterine size (weeks)	20 (12–32)	18 (12–36)	0.24 ^b
No. of fibroids removed	22 (2–47)	9.5 (2–34)	<0.05 ^b
Cavity opened	12	7	0.18 ^c
Intrauterine hyalobarrier [®]	10	4	0.08 ^c
Ovarian tourniquet time (min)	81.8 ± 40.4	73.8 ± 34.6	0.53 ^a
Specimen weight (g)	543 (197–3553)	366.5 (68–3800)	0.37 ^b
Estimated blood loss (ml)	550 (223–2200)	546.5 (20–1014)	0.52 ^b
Drain 0–24 h (ml)	50 (0–650)	130 (0–380)	0.87 ^b
Drain 24–48 h (ml)	150 (0–500)	50 (0–220)	0.43 ^b
Δ Haemoglobin (g/dl)	3.2 ± 1.8	2.9 ± 1.0	0.50 ^a
No. of patients transfused	6	4	0.71 ^c
Units of blood transfused	0 (0–4)	0 (0–2)	0.18 ^b
Post-op pyrexia	2	3	1 ^c
Post operative hospital stay (days)	4 (3–16)	5 (2–7)	0.81 ^b
AFS adhesion score	4.5 (1–8)	0	

Are synechiae a complication of laparotomic myomectomy?

Reproductive Biomedicine Online 36 (2018) 450 – 4

Perrine Capmas^{a,b,c,*}, Anne-Gaelle Pourcelot^a, Hervé Fernandez^{a,b,c}

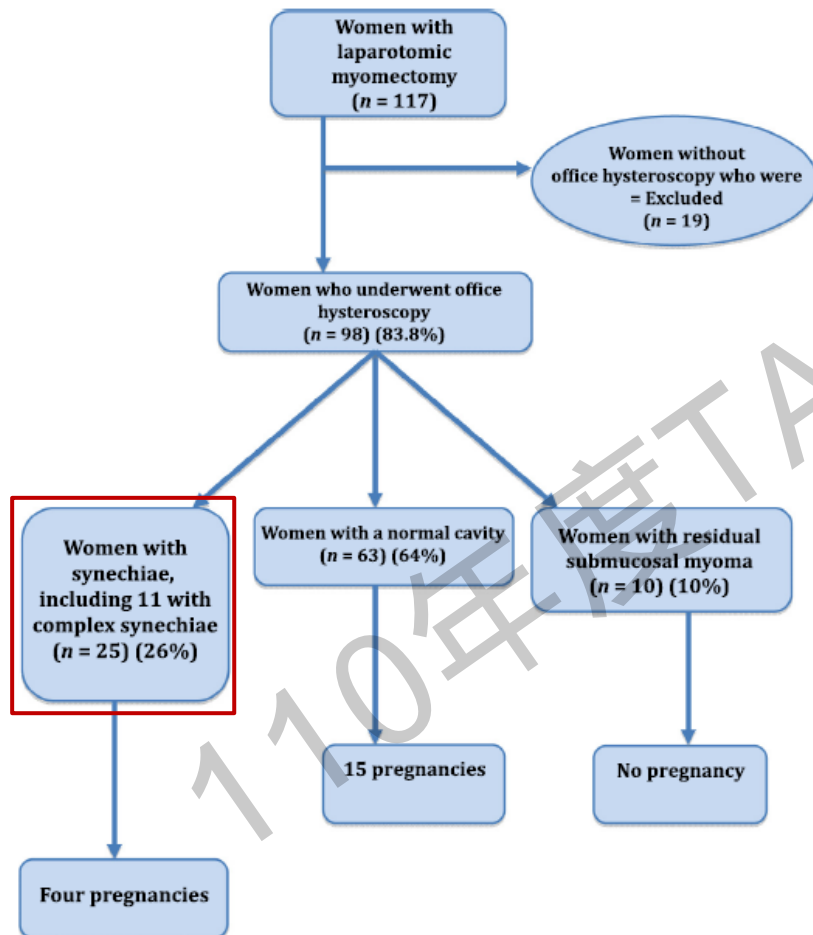


Figure 1 – Study flow chart.

Table 2 – Risk factors for synechiae: univariate logistic regression model.

	OR	95% CI
Opening of uterine cavity	2.55	0.97 to 6.65
Number of myoma	1.00	0.90 to 1.12
Size of myoma	0.97	0.85 to 1.11
Age	0.99	0.92 to 1.08
Anti-adhesion agent ^a	0.13	0.02 to 0.72

^a P = 0.02.

Table 3 – Risk factors for complex synechiae: univariate logistic regression model.

	OR	95% CI
Opening of uterine cavity ^a	6.42	1.27 to 32.52
Number of myomas	0.96	0.81 to 1.14
Size of myoma	1.14	0.97 to 1.34
Age	0.96	0.87 to 1.06
Anti-adhesion agent	0.46	0.08 to 2.74

^a P = 0.03.

The intrauterine adhesion rate after laparotomic myomectomy was 25.51%.
 Opening of the uterine cavity was a risk factor for adhesions.

