

Laparoskopik Ovarian Drilling



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PCOS /Cerrahi Tedavi

- PCOS ta ilk cerrahi tedavi 1935 yılında Stein ve Leventhal tarafından tanımlanmıştır.
- **1935-1960 arasında tek tedavi seçeneği**
- İlk sonuçlar umut verici olsa da
 - Adezyon
 - Doku kaybı
 - Medikal tedavinin çok olumlu sonuçlar vermesi nedenleri ile terk edilmiştir.

Cerrahi Tedavide Güncel Yaklaşım

- Laparoskopik Overyan Diatermi (LOD)
- 1984 Gjönnaess ilk olarak tanımlamıştır.
 - Ovulasyon oranı %90
 - Gebelik oranı %58

PCOS infertilite tedavisi CC ilk seçenektir.



	No of patients	Ovulation	Pregnancy	Abortion	Live birth
McGregor <i>et al.</i> (1968)	4098	2869	1393	279	1114
Garcia <i>et al.</i> (1977)	159	130	64	16	48
Gysler <i>et al.</i> (1982)	428	364	184	24	160
Hammond (1984)	159	137	67	10	57
Kousta <i>et al.</i> (1997)	128	113	55	13	42
Messinis and Milingos (1998)	55	51	35	4	31
Imani <i>et al.</i> (2002)	259	194	111	11	98
Total (% of patients)	5268 (100)	3858 (73)	1909 (36)	357	1550 (29)

Etken Madde	Klonifen Sitril	Eczane Perakende Satış Fiyatı (KDV Dahil)	9.44 TL
Geri Ödeme Kodu	A043F03	Eczane Perakende Satış Fiyatı (KDV Hari)	8.74 TL
Reçete Durumu	Reçeteli Satılır	Sene İçindeki En Yüksek Fiyatı	9.44 TL
İthal / İmal	İmal [Ref Ülk: Türkiye]	Ortalama Fiyatı	9.44 TL

%15-40 hasta CC karşı dirençlidir.



CC dirençli hastada yaklaşım

- Metformin
- Letrazol
- Gonadotropinler
- **Cerrahi tedavi**

Laparoskopik Overyan Diatermi (LOD) Reprodüktif Sonuçlar

Table 1 Reproductive outcomes after electrocoagulation laparoscopic ovarian drilling

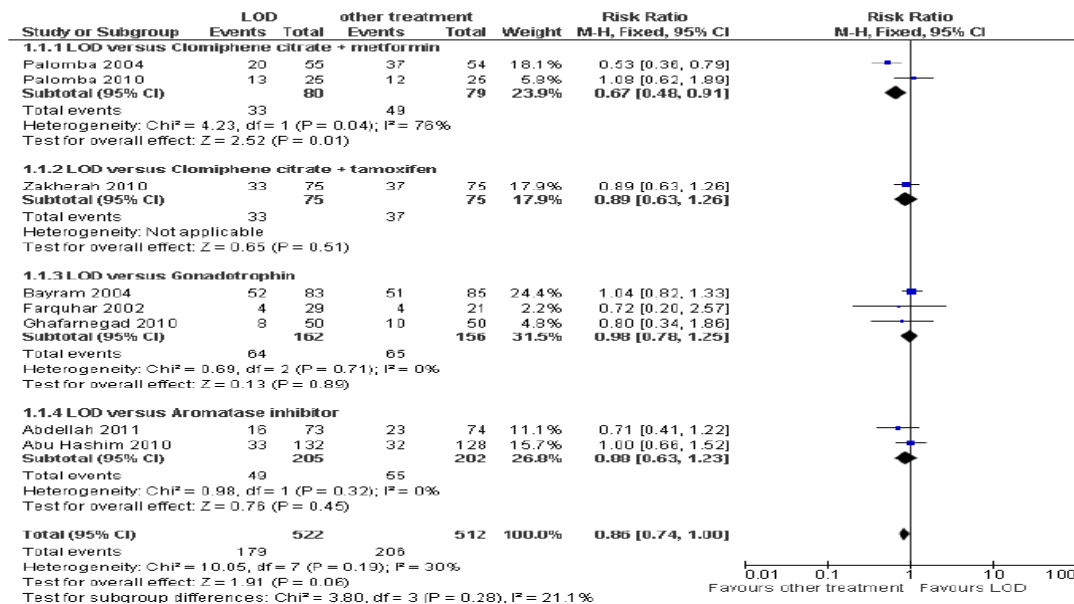
Study	Mean follow-up (months)	Starting time of other OI agents (months)	Number of patients	Regular cycles (%)	Ovulation rate (%)				Pregnancy rate (%)	Abortion rate (%)
					Total	Spontaneous	Clomiphene citrate	GnRHa		
Api <i>et al.</i> , 2005 [35]	~29.7	-	45	93	NR	NR	NR	NR	64.4 ^a	NR
Kucuk and Kilio-Okman, 2005 [36]	12	6	22	68	95	77	18	NR	54.5	8.3
Malkawi and Qublan, 2005 [12 [*]]	12	3	63	68	57	33	17.5	6.3	59.8	14.3
Palomba <i>et al.</i> , 2005 [33 ^{**}]	6	6	55	63.6	76.4	76.4	NR	NR	56.4 ^a	29
Bayram <i>et al.</i> , 2004 [20]	12	2	83	NR	NR	70	NR	NR	78	NR
Cleemann <i>et al.</i> , 2004 [37]	NR	3	57	NR	NR	NR	NR	NR	61	17.1
Amer <i>et al.</i> , 2004 [16]	12	2	200	NR	78	57	21	NR	50	9
Malkawi <i>et al.</i> , 2003 [31]	12	3	97	78.4	83.5	70.4	22.6	2.1	59.8	10.3
Amer <i>et al.</i> , 2002 [22]	12	2	30	NR	80	NR	NR	NR	47	14
Farquhar <i>et al.</i> , 2002 [38]	6	6	29	75	NR	54	NR	NR	28 ^a	36.5
	24					NR			43	NR
Felemban and Tunlandi, 2000 [9]	12	NR	112	NR	80	73.2	24.1	1.8	54 ^a	7.7
	24								72	
Li <i>et al.</i> , 1998 [39]	12	No comment on starting time	118	79	87	67	20	NR	54	6
	36								75	
Tulandi <i>et al.</i> , 1997 [40]	12	-	34	NR	88.2	NR	NR	NR	70	NR
Merchant, 1996 [41]	12	No comment on starting time		30	83.3	70	NR	NR	70 ^a -80	4.2
Pelosi and Pelosi, 1996 [42]	12	3	74	100	100	88	12	NR	57 ^a -84	10.7
Naether <i>et al.</i> , 1994 [43]	72	No comment on starting time	145	92.2	86	NR	NR	NR	48.8 ^a -70	18
Armar <i>et al.</i> , 1990 [11]	12	≥3	21	81	NR	86	NR	NR	57	23
Gjonnaess, 1984 [6]	12	No comment on starting time	62	86.4	NR	NR	NR	NR	69 ^a -80	NR

Laparoscopic drilling by diathermy or laser for ovulation induction in anovulatory polycystic ovary syndrome (Review)



Farquhar C, Brown J, Marjoribanks J

Figure 4. Forest plot of comparison: 1 LOD ± medical ovulation versus other treatment, outcome: 1.1 Live birth rate.



Authors' conclusions

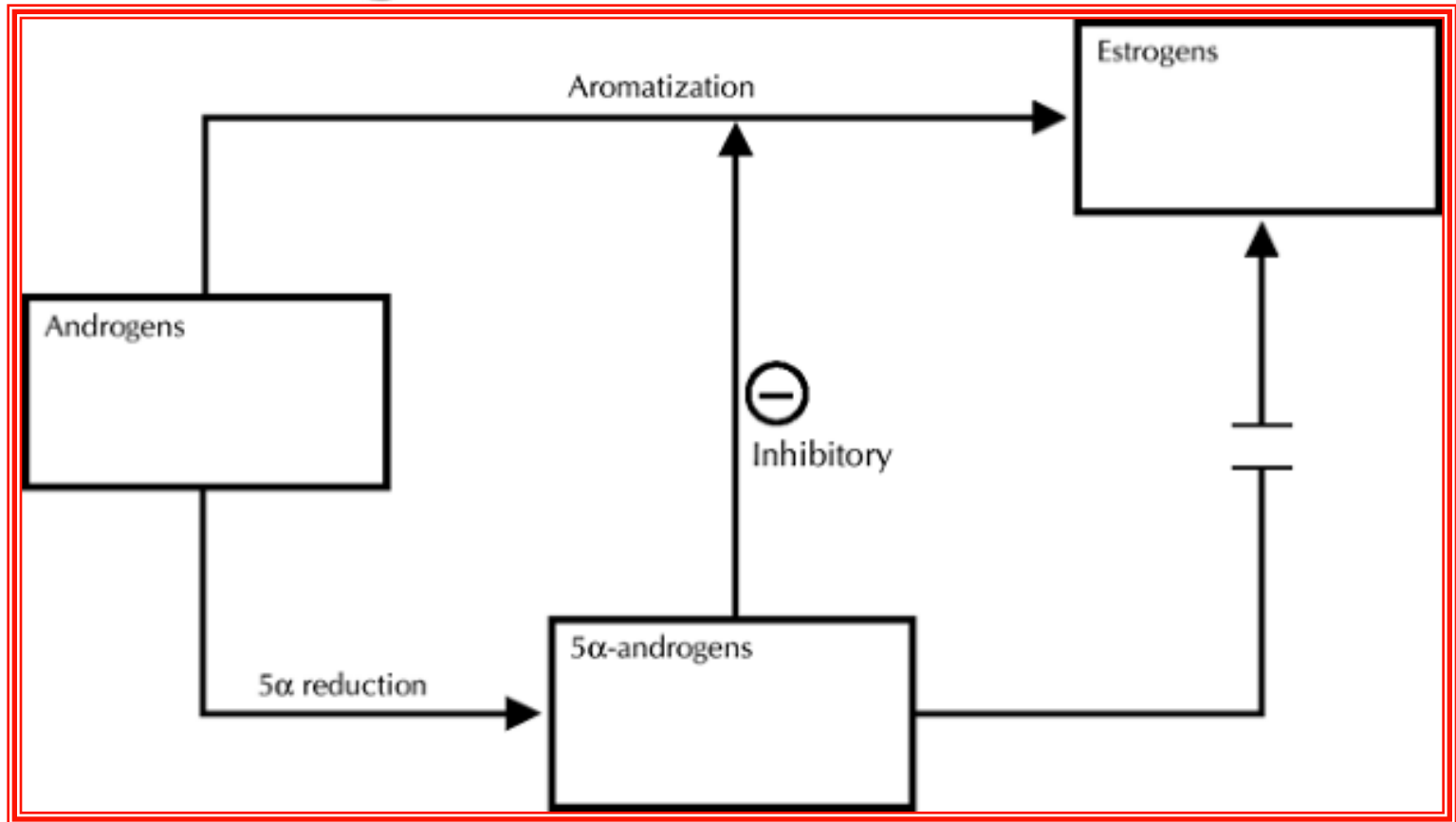
There was no evidence of a significant difference in rates of clinical pregnancy, live birth or miscarriage in women with clomiphene-resistant PCOS undergoing LOD compared to other medical treatments. The reduction in multiple pregnancy rates in women undergoing LOD makes this option attractive. However, there are ongoing concerns about the long-term effects of LOD on ovarian function.

LOD İnfertilite Tedavisi Mekanizma

- ❖ Androjenik mikro çevrenin foliküler gelişim üzerine olumsuz etkisi düzeltilir
- ❖ Estrojenik ortam folikülün gelişimine olanak sağlar
- ❖ Androjenik substratın azalması periferal aromatzasyon ile östrojen oluşumunu azaltır
- ❖ Bu hormonal deęişiklik hipotalamo-hipofiz-over aksının yeniden düzenlenmesine yol açar
- ❖ Operasyon sonrası azalan inhibin seviyesi FSH düzeyindeki artıma yardımcıdır.
- ❖ Operasyon sonrası insulin direncinde azalma bildirilmiştir.
- ❖ Operasyon sonrası AMH düzeyinde azalma

