

Η διαχείριση της κίρσοκήλης στην υπογονιμότητα και στην ορχεοδυνία

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Στρογγυλή Τράπεζα: “Χειρουργική ανδρολογία”
11^ο Πανελλήνιο Ανδρολογικό Συνέδριο
Αθήνα, 10-5-2019

Σύγκρουση συμφερόντων

ΔΕΝ ΥΠΑΡΧΕΙ

Κιρσοκήλη

➤ Πεδίο έντονης συζήτησης εδώ και 50 χρόνια

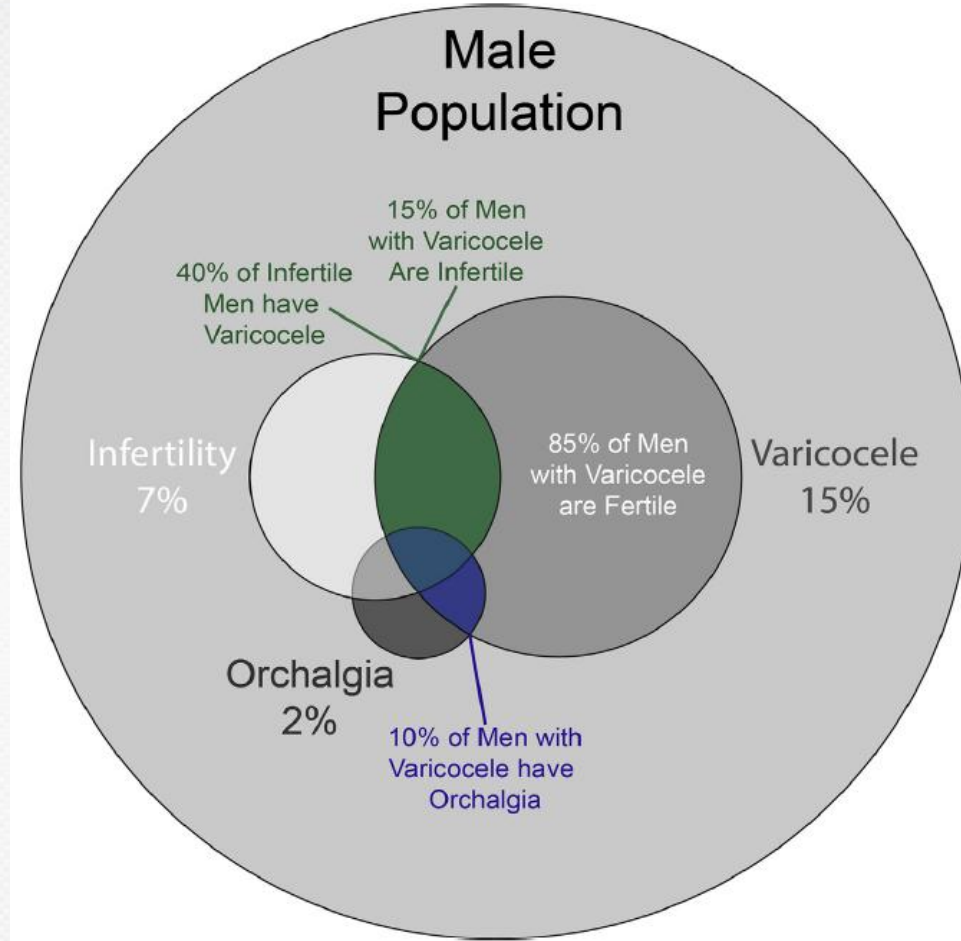
- Επηρεάζει ή όχι τη γονιμότητα;
- Χρειάζεται αντιμετώπιση;
- Πως αντιμετωπίζεται;
- Είναι αιτία ορχεοδυνίας; Αν ναι, αντιμετωπίζεται;
- Προκαλεί ορμονικές μεταβολές;

Ιστορικά στοιχεία

- Αρχαία Ελλάδα: πρώτες αναφορές
- 1^{ος} αιώνας μ.Χ.: πρώτη περιγραφή (Κέλσιος, De Medicina)
- 1550: Paret
- 1843: Curling
- 1850: Delpech
- 1955: Tulloch

Ορισμός - Επιδημιολογία

- Η μη φυσιολογική διάταση και ελίκωση των φλεβών του σπερματικού τόνου
 - 15% των ανδρών
 - 19-41% σε πρωτοπαθή υπογονιμότητα & 80% σε δευτεροπαθή
 - 0,92% σε 2-10 ετών
 - 11% σε 11-18 ετών
- ✓ Εντόπιση: 90% Αρ, 3-10% άμφω
- ✓ Μεμονωμένη Δε σπάνια. Υποψία για οπισθοπεριτοναϊκό όγκο (όγκος νεφρού, λέμφωμα, σάρκωμα)



Agarwal 2007, Goldstein 2012, Akbay 2000, Chung 2018

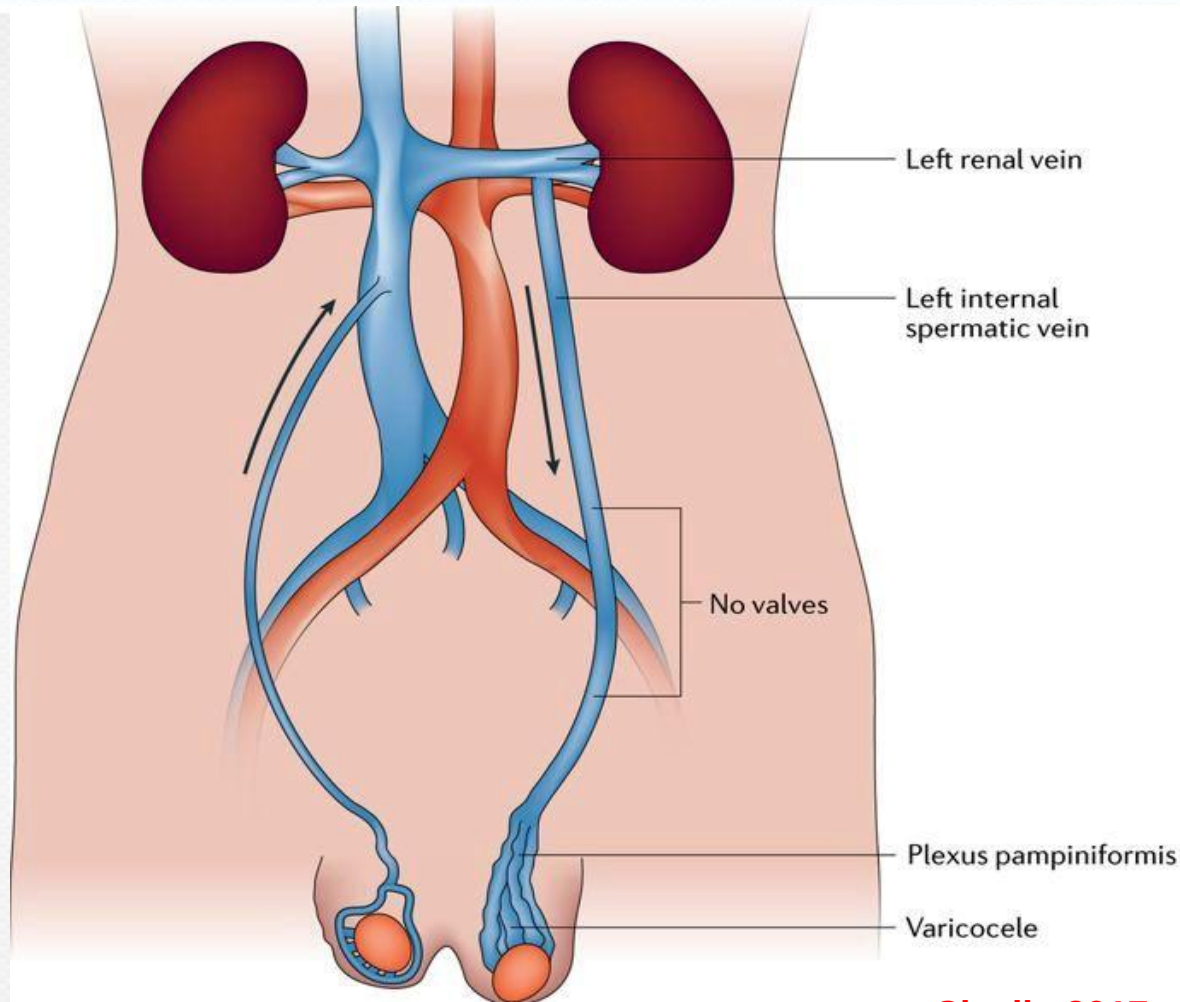
Αιτιολογία

1) Ανατομικές διαφορές:

- η κάθετη εκβολή της αρ σπερματικής φλέβας στην υψηλής πίεσης αρ νεφρική φλέβα δίκην «T» →

