



O urologista trata como?

Edson Borges Jr.

Conceitos importantes

- Interpretação da Análise Seminal
- Tratamento Clínico
- Tratamento Cirúrgico
- Abordagem terapêutica das Azoospermias
- Análise Seminal e Indicações de TRA



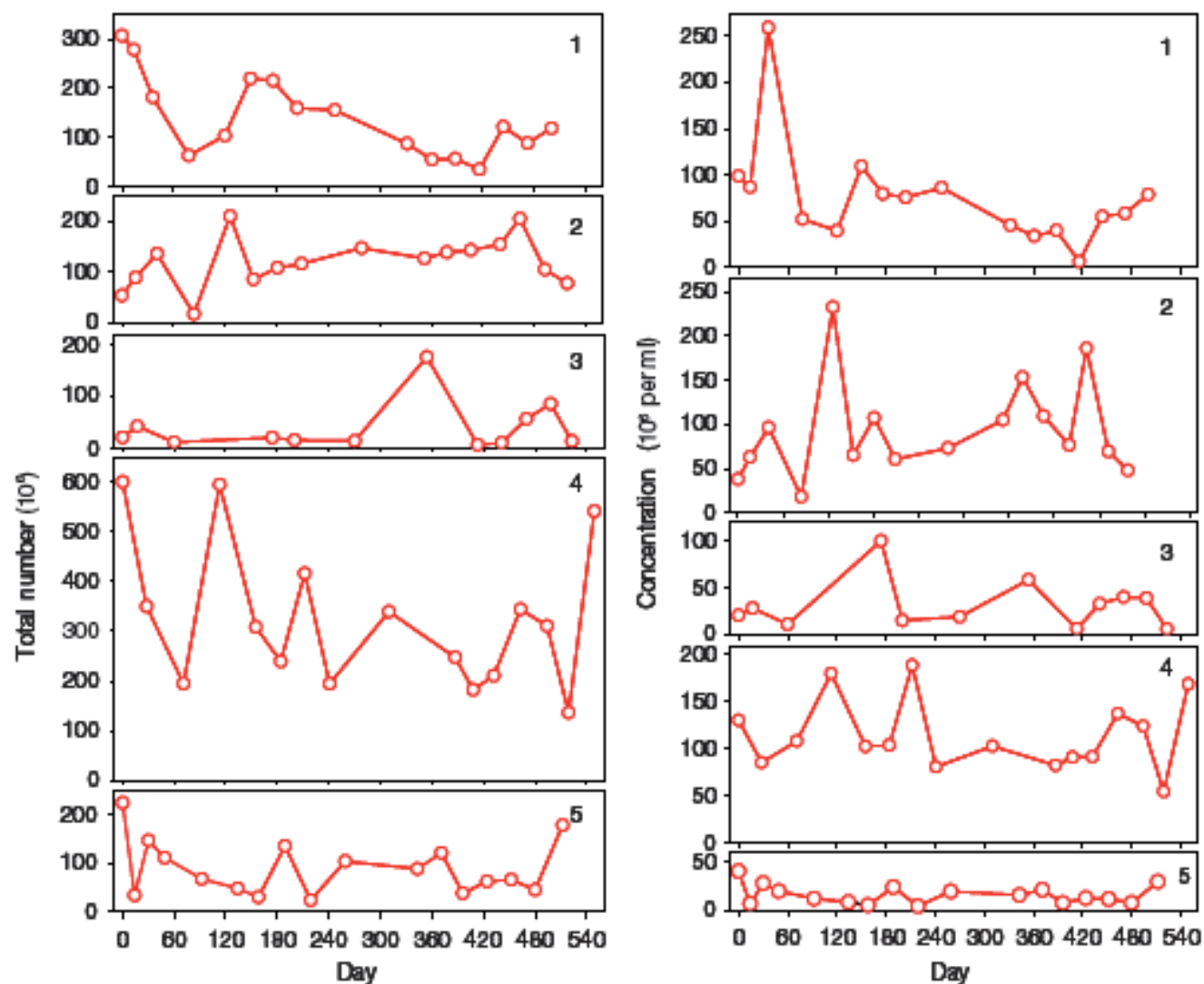
WHO laboratory manual for the Examination and processing of human semen