LOD İnfertilite Tedavisi Mekanizma

Androjenlerin Kritik Rolü



Serbest E₂ ↑

SHBG ↓

Testosteron ↑

Yüksek Östrojenik Ortam

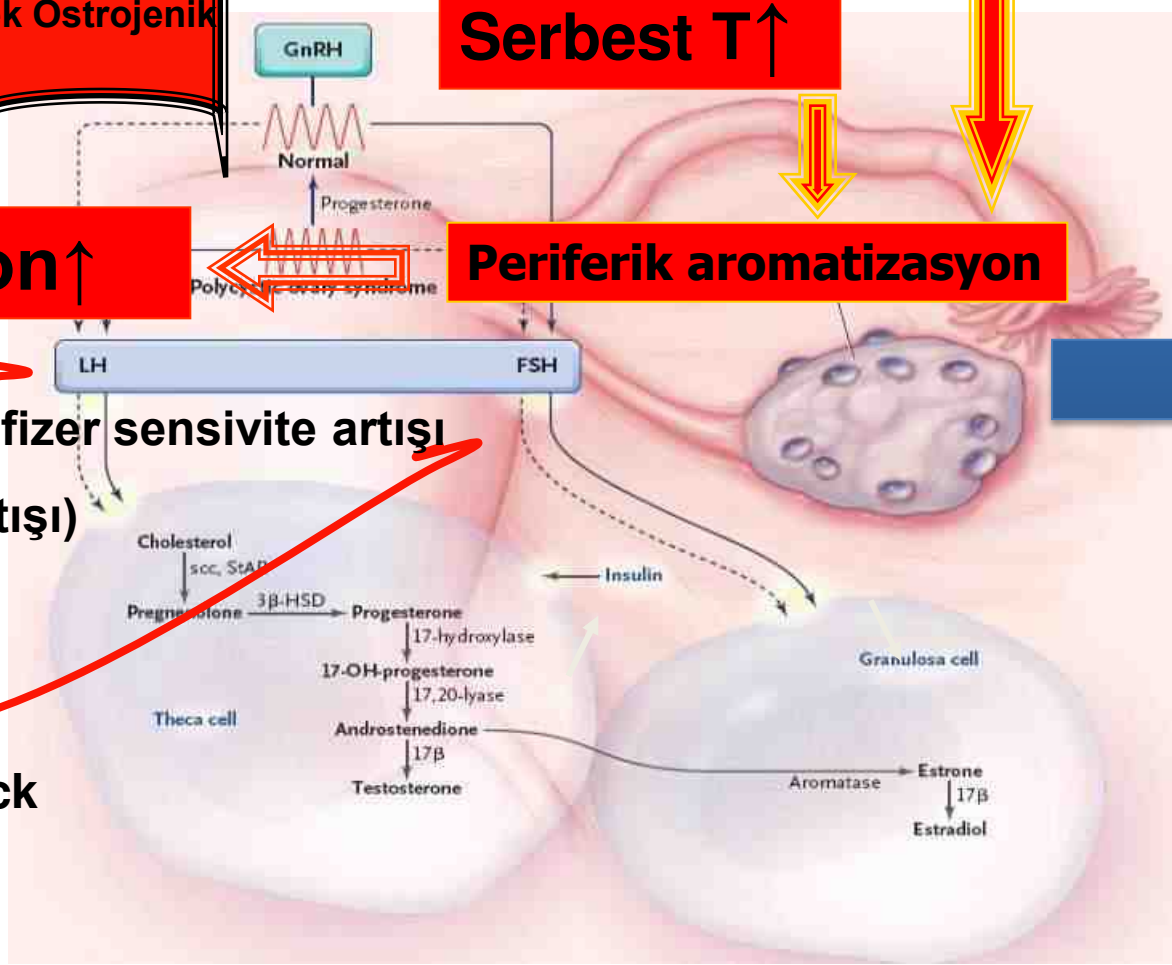
Serbest T ↑

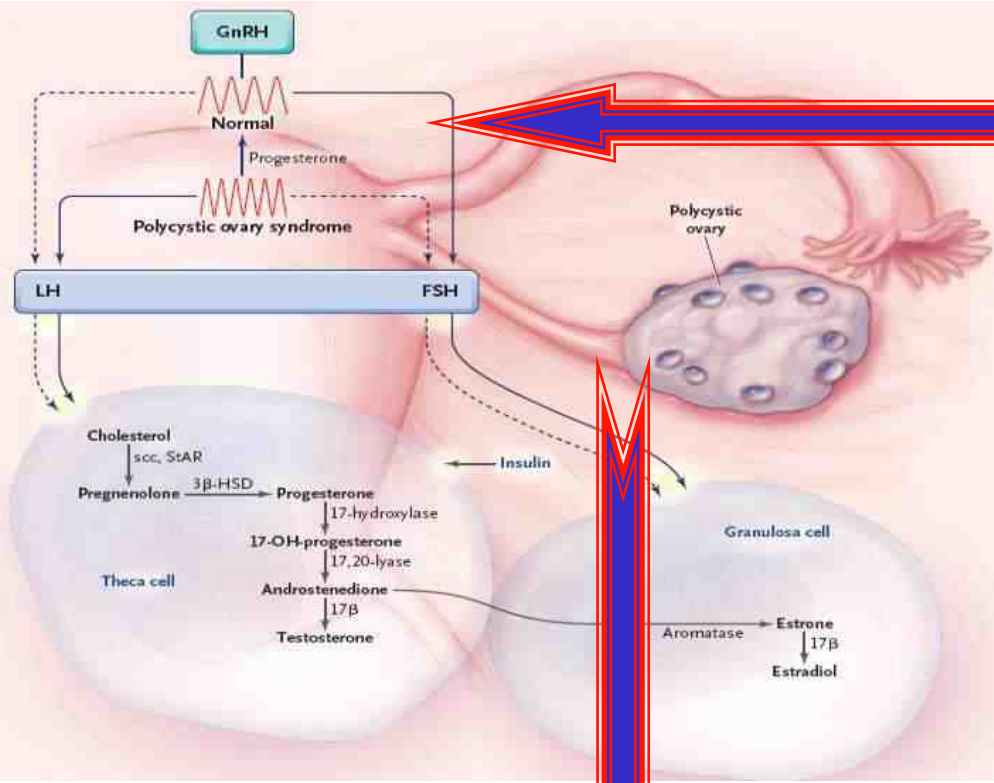
Östron ↑

Periferik aromatzasyon

**GnRh'a Hipofizer sensivite artışı
(Reseptör artışı)**

(-) feedback





Azalmış opioid inhibisyonu

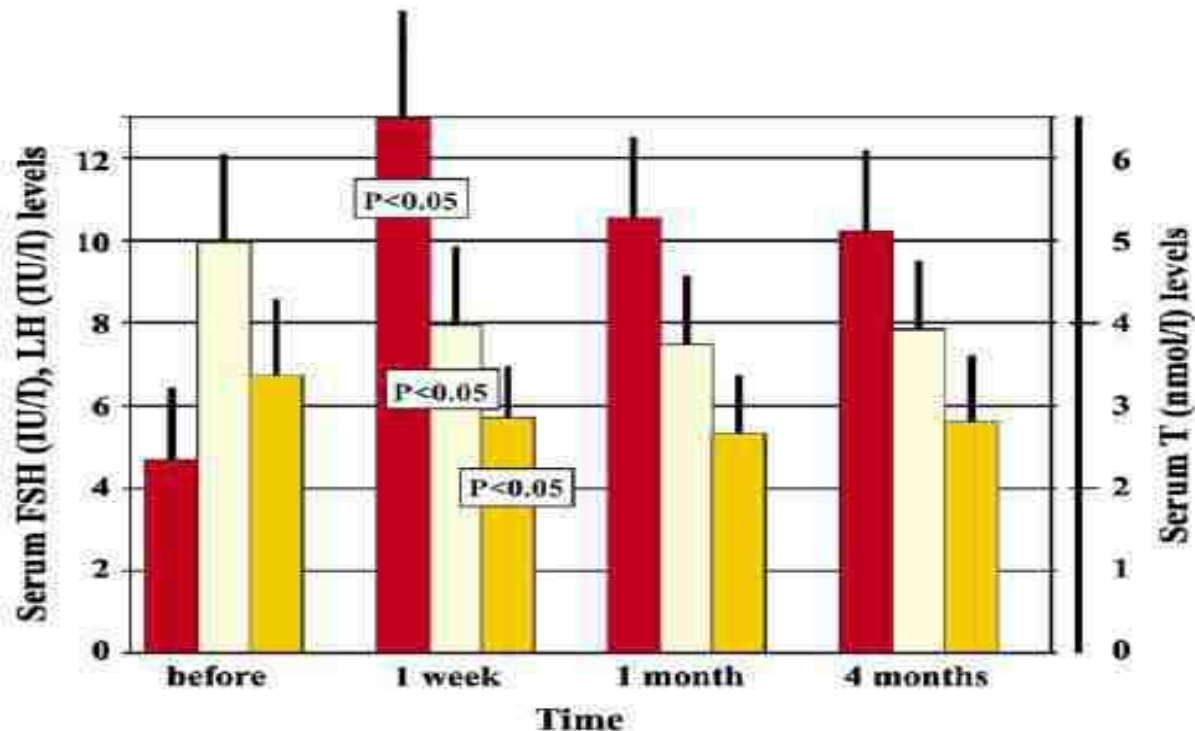
Anovulasyon

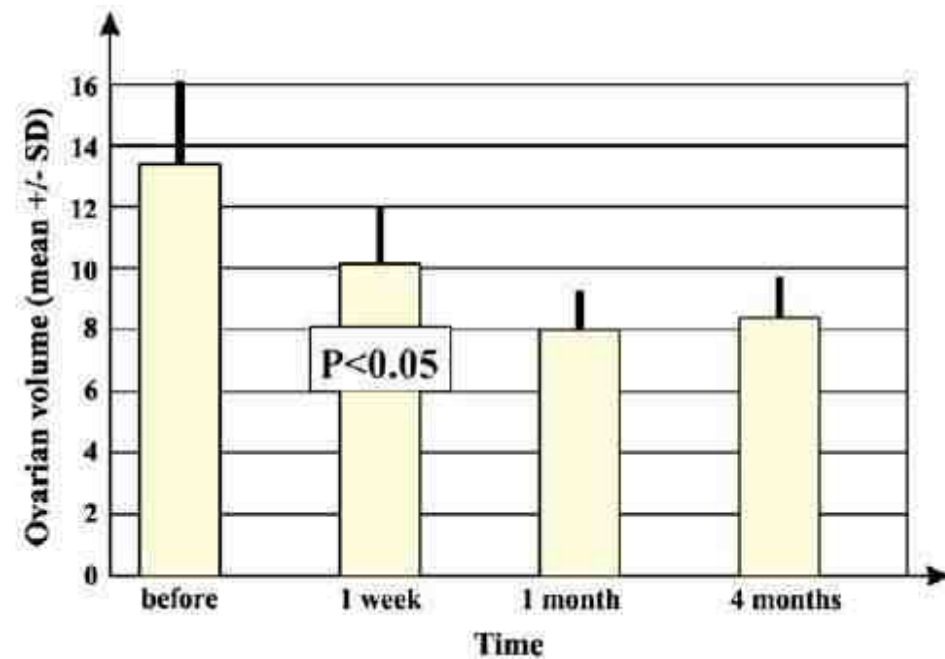
Düşük Progesteron Düzeyi

Assessment of three-dimensional sonographic features of polycystic ovaries after laparoscopic ovarian electrocautery

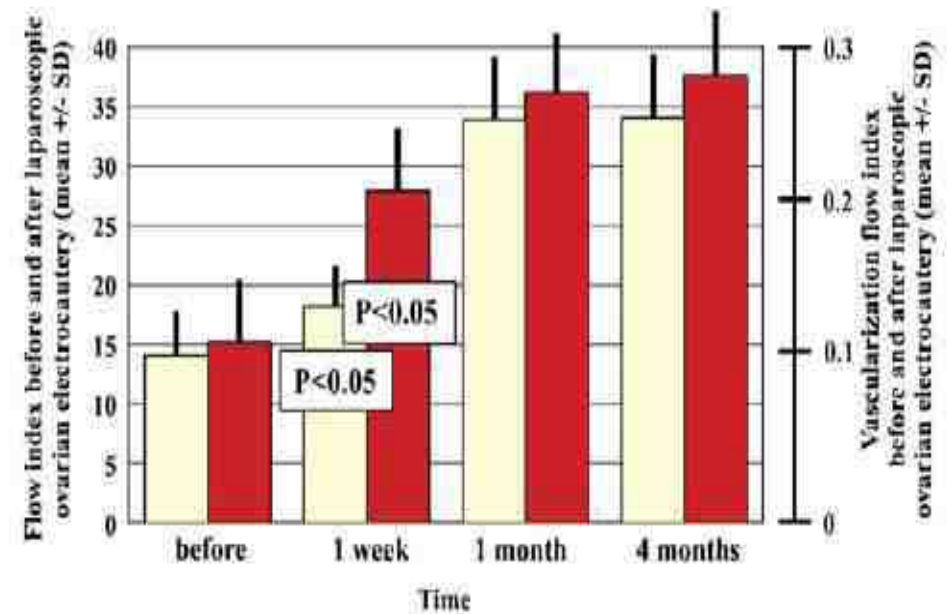
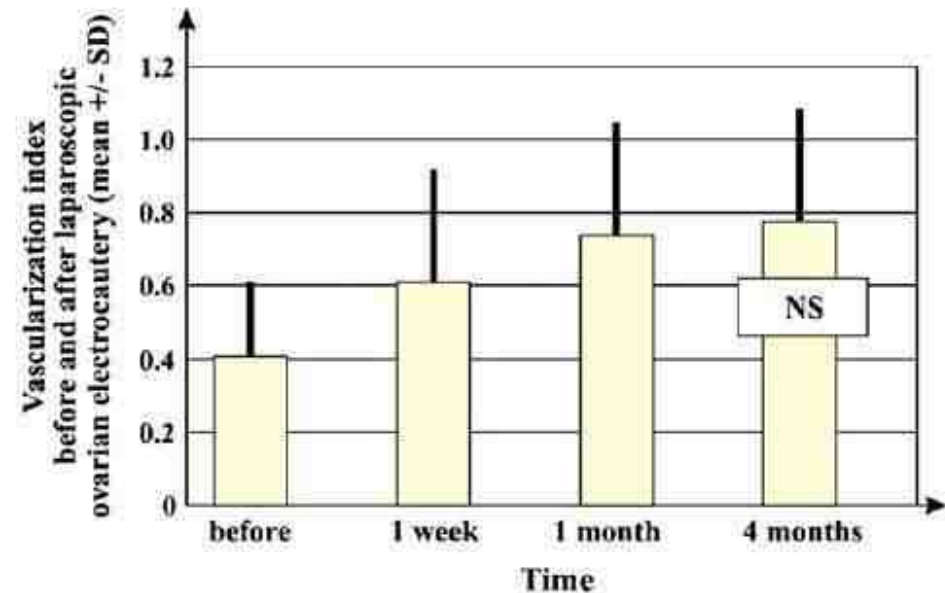
Miklós Vizer, M.D.,^a Ludwig Kiesel, M.D.,^b István Szabó, M.D., D.Sc.,^a Antal Arany, M.D.,^a Péter Tamás, M.D., Ph.D.,^a and András Szilágyi, M.D., Ph.D.^a

Serum FSH, LH, and T levels (mean \pm SEM) before and after laparoscopic ovarian electrocautery (n = 10). Red bars, FSH (IU/L); cream bars, LH (IU/L); yellow bars, T (nmol/L).





Flow index (cream bars) and VFI (red bars; range for both indices, 0–100; mean \pm SD) before and after laparoscopic ovarian electrocautery.

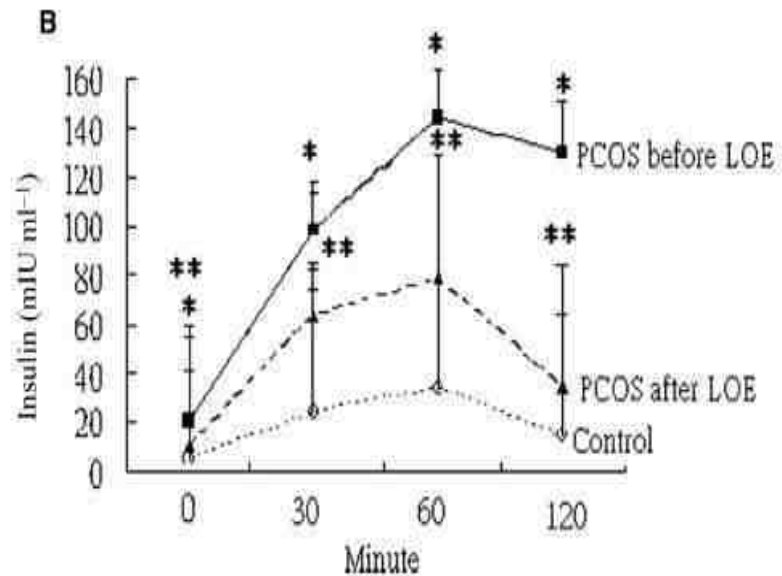
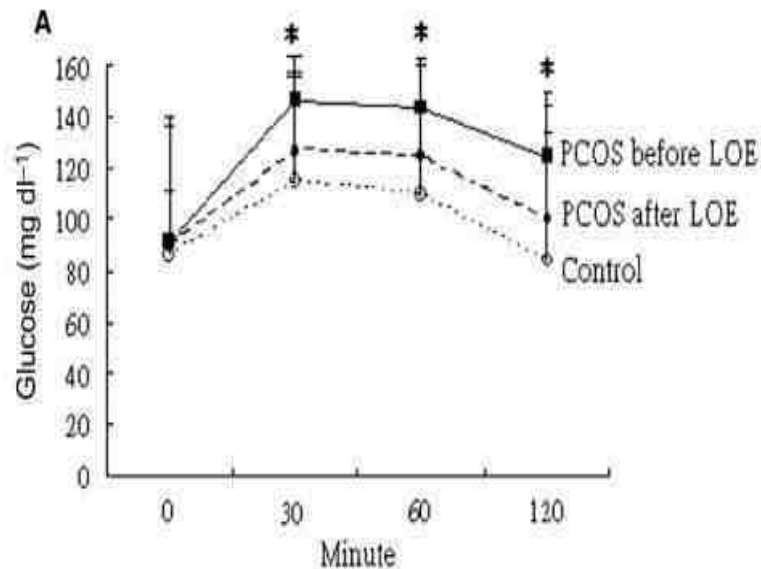


İnsülin

- ❖ İnsulin LH ile sinerjik etki gösterir ve teka hücrelerinde androjen sentezini arttırır.(hem kendi hem de IGF-1 reseptörü aracılığı ile)
- ❖ P450c17 sisteminde hiper aktivasyona yol açar
- ❖ İnsulin hepatik SHBG sentezini inhibe eder free testosteron artar
- ❖ IGFBP-1 in hepatik üretimini azaltır.
- ❖ Serin fosforilasyonu ile 17alfa hidroksilaz ve 17,20 liyaz aktivite artışı androjen artışına katkıda bulunur.