- αύξηση υδροστατικής πίεσης

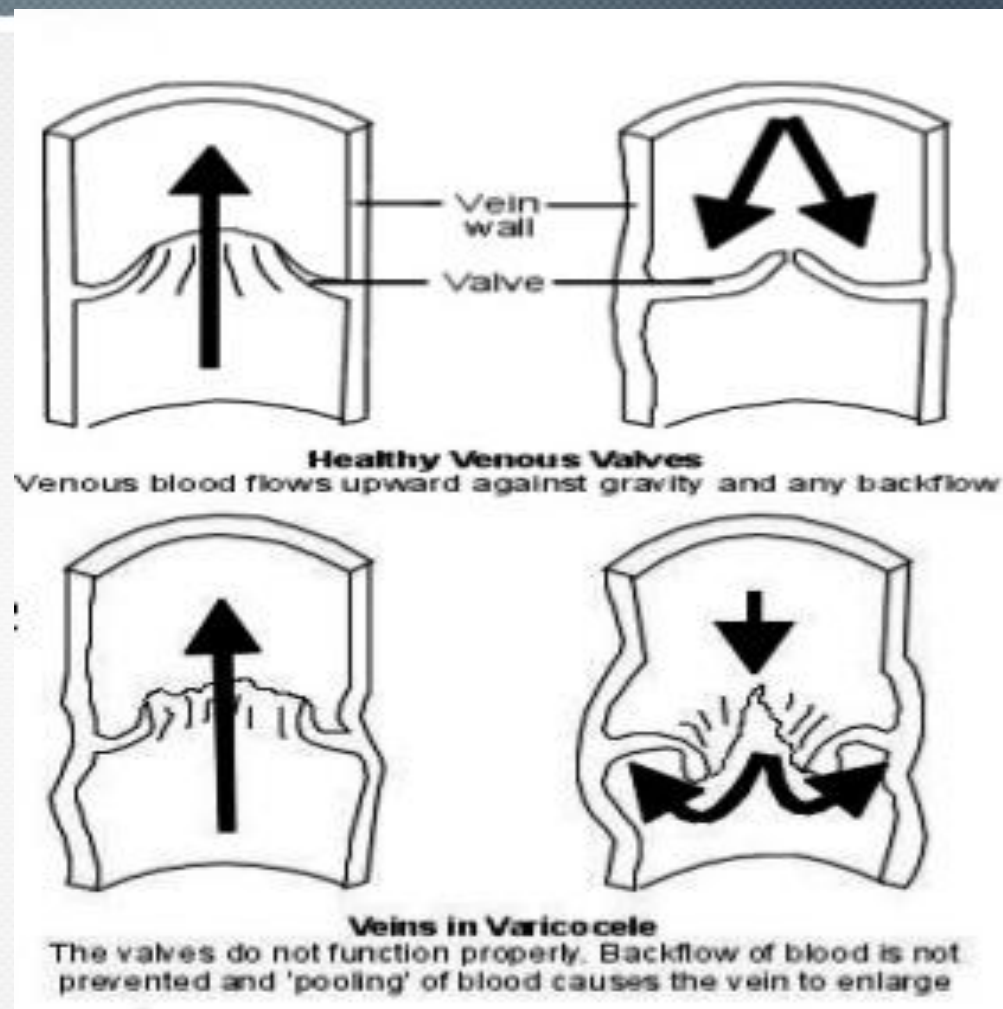
- η δε σπερματική εκβάλλει υπό οξεία γωνία στην κάτω κοίλη



❖ Αρ 8-10εκ μακρύτερη

Αιτιολογία

2) Φλεβική
παλινδρόμηση:
λόγω έλλειψης ή
ανεπάρκειας
βαλβίδων στο
σημείο εκβολής της
αρ σπερματικής
φλέβας

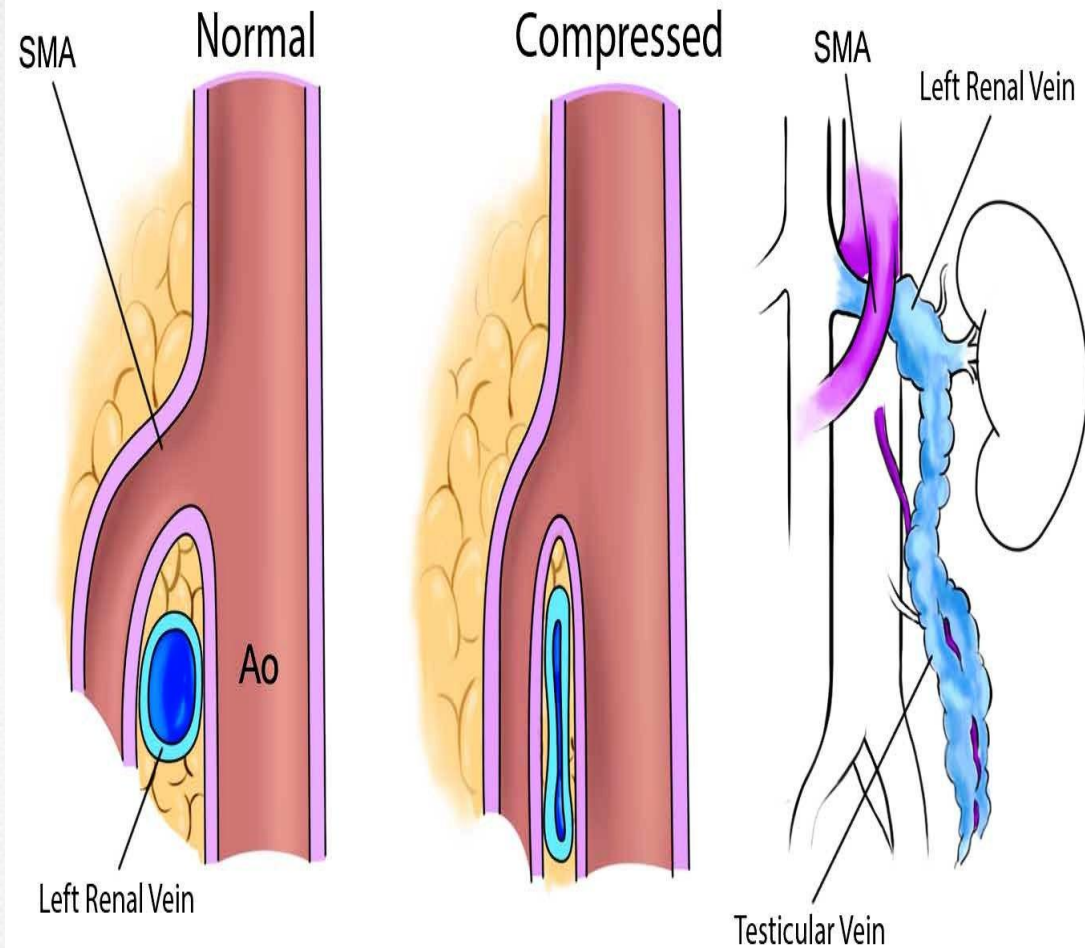


Αιτιολογία

3) Μερική φλεβική απόφραξη: φαινόμενο «καρυοθραύστη», όταν συγκεκριμένη φλέβα συμπιέζεται από αρτηρίες: η αρ νεφρική φλέβα συμπιέζεται μεταξύ άνω μεσεντερίου αρτ. και αορτής (proximal type)

ή

όταν η αρ κοινή λαγόνιος φλέβα συμπιέζεται από την αρ κοινή λαγόνια αρτηρία (distal type)



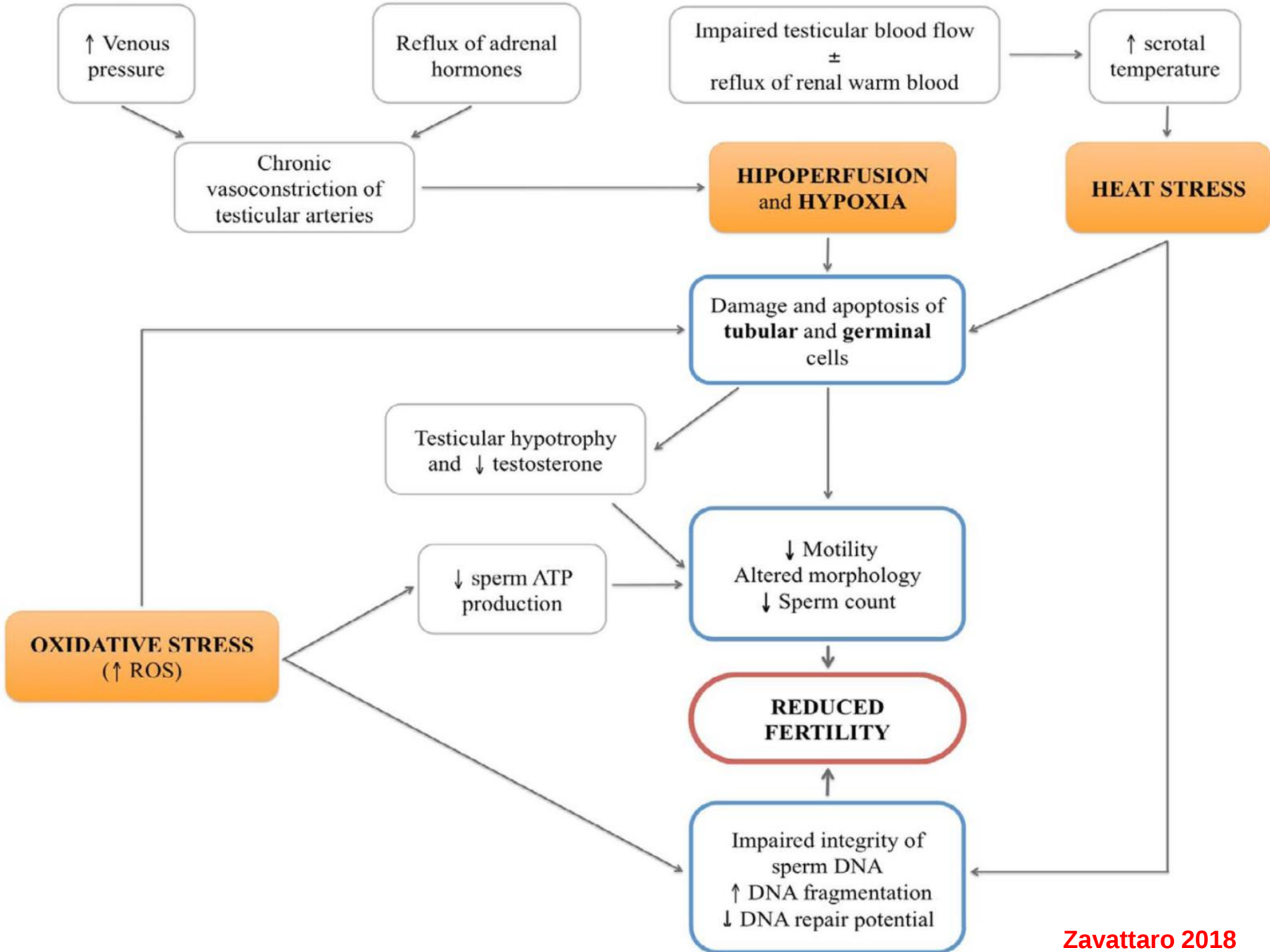
De Schepper A 1972

Παθοφυσιολογία

ΑΓΝΩΣΤΗ!