FIFTH EDITION

- Volume: $\geq 1,5$ ml
- PH: $\geq 7,2$
- Cor: branco opaco ou branco acinzentado
- Liquefação: < 30 minutos
- Concentração: $\geq 15 \times 10^6$ / ml
> 39 milhões / ejaculado
- Motilidade: $> 40\%$ (32% A+B)
 - A – progressão rápida
 - B – progressão lenta
 - C – sem progressão
 - D – imóveis
- Morfologia: $\geq 4\%$ Kruger
- Vitalidade: $> 58\%$
- Células redondas:
Leucócitos $\leq 10^6$ / ml
- Análise imunológica – espermatozóides
móveis aglutinados com as partículas
MAR test / Imonobeads: positivo $\geq 50\%$



Fig. 2.1 Variation in total number of spermatozoa and sperm concentration over a one-and-a-half-year period



O.M.S. 1980/87/92/99/2010

Table 1. Cut-off values for semen variables as published in consecutive WHO manuals [6–9] and as proposed in the fifth World Health Organization (WHO) manual [1].

Semen variable	1980	1987	1992	1999	2010 ¹
Volume (mL)	–	≥ 2.0	≥ 2.0	≥ 2.0	1.5
Concentration (10^6 mL^{-1})	20–200	≥ 20	≥ 20	≥ 20	15
Total sperm number ($10^6/\text{ejaculate}$)	–	≥ 40	≥ 40	≥ 40	39
Motility (% motile)	≥ 60	$\geq 50 \text{ (a + b)}^2$	$\geq 50 \text{ (a + b)}$	$\geq 50 \text{ (a + b)}$	40 (a + b + c)
Forward progression (for 1980 only)	$\geq 2^3$	$\geq 25 \text{ (a)}$	$\geq 25 \text{ (a)}$	$\geq 25 \text{ (a)}$	32 (a + b)
Morphology (% normal)	80.5 ⁴	≥ 50	$\geq 30^5$	(14) ⁶	4
Viability/vitality (% live)	–	≥ 50	≥ 75	≥ 75	58
White blood cells (10^6 mL^{-1})	< 4.7	< 1.0	< 1.0	< 1.0	< 1.0

Abnormal sperm count and motility on semen analysis are not sufficiently predictive of abnormal Kruger morphology

Fertility and Sterility® Vol. 94, No. 7, December 2010

Sara S. Morelli, M.D.^a
Aimee Seungdamrong, M.D.^{a,b}
David H. McCulloh, Ph.D.^{a,b}
Peter G. McGovern, M.D.^{a,b}

Abnormal morphology by Kruger's strict criteria cannot be predicted reliably by the presence of other abnormal parameters on semen analysis. Assessment of Kruger morphology therefore remains a necessary component of a complete semen analysis in the workup of the infertile couple. (Fertil Steril® 2010;94:2882-4. ©2010 by American Society for Reproductive Medicine.)

TABLE 1

Classification of semen analyses.

Count ($\geq 2 \times 10^7$ /mL)	Motility ($\geq 50\%$)	Kruger morphology ($> 4\%$)	No.	Percentage of total
Low	Low	Low	158	11
Low	Low	Normal	58	4
Low	Normal	Low	48	3
Low	Normal	Normal	41	3
Normal	Low	Low	69	5
Normal	Low	Normal	92	7
Normal	Normal	Low	187	14
Normal	Normal	Normal	731	53
Total			1,384	

Morelli. Correspondence. Fertil Steril 2010.



FERTILITY

Propedêutica em infertilidade

*Espermograma com morfologia estrita
(OMS 2010)*

*Mínimo de duas coletas seminais com intervalo igual a
frequência ejaculatória do homem*

Oligozoospermia / Azoospermia

Vale a pena tratamento?

1. Tratamento medicamentoso
2. Tratamento cirúrgico

Drug Therapy for Idiopathic Male Infertility: Rationale Versus Evidence

Rajeev Kumar,* Gagan Gautam and Narmada P. Gupta



THE JOURNAL
of UROLOGY®
Official Journal of the American Urological Association



Material e Método: Pesquisa no MEDLINE/PubMed nos últimos 20 anos com foco nas publicações sobre tratamento medicamentoso para infertilidade masculina

Conclusão: Tratamento medicamentoso para infertilidade masculina idiopática é no mínimo empírico. Não existe benefício claro no uso de qualquer medicação nestes pacientes.

Entretanto, andrógenos não devem ser usados devido a seu efeito supressório sobre a espermatogênese.



