

The management of ovarian masses prior to ART

Presentation Objectives

Introduction

Simple cysts – Corpus luteum cysts

Follicular cysts

Endometriomas and implants

Fertility Sparing surgery

IVF Vs FSS Vs combined medical &

Surgical treatment

Surgery techniques Bipolar / Monopolar

Dermoid cysts

Low Malignant Tumours and FSS

Ovarian cancer and FSS

How can surgery increase the success rate in ART ?

6-7 May 2011

ESHRE Campus
SIG Reproductive Surgery
Grado – Italy

Vasilios Tanos, MD, PhD.

*Professor in Obstetrics and Gynaecology
Hadassah University Hospital*



ARETAEION HOSPITAL

University of Cyprus



Ovarian masses and pelvic lesions

- corpus luteum cysts
- functional / simple cysts
- endometriomas and implants
- dermoid cysts
- Pelvic masses due to PID / Abscess
- Adhesion conglomerates



ARETAEION HOSPITAL

University of Cyprus



Functional ovarian cysts and Oral Contraceptives treatment

- common gynecological problem of reproductive age worldwide
- when large, persistent, or painful, may require operations
- treatment with oc common practice since 70s
- 7 RCTs from 4 countries - 500 women.
- with cysts that occurred spontaneously and /or after ovulation induction
- Results: most cysts resolved without treatment within a few cycles
- persistent cysts tended to be endometrioma or para-ovarian cyst
- Conclusion: Combined oc has no benefit in ovarian cyst resolution

Cochrane Database of Systematic Reviews 2006
DA Grimes et al. 2009



ARETAEION HOSPITAL

University of Cyprus



Benign ovarian cysts in US

Prospective Observational longitudinal study

- 323 women, 19-50 y old, with ovarian cysts
 - 120 study group, 6-12 months follow up
 -
 - Endometriomas 3.3cm (SD 1.5)
 - Simple cyst 4.1cm (SD 1.6)
 - Dermoid cyst 3.2cm (SD 1.4)
 - Haemorrhagic cyst 3.5cm (SD1.2)
 - Follow up median 42 months (18 -94 months)
 - 8.3% disappear during follow up
 - Non developed to ovarian Ca
- Conclusion: Conservative management is recommended for Bg ovarian cysts

J L Alcazar et al. 2005 Hum Reprod



ARETAEION HOSPITAL

University of Cyprus



Ovarian reserve is damaged after excision of ovarian masses

- gonadal damage is at least partly caused by the presence of an ovarian mass per se preceding surgery
- laparoscopic / laparotomy by
- stripping or excision or
- electrosurgical coagulation /bipolar /monopolar causes
- local inflammation
- vascular compromise following
- lack of local fibrinolytic response and
- creation of adhesions and
- destruction of microvascularization



ARETAEION HOSPITAL

University of Cyprus



Reduced ovarian reserves after Surgery

- 20 w Bg ovarian cysts – lappic cystectomy
- AMH & ovarian volume by US
- AMH level recovered to 65% of the preop level 3 months pop
- AMH level was higher 1 week pop in endometriosis as compared to non endometriotic cysts

H J Chang et al 2010 - Fertil Steril









ARETAEION HOSPITAL

University of Cyprus



Endometriosis

STAGE I (MINIMAL)	STAGE II (MILD)	STAGE III (MODERATE)
 <p>PERITONEUM Superficial endo - 1.3cm -2 R. Ovary - -1cm -1 Left adhesions - -1cm -1 Total points - -4</p>	 <p>PERITONEUM Deep endo - >3cm -6 R. Ovary - -1cm -1 Superficial endo - -1cm -1 Left adhesions - -1cm -1 L. Ovary - <1cm -1 Superficial endo - <1cm -1 Total points - -9</p>	 <p>PERITONEUM Deep endo - >3cm -6 Deep endo - >3cm -6 Ovarian obliteration - -4 L. Ovary - 1.3cm -15 Deep endo - 1.3cm -15 Total points - 26</p>
STAGE III (MODERATE)	STAGE IV (SEVERE)	STAGE IV (SEVERE)
 <p>PERITONEUM Superficial endo - >3cm -4 R. Tube - -1cm -1 Fibry adhesions - -1cm -1 R. Ovary adhesions - -1cm -1 L. Tube - -1cm -1 Dense adhesions - -1cm -16 L. Ovary - -1cm -4 Dense adhesions - -1cm -2 Total points - -30</p>	 <p>PERITONEUM Superficial endo - >3cm -4 L. Ovary - 1.3cm -16 Dense adhesions - -1cm -8 L. Tube - -1cm -1 Dense adhesions - -1cm -16 Total points - -32</p>	 <p>PERITONEUM Deep endo - >3cm -6 Ovarian obliteration - -6 R. Ovary - 1.3cm -15 Dense adhesions - -1cm -4 L. Tube - -1cm -16 Dense adhesions - -1cm -16 L. Ovary - 1.3cm -15 Dense adhesions - -1cm -15 Total points - 116</p>