Πιθανοί παθοφυσιολογικοί μηχανισμοί:

- Αύξηση θερμοκρασίας οσχέου **Goldstein 1989, Hosseinifar 2014**
- Αύξηση υδροστατικής πίεσης στην έσω σπερματική φλέβα λόγω παλινδρόμησης από τη νεφρική φλέβα **Ahlberg 1966, Raman 2005**
- Παλινδρόμηση τοξικών μεταβολιτών από τη νεφρική και επινεφριδική φλέβα **Comhaire 1974**
- Ορχική υποξία **Kilinc 2004, Lee 2006**
- Οξειδωτικό stress **Agarwal 2006, Mostafa 2001, Alamaneni 2004**
- Διαταραχή αιματο-ορχικού φραγμού – δημιουργία αντισπερματικών αντισωμάτων **Koksal 2007, Naughton 2001**



Διάγνωση - Εκτίμηση

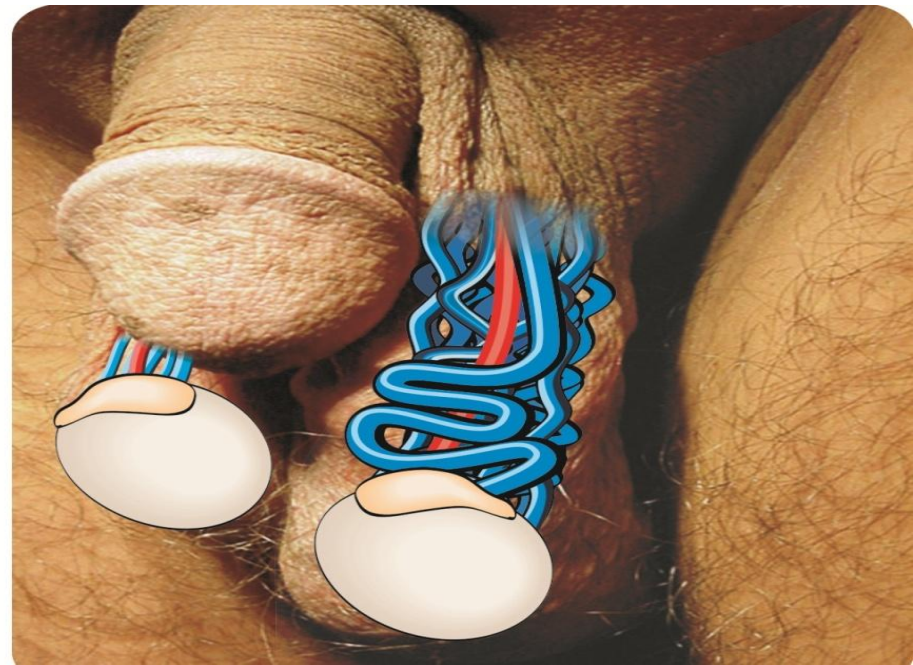
- ☐ Ασυμπτωματική
- ☐ Ενήλικες: διερεύνηση υπογονιμότητας
- ☐ Έφηβοι: τυχαίος έλεγχος
- ☐ 10% ορχεοδυνία, «αίσθημα βάρους», βουβωνικό άλγος
- ☐ Κλινική εξέταση: ευαισθησία 50-70%
- ☐ Θερμό περιβάλλον, ύπτια & όρθια θέση, χωρίς/με δοκιμασία Valsava

Lomboy 2016, Paick 2018, Gat 2004

Κλινική ταξινόμηση

Grade	Examination
Subclinical	Not visible, not palpable
Grade I	Palpable varicocele detected upon Valsalva maneuver, not visible
Grade II	Palpable varicocele detected while standing up, not visible
Grade III	Large visible varicocele while standing up

Source: Adapted from Dubin and Amelar.⁴⁷



Υπέρηχος οσχέου

❑ US οσχέου (ευαισθησία 97% & ειδικότητα 94%):

- επιβεβαίωση κλινικής κίρσοκήλης
- διάγνωση υποκλινικής κίρσοκήλης
- δύσκολη κλινική εξέταση:
 - παλαιά επέμβαση οσχέου, παχυσαρκία,
 - πεπαχυμένο τοίχωμα οσχέου, μικρό όσχεο

Κριτήριο:

η διάταση των φλεβών
μαζί με φλεβική
παλινδρόμηση

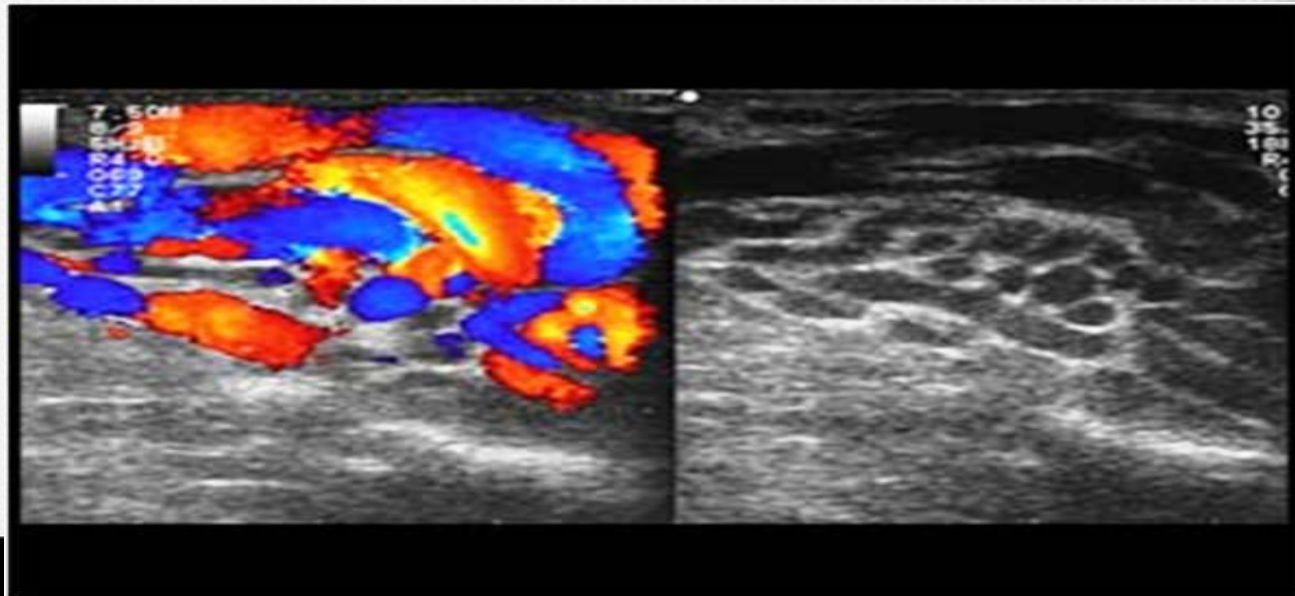
Lomboy 2016

• >2-3mm (όχι ομοφωνία)

Stahl 2011

• 217 ♂ : 2,45mm σε
χάλαση (ευαισθησία 84%,
ειδικότητα 81%) & 2,95mm
σε Valsava (ευαισθησία
84%, ειδικότητα 84%)

Pilatz 2011



Υπερηχογραφική ταξινόμηση

	Grade	Reflux	Varicosities	Testicular Hypotrophy
Ultrasound Sarteschi [38]	1	During Valsalva	None	No
	2	During Valsalva	Small	No
	3	Clearly during Valsalva	Overt	No
	4	Spontaneous reflux, increased with Valsalva or standing	Present in all positions	Common
	5	Spontaneous reflux at rest without increase during Valsalva	Venous dilatation in all positions	Yes

Sarteschi 1993

2 ΒΑΣΙΚΑ ΛΑΘΗ

A) υπερηχογράφημα μόνο σε ύπτια θέση

&

B) φλεβική διάταση χωρίς παλινδρόμηση

Κιρσοκήλη

- Πεδίο συζήτησης τα τελευταία 50 χρόνια
- Αντικρουόμενες μελέτες ———> αποκλίνουσες κατευθυντήριες οδηγίες
- **AUA & ASRM** ► θεραπεία σε κλινική κιρσοκήλη με παθολογικό σπερμοδιάγραμμα
- **National Collaborating Center for Women's Health (2005)** ► όχι επέμβαση σε άνδρες με κιρσοκήλη ως θεραπεία υπογονιμότητας
- **EAU** ► αμφιλεγόμενη επέμβαση
- Μελέτες υποστηρίζουν τη βελτίωση στην ορχική λειτουργία
- Λίγες τυχαιοποιημένες μελέτες για σχέση με γονιμότητα

Πιθανές ενδείξεις αντιμετώπισης της κίρσοκῆλης

- I. Υπογονιμότητα
- II. Παρεμπόδιση ή αναστροφή ορχικής ατροφίας σε εφήβους
- III. Χρόνια ορχεοδυνία
- IV. Υψηλός δείκτης κατάτμησης DNA σπερματοζωαρίου
- V. Βελτίωση ορχικής λειτουργίας σε υπογοναδικούς ασθενείς με κίρσοκῆλη

Jonshon 2017

Κιρσοκήλη & υπογονιμότητα

The influence of varicocele on parameters of fertility in a large group of men presenting to infertility clinics. World Health Organization.

Fertil Steril.1992 Jun;57(6):1289-93

Conclusion: varicocele is clearly associated with impairment of testicular function and infertility

Varicocele Is Associated with Impaired Semen Quality and Reproductive Hormone Levels: A Study of 7035 Healthy Young Men from Six European Countries

*Jakob Damsgaard^a, Ulla N. Joensen^a, Elisabeth Carlsen^b, Juris Erenpreiss^c,
Martin Blomberg Jensen^{a,d}, Valentinas Matulevicius^e, Birute Zilaitiene^e, Inge A. Olesen^a,
Antti Perheentupa^f, Margus Punab^g, Andrea Salzbrunn^h, Jorma Toppariⁱ, Helena E. Virtanen^j,
Anders Juul^a, Niels E. Skakkebaek^a, Niels Jørgensen^{a,*}*