Pregnancy **outcomes** following robot-assisted myomectomy[†]

Michael C. Pitter¹, Antonio R. Gargiulo², Leo M. Bonaventura³,
J. Stefano Lehman¹, and Serene S. Srouji^{2,*}

¹Newark Beth Israel Medical Center, Newark, NJ, USA ²Center for Infertility and Reproductive Surgery, Brigham and Women's Hospital, Harvard Medical School, 75 Francis Street, Boston, MA, USA ³Indiana University Hospital North, Carmel, IN, USA

2005.10 ~ 2010.11, 872 RM → 107 subsequently conceived:
127 pregnancies, 92 deliveries (till 2011)

Table II Characteristics of surgery and removed myomas.

Myoma size: 7.5 (3~18) cm,
weight: 191.7 (8~665) g, no: 3.9 (1~14)

Enter into cavity: 20.6%

Table IV Characteristics of deliveries in patients who became pregnant after RALM.

N = 92

Route of delivery, <i>n</i> (%; 95% CI)	
Vaginal	4 (4.3; 1.9, 9.3)
Cesarean	88 (95.7; 90.7, 98.1)
Forceps or vacuum assistance, <i>n</i> (%; 95% CI)	0 (0, 2.8)
Premature preterm rupture of membranes, <i>n</i> (%; 95% CI)	7 (7.6; 4.2, 13.5)
Premature delivery, <i>n</i> (%; 95% CI)	
<28 weeks	2 (2.2; 0.7, 6.4)
28–32 weeks	1 (1.1; 0.3, 4.7)
33–35 weeks	13 (14.1; 9.1, 21.1)
Uterine dehiscence, <i>n</i> (%; 95% CI)	1 (1.1; 0.3, 4.7)
Uterine rupture, <i>n</i> (%; 95% CI)	1 (1.1; 0.3, 4.7)
Placenta accreta, <i>n</i> (%; 95% CI)	1 (1.1; 0.3, 4.7)
Placenta previa, <i>n</i> (%; 95% CI)	1 (1.1; 0.3, 4.7)
Adhesions ^a , <i>n</i> (%; 95% CI)	10 (11.4; 7.0, 18.0)
Malpresentation of fetus, <i>n</i> (%; 95% CI)	9 (9.8; 5.8, 16.1)

Uterine Rupture after LM during subsequent pregnancy

Review Articles: J minim Invasive Gynecol 2010;17:551-4
Taiwan J Obstet Gynecol 2009;48:335-41

21 cases reports

Year of study: 1992-2005

4 fetal expired

Number of myoma: 1 (18/19, 94.7%)

Pedunculated: 4/20 (20%)

Cavity entered: 5/20 (25%)

No suture: 7/18 (38.9%)

★ Multilayer closure: 3/18 (16.7%)

★ Hemostasis: electrocoaguation 17/19 (89.5%)

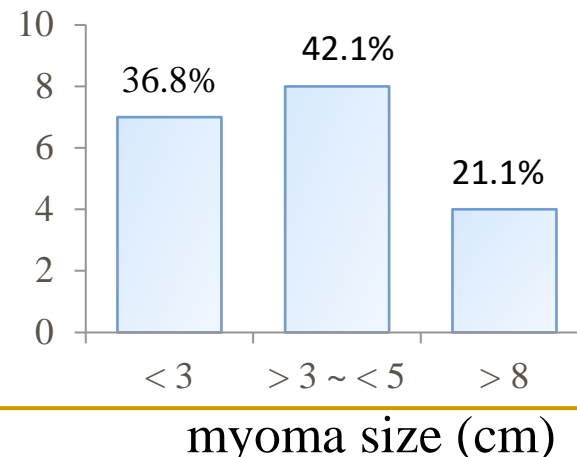
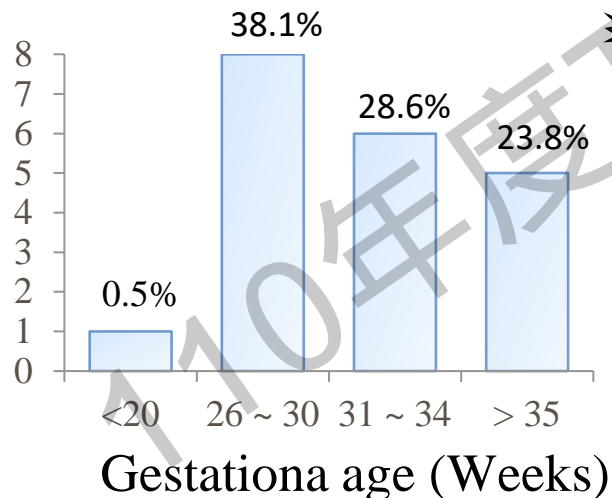


Table 4

Clinical characteristics in uterine rupture from the cases of published studies (n = 34) and the present study (n = 3)