ARETAEION HOSPITAL

University of Cyprus



The difference between Ovarian & peritoneal endometriosis: In Fertility perspective

- infertility cases main concern is the choice of treatment medical or surgical
Take in consideration that:
 - a spontaneously regressive phenomenon
 - the risk of recurrence
 - the results of in-vitro fertilization Vs medical treatment Vs combined therapy

Conclusion: Whatever type of surgery is performed the IVF results / ET are not impaired, especially if ovarian cortex stays intact

M Nisolle - Current Opinion in Obstetrics and Gynecology, 2002



ARETAEION HOSPITAL

University of Cyprus



The role of endometriosis on ART

- Does endometriosis affect the outcome of ART?
- Does surgical treatment for endometriosis prior to or after ART affect the PR
- Is ART a risk factor for endometriosis recurrence after medical or surgical therapy?

A De Hondt, et al. 2006



ARETAEION HOSPITAL

University of Cyprus



Ovarian endometriomas derange the physiological mechanisms of ovulation

Advanced Endometriosis causes

- lower reproductive performance
- is due to the lower number of oocytes achieved
- not due to lower oocyte quality.

- mechanical and vascular effects due to adhesions may decrease the number of M2-oocytes retrieved

(M.Vilela et al Argentina P-473 Poster ESHRE 2010)



ARETAEION HOSPITAL

University of Cyprus



Endometriotic ovarian cysts Reduce ovulation rate

Q - ovarian reserve is damaged after excision of ovarian endometriomas ?
Q - gonadal damage caused by the existence of endometriosis per se ?

- - 70 women with monolateral endometriomas operated
- serial US followed to determine the side of ovulation

Results

- Ovulation occurred in the affected ovary in 22 cases (31%; 95% CI: 22–43%)
Assuming that the expected rate of ovulation in both ovaries in healthy women is similar, this difference was of statistical significance ($P = 0.002$).

- Conclusion: The physiological mechanisms leading to ovulation are deranged in ovaries with endometriomas.

Laura Benaglia et al. 2010



ARETAEION HOSPITAL

University of Cyprus



Oocytes from endometriosis are altered ? Do they develop lower quality embryos ?

Q - whether endometriosis per se affects fertility ?
Q - whether surgical removal of implants should be performed at all ?

Results

- in untreated control subjects followed for spontaneous PR
- 6RCTs with medical treatment and 2RCTs with surgical treatment

- overall pregnancy rate in the (untreated) controls of all 8 RCTs together - 28% (24–33%)

- Taylor and Collins review 20 studies of 2026 couples with essentially unexplained infertility of 33% (31–35%) NO significant difference found



ARETAEION HOSPITAL

University of Cyprus



Endometriosis Surgery - Benefits Vs Risks

2 RCTs studied PR after surgical resection or ablation but,

- Results were mixed up since apart from ablation, also lysis of adhesions
- Surgery for minimal or mild endometriosis might modestly enhance fecundity in women with otherwise unexplained subfertility
- but it cannot be excluded that this improvement is due to removal of adhesions rather than implants

Johannes L. H. Evers - 2004



The Impact of Electrocoagulation on ovarian reserve (2)

- PRS 191 pts underwent laparoscopic ovarian cystectomy
- G1 laparoscopy coagulation or harmonic scalpel
- G2 laparotomy + suturing

Results:

- Electrocoagulation group had after 12 months follow up
 - FSH > 10 IU/L significant reduction by
 - the antral follicle number was significantly reduced

C-Z Li et al. Fertil Steril 2009



The Impact of Electrocoagulation On Ovarian reserve (2)

TABLE 1

Characteristics of patients.