EUROPEAN UROLOGY 70 (2016) 1019 - 1029

	All men (n = 7035) Median (5–95)	No varicocele (n = 5933) Median (5–95)	Grade 1 varicocele (n = 521) Median (5–95)	Grade 2 varicocele (n = 384) Median (5–95)	Grade 3 varicocele (n = 197) Median (5–95)	Varicocele groups <i>p</i> values
Physical appearance						
Age, yr	19.1 (18.1–22.8)	19.0 (18.2–22.7)	19.2 (18.1–22.4)	19.2 (18.0–23.4)	19.3 (18.2–22.7)	0.007 ¶¶
Height, cm	180.8 (170.0–191.9)	180.5 (170.0–191.6)	180.9 (170.0–192.0)	182.0 (172.0–193.0)	182.0 (171.8–193.0)	<0.001 ¶¶
Weight, kg	73.0 (59.4–95.0)	73.0 (59.4–95.0)	74.0 (60.0–95.0)	73.1 (59.0–93.8)	70.9 (58.9–90.4)	0.052 ¶¶
BMI, kg/m ²	22.3 (18.7–28.4)	22.3 (18.7–28.6)	22.5 (18.7–28.1)	22.0 (18.8–27.4)	21.4 (18.2–25.8)	<0.001 ¶¶
Mean testis size, mlϕ	21.0 (13.5–30.0)	21.5 (13.5–30.0)	20.5 (13.5–27.5)	20.0 (13.5–28.0)	18.5 (11.0–27.5)	<0.001 ¶¶
Left testis size, mlϕ	20.0 (12.0–30.0)	20.0 (12.0–30.0)	20.0 (12.0–28.0)	20.0 (12.0–27.9)	18.0 (10.0–25.2)	<0.001 ¶¶
Right testis size, mlϕ	22.0 (15.0–30.0)	22.0 (15.0–30.0)	21.0 (14.0–28.0)	20.0 (14.2–30.0)	20.0 (12.0–28.3)	<0.001 ¶¶
Lifestyle						
Cigarettes daily, all men#	0 (0–20)	0 (0–20)	0 (0–20)	0 (0–20)	0 (0–15)	0.8 ¶¶
Cigarettes daily, smokers only#	10 (0–20)	10 (0–20)	10 (0–21)	10 (1–20)	8 (1–20)	0.1 ¶¶
Alcohol consumption, units§	7 (0–35)	7 (0–35)	6 (0–40)	6 (0–32)	8 (0–38)	0.061 ¶¶
Ejaculation abstinence, h	68 (38–199)	67 (38–191)	72 (36–178)	70 (41–328)	72 (39–240)	0.047 ¶¶
Semen analysis delay, min	35 (15–75)	35 (15–75)	35 (20–75)	31 (15–75)	30 (15–77)	0.4 ¶¶
	% (n)	% (n)	% (n)	% (n)	% (n)	
Prevalence of						
Varicocele, highest grade	15.7 (1102)	0.0 (0)	7.4 (521)	5.5 (384)	2.8 (197)	NA
Bilateral varicocele, highest grade	1.1 (79)	0.0 (0)	0.4 (27)	0.5 (36)	0.2 (16)	<0.001 ¶¶
Unilateral left-sided varicocele	14.5 (1008)	0.0 (0)	6.8 (480)	4.9 (347)	2.6 (181)	<0.001 ¶¶
Unilateral right-sided varicocele	0.2 (15)	0.0 (0)	0.2 (14)	0.0 (1)	0.0 (0)	<0.001 ¶¶
Taken medication past 3 mo	14.7 (1023)	14.5 (852)	16.8 (86)	15.3 (57)	14.4 (28)	0.6 *
Smoker	45.6 (3165)	45.5 (2666)	45.9 (236)	46.8 (175)	45.1 (88)	1 *
Mother smoked in pregnancy	24.4 (1659)	24.8 (1425)	21.1 (107)	21.3 (78)	25.7 (49)	0.2 *
Diagnosed as having						
Epididymitis	0.7 (46)	0.7 (42)	0.2 (1)	0.8 (3)	0.0 (0)	0.4 †
Sexually transmitted disease¶	3.8 (265)	3.9 (230)	2.5 (13)	4.5 (17)	2.6 (5)	0.3 *
Inguinal hernia	4.0 (277)	3.9 (227)	4.1 (21)	5.1 (19)	5.2 (10)	0.5 *
Cryptorchidism	7.0 (491)	7.2 (427)	5.2 (27)	6.5 (25)	6.1 (12)	0.3 *
Been treated for						
Varicocele	0.7 (51)	0.6 (37)	1.4 (7)	1.3 (5)	1.0 (2)	0.06 †
Testicular torsion	0.5 (38)	0.5 (32)	1.0 (5)	0.3 (1)	0.0 (0)	0.4 †

Table 2 – Unadjusted seminal parameters of 7035 young men from the general European population

		p values	
	Median (5–95)	Overall between varicocele groups	Specific group to no varicocele
Semen volume, ml			
All men	3.1 (1.2–6.1)	0.006	
No varicocele	3.1 (1.2–6.0)		
Grade 1 varicocele	3.4 (1.3–6.4)		0.001
Grade 2 varicocele	3.4 (1.3–6.5)		0.2
Grade 3 varicocele	3.1 (1.3–6.0)		0.2
Sperm concentration, million/ml			
All men	50 (4–173)	<0.001	
No varicocele	51 (5–177)		
Grade 1 varicocele	48 (4–164)		0.002
Grade 2 varicocele	40 (2–145)		<0.001
Grade 3 varicocele	28 (1–142)		<0.001
Total sperm count, million			
All men	157 (10–576)		
No varicocele	159 (12–581)		
Grade 1 varicocele	168 (8–544)		0.2
Grade 2 varicocele	136 (5–586)		<0.001
Grade 3 varicocele	85 (1–459)		<0.001
Normal morphology, % [#]			
All men	8.0 (1.0–18.0)		
No varicocele	8.0 (1.0–18.0)		
Grade 1 varicocele	8.0 (1.0–17.7)		0.1
Grade 2 varicocele	7.5 (0.5–18.6)		0.01
Grade 3 varicocele	5.0 (0.0–15.5)		<0.001
Total normal spermatozoa, million [†]			
All men	11 (0–70)	<0.001	
No varicocele	11 (0–71)		
Grade 1 varicocele	13 (0–68)		0.046
Grade 2 varicocele	8 (0–63)		<0.001
Grade 3 varicocele	5 (0–50)		<0.001
Progressively motile (A + B), %			
All men	58 (25–77)	0.001	
No varicocele	59 (26–77)		
Grade 1 varicocele	55 (23–76)		0.5
Grade 2 varicocele	56 (18–78)		<0.001
Grade 3 varicocele	55 (12–75)		<0.001

η αύξηση του βαθμού
κίρσοκήλης συσχετίσθηκε με
αυξανόμενη πτώση στην
ποιότητα σπέρματος

η αύξηση του βαθμού
κισσοκήλης συσχετίσθηκε με
αυξανόμενη πτώση στην
ποιότητα σπέρματος

5–95 = 5–95th percentiles.
[#] Contains data from 6366 men because morphologic evaluation was not performed for all men.
[†] Contains data from 6378 men because morphologic evaluation was not performed for all men.
 The *p* values were obtained from regression analysis taking confounders into consideration.

Table 3 – Unadjusted hormonal parameters of 7035 young men from the general European population

		p values	
	Median (5–95)	Overall between varicocele groups	Specific group to no varicocele
FSH, U/l			
All men	2.7 (1.1–6.7)	<0.001	
No varicocele	2.7 (1.0–6.5)		
Grade 1 varicocele	2.9 (1.2–6.5)		0.08
Grade 2 varicocele	3.1 (1.2–7.3)		<0.001
Grade 3 varicocele	3.6 (1.3–9.4)		<0.001
Inhibin B, pg/ml			
All men	197 (95–352)	<0.001	
No varicocele	199 (97–355)		
Grade 1 varicocele	190 (94–320)		0.1
Grade 2 varicocele	189 (87–321)		<0.001
Grade 3 varicocele	171 (66–331)		<0.001
Inhibin B/FSH ratio			
All men	73 (17–266)	<0.001	
No varicocele	76 (18–276)		
Grade 1 varicocele	65 (16–215)		0.049
Grade 2 varicocele	59 (13–221)		<0.001
Grade 3 varicocele	48 (10–207)		<0.001
LH, U/l			
All men	3.6 (1.7–6.8)	0.001	
No varicocele	3.6 (1.7–6.7)		
Grade 1 varicocele	3.8 (1.9–7.3)		
Grade 2 varicocele	3.9 (1.9–6.9)		
Grade 3 varicocele	3.8 (1.6–7.4)		
Testosterone, nmol/l			
All men	22 (13–37)		
No varicocele	22 (13–37)		
Grade 1 varicocele	22 (13–38)		
Grade 2 varicocele	23 (12–38)		
Grade 3 varicocele	23 (13–36)		
Testosterone/LH ratio			
All men	6.3 (3.0–13.0)	<0.001	
No varicocele	6.4 (3.0–13.1)		
Grade 1 varicocele	5.8 (2.8–13.0)		0.005
Grade 2 varicocele	5.9 (2.8–11.9)		<0.001
Grade 3 varicocele	6.1 (2.5–12.8)		0.058
Free testosterone, pmol/l			
All men	515 (299–857)	0.3	
No varicocele	515 (301–854)		
Grade 1 varicocele	514 (296–868)		0.1
Grade 2 varicocele	520 (277–898)		0.3
Grade 3 varicocele	500 (258–821)		0.3
Free testosterone/LH ratio			
All men	145 (67–301)	<0.001	
No varicocele	148 (69–304)		
Grade 1 varicocele	135 (59–295)		0.001
Grade 2 varicocele	138 (64–279)		0.001
Grade 3 varicocele	132 (55–274)		0.02

η παρουσία κισσοκήλης
συσχετίσθηκε με αύξηση FSH,
ελάττωση ινχιμπίνης Β, αύξηση LH
& καμιά επίδραση στην Τ ή f-T

η παρουσία κερσοκήλης
 συσχετίσθηκε με αύξηση FSH,
 ελάττωση ινχιμπίνης Β, αύξηση LH
 & καμιά επίδραση στην Τ ή f-T

5–95: 5–95th percentiles; FSH = follicle-stimulating hormone; LH = luteinising hormone.
 The p values were obtained from regression analysis taking confounders into consideration.

Does Varicocele Repair Improve Male Infertility? An Evidence-Based Perspective From a Randomized, Controlled Trial

Taha A. Abdel-Meguid^{a,b,*}, Ahmad Al-Sayyad^a, Abdulmalik Tayib^a, Hasan M. Farsi^a

^aDepartment of Urology, King Abdulaziz University Medical City, Jeddah, Saudi Arabia

^bDepartment of Urology, El-Minia University, El-Minia, Egypt

Conclusions: Our RCT provided level 1b evidence of the superiority of varicocelectomy over observation in infertile men with palpable varicoceles and impaired semen quality, with increased odds of spontaneous pregnancy and improvements in semen characteristics within 1-yr of follow-up.

Follow-up of varicocele treated with percutaneous retrograde sclerotherapy: Technical, clinical and seminal aspects

C. Di Bisceglie¹, R. Fornengo¹, M. Grosso², C. Gazzera², A. Mancini², B. Andriani¹, F. Lanfranco¹, L. Brocato¹, G. Gandini² and C. Manieri¹

¹Division of Endocrinology and Metabolic Diseases, Department of Internal Medicine; ²Division of Radiology, Department of Medical-Surgical Disciplines, University of Turin, Turin, Italy

Conclusion: varicocele retrograde sclerotherapy is a well-tolerated technique with a low cost-benefit ratio, able to improve semen parameters.

