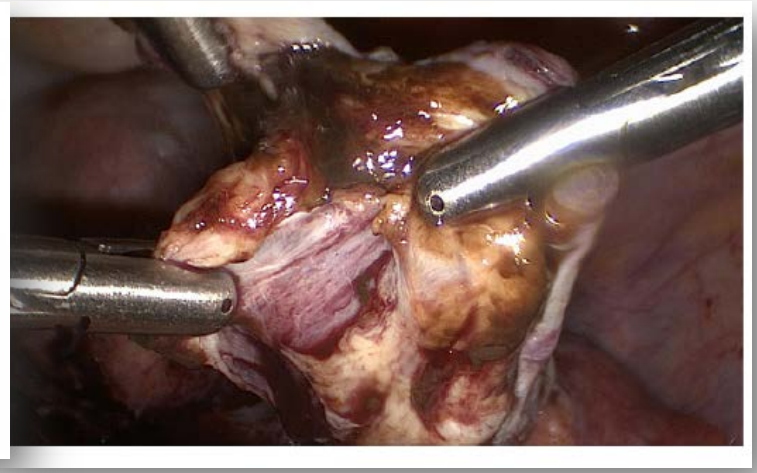
Asociación Venezolana
de Medicina Reproductiva
y Embriología.

ENDOMETRIOSIS

TRATAMIENTO MÉDICO



Dr. Isaac Benjamín F

07/2014

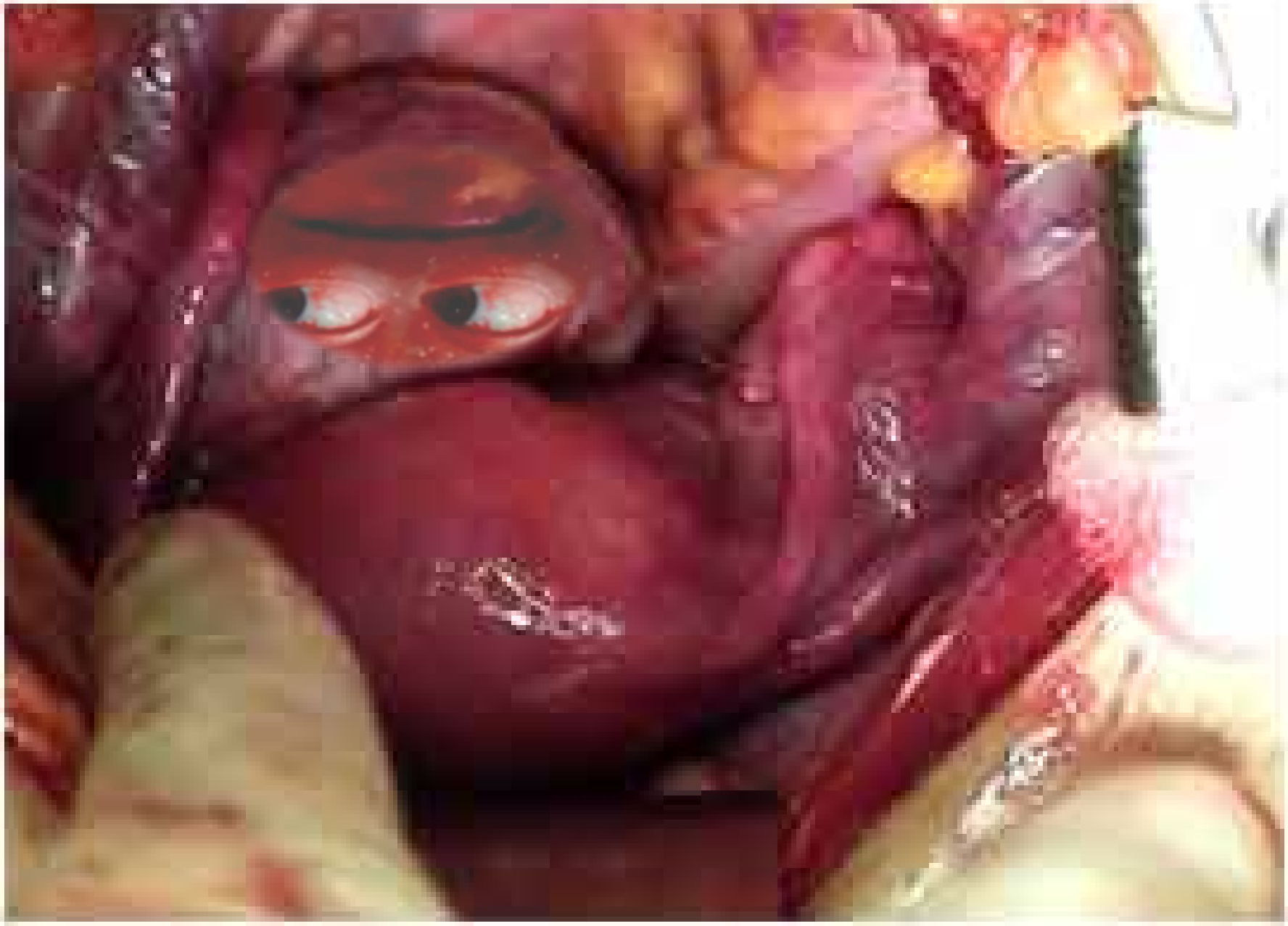
Caracas

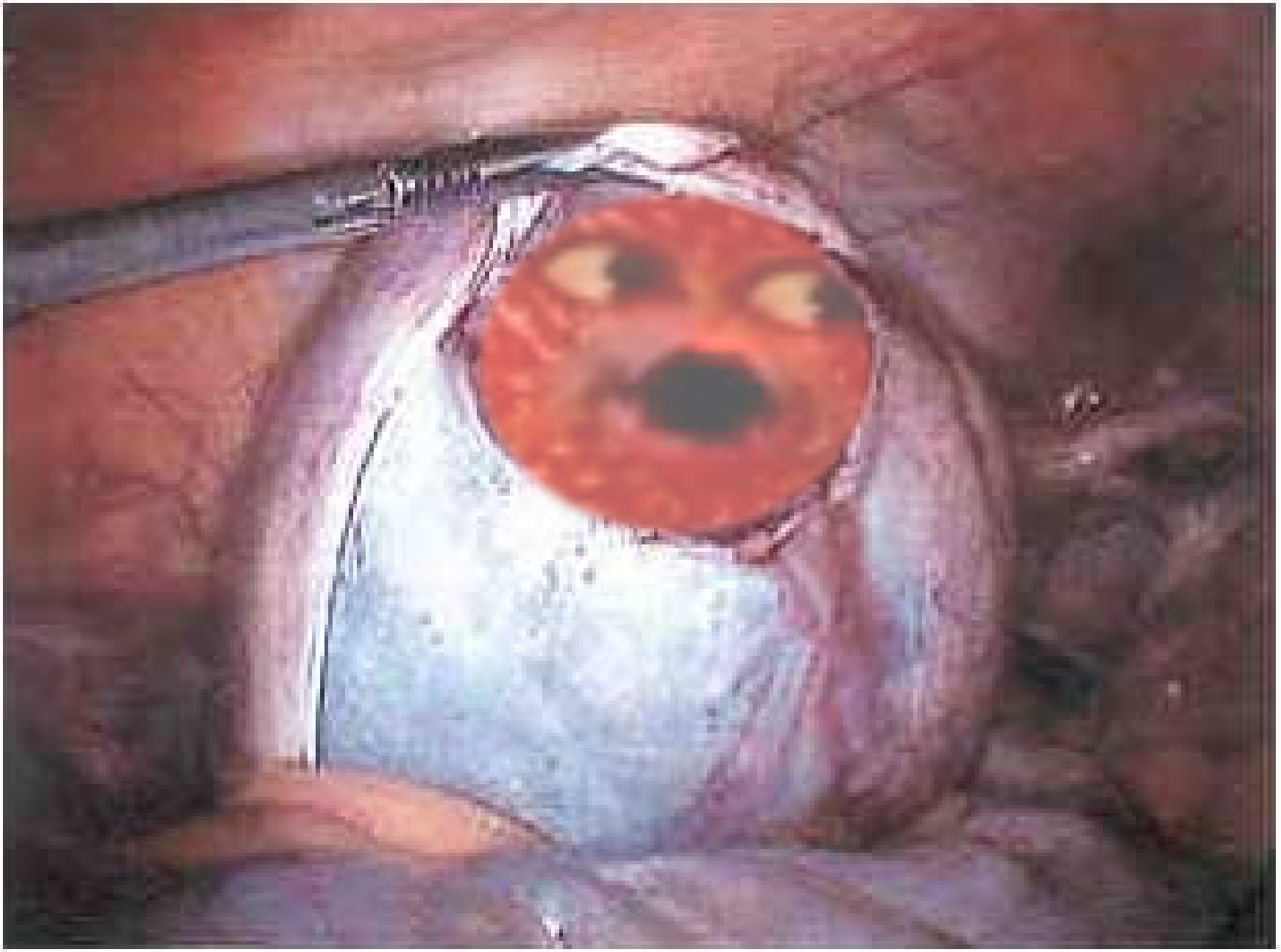
CIRUGÍA O NO ?

Ante la duda

RESECALO

TRA





ENDOMETRIOSIS

10-22 % Pacientes Fértiles
20-35 % Pacientes Infértiles
30-40 % Endometriosis-Endometrioma

Endometrioma:

Pseudoquiste de la pared del ovario, con inversión de la corteza ovárica, con posibles implicaciones adversas para la fertilidad futura.

10 -15 % FIV Endometriosis
17-44 % Endometriomas

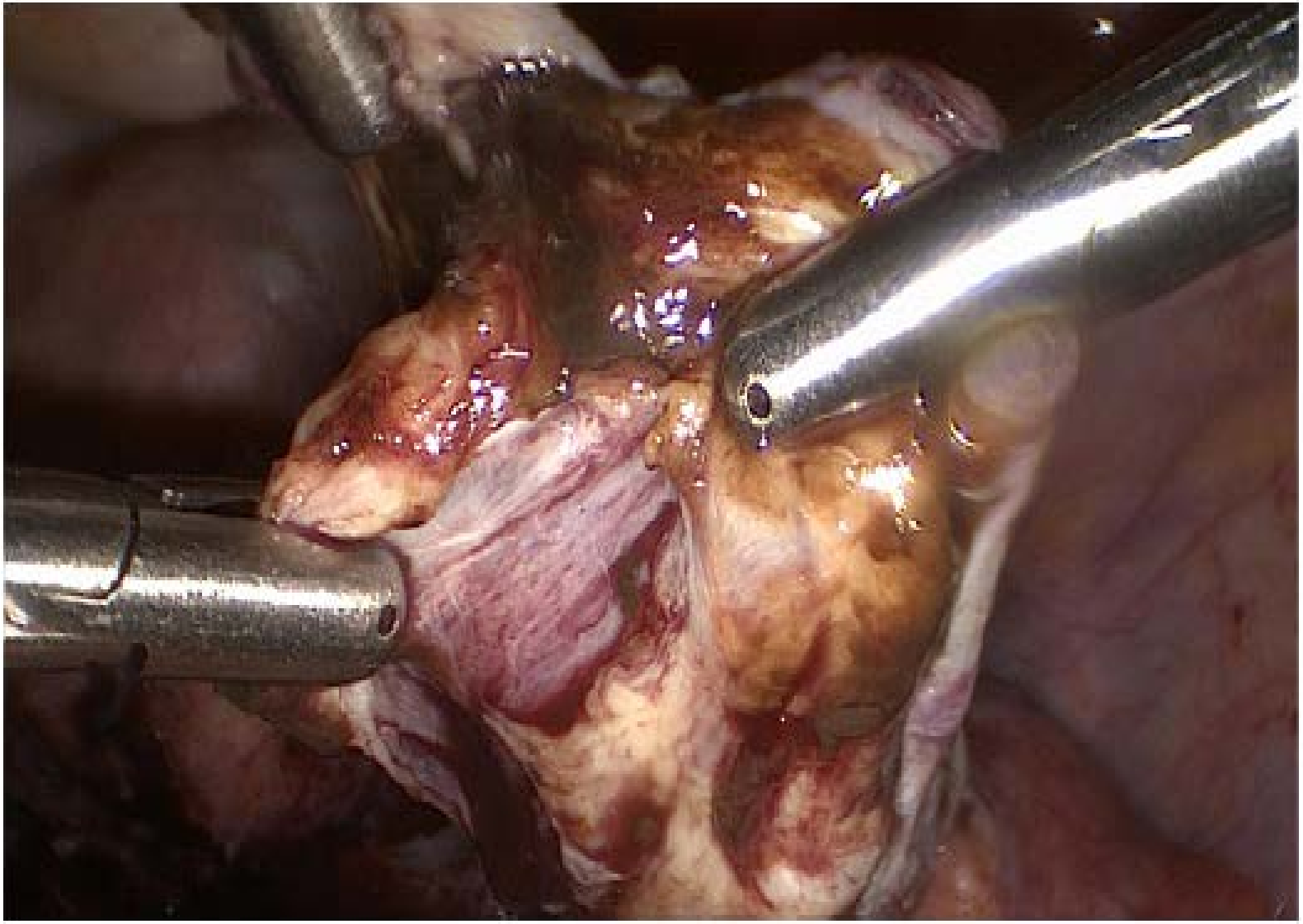
ENDOMETRIOSIS

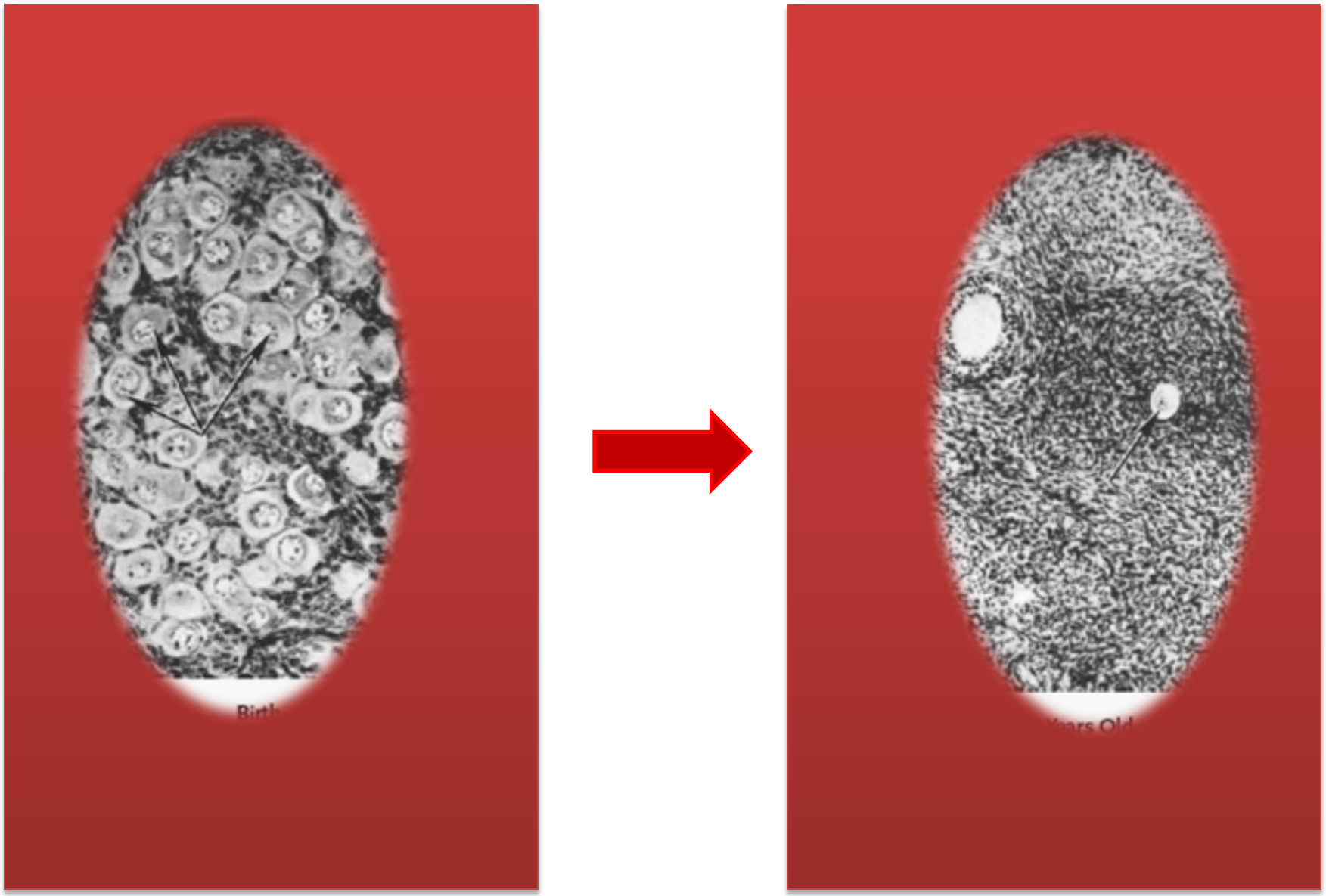
Patogénesis de los Endometriomas

1. Inversión y progresiva invaginación de la corteza ovárica luego de la acumulación de tejido endometrial derivados del sangrado de focos endometriosicos superficiales