The role of sperm oxidative stress in male infertility and the significance of oral antioxidant therapy

Parviz Gharagozloo^{1,*} and R. John Aitken²

¹CellOxess LLC, 16 Blue Spruce Drive, Pennington, NJ 08534, USA ²Priority Research Centre in Reproductive Science, Discipline of Biological Sciences, University of Newcastle, Callaghan, NSW 2308, Australia

- ***Impacto dos antioxidantes orais no estresse oxidativo (EO) e DNA espermático***
- 19 / 20 estudos mostraram diminuição do **EO**
- Forte evidência no aumento da motilidade (principalmente nos astenozoospermicos)
- 6 /10 estudos: aumento das taxas de gestação



Antioxidants for male subfertility

Showell MG, Brown J, Yazdani A, Stankiewicz MT, Hart RJ

Published Online: March 14, 2012

Oxidative stress may cause sperm cell damage. This damage can be reduced by the body's own natural antioxidant defences. Antioxidants can be part of our diet and taken as a supplement. It is believed that in many cases of unexplained subfertility, and also in instances where there may be a sperm-related problem, taking an oral antioxidant supplement may increase a couple's chance of conceiving when undergoing fertility treatment. This [review](#) identified 34 randomised controlled trials involving 2876 couples. Pooled findings from three small trials suggest an increase in live birth rates for the partners of subfertile men taking an antioxidant supplement as part of an assisted reproductive program. However, further well-designed large randomised [placebo](#)-controlled trials are needed to confirm these findings.

- 34 estudos randomizados - 2.876 casais
- Aumento da taxa gestação (OR=4,18)
- Aumento na taxa de nascidos vivos (OR=4,85)

The effect of sperm DNA fragmentation on miscarriage rates: a systematic review and meta-analysis

Lynne Robinson^{1,*}, Ioannis D. Gallos^{1,2}, Sarah J. Conner^{1,2},
Madhurima Rajkhowa¹, David Miller³, Sheena Lewis⁴,
Jackson Kirkman-Brown^{1,2}, and Arri Coomarasamy^{1,2}

- **16 estudos – 2969 casais**
- Aumento significativo de abortamento em homens com aumento da fragDNA espermática: RR =2,16 – 3,94 (1,54 – 6,32)

Tratamento Medicamentoso

Tratamento hormonal: sem eficácia (algumas vezes prejudicial)

Uso de antioxidantes: efeito parcial em alguns casos

FragDNA espermático: > abortamento

Tratamento Cirúrgico

• Cirurgia de Varicocele



Cirurgia de Varicocele

➤ INCIDÊNCIA DE VARICOCELE EM HOMENS INFÉRTEIS

5.228 homens / 1.803 com varicocele (35%)

➤ MELHORA SEMINAL E % DE GESTAÇÕES APÓS VARICOCELECTOMIA

- ✓ 3.507 pacientes operados
- ✓ Melhora seminal: 51 - 92%
- ✓ Gestação: 25 - 55% (média = 30%)

MALE FACTOR

Fertil Steril 88:639-48, 2007

**Reassessing the value of varicocelectomy
as a treatment for male subfertility
with a new meta-analysis**

Joel L. Marmar, M.D.,^a Ashok Agarwal, Ph.D.,^b Sushil Prabakaran, M.D.,^b Rishi Agarwal,^b
Robert A. Short, Ph.D.,^c Susan Benoff, Ph.D.,^d and Anthony J. Thomas, Jr., M.D.^b

Aumento 2,8x chances
de gestação espontânea



Varicocele: considerações importantes

- Principal causa conhecida de lesão testicular
- Melhora seminal com a cirurgia após 2-3 ciclos da espermatogênese (6-9 meses)
- Melhores resultados em alterações seminais moderadas

Casal tem de ter TEMPO!!

AZOOSPERMIA

- **Obstrutiva:** espermatogênese normal
- **Não-Obstrutiva:** alteração da espermatogênese
 - 1% dos homens
 - 10 -15% dos homens inférteis

The importance of semen analysis in the context of azoospermia

Nabil Aziz

Liverpool Women's Hospital & The University of Liverpool, Liverpool, United Kingdom

Reference	Recommended centrifugation
Mortimer (1994) (23)	1000 x g for 15 minutes
the Nordic Association for Andrology (24)	At least 1000 x g for 15 minutes
WHO manual (1999) (25)	600 x g for 15 minutes to concentrate samples with low sperm counts (less than 2 sperm per 400x field) <i>Less than 3000 x g for 15 minutes for all samples in which spermatozoa are not detected</i>
Corea et al. (2005) (20)	<i>A minimum of 1000 x g for 15 minutes was adequate for the detection of azoospermia</i>
WHO manual (2010) (2)	3000 x g for 15 minutes for all samples in which no spermatozoa are detected