The comparison of laparoscopic and microsurgical varicocelectomy in infertile men with varicocele on paternity rate 12 months after surgery: a prospective randomized controlled trial

P. Bryniarski, P. Taborowski, P. Rajwa, Z. Kaletka, M. Życzkowski and A. Paradysz

Department of Urology, Medical University of Silesia in Katowice, Zabrze, Poland

Conclusion: analysis of the sperm parameters after surgery revealed significant statistical difference in total motility, progressive motility and morphology in favour of microsurgical approach. Both methods showed improvement in all sperm parameters

Effects of Varicocele Repair on Spontaneous First Trimester Miscarriage

A Randomized Clinical Trial

Mandana Mansour Ghanaie,¹ Seyyed Alaeddin Asgari,¹ Nassrin Dadrass,¹ Aliakbar Allahkhah,¹ Elham Iran-Pour,² Mohammad Reza Safarinejad²

Conclusion: Varicocelectomy improves semen quality, increases pregnancy rate, and decreases miscarriage rate significantly. Further controlled studies to confirm our results seem warranted.

The impact of varicocelectomy on sperm parameters: a meta-analysis

Schauer et al.

Conclusion: this meta-analysis suggests that varicocelectomy leads to significant improvements in sperm count and motility regardless of surgical technique, with the inguinal approach offering the highest pregnancy rate.

Varicocele and Male Factor Infertility Treatment: A New Meta-analysis and Review of the Role of Varicocele Repair

Abdulaziz Baazeem^{a,}, Eric Belzile^b, Antonio Ciampi^b, Gert Dohle^c, Keith Jarvi^d, Andrea Salonia^e, Wolfgang Weidner^f, Armand Zini^g*

Conclusions: although there is no conclusive evidence that a varicocele repair improves spontaneous pregnancy rates, varicocelectomy improves sperm parameters (count and total and progressive motility), reduces sperm DNA damage and seminal oxidative stress, and improves sperm ultramorphology. The various methods of repair are all viable options, but microsurgical repair seems to be associated with better outcomes.

Cochrane Database of Systematic Reviews 2001, Issue 1. Art. No.: CD000479.

Surgery or embolisation for varicocele in subfertile men

Johannes LH Evers, John Collins, Patrick Vandekerckhove

Conclusion: insufficient evidence exists that treatment of varicocele in men from couples with otherwise unexplained subfertility does improve the couple's spontaneous pregnancy chances.

➤ **Ίδιο συμπέρασμα στα updates 2004, 2008, 2009!**

Treatment of Varicocele in Subfertile Men: The Cochrane Review – A Contrary Opinion

Vincenzo Ficarra*, Maria Angela Cerruto, Giovanni Liguori, Guglielmo Mazzoni, Sergio Minucci, Angelo Tracia, Vincenzo Gentile

Italian Varicocele Study Group of the Italian Society of Andrology (SIA), Italy

SOS: a significant increase in pregnancy rate in patients who underwent varicocele treatment (36.4%) compared with the control group (20%) ($p = 0.009$)

Conclusions: The RCTs included in the last Cochrane review concerning the efficacy of varicocele treatment in subfertile couples were heterogeneous and methodologically poor. The pooling of these studies cannot result in a good quality meta-analysis. **The Cochrane meta-analysis conclusions should not support guidelines recommendation against varicocele treatment in subfertile patients.** Data from ongoing studies should provide more information in this topic.

Surgery or embolisation for varicocele in subfertile men

Kroese ACJ, de Lange NM, Collins J, Evers JLH

Conclusion: there is evidence suggesting that treatment of a varicocele in men from couples with otherwise unexplained subfertility **may improve a couple's chance of pregnancy**. However, findings are inconclusive as the quality of the available evidence is very low and more research is needed with live birth or pregnancy rate as the primary outcome

Table 1: Randomized controlled trials of varicocelectomy and its effect on natural pregnancy rates

<i>First author and reference</i>	<i>Year</i>	<i>Population</i>	<i>Interventions and follow-up</i>	<i>Treated (%)</i>	<i>Controls (%)</i>	<i>P</i>
Madgar ³⁵	1995	45 infertile men with abnormal semen parameters and clinical varicocele (any grade); female partners with no demonstrable infertility factor	High ligation of the internal spermatic vein and observation; 3 years	PR [†] : 60.0	PR [†] : 10.0	0.001
Yamamoto ³²	1996	85 infertile men with subclinical left varicocele	High ligation of the internal spermatic vein and observation; 2–5 years	PR [†] : 6.7	PR [†] : 10.0	0.96
Nieschlag ³⁶	1998	125 infertile men with at least one abnormal semen parameter* and left clinical varicocele (any grade)	Embolization or surgical repair and counseling; 12 months	PR [†] : 29.0	PR [†] : 25.4	NS
Unal ³³	2001	42 men with subclinical varicocele; all couples with primary infertility	Surgical vein ligation and clomiphene citrate; 15 months	PR [†] : 12.5	PR [†] : 6.7	0.589
Krause ³⁷	2002	67 infertile men with at least one abnormal semen parameter* and clinical varicocele (any grade)	Antegrade or retrograde sclerotherapy and observation; 12 months	CPR*: 30	CPR*: 16.2	0.189
Abdel-Meguid ¹⁰	2011	145 men with at least one abnormal semen parameter** and clinical varicocele (any grade); all couples with primary infertility	Subinguinal microsurgical varicocelectomy and observation; 12 months	PR [†] : 32.9	PR [†] : 13.9	0.010
Mansour Ghanaie ⁹	2012	136 men with normal semen parameters** and clinical varicocele (any grade); all couples with secondary infertility (recurrent pregnancy loss)	Loupe-assisted inguinal varicocelectomy and observation; 12 months	CPR: 44.1 Miscarriage: 13.3 LBR: 38.2	CPR: 19.0 Miscarriage: 69.2 LBR: 5.9	0.003 0.002 0.003

*According to the WHO 1992 criteria; **According to the WHO 1999 criteria; CPR: clinical pregnancy rate; LBR: live birth rate; NR: not reported; [†]Delivery and miscarriage rates not reported; *Based on as-treated groups; NS: not significant; WHO: World Health Organization

Table 2: Meta-analyses of varicocelectomy and its effect on natural pregnancy rates

Author, year and reference	Population	Included studies	Interventions	Natural pregnancy after varicocelectomy	Remarks
Evers <i>et al.</i> 2008 ³⁹	607 couples and male partners with varicocele	8 RCT reporting PRs as an outcome measure	Surgical ligation or radiological embolization of the internal spermatic vein and untreated groups	Observed OR of the eight studies was 1.10 (95% CI: 0.73–1.68), indicating no benefit of varicocele treatment over expectant management in subfertile couples in whom varicocele is the only abnormal finding	Two trials involving clinical varicocele included some men with normal semen analysis. Three studies specifically addressed only men with subclinical varicoceles
Ficarra <i>et al.</i> 2006 ⁴⁰	Infertile men with abnormal results on semen analyses and a palpable varicocele. Group 1: 120 infertile men with varicocele subjected to surgical repair Group 2: 117 men with untreated varicocele	3 RCT reporting PRs as an outcome measure	Surgical ligation or radiological embolization of the internal spermatic vein and untreated groups	Significant increase in PR in patients who underwent varicocele treatment (36.4%) compared with the control group (20%) ($P=0.009$)	This study is a revaluation of the Cochrane meta-analysis (Evers <i>et al.</i> 2008) excluding men with normal semen analysis and subclinical varicocele
Marmar <i>et al.</i> 2007 ⁴¹	Infertile men with abnormal results on semen analyses and a palpable varicocele. Group 1: 396 men subjected to varicocele repair Group 2: 174 infertile men with untreated varicocele	2 RCTs and 3 observational studies	Surgical varicocelectomy compared with no or medical treatment for palpable varicocele and at least one abnormal semen parameter	Significant increase in PR in patients who underwent varicocele treatment (33.3%) compared with the control group (15%); OR of natural pregnancy after surgical varicocelectomy, compared with no or medical treatment were 2.87 (95% CI: 1.33–6.20) with use of REM and 2.63 (95% CI: 1.60–4.33) with use of FEM	The number needed to treat was 5.7 (95% CI: 4.4–9.5)
Baazeem <i>et al.</i> 2011 ¹²	380 infertile men with oligozoospermia and a palpable varicocele	4 RCTs reporting on pregnancy outcome after repair of clinical varicoceles in oligozoospermic men	Surgical ligation and untreated groups	Using the random-effects model, the combined OR was 2.23 (95% CI: 0.86–5.78; $P=0.091$), indicating that varicocelectomy is moderately superior to observation, but the effect is not statistically significant	22, 17, and 5 prospective studies reporting on sperm concentration, total motility, and progressive motility, respectively, before and after repair of clinical varicocele were evaluated. The REM indicated improvement in sperm concentration by $12.32 \times 10^6 \text{ ml}^{-1}$ (95% CI: 9.45–15.19; $P<0.0001$), and by 10.86% (95% CI: 7.07–14.65; $P<0.0001$) and 9.69% (95% CI: 4.86–14.52; $P=0.003$) total and progressive motility, respectively
Kroese <i>et al.</i> 2012 ⁴²	894 couples and male partners with varicocele	10 RCTs reporting natural PRs as an outcome measure	Surgical ligation or radiological embolization of the internal spermatic vein and untreated groups	The combined fixed-effect OR was 1.47 (95% CI: 1.05–2.05, very low quality evidence), favoring the intervention. The number needed to treat for an additional beneficial outcome was 17, suggesting benefit of varicocele treatment over expectant management for PR in subfertile couples in whom varicocele in the man was the only abnormal finding	Subgroup analysis after exclusion of the studies including men with normal semen analysis and subclinical varicocele (five studies) revealed favorable effect of treatment (combined OR: 2.39; 95% CI: 1.56–3.66; high statistical heterogeneity $I^2=67\%$). The number needed to treat for an additional beneficial outcome was 7
Kim <i>et al.</i> 2013 ⁴³	610 infertile men with varicocele from couples with otherwise unexplained subfertility	7 RCTs reporting natural PRs as an outcome measure	Surgical ligation and no treatment	The random-effects model showed an OR of 1.90 (95% CI: 0.77–4.66; $P=0.1621$). However, for subanalysis of three studies that included patients with clinical varicocele and abnormal semen parameters, the fixed-effects pooled OR was significant (OR: 4.15; 95% CI: 2.31–7.45; $P<0.001$), favoring varicocelectomy	There were differences in enrollment criteria among the studies. Four studies included patients with clinical varicocele, but three studies enrolled patients with subclinical varicocele. Meanwhile, four trials enrolled patients with impaired semen quality only, but the other three trials did not