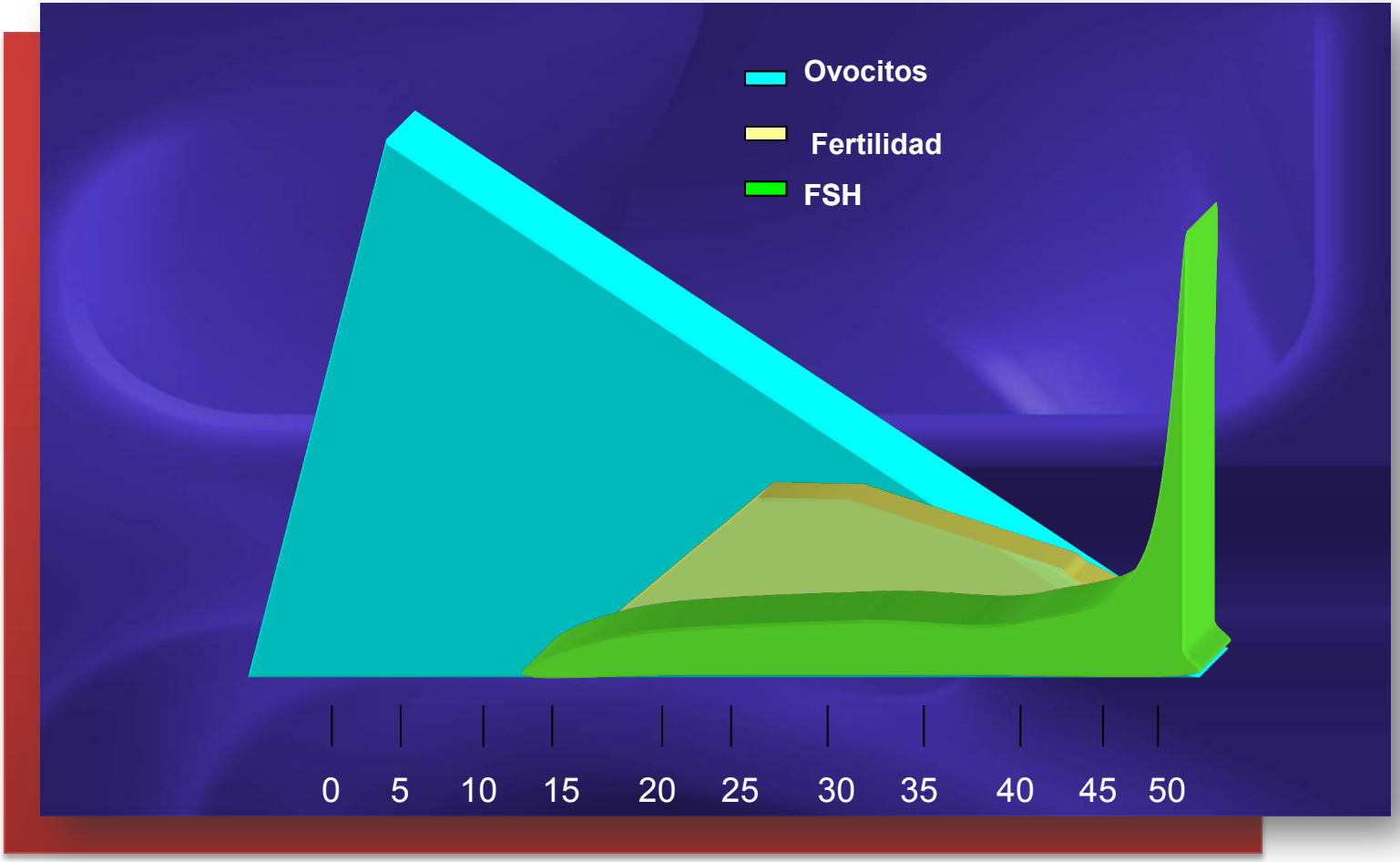
2. Envolvimiento secundario de quistes funcionales ováricos por implantes endometriales localizados en la superficie ovárica

3. Metaplasia del epitelio celómico, cubriendo el ovario





FISIOLOGÍA DE LA RESERVA OVÁRICA



RESERVA OVÁRICA

EDAD

Hormonales:

Estradiol

FSH

FSH/LH

Inhibina B

Hormona AntiMulleriana

LH

Ecográficos:

Volumen ovárico

Número de folículos antrales

Pruebas dinámicas:

Prueba de Clomifeno
EFFORT
GAST

HORMONA ANTI MULLERIANA

- Glicoproteína.

- Expresada por las células de la granulosa en el ovario

- Estabilidad en el ciclo menstrual.

- Juega un papel en varias fases de la foliculogénesis.

- Se correlaciona fuertemente con el número de folículos antrales.

- Actualmente es presentada como un buen marcador de la reserva ovárica.

CIRUGÍA ENDOMETRIOSIS Y RESERVA OVÁRICA

DAÑO A LA GÓNADA

FIV - ENDOMETRIOSIS

DAÑO A LA GÓNADA ASOCIADO AL TRATAMIENTO QUIRÚRGICO DEL ENDOMETRIOMA

ASPECTOS HISTOPATOLÓGICOS

HAM

ENDOMETRIOMAS: IMPACTO EN LA RESPUESTA OVÁRICA :EVENTO PRIMARIO O SECUNDARIO?

Endometrioma.

Kaplan y col 1989:

implantes endometriales en ovario de ratas reducen el número de puntos ovulatorios

Maneschi y col 1993:

reducción del número y actividad de folículos, en comparación con cistoadenomas o teratomas.

Stilley y col 2009: número de folículos antrales en las ratas con endometriosis es menor que en los controles

Somigliana y col 2006:

36 pacientes no operados con endometrioma unilateral

folículos	3.0 ± 1.7	4.0 ± 2.2

REDUCCIÓN DEL 25% EN OVARIO AFECTADO

The presence of ovarian endometriomas is associated with a reduced responsiveness to gonadotropins

Edgardo Somigliana, M.D.,[a] *Mirco Infantino, M.D.,*[a,b] *Francesca Benedetti, M.D.,*[a,b] *Mariangela Arnoldi, M.D.,*[a,b] *Graziella Calanna, M.D.,*[a,b] *and Guido Ragni, M.D.*[a]

[a] Infertility Unit, Department of Obstetrics, Gynecology and Neonatology, Ospedale Maggiore Policlinico, Mangiagalli and Regina Elena, Milan, Italy; and [b] Università degli Studi di Milano, Milan, Italy

Conclusion(s): The presence of ovarian endometriomas is associated with a reduced responsiveness to gonadotropins.
(Fertil Steril® 2006;86:192–6.

TABLE 3

Number of codominant follicles according to the characteristics of the endometrioma(s) and the responsiveness to ovarian hyperstimulation.

	No. of cycles	Intact ovary	Ovary with endometrioma(s)	*P*
No. of cysts				
1	49	3.9 ± 2.0	3.2 ± 1.7	.08
2	7	5.1 ± 3.1	2.0 ± 1.5	.06
Diameter of the cysts[a]				
≤20 mm	31	3.7 ± 2.1	3.0 ± 1.4	.16
>20 mm	25	4.5 ± 2.2	3.2 ± 2.1	.03
Total IU of rFSH used				
≤2,700[b]	29	4.6 ± 2.1	3.1 ± 1.7	.01
>2,700[b]	27	3.4 ± 2.1	3.0 ± 1.8	.42
No. of oocytes retrieved				
≤5	27	3.6 ± 2.2	2.9 ± 1.8	.22
>5	29	4.5 ± 2.1	3.2 ± 1.7	.03

Note: The cutoff chosen corresponds to the whole number closest to the median values. rFSH = recombinant follicle-stimulating hormone.

[a] If more than one cyst was diagnosed, the diameter of the larger one is reported.

[b] Total number ± SD of oocytes retrieved in patients receiving ≤ and >2,700 IU rFSH were 6.4 ± 3.4 and 6.8 ± 4.9, respectively (*P* =.76).

Somigliana. Endometriomas and ovarian reserve. Fertil Steril 2006.

THE PRESENCE OF OVARIAN ENDOMETRIOMAS IS ASSOCIATED WITH A REDUCE RESPONSIVENESS TO GONADOTROPINS. Somigliana y col. Fertil Steril 2006

La **resección laparoscópica del endometrioma** està asociada con **daño cuantitativo permanente de la reserva ovárica.** Este daño en parte es preexistente antes de la cirugía.

Endometrioma esta asociado con una respuesta menor a la estimulación ovárica

(tamaño y número de folículos).

- Endometriomas grandes
- Más de un quiste
- Antecedente de mejor respuesta a la hiperestimulación

OBSERVACIONAL

LIMITACIONES: ENDOMETRIOMAS? / ENDOMETRIOMAS PEQUEÑOS

EFFECTS OF OVARIAN ENDOMETRIOMA ON THE NUMBER OF OOCYTES RETRIEVED FOR IN VITRO FERTILIZATION. Almog y col Fertil Steril 2011

ENDOMETRIOMA (FIV)

NO está asociado con disminución del número de ovocitos recuperados del lado afectado

TABLE 1

Number of antral follicles and retrieved oocytes from endometrioma-containing ovaries and from the contralateral ovaries.

	Ovary with endometrioma	Ovary with no endometrioma	*P* value	95% Confidence interval
No. of antral follicles	7.7 ± 1.0	8.5 ± 0.9	.3	−1.0 to 3.0
No. of retrieved oocytes	6.0 ± 0.4	6.1 ± 0.5	.8	−1.0 to 1.0
No. of retrieved oocytes when endometrioma size >25 mm	5.8 ± 1.4	6.6 ± 1.1	.5	−4.0 to 2.0

Almog. Endometrioma and number of retrieved oocytes. Fertil Steril 2011.

RETROSPECTIVO

UNOPERATED OVARIAN ENDOMETRIOMA AND RESPONSIVENESS TO HYPERSTIMULATION.

Benaglia y col. Human Reprod 2011

ENDOMETRIOMA (FIV)

NO afecta de manera importante la respuesta a la hiperestimulación ovárica.

Decreased anti-Müllerian hormone and altered ovarian follicular cohort in infertile patients with mild/minimal endometriosis

Nadiane Albuquerque Lemos, Ph.D.,[a,b] *Elisangela Arbo, M.D.,*[a] *Renata Scalco, Ms.C.,*[c] *Eduardo Weiler, M.D.,*[a] *Virginia Rosa, M.D.,*[a] *and João Sabino Cunha-Filho, Ph.D.*[a,b]

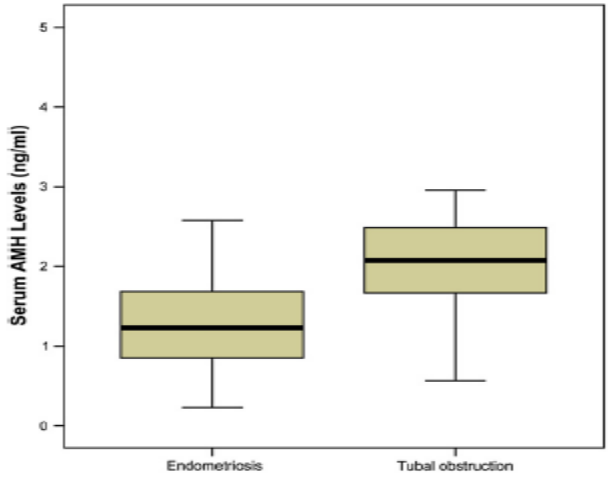
[a] Department of Obstetrics and Gynecology and [c] Unit of Biochemichemistry, Hospital de Clínicas de Porto Alegre, Universidade Federal do Rio Grande do Sul; and [b] Programa de Pós-graduação em Medicina: Ciências Médicas, Porto Alegre, Brazil

Result(s): Serum FSH were not different between the groups. However, infertile patients with endometriosis hav a decreased serum anti-Mullerian hormone (1.26 ± 0.7 ng/mL) compared to the control group (2.02 ± 0.72 ng/mL) The analysis of follicular cohort showed that the number of selectable follicles were similar, but the follicula diameter was different.

Conclusion(s): Minimal/mild endometriosis is associated with a decrease in the follicular ovarian reserve. In ad dition, the follicular cohort of these patients is more heterogeneous in comparison to the control group. (Ferti Steril® 2008;89:1064–8. ©2008 by American Society for Reproductive Medicine.)

FIGURE 1

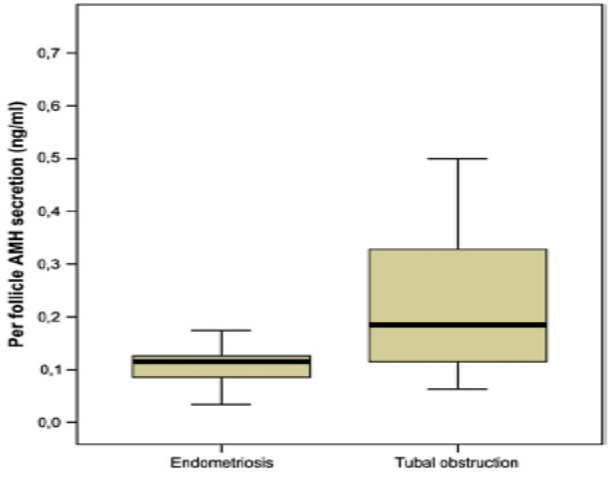
Serum anti-Müllerian hormone (AMH) (in nanograms per milliliter) comparison between infertile patients with minimal/mild endometriosis and infertile patients with tubal obstruction (without endometriosis). The box represents the interquartile range that contains the 50% of values. The whiskers are lines that extend from the box to the highest and lowest values, excluding outliers. A line across the box indicates the median. $P = .004$, Student's *t*-test.



Lemos. Follicular cohort, AMH, and endometriosis. Fertil Steril 2008.

FIGURE 2

Per follicle anti-Müllerian hormone (AMH) (in nanograms per milliliter) secretion comparison between infertile patients with minimal/mild endometriosis and infertile patients with tubal obstruction (without endometriosis). The box represents the interquartile range that contains the 50% of values. The whiskers are lines that extend from the box to the highest and lowest values, excluding outliers. A line across the box indicates the median. $P = .001$, Student's *t*-test.



Lemos. Follicular cohort, AMH, and endometriosis. Fertil Steril 2008.

ENDOMETRIOMA

Impacta sobre la respuesta

Resultados de FIV ?

Daño cuantitativo más que cualitativo

Ragni y col. 2005

Reducción significativa de folículos y de oocitos recuperados

NO diferencias en tasas de fecundación entre oocitos recuperados del ovario con endometrioma y sin endometrioma

ENDOMETRIOMA

- **Unilaretales**
- **Bilaterales (19- 28%) (Somigliana 2008)**

El lado no afectado podría compensar la reducción del lado afectado

Esinler 2006: 23 pacientes con endometriomas bilateral.
99 controles

Tasa de embarazo: 35 vs 43% NS

Somigliana 2008: 68 pacientes con endometriomas bil
136 controles

Reducción significativa en la TE

SART

2004 - 2008

23000
FIV TE ENDOMETRIOSIS

450000
TODAS INDICACIONES DE FIV

TI TRNV SIMILARES

In vitro fertilization is a successful treatment in endometriosis-associated infertility

Hans Kristian Opøien, M.D.,[a,b] Peter Fedorcsak, M.D., Ph.D.,[a] Anne Katerine Omland, M.D., Ph.D.,[a] Thomas Åbyholm, M.D., Ph.D.,[c,d] Sverre Bjercke, M.D., Ph.D.,[a] Gudvor Ertzeid, M.D., Ph.D.,[a] Nan Oldereid, M.D., Ph.D.,[a] Jan Roar Mellembakken, M.D., Ph.D.,[a] and Tom Tanbo, M.D., Ph.D.[a,d]

[a] Section for Reproductive Medicine, Department of Gynaecology, [b] Norwegian Resource Centre for Women's Health, [c] Department of Obstetrics, Oslo University Hospital Rikshospitalet, and [d] Institute of Clinical Medicine, University of Oslo, Oslo, Norway

Objective: To assess success rates of IVF and intracytoplasmic sperm injection in women with various stages of endometriosis.
Design: Retrospective cohort study.
Setting: Reproductive medicine unit in a university hospital.
Patient(s): Infertile women (n = 2,245) with various stages of endometriosis or tubal factor infertility.
Intervention(s): IVF or intracytoplasmic sperm injection.
Main Outcome Measure(s): Dose of FSH, number of oocytes retrieved, fertilization rate, implantation rate, pregnancy rate (PR), live birth/ongoing PR.
Result(s): Women with endometriosis had similar pregnancy and live birth/ongoing PR as did women with tubal factor infertility, but the American Society for Reproductive Medicine (ASRM) stage I and II endometriosis patients had a lower fertilization rate, and stage III and IV patients required more FSH and had fewer oocytes retrieved. Splitting the stage III and IV groups into patients with and without endometriomas showed that the endometrioma group required more FSH and had a significantly lower pregnancy and live birth/ongoing PR.
Conclusion(s): With the exception of patients with endometrioma, infertile women with various stages of endometriosis have the same success rates with IVF and intracytoplasmic sperm injection as patients with tubal factor. This contrasts with the systematic review on which the European Society of Human Reproduction and Embryology bases its recommendations. (Fertil Steril® 2012;97:912–8. ©2012 by American Society for Reproductive Medicine.)
Key Words: In vitro fertilization (IVF), ASRM stage I-II (minimal/mild) endometriosis, ASRM stage III-IV (moderate/severe) endometriosis, pregnancy rate, live birth rate

In vitro fertilization is a successful treatment in endometriosis-associated infertility

Hans Kristian Opøien, M.D.,[a,b] Peter Fedorcsak, M.D., Ph.D.,[a] Anne Katerine Omland, M.D., Ph.D.,[a] Thomas Åbyholm, M.D., Ph.D.,[c,d] Sverre Bjercke, M.D., Ph.D.,[a] Gudvor Ertzeid, M.D., Ph.D.,[a] Nan Oldereid, M.D., Ph.D.,[a] Jan Roar Mellembakken, M.D., Ph.D.,[a] and Tom Tanbo, M.D., Ph.D.[a,d]

[a] Section for Reproductive Medicine, Department of Gynaecology, [b] Norwegian Resource Centre for Women's Health, [c] Department of Obstetrics, Oslo University Hospital Rikshospitalet, and [d] Institute of Clinical Medicine, University of Oslo, Oslo, Norway

TABLE 2

Results of first attempt.