Variables	Total 37 cases
Age, yrs	32.5 (24–41, 26 cases)
Multiparous women	6.3% (1/16)
No. of myomas removed	
Single	90.6% (29/32)
Multiple	9.4% (3/32)
Myoma size, cm	4 (1.2–11, 30 cases)
Small myoma (≤ 3 cm)	32.4% (11/34)
Type of myoma	
Intramural	47.2% (17/36)
Subserosal or pedunculated	52.8% (19/36)
Intraligamentary	0
Location of the myoma	
Uterine anterior wall	23.5% (4/17)
Uterine posterior wall	47.1% (8/17)
Other	29.4% (5*/17)
Cavity entered	20% (7/35)
Suture of the uterine defect	63.3% (19/30)
Time between myomectomy and pregnancy, mo	12 (6 wks–8 yrs, 25 cases)
Time of rupture (gestational wks)	34 (17–40, 37 cases)
Rupture during labor	8.3% (3/36)

Clinical characteristics in cases with uterine rupture

nulliparous
Single myoma

52.8% subserosal or pedunculated

20% cavity entered
(41.2% for intramural)

8.3% rupture during labor



Maryland Bipolar Forceps

System

Power	100%
Temp	36.5°C
Flow	1.5 L/min

Monopolar Curved Scissors

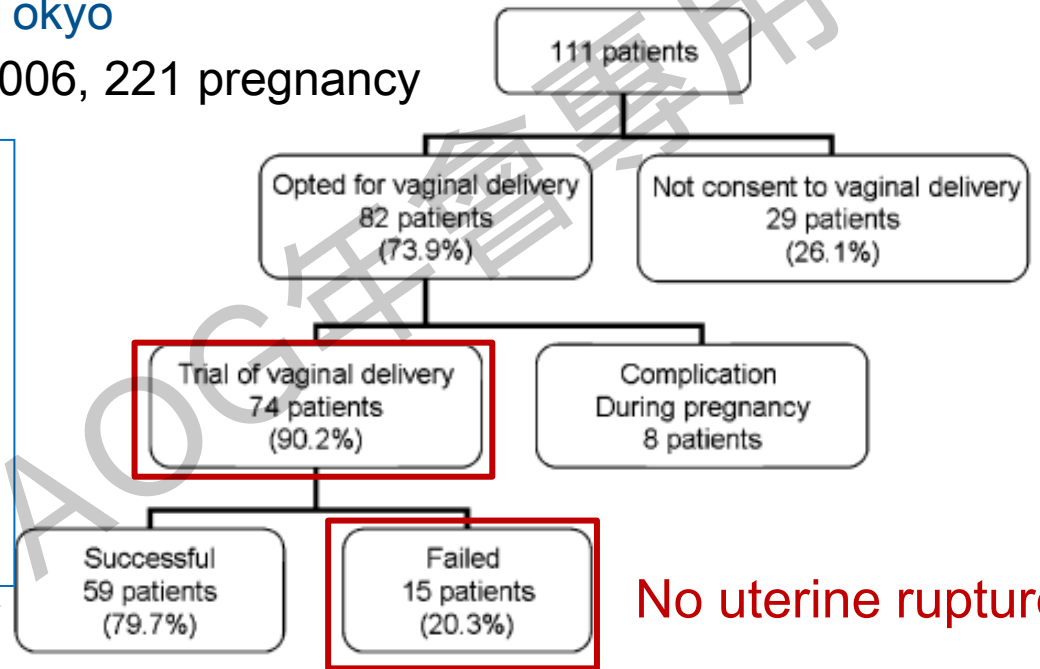
High Power

Prospective Evaluation for the Feasibility and Safety of Vaginal Birth after Laparoscopic Myomectomy *JMIG;2008;15:420-4*

Kumakiri J et al. U. of Juntendo, Tokyo

2000~2005, 1334 LM cases → by 2006, 221 pregnancy

Myoma no: 3.5 ± 3.6
 Diameter: 6.6 ± 1.9 cm
 Suture layer: 2.9 ± 1.0
 Weight: 142.5 ± 137.8 g
 Op duration: 97.5 ± 42.8 min
 Blood loss: 115.2 ± 225.1 mL



No uterine rupture

Fig. 1. Outcome of pregnancy and delivery in 111 patients after laparoscopic myomectomy

2/59 (3.4%)

4/15 (26.7%)

(1 placenta abruptio)

Endometrial perforation ($P=0.01$)

Breach: 破裂, 裂痕, 缺口

*Vaginal
delivery*

Outlines

- Myomectomy (LM) before pregnancy ?
- Uterine rupture during pregnancy after LM !!!
- Types of myomectomy: Open, LSC or Robotic ?
- **Good technique for LM**
good approximation, preserve blood supply, avoid endometrial breach (may related to uterine synchiae, placenta accreta, uterine rupture, failed vaginal delivery)

Take home message

1. LM is appropriate, except for too much uterine fibroids
2. Good suture technique
3. Pseudocapsule preservation enhanced myometrial healing
4. Avoid endometrial breach
5. Adhesion prevention



Thank You