OR: odds ratio; REM: random-effect model; FEM: fixed-effect model; PR: pregnancy rate; CI: confidence interval; RCTs: randomized controlled trials

EAU Guidelines 2019

Recommendations	Strength rating
Treat varicoceles in adolescents with ipsilateral reduction in testicular volume and evidence of progressive testicular dysfunction.	Weak
Do not treat varicoceles in infertile men who have normal semen analysis and in men with a subclinical varicocele.	Strong
Treat men with a clinical varicocele, oligozoospermia and otherwise unexplained infertility in the couple.	Weak

AUA & ASRM Guidelines

Treatment of varicoceles should be considered when:

1. the varicocele is palpable on physical examination
2. the couple is attempting to conceive and has known infertility
3. the female partner has normal fertility or a potentially treatable cause of infertility, and time to conception is not a concern
4. the male partner has abnormal semen parameters

•*American Urological Association Education and Research, Inc. The optimal evaluation of the infertile male: AUA best practice statement. Linthicum, MD: American Urological Association Education and Research, Inc.; 2010.*

•*American Society for Reproductive Medicine. Report on varicocele and infertility: a committee opinion. Fertil Steril 2014; 102: 1556-60.*

GUIDELINES

Guidelines should be used as a resource rather than law!

AUA: "This best practice statement is intended to provide medical practitioners with a consensus of principles and strategies for the care of couples with male infertility problems. The document is based on current professional literature, clinical experience and expert opinion. **It does not establish a fixed set of rules or define the legal standard of care and it does not preempt physician judgment in individual cases. Physician judgment must take into account variations in resources and in patient needs and preferences.** Conformance with this best practice statement cannot ensure a successful result."

Κιρσοκήλη & έφηβοι

- «Δύσκολη» η διαχείριση
- Στους ενήλικες στόχος η βελτίωση της παρούσης γονιμότητας. Στους εφήβους η παρεμπόδιση ορχικής βλάβης και η διατήρηση καλής ορχικής λειτουργίας για μελλοντική γονιμότητα!
- Σχετικές ενδείξεις αντιμετώπισης: ορχεοδυνία, ελάττωση μεγέθους όρχεως, παθολογικό σπερμοδιάγραμμα
- Κίνδυνος υπερθεραπείας
- Δυσκολία εκτίμησης αποτελεσμάτων σπερμοδιαγράμματος:
 - τιμές ενηλίκων
 - χρόνος από επέμβαση μέχρι προσπάθεια τεκνοποίησης

Youth varicocele and varicocele treatment: a meta-analysis of semen outcomes

Nork et al 2014

Conclusion:

The presence of varicocele in youth appears to negatively affect sperm density, motility, and morphology. Treatment appears to result in moderate improvement of sperm density and mild improvement in sperm motility.

Repair versus observation in adolescent varicocele: a prospective study.

Paduch et Niedzielski 1997

Conclusion:

Varicocele repair in adolescents with moderate and severe varicocele reversed testicular growth arrest and resulted in catch-up growth within 12 month of surgery.

Treatment of Varicocele in Children and Adolescents: A Systematic Review and Meta-analysis from the European Association of Urology/European Society for Paediatric Urology Guidelines Panel

Mesrur Selcuk Silay^{a,}, Lisette Hoen^b, Josine Quadackaers^c, Shabnam Undre^d, Guy Bogaert^e, Hasan Serkan Dogan^f, Radim Kocvara^g, Rien J.M. Nijman^c, Christian Radmayr^h, Serdar Tekgul^f, Raimund Steinⁱ*

Conclusions: the benefits of varicocele correction in children and adolescents when compared with observation are increases in testicular volume and sperm concentration. Long-term outcomes including paternity and fertility still remain unknown

Recommendations	Strength rating
Treat varicoceles in adolescents with ipsilateral reduction in testicular volume and evidence of progressive testicular dysfunction.	Weak

Κιρσοκήλη & αζωοσπερμία

- **Στόχος:**

η παρουσία έστω και μικρού αριθμού σπερματοζωαρίων στο εκσπερματιστικό υγρό, ώστε να μην απαιτούνται τεχνικές ανάκτησης σπερματοζωαρίων ή να βελτιωθεί το ποσοστό επιτυχίας της ανάκτησης

Outcome of varicocele repair in men with nonobstructive azoospermia: systematic review and meta-analysis

Sandro C Esteves¹, Ricardo Miyaoka¹, Matheus Roque², Ashok Agarwal³

<i>First author, year, and reference number</i>	<i>Mean age (years)</i>	<i>Mean follow-up (months)</i>	<i>Presence of sperm in postoperative ejaculate, n (%)</i>	<i>Mean postoperative sperm count ($\times 10^6$ mL⁻¹)</i>	<i>Mean Interval between varicocele repair and sperm in ejaculate (months)</i>	<i>Mean postoperative sperm motility (%)</i>	<i>Natural pregnancy (n)</i>	<i>Pregnancy rates by ART (n)</i>
Matthews, 1998 ¹⁴	NR	10.3	12/22 (55.0)	2.20	NR	NR	2/12	1/10
Kim, 1999 ¹⁵	35	15	14/28 (50.0)	1.18	8	44.0	0/14	2/14
Kadioglu, 2001 ¹⁶	30.1	13.4	5/24 (20.8)	0.04*	NR	NR	0/5	NR
Çakan, 2004	29	9	3/13 (23.1)	0.73	4.5	26.0	0/3	0/1
Esteves, 2005 ⁶	32	18.9	6/17 (35.3)	0.8*	5	NR	1/6	NR
Gat, 2005 ¹⁸	34.1	12	18/32 (52.6)	3.81	NR	1.2	4/18	5/14
Pasqualotto, 2006 ¹⁹	NR	12	9/27 (33.3)	4.06	NR	37.6	1/9	NR
Poulakis, 2006 ²⁰	33.8	24.8	7/14 (50.0)	3.10	NR	2.2	2/7	1/5
Ishikawa, 2008 ²¹	33.3	>6	2/6 (33.3)	0.07	NR	NR	NR	NR
Cocuzza, 2009 ²³	29.4	9	3/10 (30.0)	5.50	NR	36.6	NR	NR
Lee, 2007 ²²	32	7.4	7/19 (36.8)	0.24	NR	30.2	1/7	NR
Abdel-Meguid, 2012 ²⁴	34.9	19.3	10/31 (32.3)	2.30	NR	15.3	NR	NR
Kıraç, 2013 ²⁵	31.7	11.4	7/23 (30.4)	1.34	NR	37.5	1/7	2/6
Zampieri, 2013 ²⁶	33	6	17/35 (48.6)	0.6	6	11.0	NR	0/4
Aboutaleb, 2014 ²⁷	29.9	17.3	6/20 (30.0)	2.00	NR	NR	NR	NR
D'Andrea, 2015 ²⁸	37	6	11/23 (47.8)	1.30	6	10.0	NR	NR

*Mean total motile sperm count. ART: assisted reproductive technology; NR: not reported; SD: standard deviation; CI: confidence interval; NOA: nonobstructive azoospermia

Conclusions:

SSR is increased by 2.6-fold in treated patients compared to untreated patients. Moreover, approximately 44% of the treated men will have enough viable sperm in postoperative ejaculate to avoid testicular sperm retrieval.

- ❖ Infertile men with NOA and clinical varicocele may benefit from varicocelectomy

Κιρσοκήλη & υπογοναδισμός

- Ίσως η λιγότερο μελετημένη πιθανή ένδειξη αντιμετώπισης της κιρσοκήλης
- ↑ Επίπεδα T σε άνδρες με χαμηλή προεγχειρητικά T
- Μέση αύξηση 105,65ng/dL
- Όχι αντιμετώπιση σε μικρού βαθμού κιρσοκήλη
- Δεν επηρεάζεται η τιμή της T σε ευγοναδικούς ασθενείς που υποβάλλονται σε αντιμετώπιση κιρσοκήλης

Elzanaty 2017, Chen 2017, Smit 2013

Κιρσοκήλη & βλάβη DNA

- Η κιρσοκήλη προκαλεί αύξηση στη βλάβη του DNA του σπερματοζωαρίου
- Αύξηση της τιμής της κατάτμησης του DNA συσχετίσθηκε αρνητικά με αυτόματη σύλληψη και με το αποτέλεσμα μεθόδων υποβοηθούμενης αναπαραγωγής
- Η κατάτμηση DNA ή παραλλαγές χρωματίνης ανιχνεύονται ακόμα και σε φυσιολογικές τιμές σπέρμοδιαγράμματος
- AUA & ASRM: **ΌΧΙ** στην εξέταση ρουτίνας του DNA
- Η αντιμετώπιση της κιρσοκήλης προκαλεί ελάττωση του οξειδωτικού stress στο σπερματικό υγρό με αποτέλεσμα ελάττωση στη βλάβη του DNA. Ωστόσο, η κλινική αξία είναι αμφίβολη και νέες μελέτες χρειάζονται για να αποδείξουν συσχέτιση με αύξηση του ποσοστού γεννήσεων

Smith 2006, Majzoub 2016, Bungum 2007, Giwercman 2010, Jonhson 2017

Are varicoceles associated with increased deoxyribonucleic acid fragmentation?

Armand Zini, M.D.,^a and Gert Dohle, M.D., Ph.D.^b

Conclusion(s): Varicocele is associated with sperm DNA damage, and this sperm pathology may be secondary to varicocele-mediated oxidative stress. The beneficial effect of varicocelectomy on sperm DNA damage further supports the premise that varicocele may impair sperm DNA integrity. (Fertil Steril® 2011;96:1283–7. ©2011 by American Society for Reproductive Medicine.)

TABLE 1

Selected characteristics of studies on the relationship between varicocele (VAR) and sperm DNA damage (DD) in men without a history of infertility.