Type of treatment	ASRM I-II (n = 724)	ASRM III-IV (n = 350)	Tubal factor (n = 1171)
IVF	671 (92.7%)	332 (94.9%)	1119 (95.6%)
ICSI	53 (7.3%)	18 (5.1%)	52 (4.4%)[a]
Dose of FSH	1965 ± 930	2313 ± 1024[b]	2081 ± 1046
Cancellation rate	1.2% (9/724)	2.3% (8/350)	1.2% (14/1171)
No. of oocytes	9.3 ± 5.2	8.0 ± 5.3[b]	9.2 ± 5.6
Mature	90.3% (5082/5627)	91.3% (2050/2246)	90.4% (7619/8427)
Immature	8.5% (476/5627)	7.0% (158/2246)	7.2% (606/8427)
Others	1.2% (69/5627)	1.7% (38/2246)	2.4% (202/8427)
Sperm concentration	117 ± 89[b]	123 ± 77	135 ± 90
Sperm motility	54 ± 20[b]	57 ± 19	59 ± 20
Fertilization rate IVF	59.6%[b] (3643/6109)	62.9% (1626/2584)	63.5% (6447/10,145)
Implantation rate	27.8% (294/1058)	25.0% (133/533)	24.9% (471/1895)
PR per started cycle	36.0% (261/724)	32.9% (115/350)	34.7% (406/1171)
PR per ET	39.4% (261/662)	36.7% (115/312)	37.9% (406/1072)
Biochemical pregnancy (<6)	9.6% (25/261)	8.7% (10/115)	14.5% (59/406)
Miscarriage (6–12)	18.8% (49/261)	17.4% (20/115)	12.6 (51/406)
Birth/ongoing	71.6% (187/261)	73.9% (85/312)	72.9% (296/406)
Birth/ongoing pregnancy per started cycle	25.8% (187/724)	24.3% (85/350)	25.3% (296/1171)

[a] $P<.05$.
[b] $P<.01$.

Opøien. Endometriosis and IVF/ICSI outcomes. Fertil Steril 2012.

In vitro fertilization is a successful treatment in endometriosis-associated infertility

Hans Kristian Opøien, M.D.,[a,b] Peter Fedorcsak, M.D., Ph.D.,[a] Anne Katerine Omland, M.D., Ph.D.,[a] Thomas Åbyholm, M.D., Ph.D.,[c,d] Sverre Bjercke, M.D., Ph.D.,[a] Gudvor Ertzeid, M.D., Ph.D.,[a] Nan Oldereid, M.D., Ph.D.,[a] Jan Roar Mellembakken, M.D., Ph.D.,[a] and Tom Tanbo, M.D., Ph.D.[a,d]

[a] Section for Reproductive Medicine, Department of Gynaecology, [b] Norwegian Resource Centre for Women's Health, [c] Department of Obstetrics, Oslo University Hospital Rikshospitalet, and [d] Institute of Clinical Medicine, University of Oslo, Oslo, Norway

TABLE 3

Outcome of the first cycle in patients with ASRM stage III-IV without and with endometrioma.

	Without endometrioma	Endometrioma
No. of cycles	164	186
Dose of FSH (IU)	2152 ± 924	2446 ± 1124[a]
No. of oocytes	8.6 ± 5.3	7.6 ± 5.5
Fertilization rate	62.5% (866/1386)	61.6% (819/1329)
Implantation rate	26.9% (83/308)	20.9% (66/316)
PR	40.2% (66/164)	26.3% (49/186)[a]
Birth/ongoing PR	30.5% (50/164)	18.8% (35/186)[b]

[a] $P < .01$.
[b] $P < .05$.

Opøien. Endometriosis and IVF/ICSI outcomes. Fertil Steril 2012.

ENDOMETRIOMA

Tratamiento médico antes de FIV

Reducción del tamaño
No cambios en la tasa de éxitos

Ozcan y col 2008

Cochrane:

3 meses antes de FIV
Análogos de la GnRH
4 veces mayor la tasa de embarazo.

Sallam y Garcia Velasco y col 2006

ENDOMETRIOMA

Alternativas a la cirugía

Aspiración
Aspiración con agentes esclerosantes:
- Tetraciclina
- Metrotexate
- Etanol

ENDOMETRIOMAS QX Y RESPUESTA OVÁRICA

- RESPUESTA FOLICULAR MENOR
- MAYOR GONADOTROPINAS
- PEOR PRONÓSTICO

Respuesta ovárica comprometida después de la cirugía.

Gupta 2006 y Somigliana 2006

Meta-analisis de Gupta 2006

número de folículos desarrollados y el número de oocitos recuperados es menor en mujeres operadas comparadas con los controles

Folículos 0.9(95% IC - 1.4-0.3)

Oocitos recuperados 1.7 (95% IC -3.2 – 0.2)

OR Embarazo Clínico 1.07(95% CI 0.63-1.81)

CIRUGÍA

Efecto de la Cirugía del endometrioma en la reserva ovárica

Dermoides o quistes serosos o mucinosos

→ **6% de tejido sano**

Endometriomas

→ **50% tienen folículos primordiales**

No penetra mas allá de 1,5 mm

Muzzi y col

CIRUGÍA / PÉRDIDA FOLICULAR

Evidencia en la respuesta folicular:

SI

Nargund 1996
Loh 1999
Donnez 2001
Ho 2002
Somigliana 2003

NO

Canis 2001
Marconi 2002

Evidencia histológica

Muzii 2002 Remoción inadvertida en 54%

Maneschi 1993 Tejido ovárico cercano al endometrioma es **DIFERENTE**

Hachisuga y Kawarabayashi 2002

Fácil **folículos primordiales 69%**

Difícil **NO folículos primordiales**

TÉCNICA

CIRUGÍA Y TÉCNICA

Mayor tejido ovárico fue removido con la técnica numero II (excisión circular)

No diferencia en la calidad de tejido ovárico (número y tipo de folículos)

Sitio de adhesión inicial e intermedio no evidencia de folículos o folículos primordiales

Cerca del íleo ovárico si contiene folículos primarios y secundarios

EL TEJIDO OVARICO ES RESECADO EN FORMA INADVERTIDA AL RESECAR LOS ENDOMETRIOMAS EN LA MAYORIA DE LOS CASOS.

Muzii et al. **Laparoscopic stripping of endometriomas: a randomized trial on diferent surgical techniques: I**. Hum Reprod 2005.

ENDOMETRIOMAS: IMPACTO EN LA RESPUESTA OVÁRICA :EVENTO PRIMARIO O SECUNDARIO?

CIRUGÍA

Muzii y col. 2002

Endometrioma es un pseudoquiste extra ovárico que convierte la corteza ovárica en su pared

Brosens y col 1996

Resección de importante cantidad de tejido ovárico en la cistectomía

Cápsula genera fuerte adhesión al tejido sano

DIFICULTADES QUIRÚRGICAS

Inflamación

Electrocoagulación Compromiso vascular

MENOR POOL DE FOLICULOS PRIMORDIALES

ENDOMETRIOMAS: IMPACTO EN LA RESPUESTA OVÁRICA :EVENTO PRIMARIO O SECUNDARIO?

CIRUGÍA

Resección bilateral de endometriomas por laparoscopia

2.4% FOP **Busacca y col 2006**

Daño estroma ovárico y Vascularización

Wu y col 2003

Apertura del quiste con vaporización o coagulación de la superficie interna del quiste puede prevenir la resección inevitable de corteza ovárica

Donnez y col (2001)
Somigliana y col (2006)

CIRUGÍA

Laparoscopia → **Endometriomas**

↑ **EMBARAZO** **30-67%**

FIV ?

CIRUGÍA

Demirol, 2006

99p FIV

cirugía conservadora

Mayor tiempo de estimulación
Mayor número de ampollas
Menor número de oocitos

NO DIFERENCIAS

- Fecundación
- Tasa de implantación
- Embarazo

Quirúrgico	Expectante
34%	38%

Removal of endometriomas before in vitro fertilization does not improve fertility outcomes: a matched, case–control study

Juan A. Garcia-Velasco, M.D.,[a] Neal G. Mahutte, M.D.,[a] José Corona, M.D.,[a] Victor Zúñiga, M.D.,[a] Juan Gilés, M.D.,[a] Aydin Arici, M.D.,[b] and Antonio Pellicer, M.D.[c,d]

Instituto Valenciano de Infertilidad, Rey Juan Carlos University, Madrid, Spain; Hospital Universitario Dr Peset, Valencia University, Valencia, Spain; and Yale University School of Medicine, New Haven, Connecticut

In vitro fertilization/intracytoplasmic sperm injection cycle outcomes in women with an endometrioma present at the beginning of the stimulation compared with women with a previously removed ovarian endometrioma by laparoscopic cystectomy.

	Endometrioma removed (147 cycles)	Endometrioma present (63 cycles)	*P* value
No. of oocytes retrieved	10.8 ± 0.6	11.8 ± 0.9	.378
No. of mature oocytes	8.7 ± 0.6	8.4 ± 0.8	.780
Fertilization rate (%)	76.5	69.9	.051
No. of embryos/cycle	6.0 ± 0.4	6.4 ± 0.6	.582
No. of embryos transferred	2.7 ± 0.1	2.8 ± 0.1	.281
Implantation rate (%)	12.8	14.1	.958
Positive β-hCG (%)	30.2	28.8	.480
Clinical pregnancy rate (%)	25.4	22.7	.776
Multiple pregnancy rate (%)	7.9	12.1	.545
Biochemical pregnancy (%)	3.9	3.0	.817
Miscarriage rate (%)	3.9	6.1	.636
Cancellation rate (%)	6.3	7.6	.844

Note: Data are presented as mean ± SEM or %.

Garcia-Velasco. IVF and endometriosis. Fertil Steril 2004.

Human Reproduction, Vol.24, No.3 pp. 496–501, 2009
Advanced Access publication on December 4, 2008 doi:10.1093/humrep/den398

human reproduction

OPINION

Management of endometriomas in women requiring IVF: to touch or not to touch

1990 - 2008

Juan A. Garcia-Velasco[1,*] and Edgardo Somigliana[2]

[1]IVI Madrid, Rey Juan Carlos University, Av. del Talgo 68, Madrid 28023, Spain [2]Infertility Unit, Ospedale Maggiore Polidinico, Mangiagalli and Regina Elena, Milan, Italy

*Correspondence address. E-mail: jgvelasco@ivi.es

The classic, unproven dogma that ovarian endometrioma should be removed in all infertile women prior to IVF has been recently questioned. There is currently insufficient data to clarify whether the endometrioma-related damage to ovarian responsiveness precedes or follows surgery. Both endometrioma-related injury and surgery-mediated damage may be claimed to be involved and the relative importance of these two insults remains to be clarified. Convincing evidence has emerged showing that responsiveness to gonadotrophins after ovarian cystectomy is reduced. Conversely, the impact of surgery on pregnancy rates is unclear since no deleterious effect has been reported. Of relevance here is that surgery exposes women to risk related to a demanding procedure whereas risks associated with expectant management are mostly anecdotal or of doubtful clinical relevance. We recommend proceeding directly to IVF to reduce time to pregnancy, to avoid potential surgical complications and to limit patient costs. Surgery should be envisaged only in presence of large cysts (balancing the threshold to operate with the cyst location within the ovary), or to treat concomitant pain symptoms which are refractory to medical treatments, or when malignancy cannot reliably be ruled out.

Key words: ovarian endometriomas / surgery / IVF / ovarian responsiveness / pregnancy rates

CONCLUSIONES

Conducta en Endometriomas antes de FIV

- **Respuesta a la estimulación es menor**
- **La calidad y cantidad ovocitaría es la misma**
- **Riesgos de la cirugía**
- **Costos**
- **Tiempo**
- **<u>Cirugía laparoscópica:</u> no mejora los resultados de fertilidad**

CONCLUSIONES

- Respuesta ovárica se modifica en las gónadas afectadas.

- Daño más cuantitativo que cualitativo generalmente excepciones de mínima recuperación en los casos de bilateralidad

VARIABLES CLÍNICAS A CONSIDERAR PARA DECIDIR OPERAR O NO EN PACIENTES CON ENDOMETRIOMAS PREVIO A FIV

CARACTERÍSTICAS	CIRUGIA	EXPECTANTE
Intervención de Endometriomas	NO	≥ 1
Reserva Ovárica	Intacta	Afectada
Dolor	Presente	Ausente
Bilateralidad	Unilateral	Bilateral
Malignidad Ecográfica	Presente	Ausente
Crecimiento	Rápido	Estable

CIRUGÍA Y TÉCNICA

The effect of surgical treatment for endometrioma on in vitro fertilization outcomes: a systematic review and meta-analysis

Ioanna Tsoumpou, M.B., Ch.B.,[a] *Maria Kyrgiou, M.D.,*[b] *Tarek A. Gelbaya, M.D.,*[c] *and Luciano G. Nardo, M.D.*[c]

[a] Department of Obstetrics and Gynecology, Royal Lancaster Infirmary, Lancaster, United Kingdom; [b] Department of Obstetrics and Gynecology, Lancashire Teaching Hospitals, Preston, United Kingdom; and [c] Department of Reproductive Medicine, St. Mary's Hospital, Central Manchester and Manchester Children's University Hospitals, Manchester, United Kingdom

Objective: To investigate the effect of surgical treatment of endometrioma on pregnancy rate and ovarian response to gonadotrophin stimulation in women undergoing IVF.
Design: A systematic review and meta-analysis.
Setting: Tertiary referral center for reproductive medicine.
Patient(s): Subfertile women with endometrioma undergoing IVF.
Intervention(s): Surgical removal of endometrioma or expectant management.
Main Outcome Measure(s): Clinical pregnancy rate and ovarian response to gonadotrophins (number of gonadotrophin ampoules, peak E_2 levels, number of oocytes retrieved, and number of embryos available for transfer).
Result(s): A search of three electronic databases for articles published between January 1985 and November 2007 yielded 20 eligible studies. Meta-analysis was conducted for five studies that compared surgery vs. no treatment of endometrioma. There was no significant difference in clinical pregnancy rate between the treated and the untreated groups. Similarly, no significant difference was found between the two groups with regard to the outcome measures used to assess the response to controlled ovarian hyperstimulation with gonadotrophins.
Conclusion(s): Collectively the available data in the literature show that surgical management of endometriomas has no significant effect on IVF pregnancy rates and ovarian response to stimulation compared with no treatment. Randomized controlled trials are needed before producing best-practice recommendations on this topic. (Fertil Steril® 2009;92:75–87. ©2009 by American Society for Reproductive Medicine.)

Key Words: Endometrioma, surgery, IVF, ovarian response, pregnancy outcome

TABLE 1

Characteristics of all studies included in the systematic review.