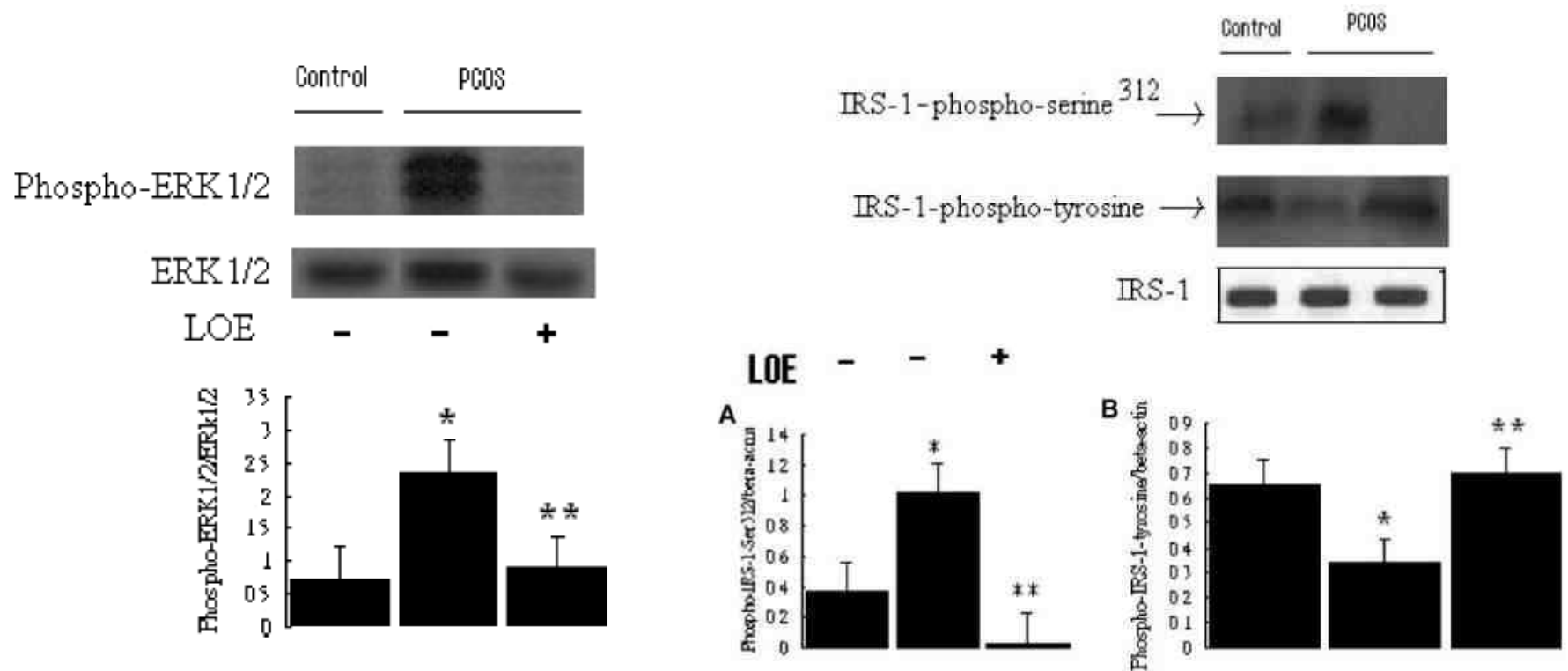
Amelioration of insulin resistance in women with PCOS via reduced insulin receptor substrate-1 Ser³¹² phosphorylation following laparoscopic ovarian electrocautery

Kok-Min Seow^{1,2}, Chi-Chang Juan^{2,3,4}, Yung-Pei Hsu⁴, Jiann-Loung Hwang^{1,6,7},
Lee-Wen Huang^{1,6,7} and Low-Tone Ho^{3,4,5,8}



Amelioration of insulin resistance in women with PCOS via reduced insulin receptor substrate-1 Ser³¹² phosphorylation following laparoscopic ovarian electrocautery

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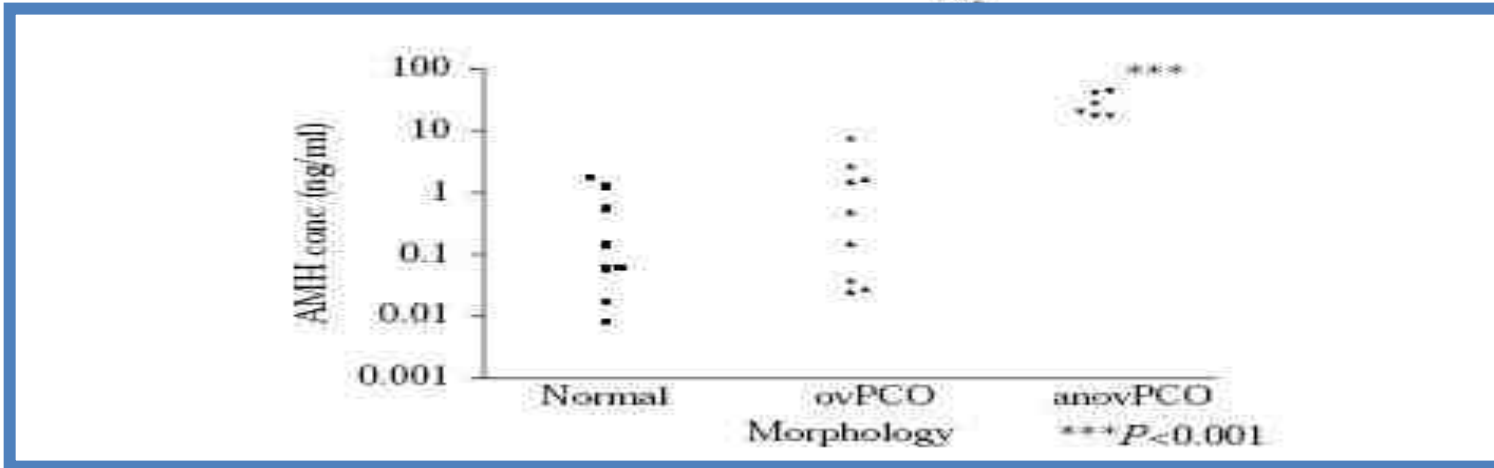
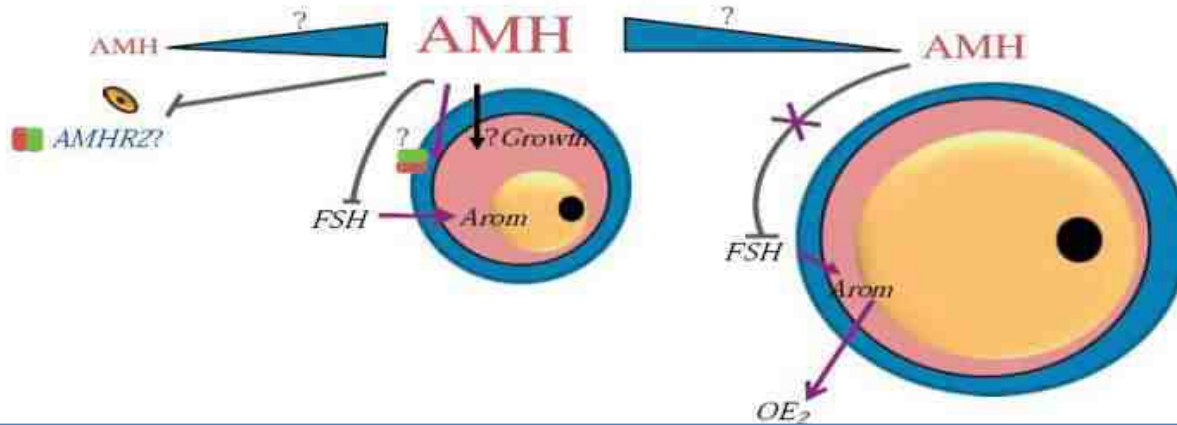
AMH / Patofizyoloji

- ❖ AMH folikül gelişiminde otokrin ve parakrin etkiye sahiptir.
- ❖ AMH FSH- ve cAMP- aracılı aromataz uyarımını baskılar.
- ❖ Azalmış aromataz aktivitesi hiperandrojenizme yol açar.
- ❖ AMH FSH aracılı FSH reseptör yapımı uyarılmasını inhibe eder .
- ❖ Dominant folikül gelişimi için gerekli FSH eşik değerini arttıırırlar.

Sebeup mi???

Sonuç mu

AMH & Folikül Gelişimi



Anovulatar PCOS lu hastaları Granuloza hücreleri Ovulatar olanlara göre 18 kat daha fazla AMH salgılar.

LOD Ne Kadar Girişim ve Termal Enerji Gereklidir?

❖ Kişiselleştirilmelidir

❖ **Mümkün olan en az uygulama yapılmalıdır.**

➤ 4 girişim 5 sn 30 W optimal

▪ Amer SA, Hum Reprod 2003; 18:1693–1698.

❖ **Fazla sayıda girişim ve enerji overyan rezervin kaybına yol açabilir.**

➤ 8 girişim 400 W

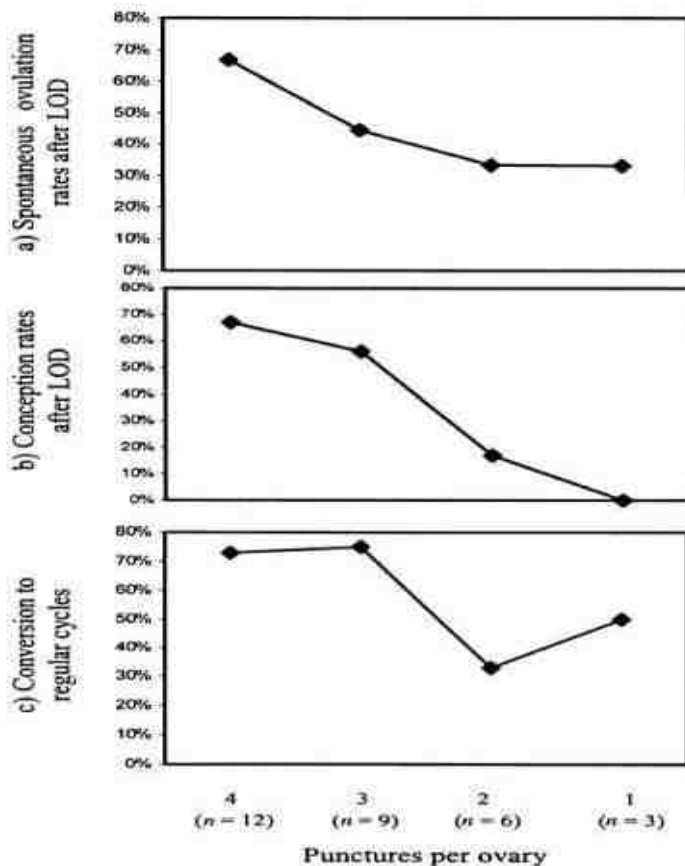
▪ Dabirashrafi H. Fertil Steril 1989; 52:878–879.

❖ **Yüksek miktarda girişim ve enerji peri-overyan adezyonlara yol açabilir!!!**

(b) Changes in the serum concentrations of androgens after LOD

Punctures per ovary	T (nmol/l)		A (nmol/l)		FAI		SHBG (nmol/l)	
	Pre-op	Post-op	Pre-op	Post-op	Pre-op	Post-op	Pre-op	Post-op
1-2	1.4 (0.8-5.1)	2.1 (1.1-3.1)	7.9 (4.7-19.2)	8.8 (1.0-18.6)	3.7 (1.0-11.4)	3.6 (2.8-6.1)	51.8 (29.7-81.7)	52.5 (38.8-57.0)
3	2.7 (0.7-2.9)	1.7 (1.2-2.8)	9.2 (3.3-10.8)	5.8 (5.1-6.6)	7.1 (1.3-20.3)	5.0 (2.2-19.6)	38 (14.3-53.5)	32.8 (23.5-55.0)
4	2.5 (0.8-4.0)	1.9 (0.7-3.7)	9.9 (6.2-16.0)	9.0* (3.5-13.5)	7.4 (1.7-14.1)	4.7 (0.8-9.8)	37.1 (20.5-82.0)	47.3 (29.9-122.0)
Overall	2.4 (0.7-5.1)	1.9 (0.7-3.7)	8.7 (3.3-19.2)	6.6** (1.0-18.6)	6.2 (1.0-20.3)	4.1* (0.8-19.6)	43.0 (14.3-82.0)	37.3 (23.5-122.0)

Values are given as median (range). Wilcoxon signed ranks test was used to compare the pre-and post-operative values (* $P < 0.05$, ** $P < 0.01$). T = testosterone; A = androstenedione; SHBG = sex hormone-binding globulin; FAI = free androgen index.



30 W – 5 Sn
150 J/puncture.

Laparoscopic ovarian drilling in the treatment of polycystic ovary syndrome: How many punctures per ovary are needed to improve the reproductive outcome?