Study (reference)	Assay(s)	n	Study groups	Results
Positive studies				
Chen et al., 2002 (68)	8-OHdG	22	Clin VAR (fertile)	Higher sperm DD in clin VAR group
		24	Subclin VAR (fertile)	Similar sperm parameters in 2 groups
Chen et al., 2004 (23)	TUNEL	30	Clin VAR (UFS)	Higher sperm DD in VAR group
		15	Fertile controls	Similar sperm parameters in 2 groups
Bertolla et al., 2006 (67)	COMET	20	Adolescents clin VAR	Higher sperm DD in VAR group
		20	Adolescents no VAR	Similar sperm parameters in 2 groups
Smith et al., 2006 (24)	SCSA	20	Clin VAR + pain (UFS)	Higher sperm DD in VAR group
	TUNEL	20	Donors (UFS)	Similar sperm parameters in 2 groups
Wu et al., 2009 (69)	COMET	15	Clin VAR (UFS)	Higher sperm DD in VAR group
		5	Fertile controls	Similar sperm parameters in 2 groups
Blumer et al., 2008 (58)	COMET	30	Clin VAR (UFS)	Higher sperm DD in VAR group
		32	No VAR (UFS)	Similar sperm parameters in 2 groups
Negative studies				
El-Segini et al., 2002 (70)	A-Blue	18	Clin VAR (fertile)	Similar sperm DD in 2 groups
		8	No VAR (fertile)	Similar sperm parameters in 2 groups

Note: 8-OHdG = 8-hydroxy-2-deoxyguanosine; Clin = clinical; Subclin = subclinical; TUNEL = terminal deoxynucleotidyl transferase-mediated deoxyuridine triphosphate nick-end labeling; UFS = unknown fertility status; COMET = single-cell gel electrophoresis assay; SCSA = sperm chromatin structure assay; A-Blue = aniline blue.

TABLE 2

Selected characteristics of studies on the effect of varicocele repair on sperm DNA damage (DD) and chromatin damage.

Study (reference)	Assay(s)	n	Study groups	Results
Retrospective studies				
Zini et al., 2005 (74)	SCSA	37	Infertile men	Reduced sperm DD after varicocelectomy
Werthman et al., 2003 (72)	SCSA	11	High sperm DD	Reduced sperm DD after varicocelectomy
Sakamoto et al., 2008 (33)	TUNEL	11	Infertile men	Reduced sperm DD after varicocelectomy
Prospective studies				
Nasr-Esfahani et al., 2009 (77)	CMA3	162	Infertile men	Reduced sperm DD after varicocelectomy
Chen et al., 2008 (36)	8-OHdG	30	Infertile men	Reduced sperm DD after varicocelectomy
Dada et al., 2010 (71)	COMET	11	Infertile men	Reduced sperm DD after varicocelectomy
Smit et al., 2010 (8)	SCSA	49	Infertile men	Reduced sperm DD after varicocelectomy
Azedi et al., 2011 (76)	CMA3, SCD	52	Infertile men	Reduced sperm DD after varicocelectomy
Sadek et al., 2011 (75)	A-Blue	72	Infertile men	Reduced sperm DD after varicocelectomy
Lacerda et al., 2011 (79)	COMET	21	Adolescents	Reduced sperm DD after varicocelectomy
Zini et al., 2011 (73)	SCSA	25	Infertile men	Reduced sperm DD after varicocelectomy
La Vignera et al., in press (78)	CC, TUNEL	30	Infertile men	Reduced sperm DD after varicocelectomy

Note: CMA3 = chromomycin A3; CC = chromatin compaction. Other abbreviations as in Table 1.

Zini. Varicocele and sperm DNA fragmentation. *Fertil Steril* 2011.

Κιρσοκήλη & ορχεοδυνία

- 10% με κιρσοκήλη έχουν ορχεοδυνία
- Αίσθημα βάρους που επιτείνεται με την ορθοστασία ή τη βαριά σωματική εργασία
- Οξύ ή χρόνιο άλγος, ετερόπλευρο ή αμφοτερόπλευρο
- Πιθανοί παθογενετικοί μηχανισμοί: διάταση φλεβώδους πλέγματος που προκαλεί συμπίεση νευρικών ινών, ιστική ισχαιμία λόγω φλεβικής στάσης, αύξηση θερμοκρασίας οσχέου, οξειδωτικό stress στο ορχικό παρέγχυμα

	Group A—15–29 days			Group B—30–59 days			Group C—above 60 days			Total
Patients (n)	198	p value		696	p value		2190	p value		3084
Varicocele	28.8%	Gr. B	0.007	41.1%	Gr. A	0.007	60.6%	Gr. A	0.000	54.1%
		Gr. C	0.000		Gr. C	0.000		Gr. B	0.000	
Idiopathic scrotal pain	57.1%	Gr. B	0.012	45.0%	Gr. A	0.012	29.0%	Gr. A	0.000	34.4%
		Gr. C	0.000		Gr. C	0.000		Gr. B	0.000	
Hernia	2.5%	Gr. B	0.322	4.6%	Gr. A	0.655	4.6%	Gr. A	0.573	4.5%
		Gr. C	0.573		Gr. C	1.000		Gr. B	1.000	
Genital infections	5.6%	Gr. B	1.000	5.8%	Gr. A	1.000	3.7%	Gr. A	0.789	4.3%
		Gr. C	0.789		Gr. C	0.207		Gr. B	0.207	
Hydrocele	5.6%	Gr. B	0.303	2.7%	Gr. A	0.303	4.6%	Gr. A	0.957	4.2%
		Gr. C	0.957		Gr. C	0.122		Gr. B	0.122	
Referred pain	3.5%	Gr. B	0.971	2.7%	Gr. A	0.971	3.4%	Gr. A	1.000	3.3%
		Gr. C	1.000		Gr. C	0.856		Gr. B	0.856	
Skin lesion	1.0%	Gr. B	1.000	1.0%	Gr. A	1.000	1.1%	Gr. A	0.999	1.1%
		Gr. C	0.999		Gr. C	0.991		Gr. B	0.991	
Torsion–detorsion	0.0%	Gr. B	0.992	0.1%	Gr. A	0.992	0.7%	Gr. A	0.972	0.5%
		Gr. C	0.972		Gr. C	0.999		Gr. B	0.999	
Trauma	0.5%	Gr. B	0.997	0.1%	Gr. A	0.997	0.2%	Gr. A	0.998	0.2%
		Gr. C	0.998		Gr. C	1.000		Gr. B	1.000	
Nephrolithiasis	0.5%	Gr. B	0.634	0.0%	Gr. A	0.634	0.1%	Gr. A	0.730	0.1%
		Gr. C	0.730		Gr. C	0.990		Gr. B	0.990	

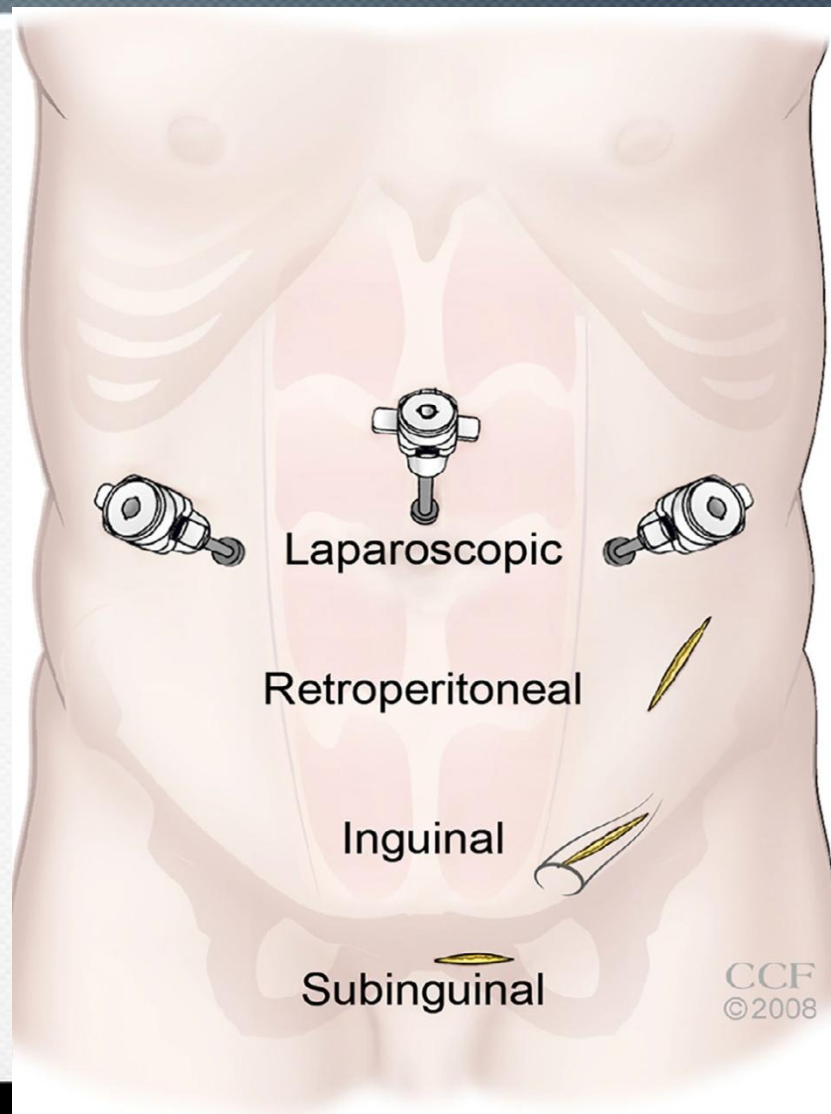
ASRM & SMRU guidelines

Εμμένουσα ορχεοδυνία που σχετίζεται με κίρσοκήλη και δεν υποχωρεί με συντηρητικά μέτρα, αντιμετωπίζεται χειρουργικά, ανεξάρτητα από την κατάσταση γονιμότητας

Study	Patients (n)	Approach	Magnification	Complete resolution of pain [n]	Improvement in pain [n]	Persistent pain [n]
Peterson, 1998 (7)	35	Inguinal, subinguinal, retroperitoneal, laparoscopic	None	86% [30]	89% [31]	11% [4]
Yaman, 2000 (11)	82	Subinguinal	Microscope	88% [72]	94% [77]	6% [5]
Maghraby, 2002 (35)	58	Laparoscopic	N/A	84% [49]	94% [55]	6% [3]
Tung, 2004 (36)	31	Subinguinal	None	90% [28]	100% [31]	0% [0]
Chawla, 2005 (37)	11	Subinguinal	Microscope	54% [6]	91% [10]	9% [1]
Karademir, 2005 (16)	121	Inguinal, subinguinal	None	61% [74]	84% [101]	16% [19]
Altunoluk, 2010 (28)	237	Subinguinal	Microscope	86% [203]	92% [218]	8% [19]
Parekattil, 2011 (38)	45	Robotic	Robotic	94% [42]	–	–
Abd Ellatif, 2012 (15)	130	Inguinal, subinguinal	None	84% [109]	89% [116]	11% [14]
Kim, 2012 (17)	81	Subinguinal	Microscope	72% [58]	91% [74]	9% [7]
Kachrilas, 2014 (39)	48	Laparoscopic	N/A	88% [42]	98% [47]	2% [48]