Characteristic	Bipolar		Ultrasonic scalpel		Suture		P value
	Unilateral cyst	Bilateral cysts	Unilateral cyst	Bilateral cysts	Unilateral cyst	Bilateral cysts	
Number	38	26	32	25	44	26	
Pregnancy ^a	2	1	2	0	5	1	NS
Dropout ^b	2	6	1	3	2	2	NS
Age	24 ± 4.2	25 ± 5.1	26 ± 3.7	27 ± 4.1	25 ± 3.9	27 ± 5.2	NS
Cyst size (cm)	6.4 ± 2.1	6.1 ± 3.2	5.9 ± 2.4	5.7 ± 2.9	6.4 ± 2.8	6.0 ± 1.9	NS
Blood loss (ml)	28 ± 4.9	39 ± 7.8	31 ± 5.7	48 ± 9.4	94 ± 15.4	139 ± 19.7	< .05 ^c
Cyst type							
Endometrioma	18	11	17	12	23	15	NS
Others	20	15	15	13	21	11	NS

Notes: Data are presented as mean ± standard deviation or number. NS = not statistically significant.

^a Suture group versus bipolar group or ultrasonic scalpel group.

^b Pregnancies occurred in four patients after postoperative menstrual cycle 3 and in another seven patients after the postoperative menstrual cycle 6.

^c A total of 14 patients dropped out for unknown reasons.

Li Z. Electrocoagulation and ovary damage. Fertil Steril 2009.



IVF poor results Space-occupying endometrioma lesion Vs endometriosis itself

- 85 - endometriomas 10–50 mm directly to IVF treatment compared
- 83 - simple ovarian cysts of 10–35 mm detected during stimulation
- endometrioma group
 - HMGs more (3,013 vs. 2,451 IU; $p = 0.001$),
 - OPU significantly less oocytes (13.9 vs. 16.4; $p = 0.03$)
 - ET grade I embryos ratio better in the cyst group (79.7 vs. 70.7 % $p = 0.03$)
 - Implantation rate significantly higher in cyst group (28 vs. 19% $p = 0.02$)
 - oocyte maturation rate – similar
 - pregnancy and ongoing pregnancy rates were similar
- endometriosis associated with a lower embryo quality and implantation rate

BKSKG Karlikaya, S Lacin, A Guney - Gynecol Obstet Invest, 2008



ARETAEION HOSPITAL

University of Cyprus



Ovarian reserve after endometrioma surgery one step Vs 3 step surgery

- PRS – 20w with endometriomas laparoscopic cystectomy for endometrioma (group 1) “three-step procedure” (group 2)
- Before and 6 months after laparoscopy all patients were evaluated - 12 months postoperatively they underwent ultrasound scan examination - ovarian reserve damage was estimated alterations AMH, antral follicle count, FSH, LH, E2 and inhibin B

Results:

- Mean serum AMH
 - Group 1 3.9 to 2.90 ng/mL significant reduction
 - Group 2 4.5 to 3.99 ng/mL
- Ovarian reserve determined by AMH is less diminished after the three-step procedure compared with cystectomy of endometriomas.

Tsolakidis et al 2010



ARETAEION HOSPITAL

University of Cyprus



TABLE 2. Laparoscopic surgery on endometriosis associated infertility

Author	Sample size	Classification	Selection criteria	Intervention	Follow-up	PR	LR	MR	ER
Matta 1985 (abstract only)	50		Endometriosis, Other uterine factors	Lap CO ₂ laser	7-19 months	80%	(1)	(1)	
Saier et al 1986	90	Acosta	Mild/moderate endomet	Lap electrocautery, Diathermy	7 months	48%, 39%			
Matta 1986 (abstract only)	115		Endometriosis, Other uterine factors	Lap CO ₂ laser	12-44 months	48%	69%	21%	1%
Diazuez 1987	114	Acosta	Endometriosis Adenoid adhesions	Lap laser, adhesionolysis	18 months		52%	(3/124)	nil
Santos et al 1990	36	vAFS	Endometriosis alone	Lap laser	1-6 years	80%, 69%			
Adamsen et al 1992	27	vAFS	Endometriosis Other uterine factors	Laparoscopy, Laparoscopy	2 years	29.6%, 23.7%			
Diop et al 1992	74	vAFS	Endometriosis Other uterine factors	Lap KTP laser	24 months	58%			
Roll et al 1992			Severe Endometriosis	Lap laser, Laparoscopy	2 years	50%			
Adamsen et al 1992	575	vAFS	Endometriosis Other uterine factors	Laparoscopy, Laparoscopy, no or Medical treatment	> 3 years	82%			
Jugdtes et al 1993		Acosta vAFS	Endometriosis Endometriosis	Laparoscopy					
Adamsen and Penn 1994		Acosta vAFS	Endometriosis Endometriosis	Laparoscopy, Laparoscopy	3 years	44-45%, 55-61%			
Barnes et al 1994	64	vAFS	Endometriosis	Lap Excision, Lap resection	24 months	68.7%, 23.2%			
Brumby et al 1996	156	vAFS	Endometriosis >3cm Stage 3 and 4 mucocyst	Lap Excision, Lap ablate, Laposcopy	26 months	60%			
Milgrom et al 1996	64	vAFS	Endometriosis < 2 cm	Lap cryotherapy, Diathermy	2 year	53%			
Clayton et al 1999	30	vAFS	Endometriosis only	Lap resect ablate	12 months	46%	(12)	(3)	
Manjavan et al 2000	186	vAFS	Endometriosis Total adhesions < 1cm	Lap resection, total adhesionolysis	18 months	37.6%			