Hasan Y. Malkawi and Hussein S. Qublan

Table 3 Menstrual and reproductive outcome over a 9-month period for both groups

	5-puncture group (n = 26)	10-puncture group (n = 37)	P-value
Resumption of regular cycles (%)	17/26 (65.4)	26/37 (70.3)	NS
Ovulation rate (%)	14/26 (53.8)	22/37 (59.5)	NS
Spontaneous (%)	8/14 (57.1)	13/22 (59.1)	NS
With CC (%)	4/14 (28.6)	7/22 (31.8)	NS
With gonadotropins (%)	2/14 (14.5)	2/22 (9.1)	NS
Pregnancy rate (%)	8/26 (30.8)	13/37 (35.1)	NS
Spontaneous (%)	4/8 (50)	7/13 (53.8)	NS
With CC (%)	3/8 (37.5)	4/13 (30.8)	NS
With gonadotropins (%)	1/8 (12.5)	2/13 (15.4)	NS
Multiple pregnancy (%)	1/8 (12.5)	2/13 (15.4)	NS
Abortion rate (%)	1/8 (12.5)	2/13 (15.4)	NS
Ovarian hyperstimulation rate (%)	1/26 (3.8)	2/37 (5.4)	NS

Laparoscopic ovarian drilling in polycystic ovary syndrome: efficacy of adjusted thermal dose based on ovarian volume

Mahmoud S. Zakherah, M.D.,^a Manal M. Kamal, M.D.,^b and Hossam O. Hamed, M.D.^a

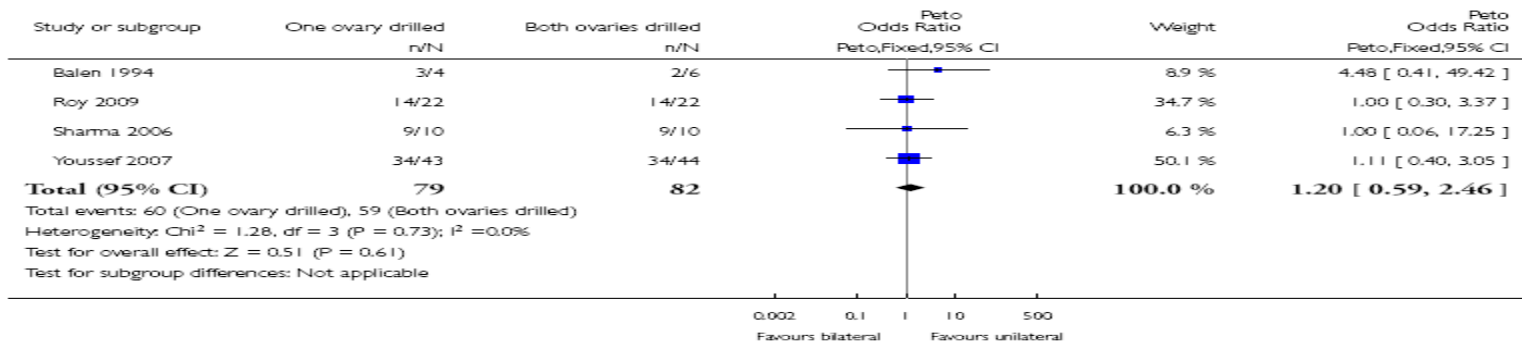
^a Department of Obstetrics and Gynecology, Women's Health Center, and ^b Department of Physiology, Assiut University, Assiut, Egypt

Reproductive outcome	Group A (n = 58) ^a	Group B (n = 57) ^a	Relative risk, odds ratio (95% CI)	P value
Total ovulation rate ^b	225/275 (81.8)	180/289 (62.2)	2.05 (1.3–3.1)	.001
First cycle	38/58 (65.5)	30/57 (52.6)	1.77 (0.79–3.96)	.05
Second cycle	46/53 (86.7)	35/54 (64.8)	2.17 (1.5–4.53)	.01
Third cycle	42/49 (85.7)	36/51 (72.5)	3.84 (1.18–5.37)	.02
Fourth cycle	38/43 (88.3)	29/46 (63.1)	2.19 (1.12–4.33)	.01
Fifth cycle	33/38 (86.8)	26/42 (61.9)	2.11 (1.19–4.52)	.01
Sixth cycle	28/34 (82.3)	24/39 (61.5)	3.23 (1.27–6.54)	.01
Pregnancy rate per cycle ^c	30/275 (10.9)	21/289 (7.2)	2.11 (1.02–4.59)	.05
Cumulative pregnancy rate ^d	30/58 (51.7)	21/57 (36.8)	2.37 (1.04–5.71)	.01
First-trimester abortion rate	4/30 (13.3)	3/21 (14.2)	1.05 (0.16–6.91)	.9
Patients with three or more regular cycles (28 ± 7 d)	51/58 (87.9)	43/57 (75.4)	2.38 (1.09–3.47)	.05
Postdrilling pelvic adhesions (grade 1) ^e	8/28 (28.5)	10/36 (27.7)	1.05 (0.23–5.82)	.9

Conclusion(s): Adjusted diathermy dose based on ovarian volume for laparoscopic ovarian drilling of polycystic ovary syndrome has a better reproductive outcome compared with fixed thermal dosage. (*Fertil Steril*® 2011;95:1115–8. ©2011 by American Society for Reproductive Medicine.)

Unilateral / Bilateral

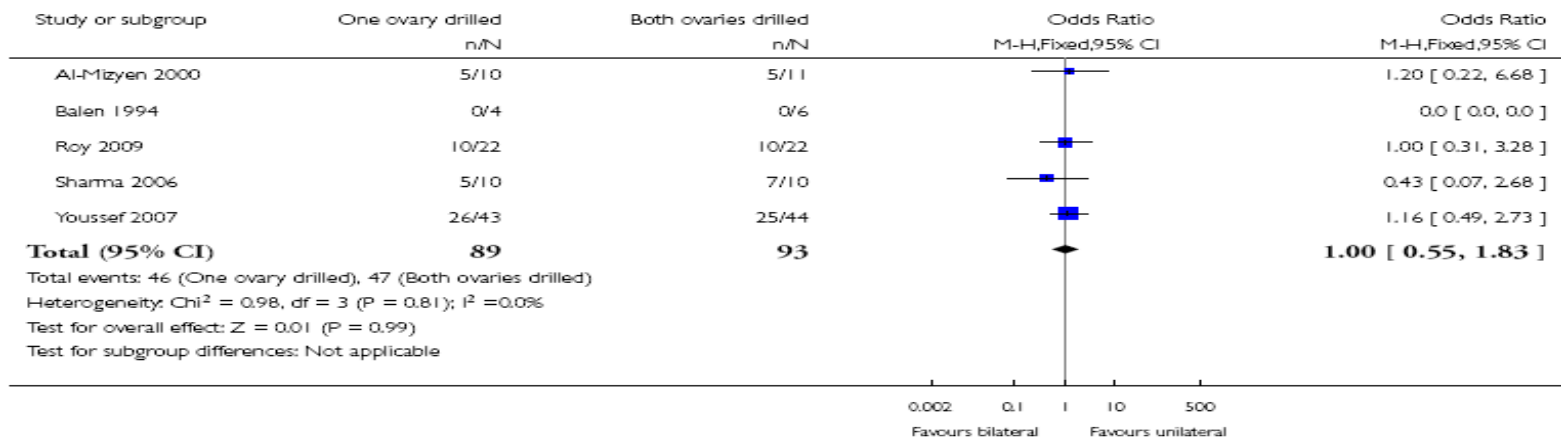
Outcome: 3 Ovulation rate (per patient)



Review: Laparoscopic drilling by diathermy or laser for ovulation induction in anovulatory polycystic ovary syndrome

Comparison: 2 Unilateral versus bilateral ovarian drilling

Outcome: 2 Pregnancy rate (per patient)



Does unilateral laparoscopic diathermy adjusted to ovarian volume increase the chances of ovulation in women with polycystic ovary syndrome?

M. Sunj¹, T. Canic², D.P. Baldani^{2,*}, M. Tandara¹, A. Jeroncic³
and I. Palada¹

Table II Frequency distributions of patients by ovulation and pregnancy.

Period after LOD	ULOD group (n = 49)		BLOD group (n = 47)	
	Ovulation	Pregnancy	Ovulation	Pregnancy
1 month	36 (73%)	10 (20%)	23 (49%)	4 (9%)
6 months	40 (82%)	27 (55%)	30 (64%)	21 (45%)

BLOD, bilateral laparoscopic ovarian drilling; LOD, laparoscopic ovarian drilling; n, number; ULOD, unilateral laparoscopic ovarian drilling.

Comparison between Unilateral and Bilateral Ovarian Drilling in Clomiphene Citrate Resistance Polycystic Ovary Syndrome Patients: A Randomized Clinical Trial of Efficacy

Ziba Zahiri Sorouri, M.D.¹, Seyede Hajar Sharami, M.D.^{1*}, Zinab Tahersima, M.D.¹, Fatemeh Salamat, M.Sc.²

1. Reproductive Health Research Center, Department of Obstetrics and Gynecology, Alzahra Hospital, Guilan University of Medical Sciences, Rasht, Iran

2. Research Vice Chancellorship, Guilan University of Medical Sciences, Rasht, Iran

Table 2: Clinical response on ovulation and pregnancy rates in 90 CC-resistant PCOS patients after laparoscopy

	Group I	Group II	P value
	n (%)	n (%)	
Menstrual resumption			
Spontaneous	30 (66.7)	32 (71.1)	0.820
Induced	15 (33.3)	13 (28.9)	
Ovulation rate			
Spontaneous	27 (60)	29 (64.4)	0.828
Induced	11 (24.4)	11 (24.4)	0.715
Pregnancy rate	14 (31.1)	18 (40)	0.350

Conclusion

Based on the results of this study, ULOD seems to be equally efficacious as BLOD in terms of ovulation and pregnancy rates.

LAZER / ELEKTROKOTER

- Elektrokoter sonuçları lazere üstündür!!!

	Elektrokoter	Lazer	OR
Kümülatif Gebelik oranı	%65	%54.5	1.5 (CI 1.1-2.1)

Saleh AM. Acta Obstet Gynecol Scand 2004

Lazerin dezavantajları

- Sadece 2-4 mm termal penetrasyon yapar.
- Over yüzeyinde daha fazla hasar ve adezyon oluşumuna yol açar

Sekond look sonuçları adezyon oluşumu

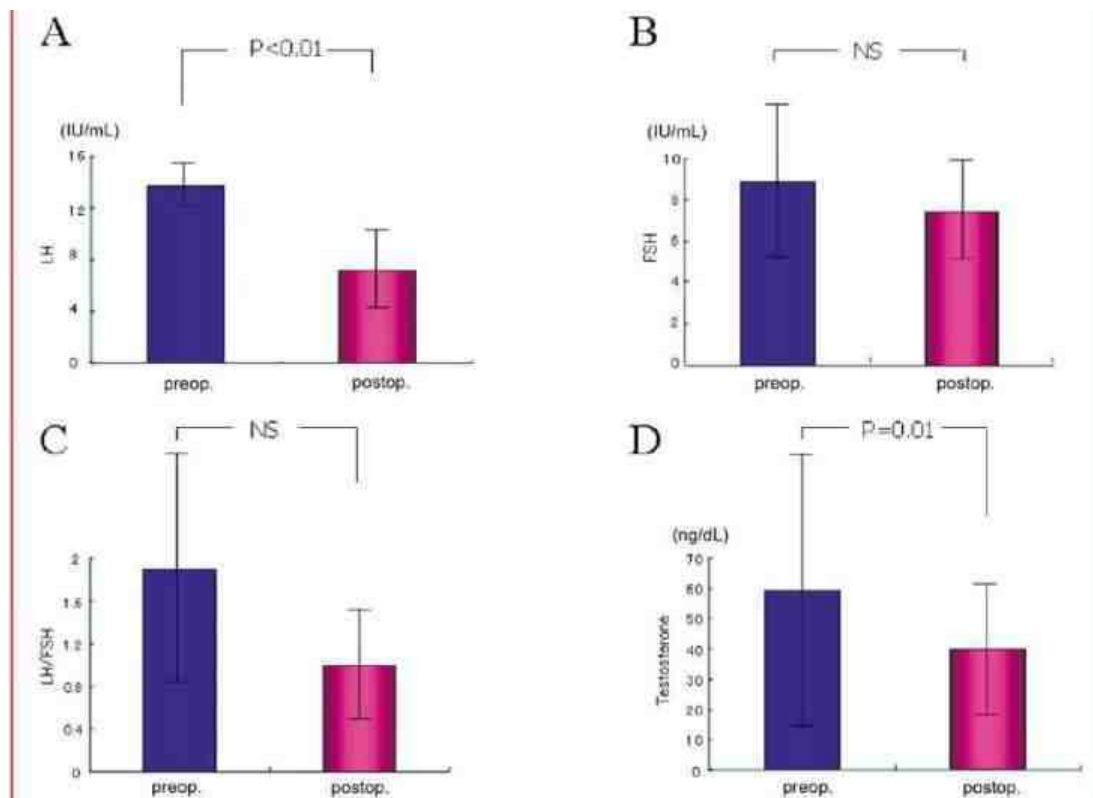
– Lazer	%41.5
– Elektrokoter	%31

Felemban A, Tulandi T.. Infertil Reprod Med Clin North Am 2000; 11:49–60.

•CO2 lazer Nd:YAG lazere göre daha fazla adezyon oluşturur

Postoperative endocrine alterations and clinical outcome of infertile women with polycystic ovary syndrome after transvaginal hydrolaparoscopic ovarian drilling

Transvaginal hydrolaparoscopic ovarian drilling (THLOD) appears to be an effective minimally invasive procedure to induce ovulation in women with polycystic ovary syndrome (PCOS). Postoperative endocrinological alterations following THLOD show significant decrease of serum LH and testosterone concentrations. (Fertil Steril® 2006;85:244–6. ©2006 by American Society for Reproductive Medicine.)



a. Insertion of a Veress needle



b. Insertion of cannula



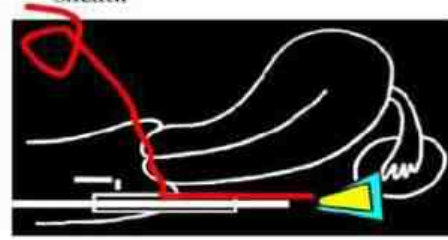
c. Pouring normal saline solution



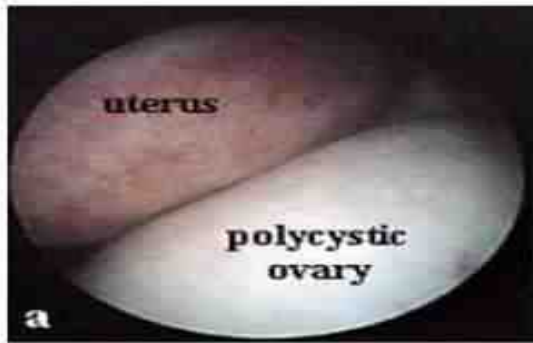
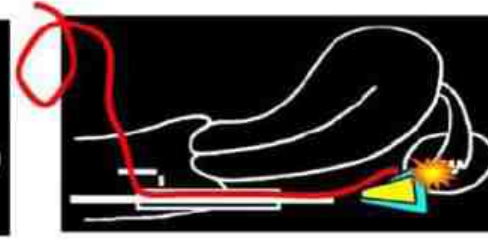
d. Insertion of a laparoscope



e. Introduction of the laser probe through the auxiliary channel of the sheath



f. Ovarian drilling with a laser



Transvaginal, ultrasound-guided, ovarian, interstitial laser treatment in anovulatory women with clomifene-citrate-resistant polycystic ovary syndrome

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^aDepartment of Reproductive Health ^bDepartment of Gynecology ^cDepartment of Central Laboratory, ShenZhen Maternity and Child Healthcare Hospital, ShenZhen, China

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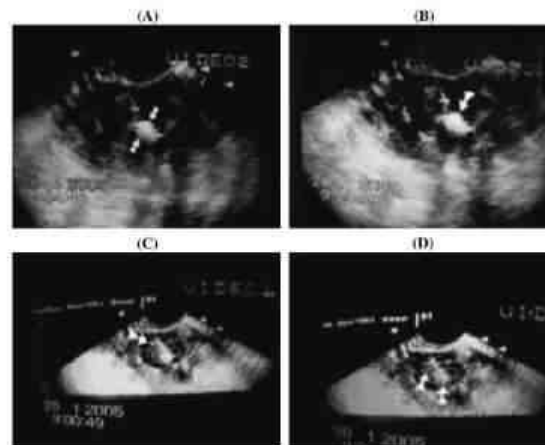
Accepted 19 April 2006.