18,6% Azoo Ob
22,8% Azoo NOb



Sptz
móveis/imóveis

RECUPERAÇÃO DE
ESPERMATÓZÓIDES
NÃO EJACULADOS

ESPERMATÓZÓIDES
ESPIDIDIMÁRIOS

PERCUTANEOUS
EPIDYDIMAL
SPERM
ASPIRATION

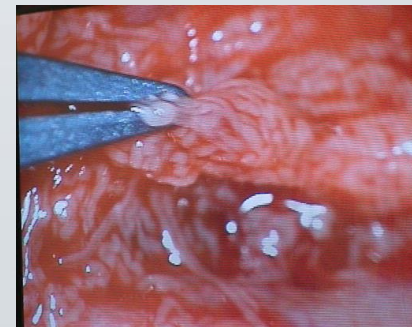


ESPERMATÓZÓIDES
TESTICULARES

TESTICULAR
SPERM
ASPIRATION

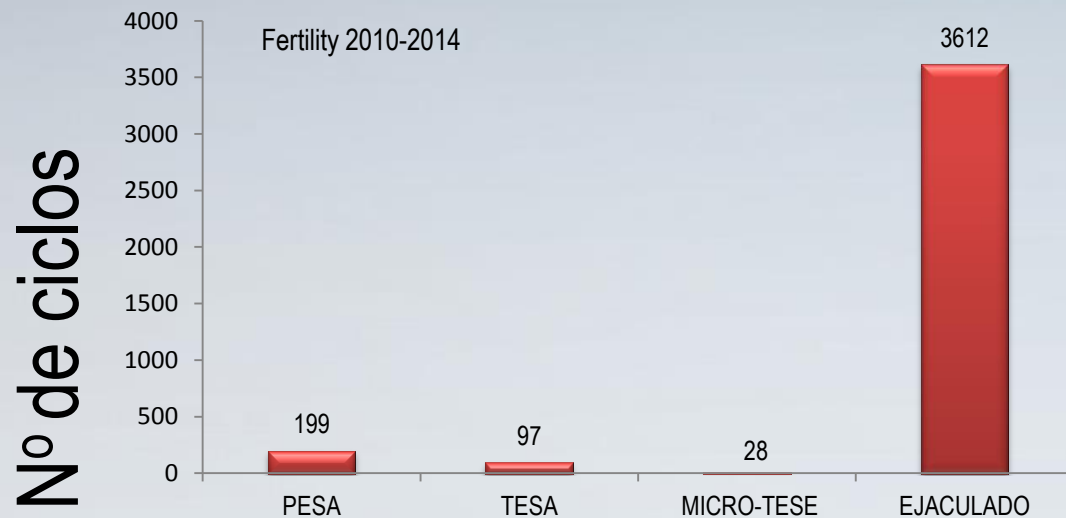


Micro
TESTICULAR
SPERM
EXTRACTION



Características gerais dos ciclos de ICSI – *Fertility* (2010-2014)

“Origem do espermatozoide”