ARETAEION HOSPITAL

University of Cyprus



E
N
D
O
M
S
E
U
R
T
R
E
R
G
V
I
U
I
O
R
E
S
Y
W
I
S

Dermoid spill facts

- Spillage in laparoscopy 15-100% and Spillage in laparotomy 4-13%
- 26 laparoscopic dermoid cysts excision 1999 - 2005
- 31 cysts with mean diameter 7.5cm,
- 28 dermoid cysts – treated with conservative cystectomy
- Encountered 14 spillages. The chemical peritonitis risk was (1/14) 0.2%
- Review of 14 studies
- 470 laparoscopic dermoid cystectomies and Spillage in 310 cases (66%)
The incidence of chemical peritonitis was 0.2%
- Only 1 case post op 9 mo developed granulomatous peritonitis
- NS differences in complications noted between the spillage and non spillage groups.

O Shawki et al 2007



ARETAEION HOSPITAL

University of Cyprus



Mg transformation in ovarian dermoid cyst

- 10 centers in Australia, Canada, Germany, and Austria.
- 33 patients mean age 49, followed between 1979 – 2007
- frequency of Mg transformation was 1% to 2%

Results:

15 pts at S I and most of S II and S III were optimally debulked.
Platinum-based regimens most commonly used
Chemotherapy after surgery was not effective

- 4 S I had fertility-sparing surgery (FSS) with good outcomes
- 2 pts had a sustained remission after second surgery for relapsed disease
- S I pts had a good outcome 2 alive and well at 12 months of follow-up

Conclusions:

FSS may be an option in Stage I young patients willing to have a child
Patients with advanced disease do poorly, regardless of treatment

M Gainford et al. International Journal of Gynaecological Cancer 2010



ARETAEION HOSPITAL

University of Cyprus



Pregnancy outcome with dermoid and other benign ovarian cysts (1)

- 93 occurred in patients with benign ovarian cysts
- benign cyatadenoma 41.9%, adenofibroma 1.8%, dermoid cyst 36.7%
- 12.9% were diagnosed during pregnancy by US
- 10.8% were diagnosed before pregnancy
- The mean diameter at diagnosis was
9.05 ± 7.6 cm for cystadenoma
6.09 ± 3.0 cm for dermoid cyst
4.55 ± 4.1 cm for adenofibroma.

L Katz et al Archives of Gynecology, 2010



ARETAEION HOSPITAL

University of Cyprus



Pregnancy outcome with dermoid and other benign ovarian cysts (2)

Results:

- Only 3 cases of ovarian torsion were noted (3.2%), and 15 cases hospitalized due to abdominal pain (16.2%).
- Pregnancy and perinatal outcome with dermoid and other Bg ovarian cysts is favorable.
- The cysts should be managed conservatively with routine US follow up during the pregnancy since complications are extremely rare

L Katz et al Archives of Gynecology, 2010

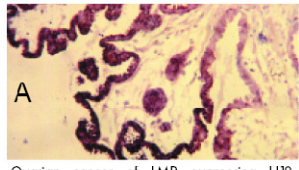
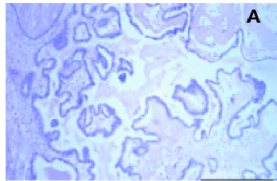


ARETAEION HOSPITAL

University of Cyprus



Borderline Ovarian Tumors



A) Serous Ovarian cancer of low malignant potential (LMP) expressing H19, by radioactive SH (bright field) [sample 228].

Ovarian cancer of LMP expressing H19 (sample 222) Expression using non-radioactive ISH method by digoxigenin.