%86 regüler mens %36 6-aylık kümülaif gebelik

BJOG 2006

Table 1. The comparison of hormone level between preoperation and postoperation (mean \pm SD) in 19 responders

Hormones (units)	Preoperation	Postoperation	P value
LH (iu/l)	13.89 \pm 3.62	4.62 \pm 1.47	<0.001
FSH (iu/l)	5.15 \pm 1.33	5.56 \pm 1.59	NS
Testosterone (nmol/l)	5.37 \pm 3.09	2.46 \pm 1.63	<0.001
PRL (microgram per litre)	12.10 \pm 6.82	11.29 \pm 5.73	NS
E ₂ (pmol/l)	58.05 \pm 15.37	57.77 \pm 12.78	NS
LH/FSH	2.78 \pm 1.21	0.87 \pm 0.19	<0.001

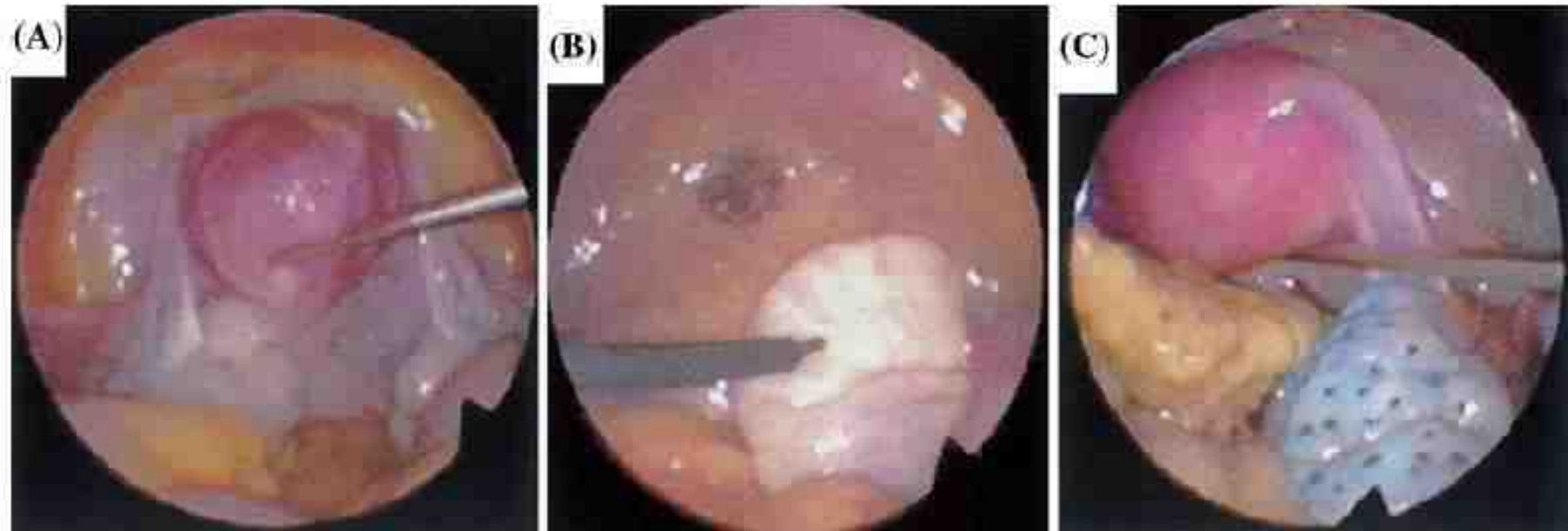


Office microlaparoscopic ovarian drilling (OMLOD) versus conventional laparoscopic ovarian drilling (LOD) for women with polycystic ovary syndrome

Imaduldin M. Salah

Table 2 Operative and reproductive data in patients treated by the proposed microlaparoscopy under augmented local anesthesia (study group, $n = 60$) and after conventional 10-mm laparoscopy under general anesthesia (comparison group, $n = 60$)

Variable	Case group	Comparison group
Intraoperative pain score	2.8 ± 0.7	–
Operative time (min)	20.3 ± 9.1	28.4 ± 7.3
Discharge time (h)	2.4 ± 0.7	6.2 ± 2.3
No. of patients discharged 2 h after surgery (%)	42 (71.8)	0
No. of patients who required additional analgesics (%)	18 (21.8)	34 (53.3)
Ovulation rate (%)	85.2	86.6
PR (%)	65.6	60.0
Miscarriage rate (%)	2.2	3.3



Hormone	Study group		Comparison group	
	Before surgery	After surgery	Before surgery	After surgery
LH (IU/L)	17.4 ± 3.6	14.4 ± 2.9	18.3 ± 3.9	14.7 ± 3.1
FSH (IU/L)	7.1 ± 0.7	7.7 ± 1.2	6.8 ± 0.9	7.2 ± 1.1
LH/FSH ratio	2.7 ± 0.3	2.1 ± 0.1	2.7 ± 1.2	2.2 ± 0.3
FAI (nmol/L)	8.1 ± 0.9	6.2 ± 0.6	8.9 ± 1.2	6.9 ± 1.2
T. (nmol/L)	3.1 ± 1.0	2.3 ± 0.7	3.3 ± 0.8	2.3 ± 1.0
Androstenedione (IU/L)	9.4 ± 1.3	7.1 ± 0.5	9.8 ± 1.9	7.6 ± 2.3
Ovarian volume (mL)	11.5 ± 2.2	9.9 ± 1.3	11.7 ± 1.7	10.1 ± 0.5

LOD de başarısızlık

- **%20-30 anovulasyon devam eder.**

- **Obezite (BMI) >35 kg/m²**
- **Belirgin hiperandrojenizm**
 - free androgen index ≥ 15
 - Testosteron >4.5 nmol/l.
- **İnfertilite süresinin >3 yıl olması**
 - Amer SA, Hum Reprod 2004; 19:1719
- **Düşük LH/FSH oranı (<2)**
- **Operasyon öncesi düşük glukoz seviyesi**
- **Erken menarş**
- **persistan anovulasyonu olasılığı artar ancak hiçbir tedavi başarısızlığını predikte etmez**
 - van Wely M, Hum Reprod 2005;20:900

Table III. Ovulation and pregnancy rates in 200 PCOS patients after LOD related to different categories of age, body mass index (BMI), acne, hirsutism, serum concentrations of LH and testosterone, LH/FSH ratio, free androgen index (FAI), duration of infertility and ovarian volume

	Category	n	Ovulation rate (%)	Pregnancy rate (%)
Age (years)	≤ 35	190	78	50
	> 35	10	70	50
BMI (kg/m ²)	< 29	118	81	57
	29-34	58	84	46
	> 34	16	44 ^a	13 ^a
Acne	Yes	36	80	51
	No	126	67	47
Hirsutism	Yes	70	84	63
	No	130	67 ^b	34 ^b
Menstrual pattern	Regular	15	87	33
	Oligomenorrhoea	150	79	51
	Amenorrhoea	35	72	48
LH (IU/l)	< 10	55	80	42
	10-19.9	99	76	52
	≥ 20	39	79	56
LH/FSH	> 2	51	78	47
	2-3.9	108	75	51
	≥ 4	32	84	50
Ovarian volume (ml)	< 14	51	80	57
	≥ 14	18	83	53
Testosterone (nmol/l)	< 2.6	58	86	56
	2.6-4.4	49	76	48
	≥ 4.5	9	33 ^b	11 ^b
FAI	< 4	29	93	68
	4-14.9	56	80	47
	> 15	14	36	15 ^b
Duration of infertility (years)	< 3	90	88	72
	3-6	83	76	33 ^c
	> 6	23	52 ^c	18 ^c

LOD de başarısızlık

YAŞ	<25	25-29	30-35	>35
Ovulasyon	23/34 %67.6	77/111 %69.4	36/52 %69.2	9/57 %15.8*
Gebelik	6/34 (%17.6)	18/111 (%16.2)	8/52 (%15.4)	1/57 %1.8*
Kümülatif gebelik	6/9 %66.7	18/28 %64.3	8/13 %61.5	1/10 %10.0*
Abortus	1/6 %16.7	3/18 %16.7	1/8 %12.5	1/1 %100.0*

LOD

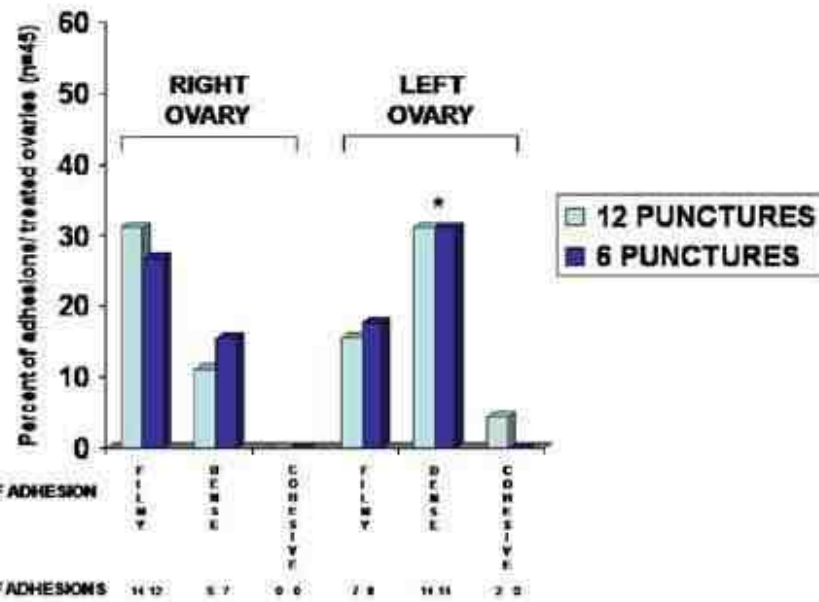
Postoperatif Adezyon

- ❖ %18-%82
 - C/S , infertilite
- ❖ Genellikle hafif reproduktif potansiyeli etkilemeyecek derecede
- ❖ Peritoneal lavaj adezyon formasyonunu azaltıyor
- ❖ **Sol overde daha fazla!!!!!!!**

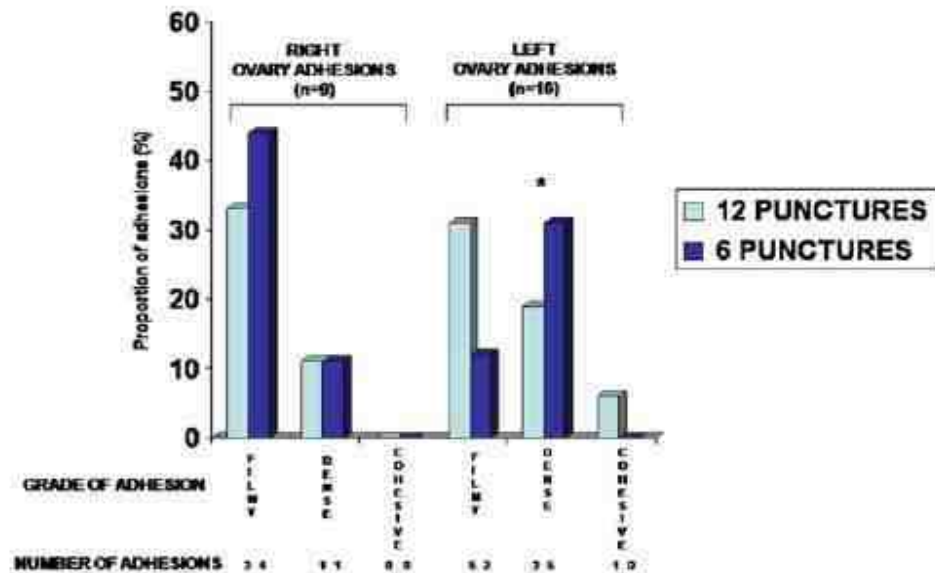
Evaluation of ovarian adhesion formation after laparoscopic ovarian drilling by second-look minilaparoscopy

Francesco Mercorio, M.D.,^a Antonio Mercorio, M.D.,^b Attilio Di Spiezio Sardo, M.D.,^a Gian Vincenzo Barba, M.D.,^c Massimiliano Pellicano, M.D.,^a and Carmine Nappi, M.D.^a

Incidence and grade of ovarian adhesions at early second-look procedure after laparoscopic ovarian drilling. * $P < .01$ vs. right ovary.



Incidence and grade of ovarian adhesions at early second-look procedure after laparoscopic ovarian drilling in the group with monolateral ovarian adhesions (n = 25); * $P < .05$ vs. right ovary.



GONADOTROPİN

- Ovulatuvar siklus % 70
- Kümülatif gebelik oranı % 55

van Santbrink *et al.*, 1995

White *et al.*, 1996

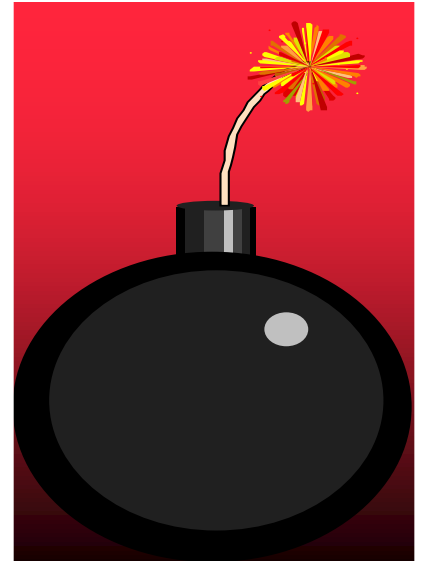
Mulders *et al.*, 2003

DEZAVANTAJ

Çoğul gebelik >%10

OHSS

Siklus iptali



CC dirençli hastalarda tedavide Gonadotropin/LOD

- 3-6 siklus FSH kullanımlarında 6. aya kadar gebelik oranları gonadotropin kullanımı lehine (OR = 0.48, 95% CI 0.28–0.81).
- 12 aylık sonuçlar benzer (OR = 1.27, 95% CI 0.77–2.09)