Study (reference)	Design	Intervention	Study group	Control group	Type of surgery	Cyst size (cm)	Laterality	Dt	Outcomes
Nargund et al. 1995 (54)	Retrospective case–control	IVF-ET long protocol	Surgical treatment of endometrioma	Ovarian cystectomy for simple (52) and dermoid cyst (2)	Cystectomy	ND	Unilateral	ND	Mature follicles, NOR
Loh et al. 1999 (55)	Retrospective case–control	IVF-ET long protocol	Surgical treatment of endometrioma	Contralateral normal ovary	Laparoscopic cystectomy	4.23 ± 2	Either	ND	Mature follicles
Tinkanen et al. 2000 (63)	Retrospective case–control	IVF-ET long protocol	Surgical treatment of endometrioma	Non-treated endometrioma	Endometrioma stripping	1.5–7	Either	1–7 y	NOR, no. of embryos, FR, IR, PR, LBR
Ho et al. 2002 (64)	Retrospective case–control	IVF-ET long protocol	Surgical treatment of endometrioma	Contralateral normal ovary	Endometrioma stripping (laparoscopy or laparotomy)	ND	Unilateral	31± 27 mo	Mature follicles, ampoules[a], E_2 peak
Marconi et al. 2002 (50)	Retrospective cohort	IVF-ET long protocol	Surgical treatment of endometrioma	Tubal factor infertility	Endometrioma stripping (laparoscopy)	4.8 ± 2.3	Either	12 ± 7 mo	Mature follicles, NOR, CPR, ampoules[a], E_2 peak
Suganuma et al. 2002 (65)	Retrospective case–control	IVF-ET long protocol	Surgical treatment of endometrioma	Aspirated endometrioma Non-treated endometrioma	Endometrioma stripping (laparoscopy or laparotomy)	ND	ND	31 ± 27 mo	NOR, FR, PR
Takuma et al. 2002 (56)	Retrospective case–control	IVF-ET long protocol	Surgical treatment of endometrioma	Laparoscopic aspiration of endometrioma	Laparoscopic cystectomy	ND	ND	12 mo	NOR, PR
Somigliana et al. 2003 (57)	Retrospective case–control	IVF/ICSI long protocol	Surgical treatment of endometrioma	Contralateral normal ovary	Laparoscopic cystectomy	3.9 ± 1.5	Unilateral	2.4 ± 1.7 mo	Mature follicles, NOR, no. of embryos, IR, CPR, ampoules[a], E_2 peak
Wu et al. 2003 (58)	Retrospective case–control	IVF-ET long protocol	Surgical treatment of endometrioma	Tubal factor infertility Contralateral normal ovary	Laparoscopic cystectomy	>6	ND	ND	NOR, FR, PR, LBR, CPR, E_2 peak
Wyns and Donnez 2003 (27)	Retrospective case–control	IVF-ET long protocol	Surgical treatment of endometrioma	Tubal factor infertility Laparoscopically treated peritoneal endometriosis Idiopathic infertility Contralateral normal ovary	Laparoscopic cyst wall laser vaporization	ND	ND	ND	Mature follicles, number of embryos, FR, IR, CPR, ampoules[a], E_2 peak

Tsoumpou. Surgery for endometrioma and IVF outcome. Fertil Steril 2009.

Tsoumpou I. et al. **The effect of surgical treatment for endometrioma on invtro fertilizationoutcomes: a systematic review and meta analysis.** 2009

TABLE 1

Continued.

Study (reference)	Design	Intervention	Study group	Control group	Type of surgery	Cyst size (cm)	Laterality	Dt	Outcomes
Garcia-Velasco et al. 2004 (16)	Retrospective case–control	IVF-ET long protocol	Surgical treatment of endometrioma	Non-treated endometrioma	Laparoscopic cystectomy	>3	Unilateral	12 mo	NOR, no. of embryos, FR, IR, CPR, MR, units[a], E_2 peak
Pabuccu et al. 2004 (51)	Prospective cohort	IVF/ICSI long protocol	Surgical treatment of endometrioma	Non-treated endometrioma Aspirated endometrioma Tubal factor infertility	Endometrioma stripping (laparoscopy or laparotomy)	ND	Either	≤4 y	Mature follicles, FR, IR, CPR, MR, ampoules[a], E_2 peak
Wong et al. 2004 (17)	Retrospective cohort	IVF/ICSI long protocol	Surgical treatment of endometrioma	Non-treated endometrioma Non-treated peritoneal endometriosis	Laparoscopic cystectomy	ND	ND	3–48 mo	Mature follicles, FR, IR, PR, CPR, MR, ampoules[a], E_2 peak
Loo et al. 2005 (59)	Retrospective case–control	IVF-ET long protocol	Surgical treatment of endometrioma	Tubal factor infertility	Laparoscopic cystectomy	>3	ND	6 mo	NOR, no. of embryos, FR, IR, CPR, units[a], E_2 peak
Ragni et al. 2005 (52)	Prospective cohort	IVF/ICSI long protocol	Surgical treatment of endometrioma	Contralateral normal ovary	Endometrioma stripping (laparoscopy)	4.0 ± 2.4	Unilateral	2.4 ± 2 y	Mature follicles, NOR, FR, IR, CPR, ampoules[a], E_2 peak
Demirol et al. 2005 (53)	RCT	ICSI long protocol	Surgical removal of endometrioma	Aspirated endometrioma	Endometrioma stripping (laparoscopy)	3–6	Unilateral	3 mo	NOR, FR, IR, CPR, E_2 peak
Esinler et al. 2006 (60)	Retrospective case–control	ICSI long protocol	Surgical treatment of endometrioma	Tubal factor infertility	Laparoscopic cystectomy	>3	Either	ND	Mature follicles, IR, CPR, MR, LBR, units[a], E_2 peak
Yazbeck et al. 2006 (61)	Retrospective case–control	IVF-ET long protocol	Surgical treatment of endometrioma	Non-treated endometriosis stage I–II	Laparoscopic cystectomy	≥4	Unilateral	ND	Mature follicles, FR, PR, CPR, ampoules[a], E_2 peak
Duru et al. 2007 (66)	Retrospective case–control	IVF/ICSI	Surgical treatment of endometrioma	Laparoscopically treated peritoneal endometriosis Contralateral normal ovary	Endometrioma stripping Laparoscopy (28) Laparotomy (10)	ND	Unilateral	≥1 y	Mature follicles, CPR
Matalliotakis et al. 2007 (62)	Retrospective case–control	IVF/ICSI long protocol	Surgical treatment of endometrioma	Tubal factor infertility	Laparoscopic cystectomy	ND	ND	ND	Mature follicles, NOR, no. of embryos, IR, FR, PR, CPR, MR, LBR, ampoules[a], E_2 peak

Note: Dt = interval between surgery and IVF; ND = not documented; NOR = number of oocytes retrieved; FR = fertilization rate; IR = implantation rate; PR = pregnancy rate; LBR = live birth rate; CPR = clinical pregnancy rate; MR = miscarriage rate; ICSI: intracytoplasmic sperm injection; RCT = randomized control trial.

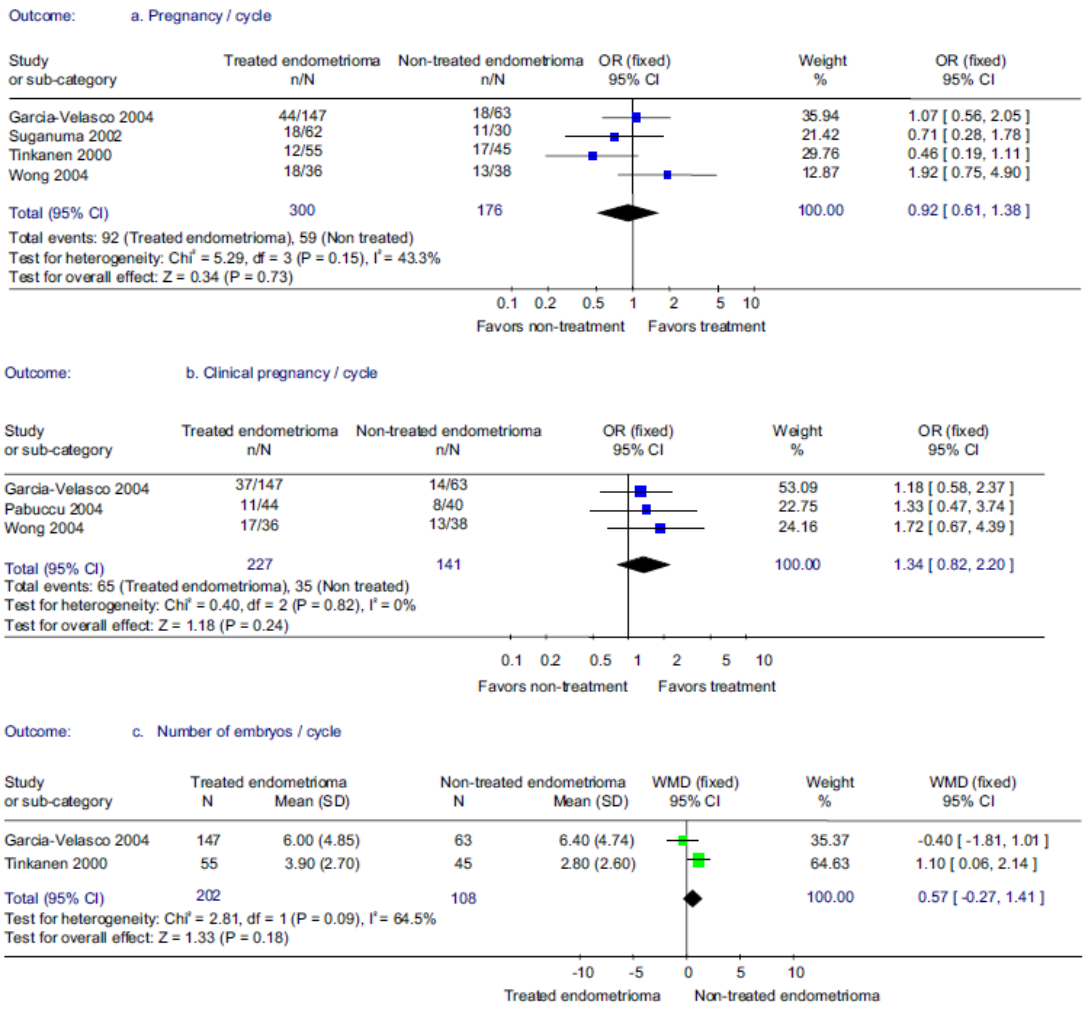
[a] Ampoules/units of gonadotrophin used for ovarian stimulation.

Tsoumpou. Surgery for endometrioma and IVF outcome. Fertil Steril 2009.

Tsoumpou I. et al. **The effect of surgical treatment for endometrioma on invtro fertilizationoutcomes: a systematic review and meta analysis.** 2009

FIGURE 2

(A–F) Forest plots of the meta-analysis on clinical outcomes and on the parameters of ovarian response to gonadotrophin stimulation in women who underwent surgical treatment for endometrioma versus women with non-treated endometrioma.



Tsoumpou. Surgery for endometrioma and IVF outcome. Fertil Steril 2009.

Tsoumpou I. et al. **The effect of surgical treatment for endometrioma on invtro fertilizationoutcomes: a systematic review and meta analysis.** 2009

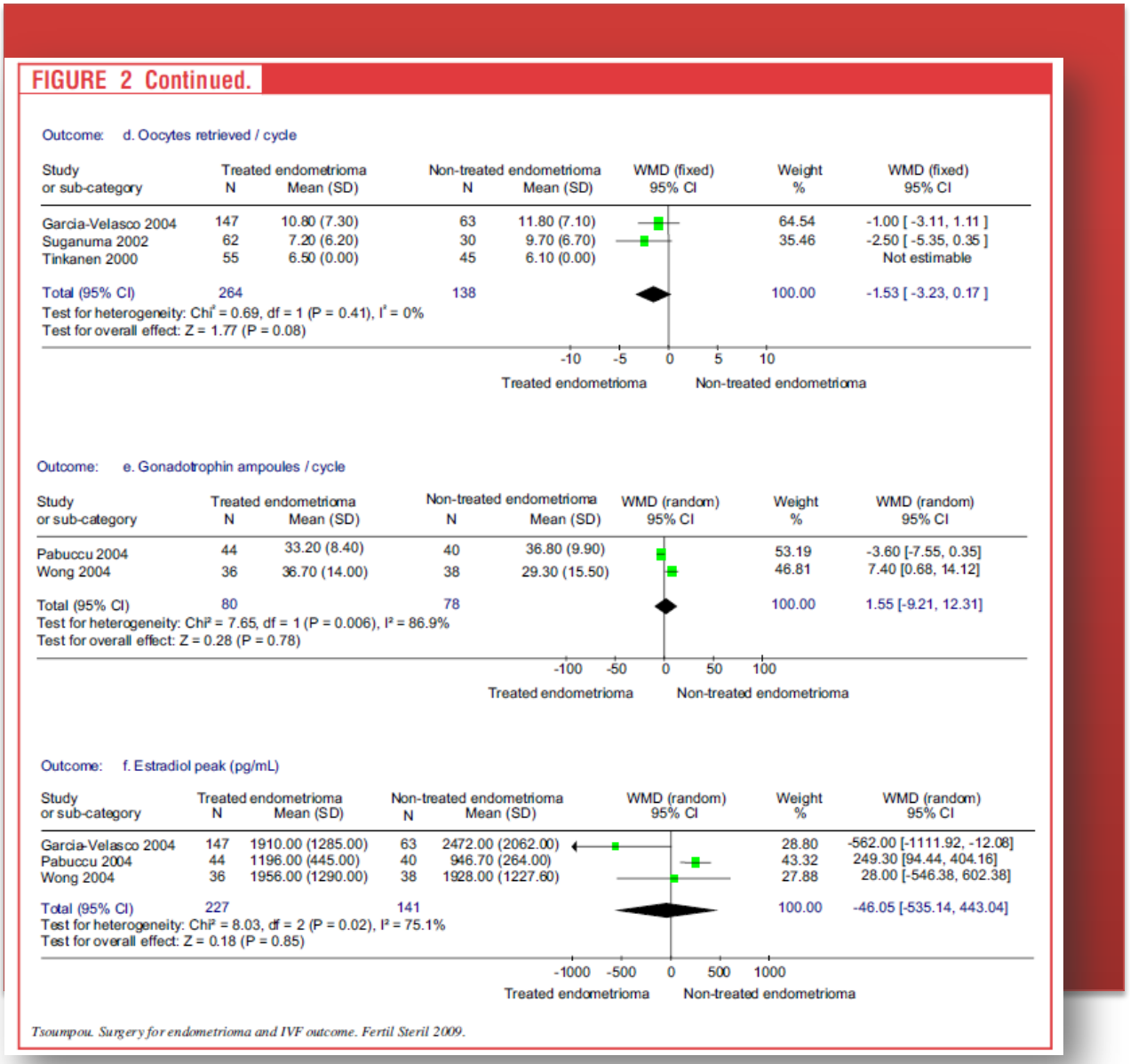


FIGURE 2 Continued.

Outcome: d. Oocytes retrieved / cycle

Study or sub-category	Treated endometrioma N	Treated endometrioma Mean (SD)	Non-treated endometrioma N	Non-treated endometrioma Mean (SD)	WMD (fixed) 95% CI	Weight %	WMD (fixed) 95% CI
Garcia-Velasco 2004	147	10.80 (7.30)	63	11.80 (7.10)		64.54	-1.00 [-3.11, 1.11]
Suganuma 2002	62	7.20 (6.20)	30	9.70 (6.70)		35.46	-2.50 [-5.35, 0.35]
Tinkanen 2000	55	6.50 (0.00)	45	6.10 (0.00)			Not estimable
Total (95% CI)	264		138			100.00	-1.53 [-3.23, 0.17]

Test for heterogeneity: Chi² = 0.69, df = 1 (P = 0.41), I² = 0%
Test for overall effect: Z = 1.77 (P = 0.08)

-10 -5 0 5 10
Treated endometrioma Non-treated endometrioma

Outcome: e. Gonadotrophin ampoules / cycle

Study or sub-category	Treated endometrioma N	Treated endometrioma Mean (SD)	Non-treated endometrioma N	Non-treated endometrioma Mean (SD)	WMD (random) 95% CI	Weight %	WMD (random) 95% CI
Pabuccu 2004	44	33.20 (8.40)	40	36.80 (9.90)		53.19	-3.60 [-7.55, 0.35]
Wong 2004	36	36.70 (14.00)	38	29.30 (15.50)		46.81	7.40 [0.68, 14.12]
Total (95% CI)	80		78			100.00	1.55 [-9.21, 12.31]

Test for heterogeneity: Chi² = 7.65, df = 1 (P = 0.006), I² = 86.9%
Test for overall effect: Z = 0.28 (P = 0.78)

-100 -50 0 50 100
Treated endometrioma Non-treated endometrioma

Outcome: f. Estradiol peak (pg/mL)

Study or sub-category	Treated endometrioma N	Treated endometrioma Mean (SD)	Non-treated endometrioma N	Non-treated endometrioma Mean (SD)	WMD (random) 95% CI	Weight %	WMD (random) 95% CI
Garcia-Velasco 2004	147	1910.00 (1285.00)	63	2472.00 (2062.00)		28.80	-562.00 [-1111.92, -12.08]
Pabuccu 2004	44	1196.00 (445.00)	40	946.70 (264.00)		43.32	249.30 [94.44, 404.16]
Wong 2004	36	1956.00 (1290.00)	38	1928.00 (1227.60)		27.88	28.00 [-546.38, 602.38]
Total (95% CI)	227		141			100.00	-46.05 [-535.14, 443.04]

Test for heterogeneity: Chi² = 8.03, df = 2 (P = 0.02), I² = 75.1%
Test for overall effect: Z = 0.18 (P = 0.85)

-1000 -500 0 500 1000
Treated endometrioma Non-treated endometrioma

Tsoumpou. Surgery for endometrioma and IVF outcome. Fertil Steril 2009.