Χειρουργική αντιμετώπιση

- ❖ Ανοικτή χειρουργική:
 - βουβωνική (Ivanissevitch)
 - υποβουβωνική (Goldstein)
 - οπισθοπεριτοναϊκή (Palomo)
- ❖ Λαπαροσκοπική χειρουργική
- ❖ Μικροχειρουργική τεχνική
- ❖ Ενδαγγειακές τεχνικές



		Study	Number of Patients	Spontaneous Pregnancy Rate	Failure or Recurrence Rate	Hydrocele Rate	Sperm concentration improvement (10 ⁶ /mL)	
Surgical	Open	Retroperitoneal	Madgar 1995 [70]	20	44%	-	-	20
		Shlansky-Goldberg 1997 [71]	148	34%	17.0%	-	13	
		Cayan 2000 [72]	232	34%	16.0%	9.0%	4	
		Bebars 2000 [73]	65	-	11.0%	4.6%	-	
		Ghanem 2004 [74]	109	-	7.0%	6.4%	-	
		Watanabe 2005 [75]	50	36%	12.0%	10.0%	13	
		Average		37%	12.6%	7.5%	12.5	
	Inguinal	Zucchi 2005 [76]	32	-	6.0%	0.0%	7	
		Zucchi 2006 [77]	22	-	7.0%	-	10	
		Al-Kandari 2007 [78]	40	28%	13.0%	13.0%	18	
		Al-Said 2008 [79]	92	31%	11.0%	2.8%	11	
		Fayez 2010 [80]	55	20%	11.0%	5.5%	-	
		Average		26%	9.6%	5.3%	11.5	
	Microsurgical Subinguinal	Cayan 1999 [81]	78	-	-	-	2	
		Jungwirth 2001 [82]	272	48%	1.4%	0.3%	13	
		Kamal 2001 [83]	159	48%	-	-	6	
		Testini 2001 [84]	150	46%	3.3%	1.4%	-	
		Perimenis 2001 [85]	146	47%	-	-	-	
		Cayan 2002 [86]	540	37%	-	-	8	
		Kumar 2003 [87]	100	34%	0.7%	2.4%	36	
		Ghanem 2004 [74]	304	-	0.0%	1.6%	-	
		Watanabe 2005 [75]	61	51%	0.0%	0.0%	36	
		Orhan 2005 [88]	65	33%	3.0%	0.0%	3	
		Cayan 2005 [89]	49	-	0.0%	0.0%	18	
		Libman 2006 [90]	369	42%	-	-	6	
		Al-Kandari 2007 [78]	40	30%	3.0%	0.0%	22	
		Boman 2008 [91]	118	65%	-	-	-11	
		Al-Said 2008 [79]	112	38%	2.6%	0.0%	23	
		Abdel-Maguid 2010 [92]	82	38%	0.0%	1.0%	8	
		Abdel-Meguid 2011 [59]	73	33%	0.0%	0.0%	14	
		Baker 2013 [93]	63	25%	-	-	4	
		Nasr 2017 [94]	48	38%	0.0%	0.0%	5	
		Average		41%	1.2%	0.6%	12.1	
	Laparoscopic	Transabdominal	Tan 1995 [95]	107	13%	0.0%	-	14
			Milad 1996 [96]	32	16%	-	9.0%	-
			Bebars 2000 [73]	128	-	4.0%	2.3%	-
Watanabe 2005 [75]			33	40%	6.0%	2.0%	30	
Zampieri 2007 [97]			122	-	4.9%	7.0%	-	
Al-Kandari 2007 [78]			40	30%	23.0%	20.0%	20	
Al-Said 2008 [79]			94	33%	17.0%	5.4%	15	
Zampieri 2009 [98]			97	-	4.0%	1.0%	-	
Average				26%	8.4%	6.7%	19.8	
Endovascular	Embolization	Ferguson 1995 [99]	87	33%	9.0%	-	11	
		Shlansky-Goldberg 1997 [71]	173	39%	16.0%	-	-	
		Nabi 2004 [100]	71	40%	5.0%	0.0%	14	
		Nasr 2017 [94]	27	33%	0.0%	0.0%	6	
		Bilreiro 2017 [101]	129	-	7.0%	0.0%	-	
		Average		36%	7.4%	0.0%	10.3	

Table 4: Recurrence and complication rates associated with treatments for varicocele

Treatment	Ref.	Recurrence/ Persistence %	Complication rates
Antegrade sclerotherapy	[135]	9	Complication rate 0.3-2.2%: testicular atrophy, scrotal haematoma, epididymitis, left-flank erythema.
Retrograde sclerotherapy	[136]	9.8	Adverse reaction to contrast medium, flank pain, persistent thrombophlebitis, vascular perforation.
Retrograde embolisation	[137, 138]	3.8-10	Pain due to thrombophlebitis, bleeding haematoma, infection, venous perforation, hydrocele, radiological complication (e.g., reaction to contrast media), misplacement or migration of coils, retroperitoneal haemorrhage, fibrosis, ureteric obstruction.
<i>Open operation</i>			
Scrotal operation		-	Testicular atrophy, arterial damage with risk of devascularisation and testicular gangrene, scrotal haematoma, post-operative hydrocele.
Inguinal approach	[139]	13.3	Possibility of missing out a branch of testicular vein.
High ligation	[140]	29	5-10% incidence of hydrocele (< 1%).
Microsurgical inguinal or subinguinal	[141, 142]	0.8-4	Post-operative hydrocele arterial injury, scrotal haematoma.
Laparoscopy	[143, 144]	3-7	Injury to testicular artery and lymph vessels; intestinal, vascular and nerve damage; pulmonary embolism; peritonitis; bleeding; post-operative pain in right shoulder (due to diaphragmatic stretching during pneumoperitoneum); pneumoscrotum; wound infection.

**Αντιμετώπιση κίρσοκῆλης
ή
Υποβοηθούμενη αναπαραγωγή;**

Is assisted reproduction the optimal treatment for varicocele-associated male infertility? A cost effectiveness analysis

Schlegel PN

Conclusion: primary treatment with varicocelectomy was more cost effective than sperm retrieval/ICSI, while providing comparable delivery rates

Urology. 1997 Jan;49(1):83-90

Surgery or assisted reproduction? A decision analysis of treatment costs in male infertility

Meng MV, Greene KL, Turek PJ

Conclusion: initial varicocele repair was more cost effective than ART treatment for infertile couples

J Urol. 2005 Nov;174(5):1926-31

The cost effectiveness of treatment for varicocele related infertility

Penson DF, Paltiel AD, Krumholz HM, Palter S

CONCLUSIONS:

The optimal choice of treatment for varicocele related infertility depends strongly on the decision maker perspective. Regardless of perspective the most technologically advanced treatment, that is immediate IVF, is never favored. The findings of this study should be used to **counsel infertile patients with varicocele that immediate IVF is not cost effective.**

J Urol. 2002 Dec;168(6):2490-4

Varicocele management in the era of in vitro fertilization/intracytoplasmic sperm injection

Piyush Pathak, Aravind Chandrashekar, Tariq S Hakky,
Alexander W Pastuszak

Conclusions:

in couples seeking fertility using assisted reproductive technologies (ARTs), varicocele repair may offer improvement in semen parameters and sperm health that **can increase the likelihood of successful fertilization using techniques such as in vitro fertilization (IVF) or intracytoplasmic sperm injection (ICSI), or may decrease the level of ART needed to achieve successful pregnancy.**

Asian Journal of Andrology (2016) 18, 343–348

Varicocelectomy improves intrauterine insemination success rates in men with varicocele

Daitch JA, Bedaiwy MA, Pasqualotto EB, Hendin BN, Hallak J, Falcone T, Thomas AJ Jr, Nelson DR, Agarwal A

CONCLUSIONS:

Varicocele treatment may not improve semen characteristics in all men but **it appears to improve pregnancy and live birth rates among couples undergoing intrauterine insemination for male factor infertility.** A functional factor not measured on routine semen analysis may affect pregnancy rates in this setting. Men should be screened for varicocele before intrauterine insemination is initiated for male factor infertility.

J Urol 2001 May;165(5):1510-3

Συμπέρασματα

- ❖ Η κισσοκήλη συχνό εύρημα στους υπογόνιμους άνδρες
- ❖ Τις περισσότερες φορές είναι η μοναδική εμφανής αιτία υπογονιμότητας στο ζευγάρι
- ❖ Προκαλεί επιδείνωση στις παραμέτρους του σπερμοδιαγράμματος
- ❖ Ο στόχος της επέμβασης είναι η διατήρηση της ορχικής λειτουργίας και η εγκυμοσύνη στα υπογόνιμα ζευγάρια
- ❖ Ωστόσο, ακόμα και όταν δεν επιτυγχάνεται η εγκυμοσύνη, η βελτίωση του σπέρματος μπορεί να ελαττώσει την ανάγκη για υποβοηθούμενη αναπαραγωγή
- ❖ Η αναγνώριση αυτών των ανδρών που θα παρουσιάσουν το καλύτερο αποτέλεσμα από την επέμβαση είναι πάντα μια πρόκληση για τους ανδρολόγους
- ❖ Οι περισσότερες μελέτες δείχνουν ότι η αντιμετώπιση της κισσοκήλης βελτιώνει το σπέρμα και νέες μετα-αναλύσεις υποστηρίζουν αύξηση του δείκτη γεννήσεων
- ❖ Ωστόσο, πολλές από τις μελέτες στηρίζονται σε χαμηλής ποιότητας ερευνητικά πρωτόκολλα και καθίσταται επιτακτική η ανάγκη διεξαγωγής καλά σχεδιασμένων, τυχαιοποιημένων, προοπτικών μελετών για να δοθούν απαντήσεις

ΣΑΣ ΕΥΧΑΡΙΣΤΩ