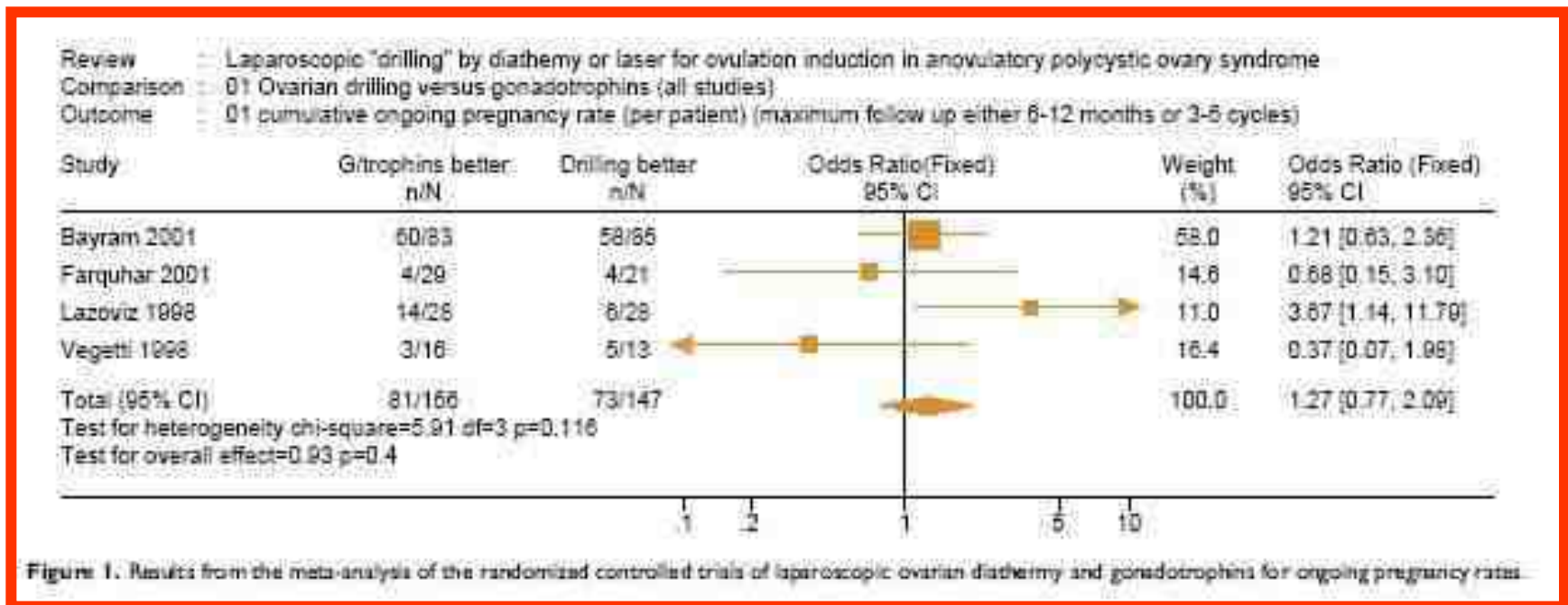
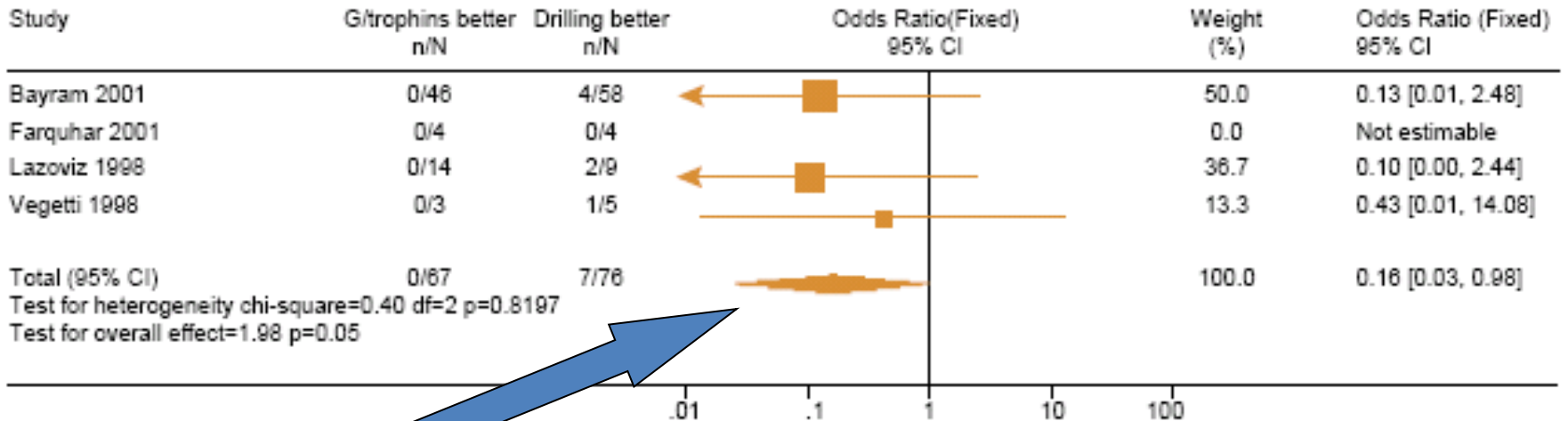


Figure 1. Results from the meta-analysis of the randomized controlled trials of laparoscopic ovarian diathermy and gonadotropins for ongoing pregnancy rates.

CC dirençli hastalarda tedavide Gonadotropin/LOD

Çoğul gebelik

Review : Laparoscopic "drilling" by diathermy or laser for ovulation induction in anovulatory polycystic ovary syndrome
Comparison : 01 Ovarian drilling versus gonadotrophins (all studies)
Outcome : 03 multiple pregnancy rate (per ongoing pregnancy)

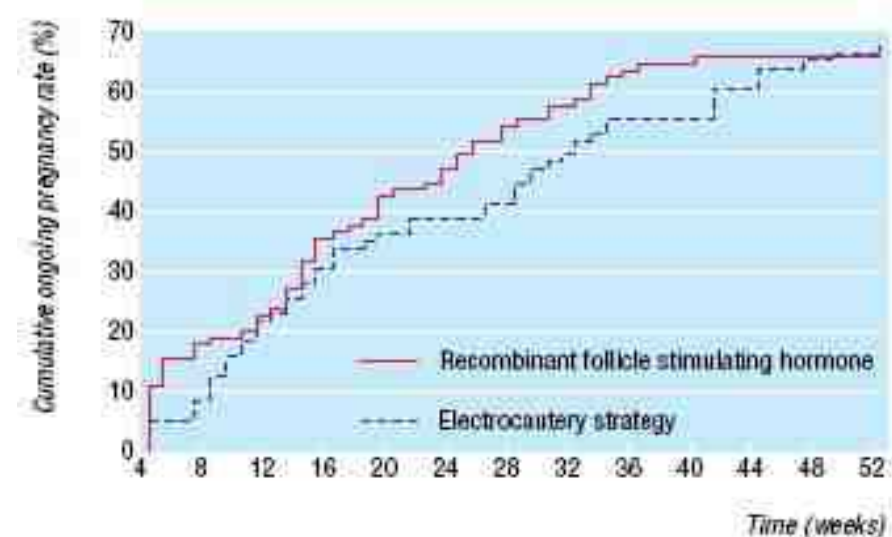


Farquhar CM. Best Pract Res Clin Obstet Gynaecol 2004

CC dirençli hastalarda tedavide Gonadotropin/LOD

Table 2 Pregnancy outcomes at 12 months in 83 women allocated to electrocautery strategy and 85 allocated to ovulation induction with recombinant follicle stimulating hormone. Values are numbers (percentages) of women

Treatment regimen	No of women	Pregnant	No of miscarriages*	No of multiple pregnancies	Ongoing pregnancy	No of premature deliveries	Live births
Electrocautery strategy:							
Electrocautery	83 (100)	31 (37)	3	—	28 (34)	—	28 (34)
Electrocautery and clomiphene citrate	45 (54)	14 (31)	1	—	13 (29)	—	13 (29)
Electrocautery, clomiphene citrate, and recombinant follicle stimulating hormone	23 (28)	18 (78)	3†	1	15 (65)	3	12 (52)
Electrocautery strategy: total	83	63 (76)	7	1	56 (67)	3	53 (64)
Recombinant follicle stimulating hormone	85	64 (75)	7	9	57 (67)	6	51 (60)



OHSS!!!!

Bayram N , BMJ 2004

CC dirençli hastalarda tedavide Gonadotropin/LOD

- LOD maliyet etkin

Table III. Mean cost (€) per woman per cost category

	Electrocautery strategy	Recombinant FSH
Operative procedure	943	554
Hormonal treatment	683	2733
Monitoring	3037	2131
Total direct medical costs	4664	5418
Indirect costs	644	507
Total costs	5308	5925

Long-term follow-up of laparoscopic electrocautery of the ovaries versus ovulation induction with recombinant FSH in clomiphene citrate-resistant women with polycystic ovary syndrome: an economic evaluation

M.J. Nahuis^{1,2,3,*}, E. Oude Lohuis², N. Kose¹, N. Bayram⁴, P. Hompes³, G.J.E. Oosterhuis², E.M. Kaaijk⁵, B.J. Cohlen⁶, P.P.M. Bossuyt⁷, F. van der Veen¹, B.W. Mol¹, and M. van Wely¹

	LOD	rFSH
Canlı doğum	71/83 (%86)	69/85 (%81)
Ek Oİ veya ART ihtiyacı	44/83 (%53)	65/85 (%76)
Canlı doğum başına ort maliyet	11176€	14423 €

CONCLUSION: In women with clomiphene-resistant PCOS, laparoscopic electrocautery of the ovaries results in significantly lower costs per live birth than ovulation induction with gonadotrophins for an at least equal effectiveness.

CC dirençli hastalarda tedavide Gonadotropin/LOD

❖ LOD maliyet/etkin

- Reprodüktif performans ve hormonal etki ve menstrual regülarite LOD de yıllar boyu sürmekte 18-20 yıl

Gjonnaess H. Fertil Steril 1998; 69:697–701.

❖ LOD uygulana hastalarda takip eden Oİ daha kolay

- LOD geçiren hastalarda Gonadotropinler kullanıldığında süre, total doz azalırken gebelik oranları yükseliyor

Pirwany I, Fertil Steril 2003; 80:241–251.

❖ IVF hastalarında LOD geçiren grupta ciddi OHSS oranı ve bu nedenle siklus iptal oranı az bulunmuş

Rimington Hum Reprod 1997; 12:1443–1447.

CC dirençli hastalarda tedavide Metformin/LOD

TABLE 1

Comparison between laparoscopic ovarian drilling and metformin treatment.

	Laparoscopic ovarian drilling	Metformin therapy
Ovulation rate	74% up to 20 years after LOD (34)	82% after 16 weeks of treatment (94)
Pregnancy rate	50–70% 12 months after LOD (27, 28, 51)	55% with metformin + clomiphene for 6 months (112)
Miscarriage rate	17% vs. 54% in the control group (69)	3.8% vs. 41.9% in the control group (104)
Hirsutism	Improvement up to 9 years after surgery (25, 69)	Conflicting results (106, 107)
In vitro fertilization	Decreased cancellation, decreased risk of hyperstimulation	Decreased cancellation, decreased risk of hyperstimulation
Follow-up	Up to 20 years	Up to 26 months

Pivovary. Laparoscopic ovarian drilling and metformin in PCOS. Fertil Steril 2003.

CC Dirençli Hastalarda Tedavide Metformin/LOD (RCT)

	LOD+plasebo	Metformin +Diag L/S
Ovulasyon	%54.8	% 53.3
Gebelik /siklus	% 13.4	% 21.8
Gebelik kümülatif	%56.4	% 72.2
Abortus	% 29.0	%9.3
Canlı doğum(gebelik başına)	%64.5	%82.1

CC Dirençli Hastalarda Tedavide Metformin/LOD (RCT)

- **Metformin 20 kat maliyet/etkin**

LOD	Metformin cloridrate treatment (850 mg twice daily)
Day-surgery fee = 400 €	One pack of metformin cloridrate (30 cps of 850 mg each) = 4.18 €
Surgeon's fee = 350 €	1 month of treatment = $4.18 \text{ €} \times 2 = 8.36 \text{ €}$
Assistant's fee = 100 €	6 months of treatment = $8.36 \text{ €} \times 6 = 50.16 \text{ €}$
Anesthetist's fee = 200 €	
Total = 1050 €	Total = 50.16 €

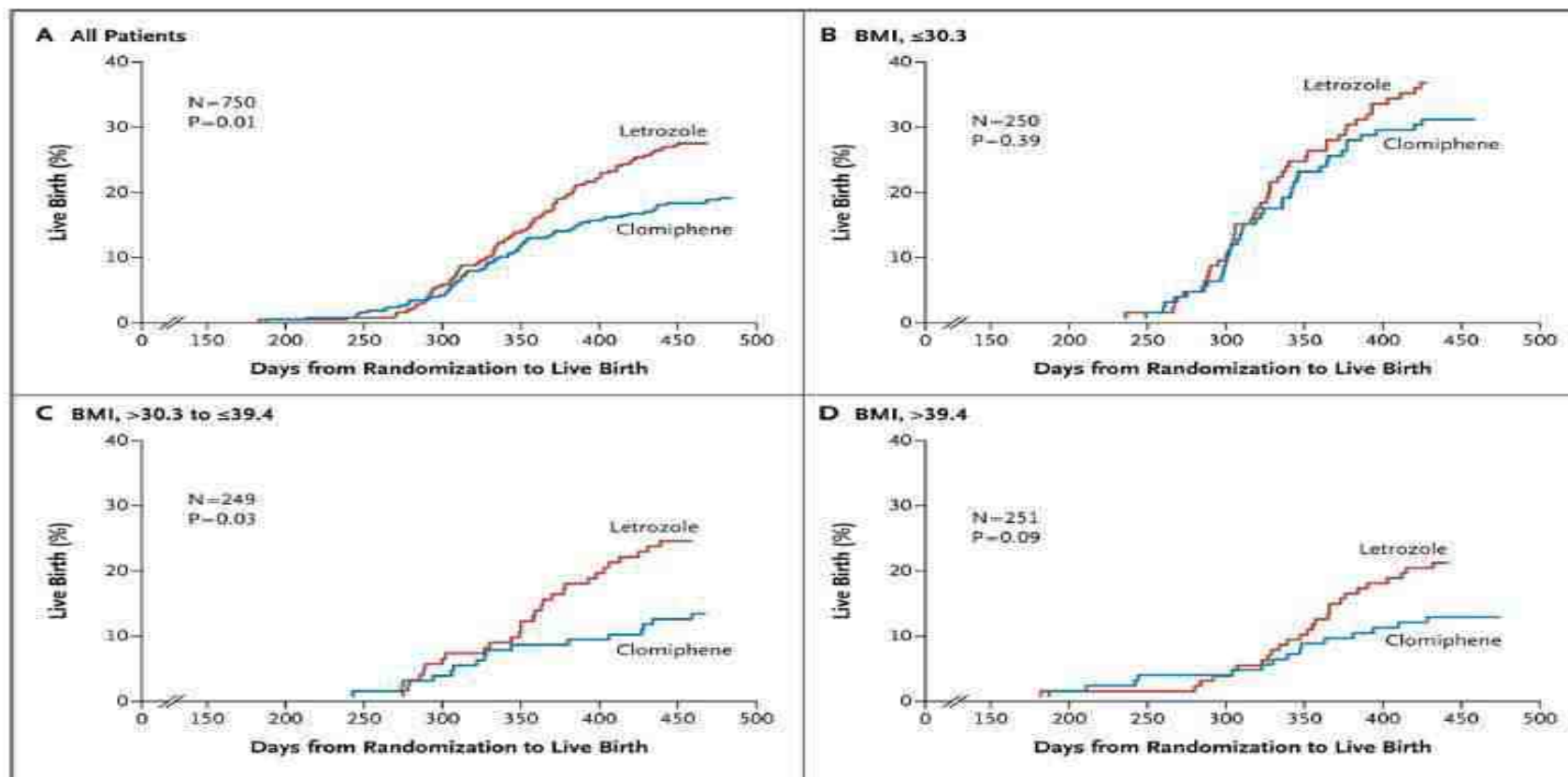
- İlave olarak metformin genel anestezi ve L/S riskleri taşıyor.
- CC rezistan hastalarda ilk seçenek olmalı

Published in final edited form as:

N Engl J Med. 2014 July 10; 371(2): 119–129. doi:10.1056/NEJMoa1313517.