Tsoumpou I. et al. **The effect of surgical treatment for endometrioma on invtro fertilizationoutcomes: a systematic review and meta analysis.** 2009

CIRUGÍA Y TÉCNICA

Endometrioma

Tratamiento quirúrgico vs No Tratamiento antes del FIV

No diferencias :

- Tasa de embarazo
- Niveles de estradiol
- Número de ovocitos recuperados
- Número de ampollas utilizadas
- Número de embriones para Transferencia

La mayoría de los trabajos NO reportan el tamaño de Endometrioma operado, NO SON TCR

Tsoumpou I. Et al. **The effect of surgical treatment for endometrioma on invtro fertilizationoutcomes: a systematic review and meta analysis**. 2009

CONCLUSIONES

Tsoumpou I y col 2009

El daño precede a la cirugía

Evidencia de cambios (descenso) en la HAM y Endometriosis

Cistectomía: Resección de tejido ovárico sano en forma inadvertida disminuye la reserva Ovárica

El tamaño del endometrioma no determina el numero de folículos para FIV o severidad en la caída de la reserva ovárica

CONCLUSIONES

Tsoumpou I y col 2009

Reducción de la reserva ovárica por alteración en la vascularización por la cirugía, electrocoagulación e inflamación.

A mayor grado de endometriosis mayor perdida de reserva posterior a la cirugía

La bilateralidad también esta asociada con mayor perdida de reserva ovárica posterior Cirugía

Effects of excision of ovarian endometrioma on the antral follicle count and collected oocytes for in vitro fertilization

We compared the response of operated and nonoperated ovaries to gonadotropin stimulation in 38 women who had had excision of ovarian endometrioma. The antral follicle count, numbers of dominant follicles, and number of oocytes collected in the operated ovaries were significantly lower than in the nonoperated ovaries suggesting reduced ovarian reserve after excision of ovarian endometrioma. (Fertil Steril® 2010;94:2340–2. ©2010 by American Society for Reproductive Medicine.)

Key Words: Endometrioma, laparoscopy, ovarian reserve, laparoscopic treatment of endometrioma, ovarian cystectomy

TABLE 1

Number of antral follicle count, dominant follicle, and collected oocytes in the operated ovaries and in the nonoperated ovaries among women with previous ovarian endometrioma.

	Operated side (n = 80)	Nonoperated side (n = 80)	*P* value	95% CI
Antral follicle count	4.5 ± 3.8	7.4 ± 5.2	0.003	1.0–5.0
No. of dominant follicles	4.7 ± 3.9	7.5 ± 4.7	<0.0001	1.5–4.2
No. of dominant follicles ≤ 2 (%)	24 (30%)	10 (12.5%)	0.02	5.1–29.8
No. of collected oocytes	4.3 ± 3.9	7.4 ± 4.8	<0.0001	1.7–4.4
No. of collected oocytes ≤ 2 (%)	32 (40%)	13 (16.2%)	0.008	10.3–37.2
No. of zero oocytes collected (percent)	15 (18.7%)	1 (1.2%)	0.0002	8.6–26.4

Almog. Endometrioma excision, antral follicle count, and retrieved oocytes. Fertil Steril 2010.

EFFECTS OF EXCISION OF OVARIAN ENDOMETRIOMA ON THE ANTRAL FOLLICLE COUNT AND COLLECTED OOCYTES FOR FIV. Almog y col. Fertil Steril 2010

- Número de folículos antrales
- Número de folículos dominantes
- Número de ovocitos recuperados

Son significativamente menores en los pac operados sugiriendo reducción de la reserva ovárica posterior a la excisión del Endometrioma

The effect of laparoscopic ovarian cystectomy versus coagulation in bilateral endometriomas on ovarian reserve as determined by antral follicle count and ovarian volume: a prospective randomized study

Turgut Var, M.D., Sertac Batioglu, M.D., Esra Tonguc, M.D., and Inci Kahyaoglu, M.D.

Department of Reproductive Endocrinology, Zekai Tahir Burak Women's Health Research and Education Hospital, Ankara, Turkey

Conclusion(s): The decreases in AFC and ovarian volume were found for both coagulation and cystectomy, but the decrease was statistically significantly more frequent in cystectomized ovaries than in coagulated ovaries. Also, in the in vitro fertilization cycles, the ovarian response to ovulation induction was statistically significantly reduced in cystectomized ovaries as compared with coagulated ovaries. (Fertil Steril® 2011;95:2247–50. ©2011 by American Society for Reproductive Medicine.)

TABLE 1

Presurgical and postsurgical basal follicle numbers.

Surgical technique	Basal follicle number		*P* value
	Presurgical	Postsurgical	
Cystectomy	5.58 ± 1.13	3.67 ± 1.26	.001
Cauterization	5.42 ± 0.77	4.75 ± 0.60	.02

Note: $P<.05$ was considered statistically significant. Data are expressed as mean ± standard deviation.

Var. Ovarian cystectomy vs. coagulation in bilateral endometriomas. Fertil Steril 2011.

TABLE 2

Presurgical and postsurgical ovarian volumes.

Surgical technique	Ovarian volume		*P* value
	Presurgical	Postsurgical	
Cystectomy	13.03 ± 1.13	6.27 ± 1.95	.01
Cauterization	13.56 ± 1.5	9.87 ± 2.01	.01

Note: $P<.05$ was considered statistically significant. Data are expressed as mean ± standard deviation.

Var. Ovarian cystectomy vs. coagulation in bilateral endometriomas. Fertil Steril 2011.

TABLE 3

The number of basal follicles, dominant follicles, and retrieved oocytes, and the ovarian volume after two different surgical techniques.

Parameter	Postcystectomy	Postcauterization	*P* value
Basal follicle number	3.67 ± 1.26	4.75 ± 0.60	.001
Ovarian volume	6.27 ± 1.95	9.87 ± 2.01	.005
Dominant follicle	4.38 ± 0.95	5.05 ± 0.91	.03
Retrieved oocyte	3.08 ± 0.79	3.86 ± 0.88	.01

Note: $P<.05$ was considered statistically significant. Data are expressed as mean ± standard deviation.

Var. Ovarian cystectomy vs. coagulation in bilateral endometriomas. Fertil Steril 2011.

Turgut V, Batioglu S, Tonguc E, Kahyaoglu I. **The effect of laparoscopic ovarian cystectomy versus coagulation in bilateral endometriomas on ovarian reserve as determined by antral follicle count and ovarian volume: a prospective randomized study.** Fertl Steril. 2011;95:2247-2250.

Laparoscopic management of endometriomas using a combined technique of excisional (cystectomy) and ablative surgery

Jacques Donnez, M.D., Ph.D., Jean-Christophe Lousse, M.D., Pascale Jadoul, M.D., Olivier Donnez, M.D., and Jean Squifflet, M.D.

Department of Gynecology, Université Catholique de Louvain, Brussels, Belgium

TABLE 1

Ovarian volume and AFC 6 months after surgery in women treated for endometriomas by the combined technique and in women of similar age with normal ovaries and regular ovulatory cycles presenting for IVF because of male factor infertility.

	Ovarian volume (cm^3)	AFC
Combined technique (n = 31)	7.64 ± 2.95	6.1 ± 3.2
Women without endometriosis (n = 20)	7.99 ± 5.33	6.2 ± 4.8

Donnez. Laparoscopic surgery of endometriomas. Fertil Steril 2010.

TABLE 2

Ovarian volume and AFC 6 months after surgery in women with unilateral endometriomas and contralateral normal ovaries serving as controls.

	Ovarian volume (cm^3)	AFC
Combined technique (n = 20)	7.45 ± 2.93	5.5 ± 2.4
Contralateral normal ovaries (n = 20)	7.82 ± 3.91	5.7 ± 1.6

Donnez. Laparoscopic surgery of endometriomas. Fertil Steril 2010.

Ovarian endometrioma ablation using plasma energy versus cystectomy: a step toward better preservation of the ovarian parenchyma in women wishing to conceive

Horace Roman, M.D., Ph.D.,[a,b] *Mathieu Auber, M.D.,*[a] *Cécile Mokdad, M.D.,*[a] *Cécile Martin, M.D.,*[c] *Alain Diguet, M.D.,*[a] *Loïc Marpeau, M.D.,*[a] *and Nicolas Bourdel, M.D.*[d]

[a] Department of Gynecology and Obstetrics, Rouen University Hospital-Charles Nicolle, Rouen; [b] Research Group 4308 Spermatogenesis and Gamete Quality, IHU Rouen Normandy, IFRMP23, Reproductive Biology Laboratory, Rouen University Hospital, Rouen; [c] Department of Radiology, Rouen University Hospital-Charles Nicolle, Rouen; and [d] Department of Gynecology, Obstetrics and Reproductive Medicine, University Hospital Estaing, Clermont Ferrand, France

Conclusion(s): When compared with plasma energy ablation, cystectomy is responsible for a statistically significant decrease in ovarian volume and a statistically significant reduction in AFC. This data should be taken into account in therapeutic decision-making concerning women attempting pregnancy, especially where there are other risk factors for postoperative ovarian failure. (Fertil Steril® 2011;■:■–■. ©2011 by American Society for Reproductive Medicine.)

TABLE 1

Patient characteristics and results of three-dimensional ultrasound examination.

	Endometrioma ablation using plasma energy n = 15 (%)	Endometrioma cystectomy n = 15 (%)	*P* value
Age (y)	31.6 ± 5.2	33.9 ± 5.3	.23
Nulligesta	10 (67)	5 (33)	.01
Nullipara	13 (87)	7 (47)	.06
Cyst diameter (mm)	38 ± 13	47 ± 16	.10
Side			1
Left	11	10	
Right	4	5	
AFSr score	48 ± 24	52 ± 29	.68
Volume of nonoperated ovary (mL)	7 ± 2.7	8.8 ± 4.2	.15
Volume of operated ovary (mL)	5.2 ± 2.5	3 ± 1.6	.007
Ratio of the volume operated/nonoperated ovary	0.79 ± 0.26	0.35 ± 0.17	<.001
AFC of nonoperated ovary	6.8 ± 3.5	8 ± 5.3	.47
AFC of operated ovary	5.5 ± 3.9	2.9 ± 2.4	.03
Ratio of the AFC of operated/nonoperated ovary	0.83 ± 0.31	0.33 ± 0.25	<.001

Note: AFC = antral follicle count; AFSr = Revised American Fertility Society score.

Roman. Plasma energy ablation versus excision. Fertil Steril 2011.

Endometriomas as a possible cause of reduced ovarian reserve in women with endometriosis

Michio Kitajima, M.D., Ph.D., Sylvie Defrère, Ph.D., Marie-Madeleine Dolmans, M.D., Ph.D., Sebastien Colette, Ph.D., Jean Squifflet, M.D., Ph.D., Anne Van Langendonckt, Ph.D., and Jacques Donnez, M.D., Ph.D.

Université Catholique de Louvain, Institut de Recherche Expérimentale et Clinique, Department of Gynecology, Brussels, Belgium

Objective: To evaluate the adverse effects of endometriomas on ovarian reserve.
Design: Analysis of prospectively collected biopsy samples.
Setting: Gynecology research unit in a university hospital.
Patient(s): Women younger than age 35 years with endometriomas.
Intervention(s): Biopsy of normal cortex from ovaries affected by endometriomas ($\leq$4 cm) and contralateral ovaries without cysts.
Main Outcome Measure(s): Presence of cortex-specific stroma, observation of superficial endometriosis, follicular density, and presence of fibrosis.
Result(s): Twenty samples of cortical tissue from ovaries with endometriomas and 11 from contralateral ovaries without cysts were analyzed. Follicular density was significantly lower in cortex from ovaries with endometriomas than in cortex from contralateral ovaries without cysts (mean $\pm$ SD = $6.3 \pm 4.1/mm^3$ vs $25.1 \pm 15.0/mm^3$). Eleven (55%) cortical samples from ovaries with endometriomas showed fibrosis and concomitant loss of cortex-specific stroma, not observed in contralateral normal ovaries. Multivariate analysis revealed that the presence of endometrioma and fibrosis were significantly and independently associated with follicular density.
Conclusion(s): Endometriotic cyst formation and associated structural tissue alterations in apparently normal ovarian cortex may be a cause of reduced ovarian reserve. Early diagnosis and intervention may be beneficial in women with endometriomas to protect their ovarian function. (Fertil Steril® 2011;96:685–91. ©2011 by American Society for Reproductive Medicine.)

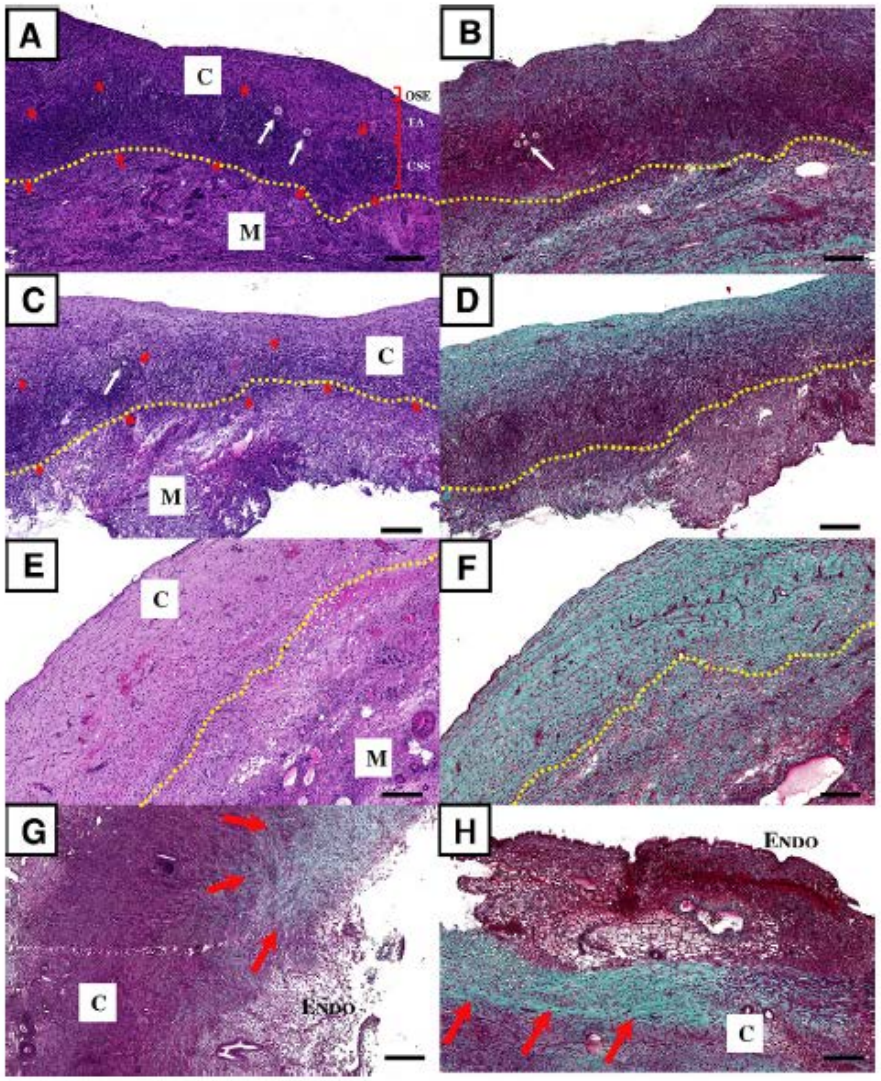
Key Words: Endometriosis, endometrioma, ovarian reserve, follicular density, fibrosis, ovarian stroma

ENDOMETRIOMAS AS A POSSIBLE CAUSE OF REDUCED OVARIAN RESERVE IN WOMEN WITH ENDOMETRIOSIS. Kitajima y col. Fertil Steril 2011

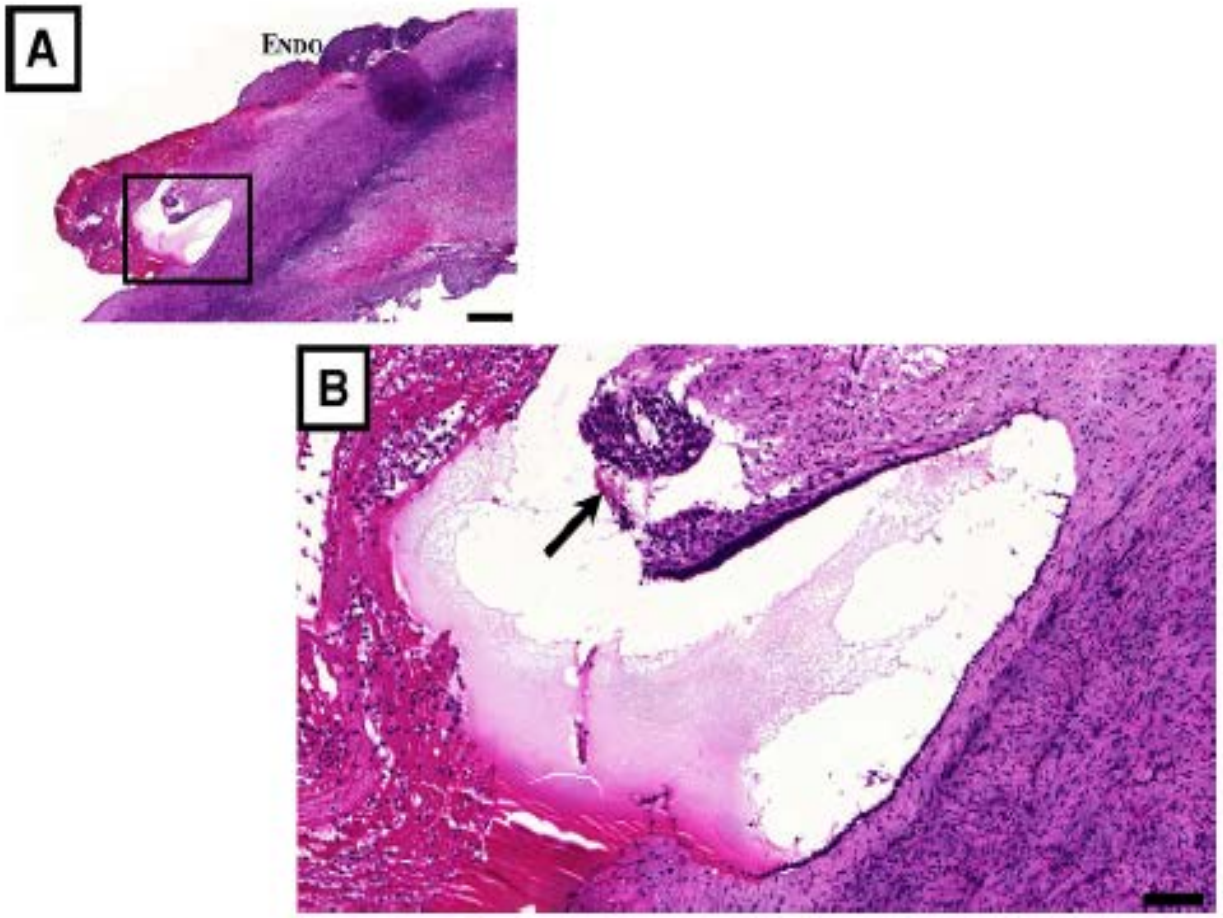
La densidad folicular en la corteza de ovarios con endometriomas menor de 4 cm de diámetro es significativamente menor que la corteza de ovarios normales.