ARETAEION HOSPITAL

University of Cyprus



Management of BOT (borderline ovarian tumors) The role of FSS (fertility-sparing surgery) (1)

- 360 BOT pts treated FSS, retrospective review, 1989 – 2008, recurrence, survival and pregnancy outcomes evaluated and compared between groups that underwent radical operation
- FSS = preservation of uterus and ovarian tissue in one or both adnexa
- 344 - S I, 1- S II, and 15 - S III disease
- 176 - radical surgery (23 lap/py and 153 lap/my),
- 184 - FSS (48 lap/py and 136 lap/my)
- 45 - adjuvant chemotherapy, post -op

Jeong-Yeol Park et al. 2009



ARETAEION HOSPITAL

University of Cyprus



Management of BOT (borderline ovarian tumors) The role of FSS (fertility-sparing surgery) (2)

Results:

- After a median follow-up - 70 months (range, 3–216 months)
- 18 patients had recurrent disease and 5 died of disease.
- RR - radical 4.9% and FSS 5.1% - similar
- FSR (free survival rate) – similar ($p = 0.651$).

- In FSS the most common recurrency site was the remaining ovarian tissue
- 34 full-term deliveries by women with FSS

- FSS is safe for young patients wishing to preserve fertility

Jeong-Yeol Park et al. 2009



ARETAEION HOSPITAL

University of Cyprus



Management of BOT (borderline ovarian tumors) The role of FSS (fertility-sparing surgery)

- 62 -BOTs, USO 40pts and 22 only cystectomy
- 63 -Follow up 88 months
- Recurrence rate USO 22.7% and Cystectomy 27.5% (NS)
- Disease free interval USO 41 mo and Cystectomy 23.6 mo (NS)

- 25/62 (40.3%) pregnant

- Conclusion: Conservative management in BOT is acceptable

Yimon Y et al 2007 Fertil Steril



ARETAEION HOSPITAL

University of Cyprus



RCT comparing 2 FSS approaches for bilateral BOT

- Standard care is USO plus contralateral cystectomy or BSO
- 32 women with bilateral early-stage BOTs who desired to conceive were randomized
 - bilateral cystectomy (experimental group $n = 15$)
 - oophorectomy plus contralateral cystectomy (control group, $n = 17$).

Results: follow-up period of 81 months

- the cumulative pregnancy rate (CPR) (14/15 versus 9/17; $P = 0.003$)
- cumulative first pregnancy signif. higher in bil. cystectomy ($P = 0.011$)
- No significant ($P = 0.358$) difference between groups was detected in cumulative probability of first recurrence

Conclusion:

- The laparoscopic bilateral cystectomy is an effective surgical strategy for patients with bilateral early-stage BOTs who desire to conceive as soon as possible.
- TAH BSO must follow at the first recurrency or after childbearing completion

S. Palomba

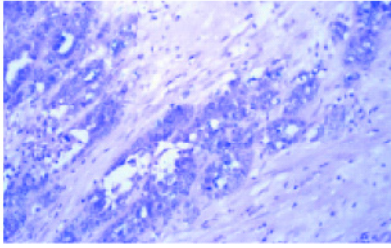


ARETAEION HOSPITAL

University of Cyprus



Epithelial Ovarian cancer (EOC)



Expression of H19 in ovarian cancer after ISH (sample 76) radioactive method, bright field



FSS for epithelial ovarian cancer Safety and Reproductive outcomes (1)

- EOC young patients frequently want to preserve their fertility
- 62 patients underwent FSS, (preservation of ovarian tissue in one or both adnexa and the uterus)
- 1990 – 2006, retrospective review
- 36 - S IA, 2 -S IB, 21 S - IC, and 1 - S IIB, 1 - S IIIA, 1 - S IIIC;
- 48 - G I, 5 - G II, and 9 - G III
- 48 - platinum-based chemo (mean 4.6 cycles, range 1-9 cycles)

JY Park, et al. 2008



FSS for epithelial ovarian cancer Safety and Reproductive outcomes (2)

Results:

- median follow-up of 56 months (range, 6-205 months),
- 11 -with tumor recurrence, 6 died of disease, 2 were alive with disease
- 54 alive without disease
- Patients with stage > IC ($p = 0.0014$) or grade III ($p = 0.0002$) tumors had significantly poorer survival.
- 19 attempted to conceive, 22 - term pregnancies, with no congenital anomalies in any of the offspring.

Conclusion:

Fertility-sparing surgery in young patients with EOCs at S IA-C and G I-II who desire to preserve their fertility seems to be acceptable

JY Park, et al. 2008



Conclusion

Surgery for endometriosis provides good chances for spontaneous pregnancy and increases ART pregnancy rate

FSS is accepted in LMP and EOCs at early stage I and low grade I tumors, in young patients willing to be pregnant



😊 Thank U!!!