Letrozole versus Clomiphene for Infertility in the Polycystic Ovary Syndrome

Richard S. Legro, M.D., Robert G. Brzyski, M.D., Ph.D., Michael P. Diamond, M.D., Christos Coutifaris, M.D., Ph.D., William D. Schlaff, M.D., Peter Casson, M.D., Gregory M. Christman, M.D., Hao Huang, M.D., M.P.H., Qingshang Yan, Ph.D., Ruben Alvero, M.D., Daniel J. Haisenleder, Ph.D., Kurt T. Barnhart, M.D., G. Wright Bates, M.D., Rebecca Usadi, M.D., Scott Lucidi, M.D., Valerie Baker, M.D., J.C. Trussell, M.D., Stephen A. Krawetz, Ph.D., Peter Snyder, M.D., Dana Ohi, M.D., Nanette Santoro, M.D., Esther Eisenberg, M.D., M.P.H., Heping Zhang, Ph.D., and for the NICHD Reproductive Medicine Network*



Letrozole versus Clomiphene for Infertility in the Polycystic Ovary Syndrome

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Outcome	Clomiphene Group (N = 376)	Letrozole Group (N = 374)	Absolute Difference between Groups (95% CI) [†]	Rate Ratio in Letrozole Group (95% CI)	P Value [‡]
Primary outcome					
Live birth — no. (%)	72 (19.1)	103 (27.5)	8.4 (2.4 to 14.4)	1.44 (1.10 to 1.87)	0.007
Singleton live birth — no./total no. (%)	67/72 (93.1)	99/103 (96.1)	3.1 (−3.9 to 10.0)	1.03 (0.96 to 1.11)	0.49
Twin live birth — no./total no. (%) [§]	5/72 (6.9)	4/103 (3.9)	−3.0 (−10.0 to 3.9)	0.56 (0.16 to 2.01)	0.49
Ovulation					
Women who ovulated — no. (%)	288 (76.6)	331 (88.5)	11.9 (6.5 to 17.3)	1.16 (1.08 to 1.24)	<0.001
No. of ovulations/total treatment cycles (%)	688/1425 (48.3)	834/1352 (61.7)	13.4 (9.7 to 17.1)	1.28 (1.19 to 1.37)	<0.001
Serious adverse event after 20 wk of pregnancy in fetus through neonatal period in infant					
Congenital anomaly ^{**}	1/66 (1.5)	4/102 (3.9)			

CONCLUSIONS—As compared with clomiphene, letrozole was associated with higher live-birth and ovulation rates among infertile women with the polycystic ovary syndrome. (Funded by the Eunice Kennedy Shriver National Institute of Child Health and Human Development and others; ClinicalTrials.gov number, NCT00719186.)

Randomized controlled trial comparing letrozole with laparoscopic ovarian drilling in women with clomiphene citrate-resistant polycystic ovary syndrome

WEI LIU^{1*}, SHENGNAN DONG^{1*}, YUMEI LI², LIHONG SHI¹, WEI ZHOU¹,
YINGLING LIU¹, JIE LIU³ and YAZHONG JI¹

Reproductive outcome	letrozole treatment	laparoscopic ovarian drilling	P-value
	Group A, n=71	Group B, n=70	
Ovulation rate, n/total n (%)	305/382 (79.8)	237/358 (66.2)	<0.001
Endometrial thickness ^a , mm	7.82±1.70	6.21±1.46	0.324
Synchronous cycles, n/total n (%)	249/305 (81.6)	132/237 (55.7)	<0.001
Clinical pregnancy rate, n/total n (%)	29/71 (40.8)	19/70 (27.1)	0.086
Spontaneous abortion rate, n/total n (%)	2/29 (6.9)	3/19 (15.8)	0.372
Live birth rate, n/total n (%)	27/71 (38.0)	16/70 (22.9)	0.050

ORIGINAL ARTICLE

Metformin administration and laparoscopic ovarian drilling improve ovarian response to clomiphene citrate (CC) in oligo-anovulatory CC-resistant women with polycystic ovary syndrome

Stefano Palomba*, Francesco Orio Jr†, Angela Falbo*, Tiziana Russo*, Grande Caterina*, Francesco Manguso‡, Achille Tolino§, Annamaria Colaot and Fulvio Zullo*

- LOD sonrası Anovulatuvar hastalarda tekrar CC tedavisi ile
 - %31.1 Ovulasyon (23/74 siklus)
 - %16.2 gebelik

LOD ve Overryan rezerv

Gynecological Endocrinology, August 2007; 23(8): 455–460

informa
healthcare

PCOS

Ovarian reserve in women with polycystic ovary syndrome who underwent laparoscopic ovarian drilling

SAWAEK WEERAKIET¹, SRITHEAN LERTVIKOOL¹, YADA TINGTHANATIKUL¹, SURAPEE WANSUMRITH², SUPATRA LEELAPHIWAT³, & RATTIYA JULTANMAS⁴

	LOD (n=21) [A]	PCOS (n=21) [B]	Control (n=21) [C]	p Value for comparison between		
				A & B	A & C	B & C
<i>Ovarian reserve</i>						
AMH (ng/ml)	4.60 ± 3.16	5.99 ± 3.36	2.42 ± 2.17	NS	0.058	0.001
FSH (mIU/ml)	6.9 (2.7–13.2)	5.2 (3.1–8.2)	7.1 (4.3–19.3)	0.0068	NS	0.0043
Inhibin B (pg/ml)	0.82 (0–91.2)	5.16 (0–185)	0 (0–68.9)	NS	NS	NS
AFC	19 (8–57)	31 (10–72)	13 (5–28)	0.0122	0.006	0.000
Summed ovarian volume (cm ³)	11.62 ± 4.56	11.69 ± 4.17	8.69 ± 2.89	NS	0.057	0.049
<i>Androgens</i>						
T (ng/dl)	25.2 (20.0–52.0)	34.6 (22.2–61.5)	23.5 (20.0–46.7)	NS	NS	0.001
A (ng/ml)	2.25 ± 0.62	2.54 ± 0.81	1.94 ± 0.72	NS	NS	0.027
DHEAS (μg/dl)	135.6 (65–272)	144.6 (48–438)	113 (54–225)	NS	NS	NS

OVARY

Is ovarian reserve diminished after laparoscopic ovarian drilling?

MURAT API

Authors [reference]	Number of participants in studies	Ovarian reserve markers	PCOS medically treated		p^a	PCOS bilateral LOD		p^b	PCOS patients	Normal ovulatory controls	p^c
			Before	After		Before	After				
Kandil and Selim [37]	Medically treated ($n=20$); LOD ($n=20$)	Day 3 FSH	6.8 ± 0.5	7.0 ± 0.04	0.098	6.8 ± 0.7	7.1 ± 0.08	0.41			
		CCCT	8.5 ± 1.2	8.8 ± 1.3	0.469	8.6 ± 1.2	9.3 ± 1.2	0.8			
		Day 3 Inhibin B	54.8 ± 12.6	50.2 ± 13	0.258	53.8 ± 13.5	46.3 ± 6.2	0.031			
		AFC	16.2 ± 1.5	15.4 ± 2.5	0.222	16.5 ± 1.3	14.9 ± 2.1	0.007			
		Ovarian volume	11.0 ± 0.9	10.6 ± 0.9	0.123	11.5 ± 1.0	10.3 ± 1.1	0.001			
Lockwood et al. [38]	LOD ($n=8$); PCOS ($n=10$); Control ($n=5$)	Day 5 Inhibin B				227.7	191.4	0.038	248 ± 43.4	126 ± 18.6	<0.01
		Mean FSH							3.2	3.7	NS
		Mean LH				10.53	9.58	0.43			
Amer et al. [39]	PCOS with LOD ($n=50$)	Inhibin B				110	106	NS			
		Inhibin B non-obese				122.9	117.5	NS			
		Inhibin B obese				51	78	NS			
		LH				12.2 ± 0.9	9.1 ± 0.8	<0.01			
		FSH				4.8 ± 0.2	4.7 ± 0.2	0.496			
Weerakiet et al. [40]	LOD ($n=21$); PCOS ($n=21$); Control ($n=21$)	Day 3 AMH					4.6 ± 3.16	NS ^d	5.99 ± 3.36	2.42 ± 2.17	0.001
		Day 3 Inhibin B					0.82(0–91)	NS ^d	5.16(0–185)	0(0–68.9)	NS
		Ovarian volume					11.62 ± 4.5	NS ^d	11.69 ± 4.17	8.69 ± 2.89	0.049
		Day 3 FSH					$6.9(2.7–13.2)$	0.0068	$5.2(3.1–8.2)$	$7.1(4.3–19)$	<0.001
		AFC					19(8–17)	0.0122	31(10–72)	13(5–28)	<0.001

Conclusion. Although the available data in the literature is limited, there was no concrete evidence of a DOR or POF associated with LOD in women with PCOS. Most of the changes in the ovarian reserve markers observed after LOD could be interpreted as normalisation of ovarian function rather than a reduction of ovarian reserve. LOD, if applied properly, normalises the exaggerated ovarian morphologic and endocrinologic properties.

Impact of laparoscopic ovarian drilling on anti-Müllerian hormone levels and ovarian stromal blood flow using three-dimensional power Doppler in women with anovulatory polycystic ovary syndrome

Ashraf I. Elmashad, M.D.

Department of Obstetrics and Gynecology, Benha Faculty of Medicine, Benha University, Egypt

Variable	Control group (n = 20)	PCOS group (n = 23)	
		Pre-LOD	Post-LOD
Age (y)	27.4 ± 2.8	28.8 ± 3.1	—
BMI (kg/m ²)	26.7 ± 2.4	29.2 ± 2.6	28.4 ± 2.3
LH (IU/L)	4.9 ± 1.2	11.7 ± 1.3 ^a	10.8 ± 1.8
FSH (IU/L)	3.9 ± 1.1	4.2 ± 1.3	4.1 ± 1.4
LH:FSH	1.2 ± 0.2	2.8 ± 0.4 ^a	2.5 ± 0.6
T (nmol/L)	1.1 ± 0.3	4.2 ± 0.4 ^a	2.6 ± 0.6 ^b
SHBG	48	31	34
FAI	2.3	11.6	7.6
AMH (ng/mL)	1.9 ± 0.3	7.4 ± 4.6 ^a	4.2 ± 2.5 ^b
Ovarian volume (mL)	6.9 ± 1.1	13.8 ± 2.1 ^a	7.4 ± 2.9 ^d
Mean number of follicles (both ovaries)	13.0 ± 1.9	29.0 ± 2.4 ^a	15.0 ± 2.2 ^b
Vascularization index	1.7 ± 0.34	4.8 ± 1.3 ^a	2.4 ± 0.75 ^b
Flow index	43.9 ± 5.9	52.4 ± 4.3 ^a	44.3 ± 2.5 ^b
Vascularization flow index	0.97 ± 0.38	2.9 ± 0.43 ^a	1.2 ± 0.59 ^b

Preoperative and postoperative plasma levels of AMH, power Doppler flow studies, and other hormones in women with PCOS who ovulated in response to LOD (responders) versus nonresponders.

LOD	Variable	Responders (n = 17)	Nonresponders (n = 6)	P value ^a
Pre-LOD	AMH (ng/mL)	6.3 (5.1–6.9) ^b	11.9 (11.1–13.6)	.003
	FSH (IU/L)	4.8 (2.8–5.1)	4.7 (2.7–5.2)	.437
	LH (IU/L)	11.8 (8.1–13.2)	12.4 (11.31–6.8)	.243
	T (nmol/L)	3.4 (3.2–3.6)	4.1 (3.8–4.2)	.116
	SHBG	36.0 (34.1–38.0)	34.7 (34.1–37.1)	.721
	FAI	9.7 (8.4–10.3)	11.0 (10.3–11.3)	.218
	Vascularization index	4.7 (4.5–4.9)	5.1 (4.5–5.2)	.183
	Flow index	50.9 (49.4–53.4)	51.3 (49.7–53.9)	.872
	VFI	2.8 (2.3–3.1)	3.1 (2.8–3.2)	.170
Post-LOD	AMH (ng/mL)	4.2 (2.6–4.9) ^b	11.2 (10.4–14.0)	.002
	FSH (IU/L)	4.7 (2.7–5.2)	4.9 (4.2–5.4)	.129
	LH (IU/L)	10.9 (7.8–12.7)	12.1 (11.1–17.5)	.241
	T (nmol/L)	3.3 (3.1–3.5)	3.8 (3.6–4.1)	.578
	SHBG	38.1 (35.1–39.2)	36.2 (35.3–38.5)	.258
	FAI	8.8 (7.9–9.9)	10.3 (9.7–10.9)	.063
	Vascularization index	2.4 (2.2–2.7)	2.5 (2.3–2.7)	.610
	Flow index	44.3 (42.1–45.2)	44.8 (41.7–45.8)	.364
	VFI	1.3 (1.2–1.4)	1.7 (1.4–1.1.8)	.412

LOD sonrası özellikle tedaviye olumlu yanıt veren hastalarda serum AMH seviyesi azalır.

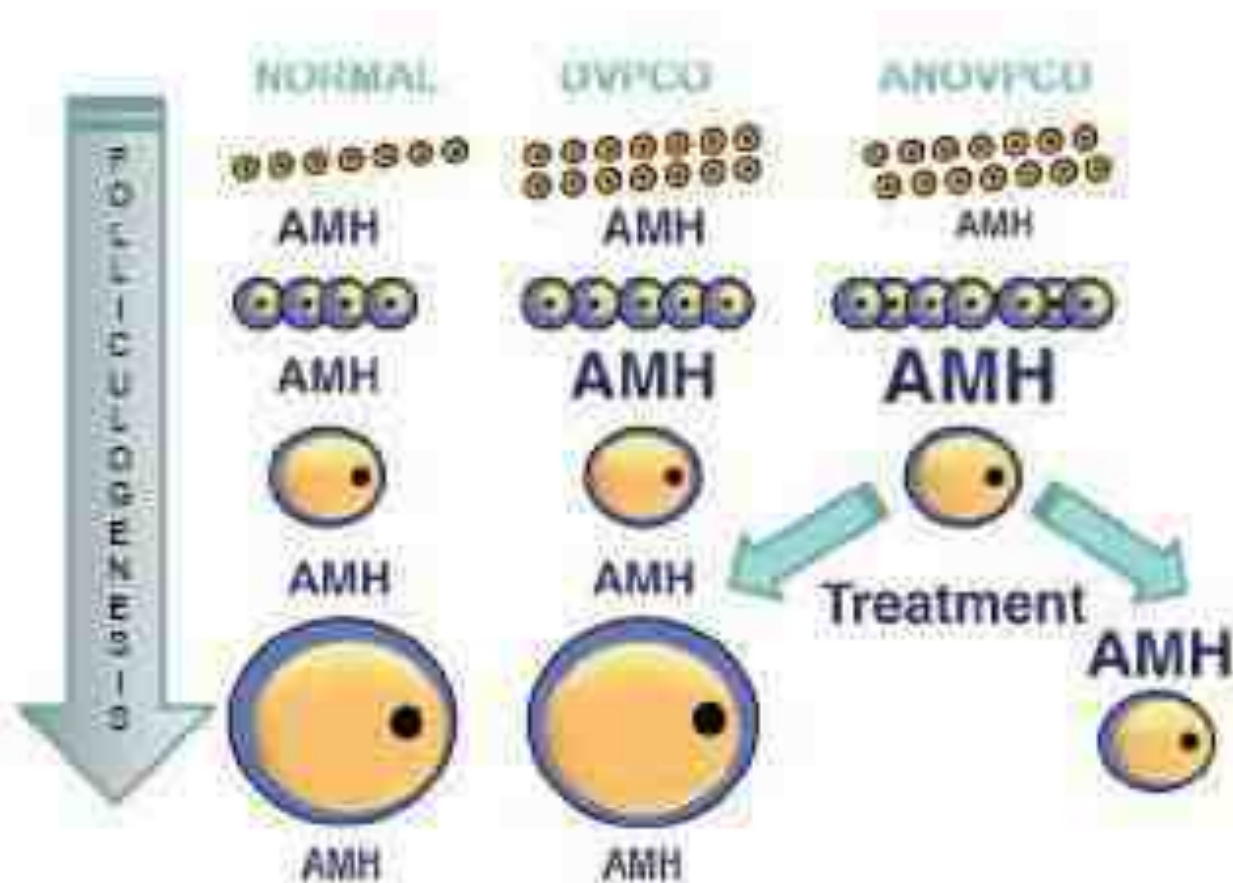
Bazal AMH seviyesi yüksek hastanın tedaviye yanıtları daha düşüktür.