Ovarios con endometriomas:

- fibrosis,
- inflamación,
- perdida de estroma (folículos)



Kitajima. Endometriomas and focal follicular loss. Fertil Steril 2011.



Kitajima. Endometriomas and focal follicular loss. Fertil Steril 2011.

Serum anti-Müllerian hormone level is a useful marker for evaluating the impact of laparoscopic cystectomy on ovarian reserve

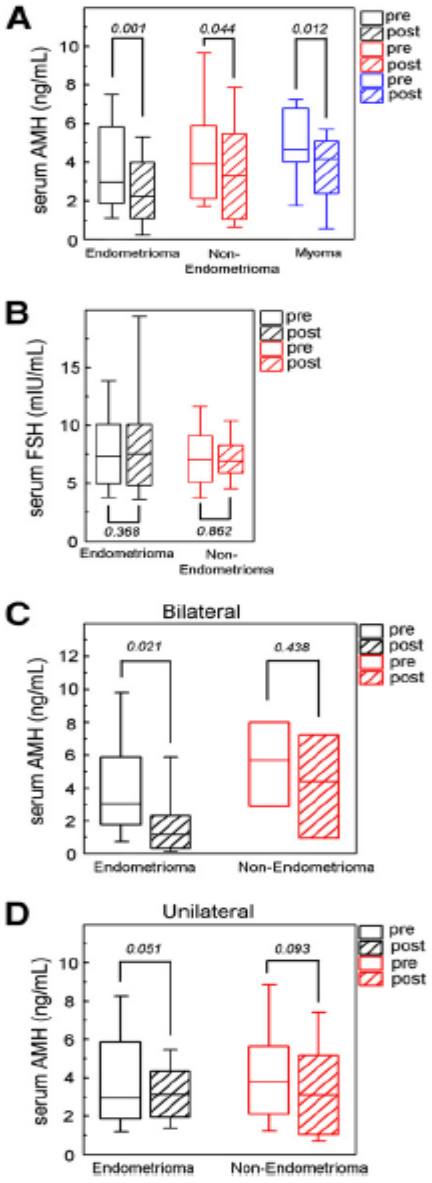
To assess the impact of laparoscopic surgery on ovarian reserve, we evaluated pre- and postoperative levels of serum anti-Müllerian hormone (AMH) in comparison with basal levels of FSH. The median AMH level was 2.98 ng/mL and 3.92 ng/mL before operation and was significantly reduced to a median level of 2.24 ng/mL and 3.29 ng/mL at 1 month after operation in the endometrioma group (n = 29) and the nonendometrioma group (n = 21), respectively, whereas postoperative basal FSH levels did not significantly change in comparison with preoperative levels. (Fertil Steril® 2010;94:2846–9. ©2010 by American Society for Reproductive Medicine.)

Key Words: Anti-Müllerian hormone, laparoscopic cystectomy, ovarian reserve

Akira Iwase, M.D.[a,b]
Wakana Hirokawa, M.D.[a,b]
Maki Goto, M.D.[a]
Sachiko Takikawa, M.D.[a]
Yoshinari Nagatomo, B.S.[a]
Tatsuo Nakahara, M.D.[a]
Shuichi Manabe, M.D.[a]
Fumitaka Kikkawa, M.D.[a]

[a] *Department of Obstetrics and Gynecology, Nagoya University Graduate School of Medicine, Nagoya, Japan*
[b] *Department of Maternal and Perinatal Medicine, Nagoya University Graduate School of Medicine, Nagoya, Japan*

FIGURE 1



Iwase. Correspondence. Fertil Steril 2010.

Human Reproduction, Vol.26, No.4 pp. 904–910, 2011
Advanced Access publication on February 2, 2011 doi:10.1093/humrep/der006

human reproduction

ORIGINAL ARTICLE *Reproductive endocrinology*

The post-operative decline in serum anti-Müllerian hormone correlates with the bilaterality and severity of endometriosis

Wakana Hirokawa [1,2], Akira Iwase [1,2]*, Maki Goto [1,2], Sachiko Takikawa [1], Yoshinari Nagatomo [1], Tatsuo Nakahara [1], Bayasula Bayasula [1], Tomoko Nakamura [1], Shuichi Manabe [1], and Fumitaka Kikkawa [1]

[1]Department of Obstetrics and Gynecology, Nagoya University Graduate School of Medicine, 65 Tsurumai-cho, Showa-ku, Nagoya 466-8550, Japan [2]Department of Maternal and Perinatal Medicine, Nagoya University Graduate School of Medicine, Nagoya, Japan

*Correspondence address. Tel: +81-52-744-2261; Fax: +81-52-744-2268; E-mail: akiwase@med.nagoya-u.ac.jp

Submitted on October 31, 2010; resubmitted on December 22, 2010; accepted on January 7, 2011

BACKGROUND: To assess the impact of ovarian cystectomy for endometriomas on the ovarian reserve, we evaluated the pre- and post-operative levels of serum anti-Müllerian hormone (AMH). We also analyzed the correlations between factors related to endometriosis and surgery for endometriomas and the serum AMH levels to investigate which factors affect ovarian reserve.

METHODS: Thirty-eight patients who were undergoing ovarian cystectomy for unilateral endometrioma ($n = 20$) and bilateral endometriomas ($n = 18$) participated. Preoperative and post-operative serum samples were collected and assayed for AMH levels, and changes between the two samples were analyzed in association with parameters of endometriosis and surgery for endometriomas.

RESULTS: The mean AMH level was 3.9 ng/ml prior to surgery, and was reduced to 2.1 ng/ml at 1 month post-surgery. The rate of decline of the serum AMH level was significantly higher in the bilateral group than the unilateral group (62.8 ± 29.6 versus $24.7 \pm 32.5\%$, $P < 0.001$). The rate of decline in the serum AMH levels showed a significant correlation to the revised American Society for Reproductive Medicine (rASRM) score ($P = 0.003$), but not age, cyst diameter, blood loss during the operation or the number of follicles removed in the specimens.

CONCLUSIONS: Our results suggest that the decrease in ovarian reserve should be taken into account in patients indicated for cystectomy for bilateral endometriomas or unilateral endometrioma with high rASRM scores.

Key words: anti-Müllerian hormone / cystectomy / endometrioma / ovarian reserve

Table I Patient characteristics.

Characteristics and variables	Overall (n = 38)	Unilateral (n = 20)	Bilateral (n = 18)	P-value
Age (years)	33.8 ± 4.7	34.0 ± 3.9	33.6 ± 5.4	0.830[a]
BMI (kg/m^2)	20.1 ± 2.3	20.4 ± 2.7	19.7 ± 1.7	0.781[b]
Preoperative				
Monocystic/Multicystic (%)	6 (16)/32 (84)	5 (25)/15 (75)	1 (6)/17 (94)	0.184[c]
Cyst size 1 (cm)	6.4 ± 2.2	6.1 ± 2.5	6.7 ± 1.8	0.125[b]
Cyst size 2 (cm)	3.9 ± 1.3	NA	3.9 ± 1.3	NA
Cyst size 1 + 2 (cm)	8.2 ± 3.4	6.1 ± 2.5	10.6 ± 2.5	<0.001[b]
Serum CA125 (IU/ml)	85.4 ± 84.8	99.7 ± 105.1	68.7 ± 46.3	0.915[b]
Surgery				
Laparoscopy/Laparotomy	33 (87)/5 (13)	18 (90)/2 (10)	15 (83)/3 (17)	0.653[c]
Blood loss (ml)	249 ± 305	152 ± 216	357 ± 350	0.005[b]
rASRM score	49.5 ± 28.3	36.7 ± 23.5	63.7 ± 26.3	<0.001[b]
Number of follicles in specimens	18.1 ± 19.8	16.9 ± 14.8	19.4 ± 24.2	0.763[b]
Serum AMH (ng/ml)				
Preoperative	3.9 ± 2.5	4.1 ± 2.3	3.6 ± 2.7	0.299[b]
Post-operative	2.1 ± 1.6	2.9 ± 1.6	1.2 ± 1.0	0.001[b]

Values are means ± SD. P-values in unilateral versus bilateral.
[a]Student's t-test.
[b]Mann–Whitney U-test.
[c]Fisher's exact test.

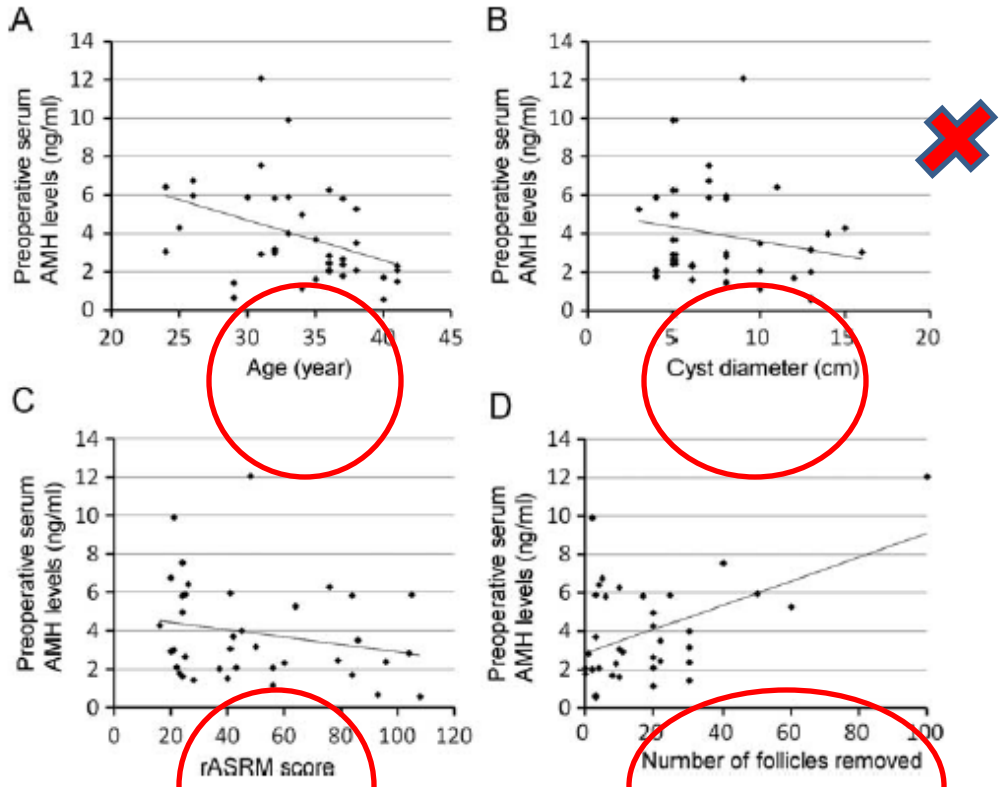


Figure 2 Correlation of the preoperative serum AMH level with (**A**) age ($r = -0.392$, $P = 0.0149$), (**B**) cyst diameter ($r = -0.203$, $P = 0.22$), (**C**) rASRM score ($r = -0.219$, $P = 0.187$) and (**D**) the number of follicles removed ($r = 0.488$, $P = 0.00255$). The r is the Pearson correlation coefficient.

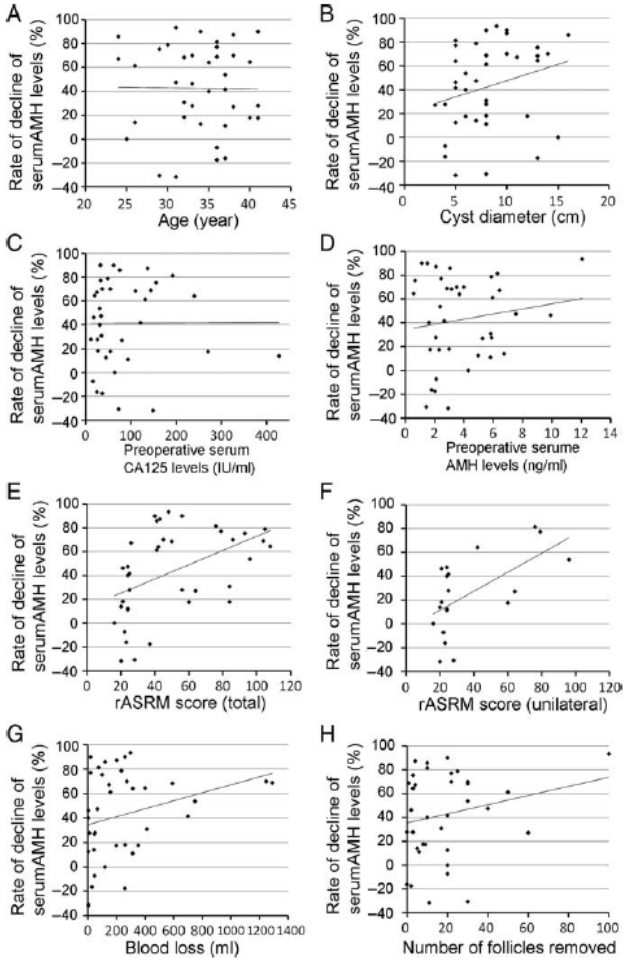


Figure 3 Correlation of rate of decline in the serum AMH level with (**A**) age ($r = -0.0122$, $P = 0.942$), (**B**) cyst diameter ($r = 0.259$, $P = 0.117$), (**C**) preoperative CA125 level ($r = 0.00221$, $P = 0.99$), (**D**) preoperative serum AMH level ($r = 0.151$, $P = 0.365$), (**E**) rASRM score in all patients ($r = 0.473$, $P = 0.00273$), (**F**) rASRM score in the unilateral patients ($r = 0.592$, $P = 0.00594$), (**G**) blood loss during operation ($r = 0.277$, $P = 0.0927$) and (**H**) the number of follicles removed ($r = 0.215$, $P = 0.208$). The r is the Pearson correlation coefficient.

Effect of laparoscopic excision of endometriomas on ovarian reserve: serial changes in the serum antimüllerian hormone levels

Hale Goksever Celik, M.D.,[a] Erbil Dogan, M.D.,[b] Emre Okyay, M.D.,[b] Cagnur Ulukus, M.D.,[c] Bahadir Saatli, M.D.,[b] Sezer Uysal, M.D.,[d] and Meral Koyuncuoglu, M.D.[c]

[a] Department of Obstetrics and Gynecology, Kayseri Develi General Hospital; [b] Department of Obstetrics and Gynecology, [c] Department of Pathology, and [d] Department of Biochemistry, Dokuz Eylul University, Inciralti, Izmir, Turkey

Objective: To investigate the effect of laparoscopic endometrioma stripping on serum antimüllerian hormone (AMH) and the correlation between the clinicopathologic factors.
Design: Prospective study.
Setting: University hospital.
Patient(s): Sixty-five women with endometriomas.
Intervention(s): All patients underwent laparoscopic cystectomy. Serum AMH, FSH, LH, E_2, and antral follicle count (AFC) were measured preoperatively, at 6 weeks, and at 6 months postoperatively. Specimens were analyzed histopathologically.
Main Outcome Measure(s): The primary end point was to assess the ovarian reserve damage based on alterations of AMH and the secondary end point was to detect the changes in FSH, LH, E_2, and AFC.
Result(s): Serum AMH decreased significantly at the sixth month (61%) postoperatively. The FSH level increased significantly at the sixth week, but returned to normal at the sixth month. The AFC increased significantly at the sixth week and at the sixth month. The AMH level decrease was more evident in patients with the cyst <5 cm (65.7% vs. 41.3%). The AMH decrease was more in bilateral compared with unilateral endometriomas (67% versus 57%, respectively). No correlation was detected between the histopathologic analyses and tAMH level. Initially the AMH level was the only independent factor affecting the AMH decrease (odds ratio, 3.68; 95% confidence interval 1.66–8.14).
Conclusion(s): Laparoscopic cystectomy of ovarian endometriomas causes a significant and progressive decline in serum AMH levels. (Fertil Steril® 2012;97:1472–8. ©2012 by American Society for Reproductive Medicine.)
Key Words: Endometrioma, laparoscopy, ovarian reserve, antimüllerian hormone, antral follicle count

TABLE 1

The mean levels of ovarian reserve markers before and after laparoscopic ovarian cystectomy.