Anti-Müllerian hormone and polycystic ovary syndrome: a mountain too high?

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The Impact of Gradually Increasing Energy Dose on AMH Levels in Ovarian Drilling

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Recai Pabuccu

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Table 1. Pre- and postoperative AMH (ng/ml) values of the groups

	Dose/rat (Joule)	Preoperative, median (25th–75th percentile)	Postoperative, median (25th–75th percentile)	p value ^a
Group A (n = 10)	–	1.45 (0.77–2.40)	1.55 (1.00–2.30)	0.953
Group B (n = 10)	40	1.85 (0.85–2.25)	0.55 (0.10–1.12)	0.138
Group C (n = 10)	120	2.00 (1.07–2.12)	0.95 (0.60–1.72)	0.038
Group D (n = 10)	240	1.25 (1.07–2.05)	0.40 (0.30–0.72)	0.012 ^a

Conclusions: AMH is a promising marker that can be used for the individualization of the energy dose to increase OD success, but the relationship between the energy and AMH has not been documented yet.

Does the level of serum antimüllerian hormone predict ovulatory function in women with polycystic ovary syndrome with aging?

Enrico Carmina, M.D.,^a Anna Maria Campagna, M.D.,^a Pasquale Mansueti, M.D.,^b Giustina Vitale, M.D.,^b Daniel Kort, M.D.,^c and Roger Lobo, M.D.^c

^a Department of Medical and Biological Sciences and ^b Department of Clinical Medicine, University of Palermo, Palermo, Italy; and ^c Department of Obstetrics and Gynecology, Columbia University, New York, New York

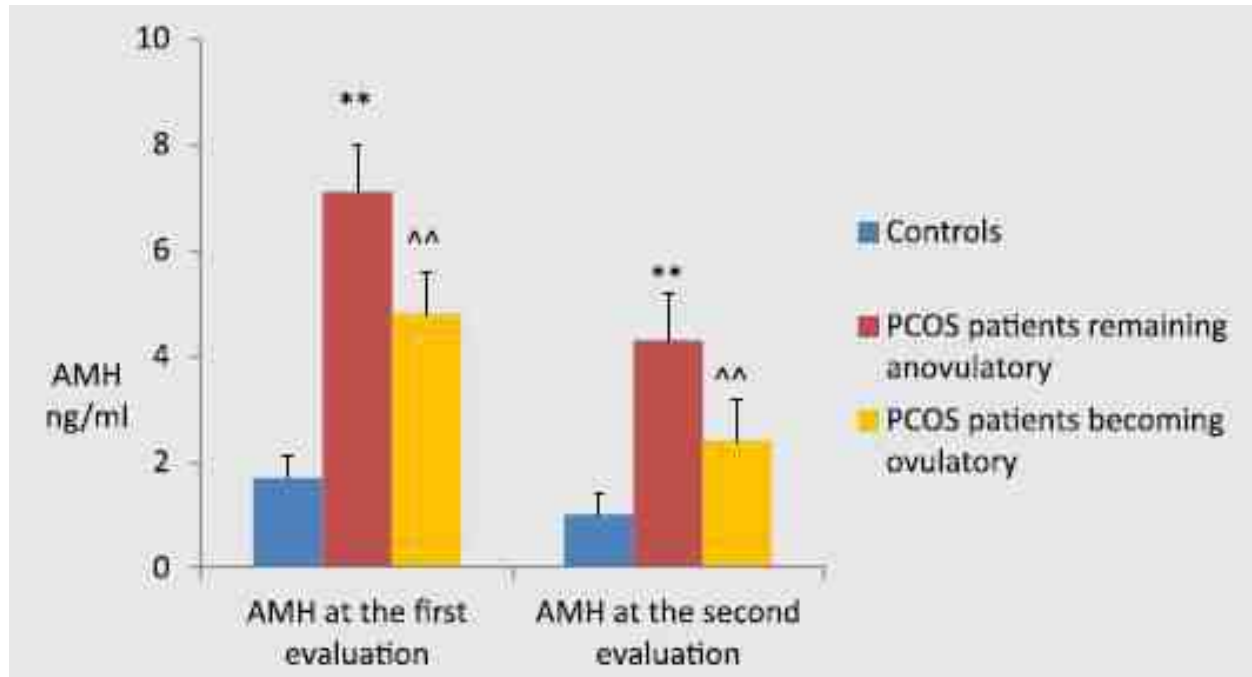
Some clinical and endocrine parameters in 54 PCOS women and 20 control subjects aged 35–40 years and 5 years later.

	Age, y	AMH, ng/mL
PCOS	37 ± 1	6.7 ± 2.1
Control	37 ± 1	1.7 ± 0.7
PCOS	42 ± 1	3.9 ± 1.2
Control	42 ± 1	1 ± 0.7

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Carmina. AMH and normalization of menses in PCOS. Fertil

AMH seviyesindeki yaşla birlikte azalma ile birlikte anovulatuvar hastaların bir kısmı ovulatuvar oluyor.

IVF öncesi LOD

- LOD sonrası serumda VEGF ve IGF-1 seviyeleri azalmakta, over stroması kan akımı artmaktadır. Bu nedenle özellikle daha önce OHSS gelişmiş hastaların IVF tedavisinde bu işlem önerilmekteydi
- **Günümüzde agonist trigger,freeze all, kabergolin gibi etkin güncel yaklaşımlar tercih edilir.**

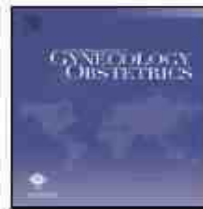
Effect of Laparoscopic Ovarian Drilling on Outcomes of *In Vitro* Fertilization in Clomiphene-Resistant Women with Polycystic Ovary Syndrome

Maryam Eftekhar, M.D.¹, Razieh Deghani Firoozabadi, M.D.¹, Parisa Khani, M.D.^{1*},
Ehsan Ziaei Bideh, M.D.¹, Hosein Forghani, M.D.^{2*}

1. Research and Clinical Center for Infertility, Shahid Sadoughi University of Medical Sciences, Yazd, Iran
2. Department of Health Education, Faculty of Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran

Table 2: ART outcomes in two groups

	With LOD	Without LOD	P value (Mann-Whitney test)
Number of oocytes obtained*	12.44 ± 3.25	13.48 ± 3.02	<0.001**
Number of embryo obtained*	9.84 ± 2.65	10.50 ± 2.67	0.033**
	n (%)	n (%)	P value (Chi-squre test)
Chemical pregnancy	61 (40.7%)	60 (40%)	0.906
Clinical pregnancy	53 (35.3%)	52 (34.7%)	0.604
Chemical pregnancy	61 (40.7%)	60 (40%)	0.906
OHSS	10 (6.7%)	22 (14.7%)	0.025**



CLINICAL ARTICLE

Effect of laparoscopic ovarian drilling on vascular endothelial growth factor and ovarian stromal blood flow using 3-dimensional power Doppler

Manal M. El Behery ^{a,*}, Abdalla E. Diab ^a, Hala Mowafy ^a, Moustafa A. Ebrahiem ^a, Amal E. Shehata ^b^a Department of Obstetrics and Gynecology, Faculty of Medicine, Zagazig University, Egypt^b Department of Biochemistry, Faculty of Medicine, Zagazig University, EgyptSerum concentrations of hormones in patients with PCOS as compared with normal fertile women.^a

Variables	Normal women (n = 22)	Women with PCOS (n = 26)	
		Pre-LOD ^b	Post-LOD ^c
LH, IU/L	6.0 ± 0.3	8.2 ± 0.32 ^d	6.1 ± 0.22 ^d
FSH, IU/L	6.3 ± 0.3	6.1 ± 0.2	5.8 ± 0.2
Testosterone, nmol/L	1.7 ± 0.1	4.9 ± 0.2 ^d	2.7 ± 0.4 ^d
Estradiol, pg/mL	62.3 ± 5.1	80.6 ± 9.8	79.2 ± 9.0
LH/FSH ratio	1.0 ± 0.1	1.4 ± 0.4 ^d	1.1 ± 0.1 ^d
VEGF, ng/mL	2.5 ± 0.1	5.6 ± 0.2 ^d	3.1 ± 0.3 ^d



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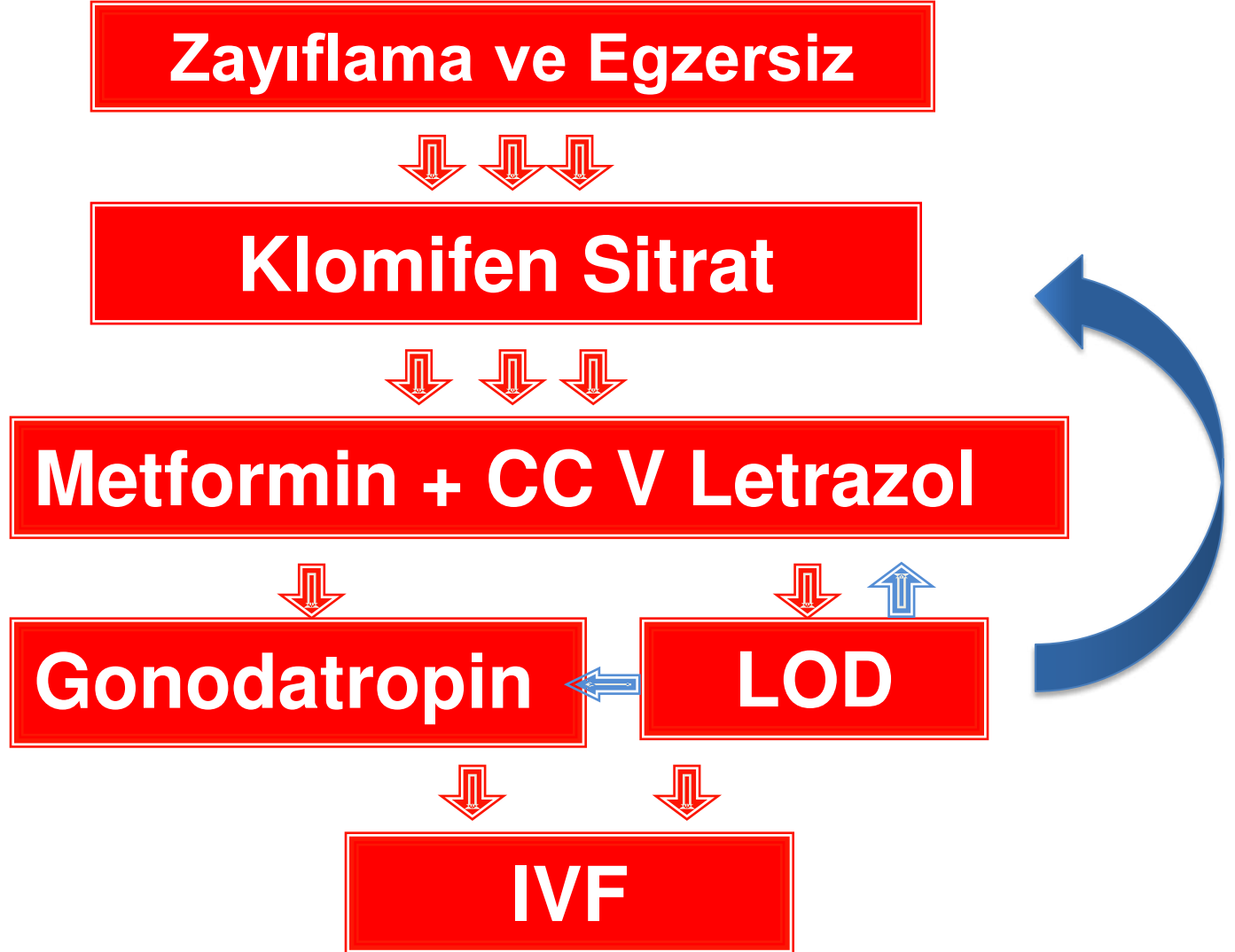
CLINICAL ARTICLE

Effect of laparoscopic ovarian drilling on vascular endothelial growth factor and ovarian stromal blood flow using 3-dimensional power Doppler

Manal M. El Behery ^{a,*}, Abdalla E. Diab ^a, Hala Mowafy ^a, Moustafa A. Ebrahiem ^a, Amal E. Shehata ^b^a Department of Obstetrics and Gynecology, Faculty of Medicine, Zagazig University, Egypt^b Department of Biochemistry, Faculty of Medicine, Zagazig University, EgyptPower Doppler signal parameters in normal ovaries and in PCOS before and after LOD.^a

Doppler indices	Normal women	Women with PCOS	
		Pre-LOD ^b	Post-LOD ^c
Right ovarian stromal vasculature			
VI	1.4 ± 0.3	4.0 ± 0.5 ^d	2.54 ± 0.39 ^f
FI	44.5 ± 1.2	51.2 ± 0.6 ^d	46.4 ± 0.8 ^d
VFI	0.8 ± 0.2	2.1 ± 0.3 ^e	1.1 ± 0.2 ^e
Left ovarian stromal vasculature			
VI	1.4 ± 0.3	3.8 ± 0.5 ^d	2.23 ± 0.4 ^f
FI	42.6 ± 0.3	50.5 ± 0.5 ^d	47.6 ± 0.8 ^e
VFI	0.8 ± 0.2	2.2 ± 0.3 ^e	1.0 ± 0.2 ^d

PCOS İnfertilite Tedavisi



Androjenik Semptomları Düzeltilmesinde LOD Yeri

- ❖ Konsensus yok
- ❖ Uzun süreli etkinlik avantajıdır.
- ❖ Daha fazla puncture veya overyan wedge rezeksiyon veya unilateral ooferektomi gerekli
- ❖ **Premature overyan yetmezlik !!!**
- ❖ Diğer nedenle yapılmış operasyonlarda hirsutizmi olan fertilitate problemi olmayan vakalarda uygulanabilir????

Sonuçlar I

- ❖ PCOS lu hastalarda infertilite tedavisinden CC ilk seçenektir.
- ❖ CC dirençli hastalarda letrozol veya insulin direnci varsa metformin tedavisi düşünülebilir.
- ❖ Anovulasyonu devam eden hastalarda gonodatropin ve LOD seçenekleri tartışılmalıdır.
- ❖ LOD intraoveryan androjenik mikro çevreyi düzelterek hipotalamo-hipofiz-over aksını düzelterek etki gösterir.

Sonuçlar II

- ❖ LOD de tedavi kişiselleştirilmelidir ve mümkün olan en az uygulama yapılmalıdır.
- ❖ Obez, hiperandrojenizmi olan, 3 yıldan fazla infertilitesi olan, FSH >10 ve yaş >35 olan hastalarda başarı şansı azalmaktadır.
- ❖ Androjenik semptomların giderilmesinde konsensus yoktur.



TEŞEKKÜRLER