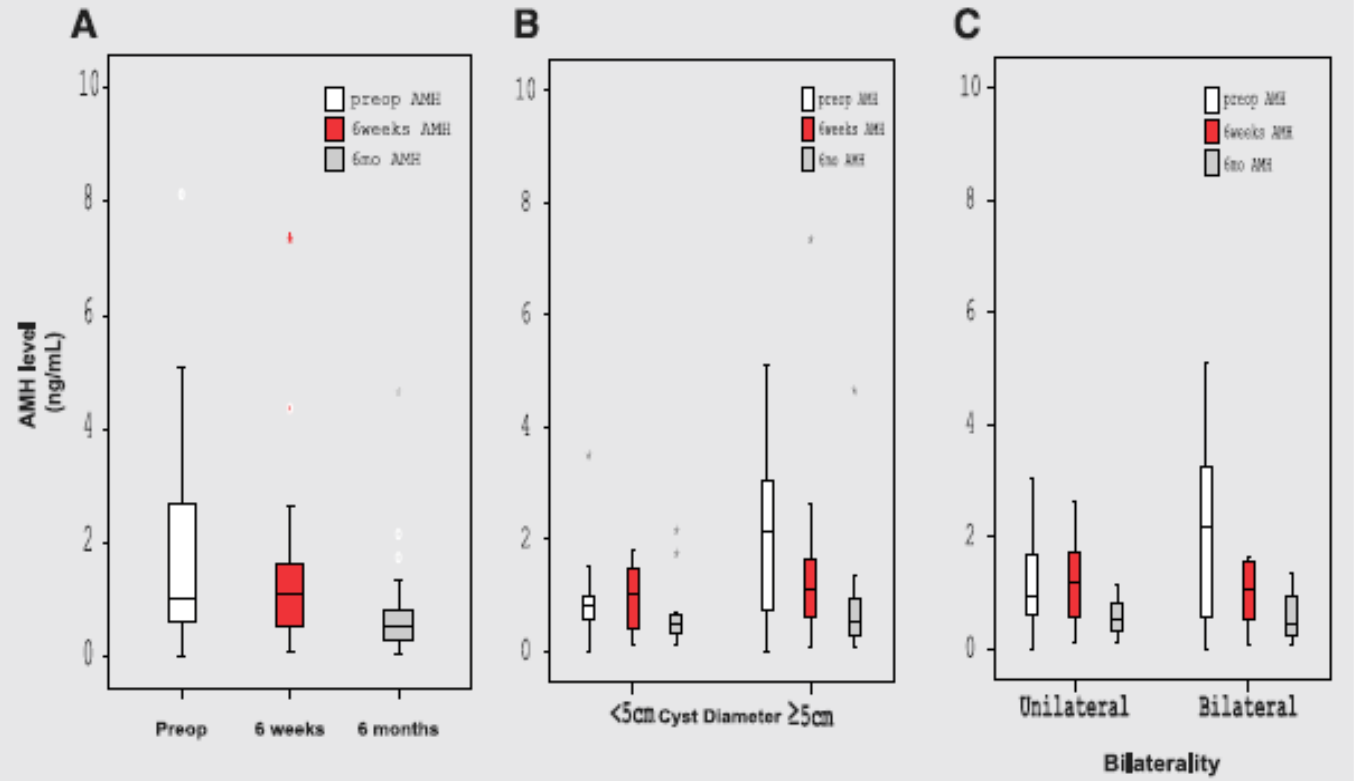
	Preoperative (n = 65)	Postoperative 6th week (mean ± SD; n = 64)	Postoperative 6th month (mean ± SD; n = 39)	*P* value[a]
FSH (mIU/mL)	6.37 ± 3.04	8.70 ± 5.74	6.67 ± 4.53	< .001
LH (mIU/mL)	7.32 ± 9.02	6.33 ± 7.89	5.64 ± 4.43	NS
FSH:LH ratio	1.66 ± 1.66	2.65 ± 4.42	1.90 ± 3.02	NS
E_2 (pg/mL)	87.66 ± 63.54	101.56 ± 125.19	91.15 ± 74.58	NS
AFC	4.9 ± 2.2	5.1 ± 2.4	6.4 ± 2.2	.008
AMH (ng/mL)	1.78 ± 1.71	1.32 ± 1.29	0.72 ± 0.79	< .001

Note: AFC = antral follicle count; AMH = antimüllerian hormone; NS = not significant.

[a] Analysis of variance (ANOVA) with repeated measures.

Celik. Endometrioma excision and AMH. Fertil Steril 2012.

FIGURE 1



Box-and-whisker plots showing the serum antimüllerian hormone (AMH) levels before and after laparoscopic ovarian cystectomy. Lines inside boxes indicate median, and the upper and lower limits of the boxes and whiskers indicate interquartile and total ranges. (A) The whole group; (B) AMH levels according to cyst diameter; and (C) AMH levels according to bilaterality of the endometrioma. Preoperative and sixth week postoperative values are for 65 patients and the sixth month value is for 39 patients.

Celik. Endometrioma excision and AMH. Fertil Steril 2012.

Surgical excision of endometriomas and ovarian reserve: a systematic review on serum antimüllerian hormone level modifications

Edgardo Somigliana, M.D., Ph.D.,[a] Nicola Berlanda, M.D.,[a] Laura Benaglia, M.D.,[a] Paola Viganò, D.Sc., Ph.D.,[b] Paolo Vercellini, M.D.,[a,c,d] and Luigi Fedele, M.D.[a,c]

[a] Fondazione Cà Granda, Ospedale Maggiore Policlinico; [b] Università Vita-Salute, Scientific Institute San Raffaele; [c] Università degli Studi di Milano; and [d] Center for Research in Obstetrics and Gynecology, Milan, Italy

Objective: To evaluate serum antimüllerian hormone (AMH) level modification after surgical excision of ovarian endometriomas.
Design: Systematic review. MEDLINE search from January 1990 to April 2012 using the combination of medical terms endometriosis, endometrioma, endometriotic cyst, and AMH or antimüllerian hormone, MIF or müllerian inhibiting factor. Reference lists of selected studies were checked for additional potential contributions.
Setting: Not applicable.
Patient(s): Women with ovarian endometriomas requiring surgery.
Intervention(s): Serum AMH level assessment.
Main Outcome Measure(s): Serum AMH level modifications.
Result(s): Eleven articles satisfied our selection criteria. Data pooling were deemed inopportune owing to the heterogeneity of the study designs and of the reported parameters. Nine of 11 studies documented a statistically significant reduction of serum AMH level after surgery. The two studies failing to document this decrease were published by the same study group and partly overlapped. The magnitude of the decline was more evident in women operated on for bilateral endometriomas.
Conclusion(s): Evidence deriving from the evaluation of serum AMH level modifications after surgical excision of endometriomas supports a surgery-related damage to ovarian reserve.
(Fertil Steril® 2012;98:1531–8. ©2012 by American Society for Reproductive Medicine.)
Key Words: Endometrioma, AMH, surgery, stripping, ovarian reserve

Discuss: You can discuss this article with its authors and with other ASRM members at http://fertstertforum.com/somiglianae-endometrioma-ovarian-reserve-amh/

Use your smartphone to scan this QR code and connect to the discussion forum for this article now.*

* Download a free QR code scanner by searching for "QR scanner" in your smartphone's app store or app marketplace.

TABLE 1

Main characteristics of the included studies.

Study	Surgical technique used	AMH assay kit	Age (y)	No. of cases (monolateral/ bilateral)	Data for monolateral/ bilateral	Diameter (mm)	Type of controls (N)	Time points assessments
Chang et al., 2010 (11)	LPS stripping, bipolar forceps for hemostasis, ovarian suture	Stored −70°C, ELISA-DSL. Same assay	34 ± 7	13 (nr)	Yes[b]	nr	Benign cysts (7)	Basal, 1 wk, 1 mo, 3 mo
Biacchiardi et al., 2010 (12)	LPS stripping, bipolar forceps for hemostasis	Stored −20°C. ELISA-Immunotech. Different assays	34 ± 5	43 (33/10)	No	37 ± 11	None	Basal, 3 mo, 9 mo
Tsolakidis et al., 2010 (13)	LPS stripping, bipolar forceps for hemostasis	Not stored, ELISA-DSL. Different assays	33 ± 2	10 (7/3)	No	≥30	Endometrioma's vaporization (10) [a]	Basal, 6 mo
Ercan et al., 2010 (14)	LPS stripping, bipolar forceps for hemostasis	Stored −70°C, ELISA-DSL. Same assay	28 ± 4	47 (33/14)	Yes	≥45	None	Basal, 1 mo
Iwase et al., 2010 (15)	LPS stripping, bipolar forceps for hemostasis, ovarian suture	Stored −80°C. ELISA-Immunotech. Different assays	33 ± 5	29 (16/13)	Yes	nr	Benign cysts (21) and fibroids (15)	Basal, 1 mo
Lee et al., 2011 (16)	LPS stripping, bipolar forceps for hemostasis	Stored −70°C, ELISA-Beckman Coulter. Different assays	30 ± 4	13 (13/0)	na	40 ± 18	Ovariectomy for endometrioma (14)	Basal, 1 wk, 1 mo, 3 mo
Hirokawa et al., 2011 (17)	LPS or LPT stripping, bipolar forceps for hemostasis, ovarian suture	Stored −80°C. ELISA-Immunotech. Different assays	34 ± 5	38 (20/18)	Yes	64 ± 22	None	Basal, 1 mo
Kitajima et al., 2011 (18)	LPS stripping, measures for hemostasis not mentioned	Stored −80°C. ELISA-Immunotech. Different assays	30 ± 5	19 (19/0)	na	67 ± 19	Benign cysts (13)	Basal, 3 mo
Ercan et al., 2011 (19)	LPS stripping (coagulation if close to the hilus), bipolar forceps for hemostasis	Stored −70°C, ELISA-DSL. Different assays	29 ± 5	36 (36/0)	na	25 ± 23	None	Basal, 3 mo
Hwu et al., 2011 (20)	LPS stripping, bipolar forceps for hemostasis	Not stored, ELISA-DSL. Different assays	31 ± 4	31 (31/0)	na	≥30	None	Basal, 3 mo
Celik et al., 2012 (21)	LPS stripping, bipolar forceps for hemostasis	Stored −80°C, ELISA-DSL. Same assay	28 ± 6	65 (46/19)	Yes	59 ± 21	None	Basal, 6 wk, 6 mo

Note: AMH = antimüllerian hormone; DSL = Diagnostic System Laboratories; LPS = laparoscopic; LPT = laparotomic; na = not applicable; nr = not reported.

[a] The study from Tsolakidis et al. (2010) is a randomized controlled trial comparing the classic stripping technique and the three-step technique (LPS drainage, GnRH analogues, LPS cyst vaporization).

[b] Data are reported separately for monolateral and bilateral cysts but referred to both endometriotic and non endometriotic ovarian cysts.

TABLE 2

Serum AMH levels at the different time points.

Study	Parameter reported	No. of cases	Basal	1 wk	4–6 wk	3 mo	6–9 mo	*P* value
Chang et al., 2010 (11)	Median (IQR)	13	2.0 (1.3–3.1)	0.6 (0.4–0.8)*	1.0 (0.5–1.5)*	0.8 (0.7–1.6)	–	<.05 vs. basal*
Biacchiardi et al., 2010 (12)	Mean ± SD	43	3.0 ± 0.4	–	–	1.4 ± 0.2*	1.3 ± 0.3*	<.0001 vs. basal*
Tsolakidis et al., 2010 (13)	Mean ± SD	10	3.9 ± 0.4	–	–	–	2.9 ± 0.2*	.026 vs. basal*
Ercan et al., 2010 (14)	Mean ± SD	47	1.6 ± 1.1	–	1.4 ± 1.2	–	–	ns
Iwase et al., 2010 (15)	Median (range)	29	3.0 (0.5–12.1)	–	2.2 (0.1–7.2)*	–	–	.001 vs. basal*
Lee et al., 2011 (16)	Mean ± SD	13	4.7 ± 2.5	2.8 ± 1.6*	2.8 ± 1.5*	3.3 ± 2.1*	–	<.05 vs. basal*
Hirokawa et al., 2011 (17)	Mean ± SD	38	3.9 ± 2.5	–	2.1 ± 1.6*	–	–	<.001vs. basal*
Kitajima et al., 2011 (18)	Mean ± SD % of reduction	19	4.3 ± 3.0	–	–	–25% ± 29%*	–	.02 vs. controls (–3% ± 35%)*
Ercan et al., 2011 (19)	Mean ± SD	36	2.0 ± 0.4	–	–	2.0 ± 0.6	–	ns
Hwu et al., 2011 (20)	Mean ± SD	31	3.9 ± 0.4	–	–	2.0 ± 0.2*	–	<.01 vs. basal*
Celik et al., 2012 (21)	Mean ± SD	65[a]	1.8 ± 1.7	–	1.3 ± 1.3*	–	0.7 ± 0.8*	<.001 vs. basal*

Note: AMH levels are reported in nanograms per milliliter. AMH = antimüllerian hormone; IQR = interquartile range; ns = not significant.

[a] Thirty-nine women remained at the 6-month assessment.

* $P < .05$. The specific comparison and the precise *P* value is shown in the last column.

Somigliana. Surgery for endometriomas and serum AMH. Fertil Steril 2012.

Determinantes de la reducción de HAM

Hirokawa / Bilateralidad

Celik / niveles pre qx de HAM

Kitajima / tejido ovárico

Modificación de la HAM post a qx

9 - 11

Ecron

Modificaciones de HAM en grupos control / Control de técnicas qx

Kitajima /no cambios

Chang / recuperación a los 3 meses

Iwase / miomectomia

Tsolakidis / qx tres pasos

Lee oforectomía unilt - cistectomía

Trabajos de Ecran : menor edad
menor número de folículos antrales en ovario operado sin cambios en HAM

Limitaciones: difícil comparación
Disminución espontanea de HAM con el tiempo (0,1 ng/ml por año)
Controles: quistes ováricos / disminución del volumen luego de qx de endometriomas
Descenso de HAM luego de Miomectomia

HAM disminuye después de la cirugía y es mayor en endometriomas bilaterales

CIRUGIA = DAÑO A LA RESERVA OVARICA

ASRM PAGES

Endometriosis and infertility: a committee opinion

The Practice Committee of the American Society for Reproductive Medicine

American Society for Reproductive Medicine, Birmingham, Alabama

Women with endometriosis typically present with pelvic pain, infertility, or an adnexal mass, and may require surgery. Treatment of endometriosis in the setting of infertility raises a number of complex clinical questions that do not have simple answers. This document replaces the 2006 ASRM Practice Committee document of the same name. (Fertil Steril® 2012;98:591–8. ©2012 by American Society for Reproductive Medicine.)

Earn online CME credit related to this document at www.asrm.org/elearn

Discuss: You can discuss this article with its authors and with other ASRM members at http://fertstertforum.com/goldsteinj-endometriosis-and-infertility-a-committee-opinion/

Use your smartphone to scan this QR code and connect to the discussion forum for this article now.*

* Download a free QR code scanner by searching for "QR scanner" in your smartphone's app store or app marketplace.

CONCLUSIONS

- Female age, duration of infertility, pelvic pain, and stage of endometriosis should be considered when formulating a management plan.

- The benefit of laparoscopic treatment of minimal or mild endometriosis is insufficient to recommend laparoscopy solely to increase the likelihood of pregnancy.
- When laparoscopy is performed for other indications, the surgeon may consider safely ablating or excising visible lesions of endometriosis.
- In younger women (under age 35 years) with stage I/II endometriosis-associated infertility, expectant management or SO/IUI can be considered as first-line therapy.
- For women 35 years of age or older, more aggressive treatment, such as SO/IUI or IVF may be considered.
- In women with stage III/IV endometriosis-associated infertility, conservative surgical therapy with laparoscopy or possible laparotomy may be beneficial.
- Surgical management of an endometrioma should include resection or ablation, rather than drainage, with resection preferred.
- For women with stage III/IV endometriosis who fail to conceive following conservative surgery or because of advancing reproductive age, IVF-ET is an effective alternative.

Table II International guidelines on surgical treatment of endometriosis-associated infertility in asymptomatic women

Clinical condition	Recommendation		
	ESHRE 2005	**ASRM 2006**	**RCOG 2006**
Minimal-mild endometriosis (stage I–II disease)	Limited benefit: surgery recommended	Small benefit: surgery recommended	Demonstrated benefit: surgery recommended
Moderate–severe endometriosis (stage III-IV disease)	Possible but unproven benefit: surgery recommended	Possible benefit: surgery recommended	Possible benefit: recommendation uncertain
Post-operative adjuvant treatment	No benefit: not recommended	No benefit: not recommended	No benefit: not recommended
Surgery before IVF	Recommended if endometrioma $\geq$4 cm	Doubtful benefit: no recommendation	Recommended if endometrioma $\geq$4 cm
Recurrent endometriosis	No recommendation	Second-line surgery not recommended	No recommendation

Human Reproduction, Vol.29, No.3 pp. 400–412, 2014
Advanced Access publication on January 15, 2014 doi:10.1093/humrep/det457

human reproduction

ORIGINAL ARTICLE *ESHRE pages*

ESHRE guideline: management of women with endometriosis†

G.A.J. Dunselman[1,*], N. Vermeulen[2], C. Becker[3], C. Calhaz-Jorge[4], T. D'Hooghe[5], B. De Bie[6], O. Heikinheimo[7], A.W. Horne[8], L. Kiesel[9], A. Nap[10], A. Prentice[11], E. Saridogan[12], D. Soriano[13], and W. Nelen[14]

[1]Department of Obstetrics & Gynaecology, Research Institute GROW, Maastricht University Medical Centre, PO Box 5800, 6202 AZ Maastricht, The Netherlands [2]European Society of Human Reproduction and Embryology, Central Office, Meerstraat 60, 1852 Grimbergen, Belgium [3]Nuffield Department of Obstetrics and Gynaecology, University of Oxford, John Radcliffe Hospital, Headley Way, Headington, Oxford OX3 9DU, UK [4]Faculdade de Medicina da Universidade de Lisboa, Human Reproduction Unit, Department of Obstetrics and Gynecology, CHLN/Hospital de Santa Maria, Avenida Professor Egas Moniz, 1649-035 Lisboa, Portugal [5]Department of Obstetrics and Gynecology, Department of Development and Regeneration, Herestraat 49 bus 611, 3000 Leuven, Belgium [6]Endometriose Stichting, Bourgognestraat 9, 6137 JH Sittard-Geleen, The Netherlands [7]Department of Obstetrics and Gynecology (Kätilöopisto hospital), PO Box 610 (Sofianlehdonkatu 5), 00029-HUS, Finland [8]MRC Centre for Reproductive Health, University of Edinburgh, QMRI, 47 Little France Crescent Edinburgh EH16 4SA, UK [9]University Hospital of Münster, Albert-Schweitzer-Campus 1, building A1 48149 Münster/Westf., Germany [10]Rijnstate Arnhem, Wagnerlaan 55, 6800 TA Arnhem, The Netherlands [11]Department of Obstetrics and Gynaecology, The Rosie Hospital, Robinson Way, Cambridge CB2 0SW, UK [12]University College London Hospital, Women's Health Division, 250 Euston Road, London NW1 2PG, UK [13]Endometriosis Center, Sheba Medical Center, 16 Remalt Street, 52281 Ramat Gan, Israel [14]Radboud University Nijmegen Medical Centre, PO Box 9101, 6500 HB Nijmegen (115), The Netherlands

*Correspondence address. E-mail: g.dunselman@maastrichtuniversity.nl

Submitted on October 14, 2013; resubmitted on October 14, 2013; accepted on November 18, 2013

CONCLUSIONES I

1. EL endometrioma ovárico esta asociado con reducción de la reserva ovárica.

2. La resección del endometrioma resulta en compromiso de la reserva ovárica.

3. Los endometriomas bilaterales representan un aspecto negativo mayor sobre la reserva ovárica que los unilaterales, antes y después de la cirugía.

CONCLUSIONES II

4. La resección del Endometrioma debe evitar:
   - **Remover el estroma pre- capsular**
   - **Remover la porción iliar de la pseudo-cápsula**
   - **Excesiva coagulación.**

5. Medir los niveles de HAM antes de la cirugía para identificar las pacientes de riesgo de falla ovárica postoperatoria.

6. Los endometriomas pequeños y asintomáticos < 4 cm que no interfieren con la accesibilidad de los folículos, no deben removerse antes de FIV

"Se necesita poco para hacer las cosas bien pero menos aun para hacerlas mal"

Paul Bocuse

CIRUGÍA Y TÉCNICA

Endometrioma

Tratamiento quirúrgico vs No Tratamiento antes del FIV

Tamaño:

Asintomáticas:

- Dificultad técnica en aspiración
- Riesgo de infección /punción inadvertida

No Cirugía en endometriomas pequeños

- Técnicamente más difícil
- Mayor cantidad de tejido sano removido inadvertido
- Interfieren menos técnicamente
- Menor riesgo de infección

Tsoumpou I. Et al. **The effect of surgical treatment for endometrioma on invtro fertilizationoutcomes: a systematic review and meta analysis**. 2009

TRATAMIENTO EXPECTANTE

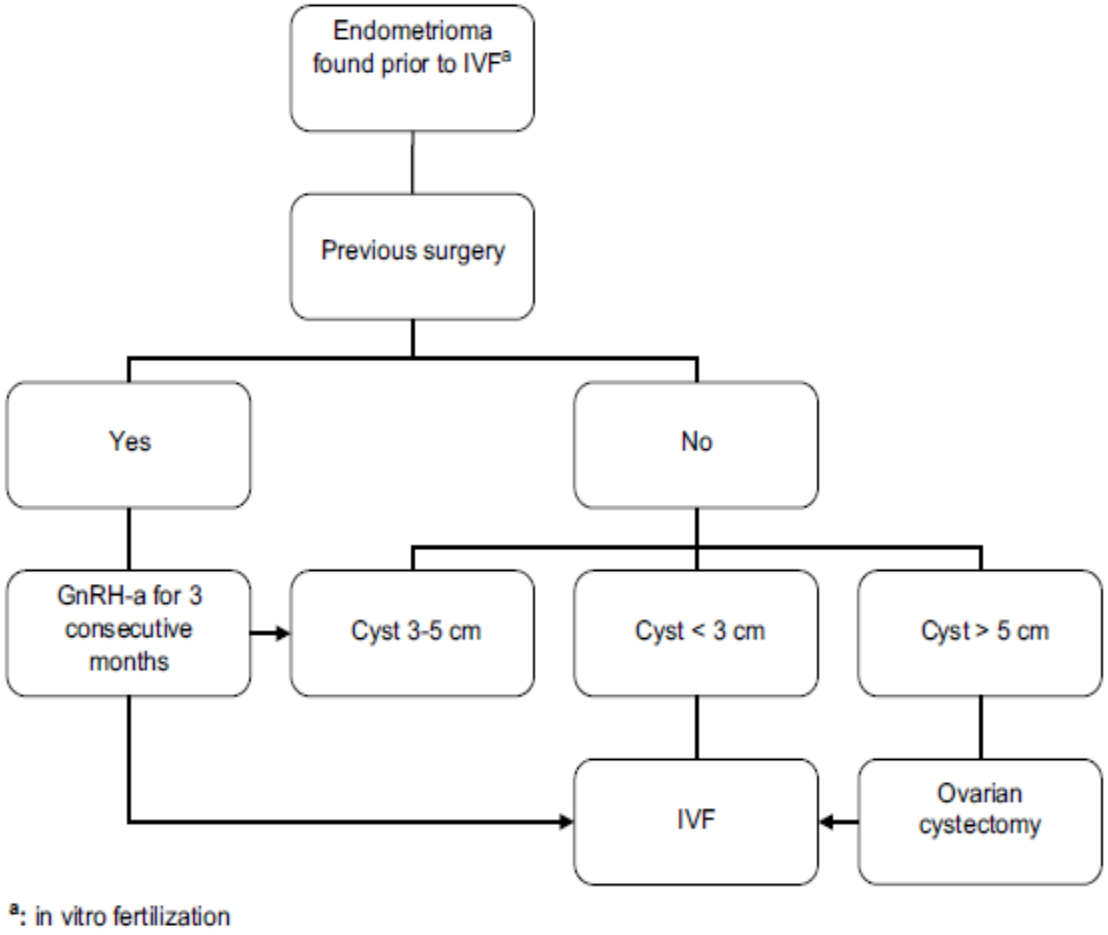
Ningún estudio

Riesgos:

- Dificultad en monitoreo de ovulación
- Ruptura espontanea
- Dificultad para la aspiración folicular
- Ruptura inadvertida en la aspiración
- Efectos en los ovocitos y embriones
- Reducción chance de implantación
- Infección pélvica
- No tejido / Exclusión de malignidad

Tsoumpou I. et al. **The effect of surgical treatment for endometrioma on invtro fertilizationoutcomes: a systematic review and meta analysis.** 2009

Flow chart for management of endometrioma.



[a]: in vitro fertilization

Tsoumpou. Surgery for endometrioma and IVF outcome. Fertil Steril 2009.

Tsoumpou I. et al. **The effect of surgical treatment for endometrioma on invtro fertilizationoutcomes: a systematic review and meta analysis.** 2009

NO CIRUGÍA

1. Estudio histológico de los endometriomas
    - Muzzii
    - Roman
    - Dogan
    - Var
    - Bussaca
2. Pronóstico de FIV luego de la cistectomía del endometrioma
3. Reserva ovárica
    - volumen ovárico / Var
    - CFA
    - HAM

Surgical treatment of ovarian endometriomas: state of the art?

Pascale Jadoul, M.D.,[a] Michio Kitajima, M.D., Ph.D.,[b] Olivier Donnez, M.D.,[a] Jean Squifflet, M.D., Ph.D.,[a] and Jacques Donnez, M.D., Ph.D.[a]

[a] Department of Gynecology, Cliniques Universitaires St. Luc, Université Catholique de Louvain, Brussels, Belgium; and [b] Department of Obstetrics and Gynecology, Graduate School of Biomedical Sciences, Nagasaki University School of Medicine, Nagasaki, Japan

Nevertheless, the authors did not reach a physiologic explanation for this finding. Therefore, we think that this finding could be somewhat compared with the accelerated dominant follicle development phenomenon in older women, formerly described by Nancy Klein (4). If these patients were suffering from a type of reduction of ovarian reserve, it would be plausible to accept that higher FSH levels in the luteal–follicular transition, also demonstrated by the authors, and the reactive response of ovarian tissue after surgery, have led to the production of larger follicles. It is well known that follicles in more-advanced stages of maturation do not produce AMH. It would justify a reduction in AMH levels and augmentation in the number of follicles counted.

Celik y col

To confirm this hypothesis, it would be necessary to have the size of all follicles measured by ultrasound before and after surgery. This model could provide us with valuable information about follicular dynamics in the remaining ovarian tissue after endometrioma excision.

Vanessa K. Genro, Ph.D.
Carlos A. B. Souza
Raquel Fitarelli
João Sabino Cunha-Filho
Universidade Federal do Rio Grande do Sul, Ramiro Barcelos, Brazil

August 8, 2012

HORMONA ANTI MULLERIANA

NIVELES EN SANGRE ng/ml	INTERPRETACIÓN
< 0,3	MUY BAJO
0,3 – 0,6	BAJO
0,7 – 0,9	RANGO NORMAL BAJO
> 1,0 – 2,9	NORMAL
Más 3,0	ALTO (a menudo SOP)

CIRUGÍA

1. Dolor
2. Aumento de la tasa de embarazo
3. Endometriosis y Ca ovárico
4. Aspiración: Accesibilidad de ovario y folículos
   Infección pélvica post aspiración
   Calidad ovocitaria

NO CIRUGÍA

Disminución de la reserva ovárica / alto riesgo de falla ovárica prematura

1. Estudio histológico de los endometriomas
2. Pronóstico de FIV luego de la cistectomía del endometrioma
3. Reserva ovárica

REMOVAL ENDOMETRIOMAS BEFORE IVF DOES NOT IMPROVE FERTILITY OUTCOMES: A MATCHED, CASE-CONTROL STUDY. Garcia Velasco y col. Fertil Steril 2004

1.- La cirugía laparoscópica no mejora las tasas de FIV
2. - Dolor está indicada
3. - Posibilidad de ruptura del quiste
4.- Posibilidad de malignidad
5.- La cirugía laparoscópica **No compromete el número o calidad de los ovocitos obtenidos**
6.- No ofrece beneficios adicionales en términos de pronóstico de fertilidad
7.- Paciente asintomático no cirugía reduce el tiempo de embarazo, disminuye costos y evita complicaciones quirúrgicas
8.- Paciente sintomático operado por endometrioma con cirugía conservadora no cambia su pronostico en FIV

IMPACTO DE LA CIRUGÍA

Número de Ovocitos recuperados después de Cistectomía en comparación al grupo control.

	CONTROL	ENDOMETRIOMAS
Al-Azemil et al. 2000	7.1 +/- 0.5	6.9 +/- 0.7
Canis et al. 2001	10.9 +/- 6.5	9.4 +/- 6.2
Donnez et al. 2001	8.6 +/- 4.3	10.6 +/- 4.2
Marconi et al. 2002	8.7 +/- 5.1	7.5 +/- 3.9
Geber et al. 2002	12.0 +/- 5.9	9.8 +/- 5.4
Pabuccu et al 2004	7.2 +/- 1.5	5.7 +/- 1.3
Esinler et al. 2006	11.1 +/- 6.1	10.8 +/- 6.2 (unilateral)
Esinier et al. 2006	-	7.1 +/- 4.4 (bilateral)
Demirol et al. 2006	8.6 +/- 2.8	7.8 +/- 3.1

Catenacci M. 2008

Decline of serum antimüllerian hormone levels after laparoscopic ovarian cystectomy in endometrioma and other benign cysts: a prospective cohort study

Su Kyoung Kwon, M.D.,[a] Sung Hoon Kim, M.D., Ph.D.,[a] Sung-Cheol Yun, Ph.D.,[b] Dae Yeon Kim, M.D., Ph.D.,[a] Hee Dong Chae, M.D., Ph.D.,[a] Chung-Hoon Kim, M.D., Ph.D.,[a] and Byung Moon Kang, M.D., Ph.D.[a]

[a] Department of Obstetrics and Gynecology and [b] Division of Biostatistics, University of Ulsan College of Medicine, Asan Medical Center, Seoul, South Korea

Objective: To identify the most important factor in predicting ovarian reserve after laparoscopic ovarian cystectomy and to evaluate whether there is any difference in the postoperative decline of ovarian reserve between women with endometrioma and those with other benign ovarian cysts.
Design: Prospective cohort study.
Setting: University hospital.
Patient(s): A total of 100 women who had undergone laparoscopic ovarian cystectomy for endometrioma (n = 68) or other benign ovarian cysts (n = 32).
Intervention(s): Serum antimüllerian hormone (AMH) levels measured by enzyme immunoassay preoperatively and at 3 months after surgery.
Main Outcome Measure(s): Rate of AMH decline after surgery and follicle numbers retained in cystectomy specimens.
Result(s): Serum AMH levels were obviously decreased at 3 months after the surgery (4.97 ± 2.83 vs. 3.33 ± 2.08 ng/mL, mean ± standard deviation). Adjusting for several parameters, we could see that bilaterality of the ovarian cyst was the only significant factor in predicting the rate of postoperative decline of AMH levels. The rate of AMH decline did not differ between the endometrioma group and the other benign ovarian cyst group.
Conclusion(s): Bilaterality of the ovarian cyst is the only significant factor in predicting the rate of decline of AMH level after laparoscopic ovarian cystectomy. The rate of decline of AMH levels after surgery was similar between the endometrioma group and the other benign ovarian cyst group. (Fertil Steril® 2014;101:435–41. ©2014 by American Society for Reproductive Medicine.)
Key Words: antimüllerian hormone, endometrioma, endometriosis, ovarian cystectomy, ovarian reserve

Discuss: You can discuss this article with its authors and with other ASRM members at http://fertstertforum.com/kwonsk-amh-ovarian-cystectomy-endometrioma/

Use your smartphone to scan this QR code and connect to the discussion forum for this article now.*

* Download a free QR code scanner by searching for "QR scanner" in your smartphone's app store or app marketplace.

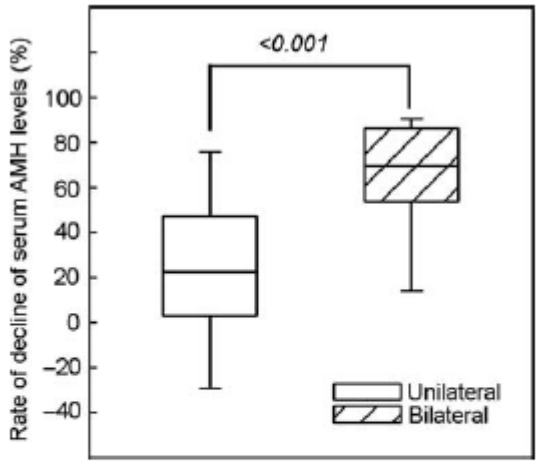


Figure 1 The rate of decline in serum AMH is defined as 100 × [preoperative AMH level – post-operative AMH level]/preoperative AMH level. Data are represented by box-and-whisker plots. The lines inside boxes indicate the median value, and the upper and lower limits of the boxes and whiskers indicate the interquartile and total ranges. The *P*-value is denoted with italicized numbers.