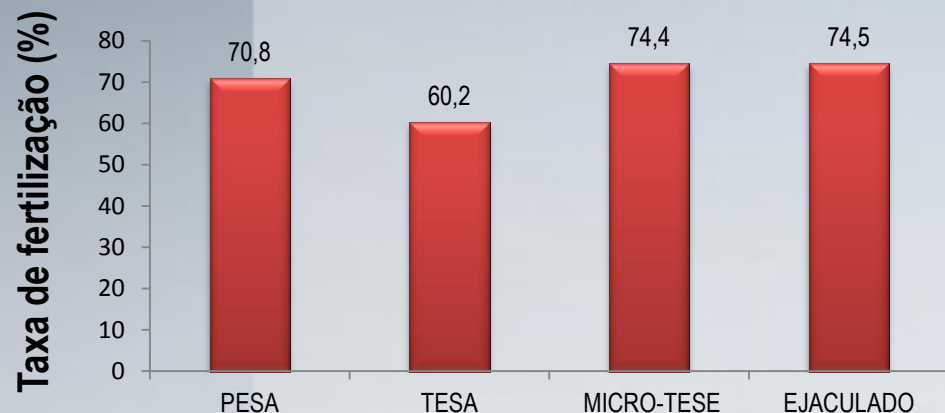


Características	PESA	TESA	MICRO-TESE	EJACULADO
Nº de ciclos	199	97	28	3612
Idade média ± DP	34.9 ± 4.6	34.8 ± 5.4	32.2 ± 2.7	35.8 ± 4.7
Nº de folículos aspirados ± DP	20.4 ± 15.4	18.1 ± 11.3	15.9 ± 14.4	15.8 ± 12.4
Nº de oócitos recuperados ± DP	14.2 ± 10.8	13.3 ± 9.3	11.0 ± 11.4	11.0 ± 9.0
Nº de oócitos micromanipulados ± DP	9.8 ± 6.4	8.9 ± 5.1	8.0 ± 6.9	7.8 ± 5.8



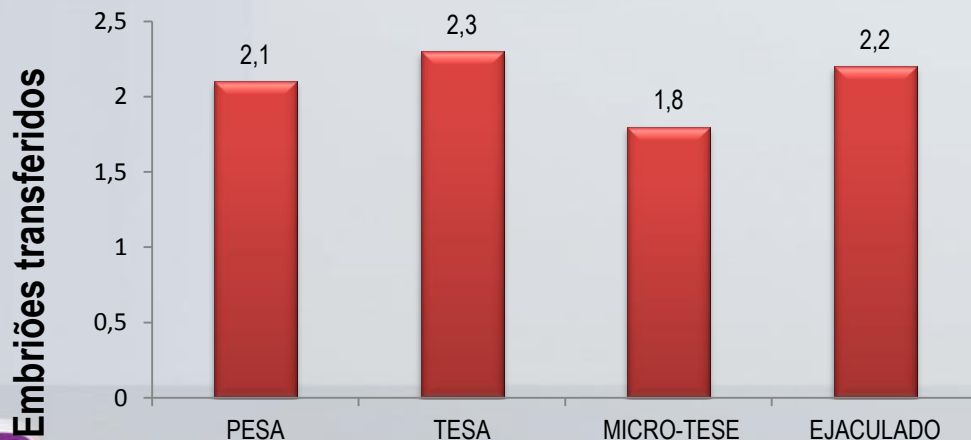
Resultados clínicos e laboratoriais – *Fertility* (2010-2014)

“Origem do espermatozoide”



COMPARAÇÃO	VALOR DE P
PESA VS TESA	< 0.001
PESA VS MICRO-TESE	> 0.05
PESA VS EJACULADO	> 0.05
TESA VS MICRO-TESE	> 0.05
TESA VS EJACULADO	< 0.001
MICRO-TESE VS EJACULADO	> 0.05

ANOVA



COMPARAÇÃO	VALOR DE P
PESA VS TESA	> 0.05
PESA VS MICRO-TESE	> 0.05
PESA VS EJACULADO	> 0.05
TESA VS MICRO-TESE	> 0.05
TESA VS EJACULADO	> 0.05
MICRO-TESE VS EJACULADO	> 0.05

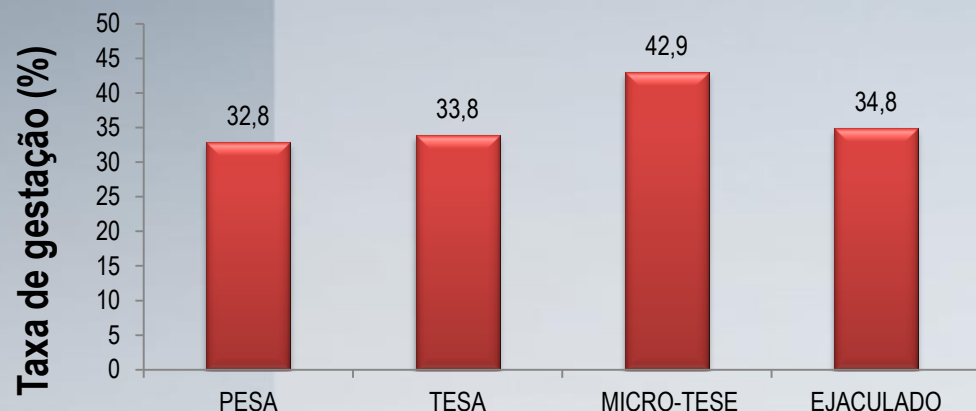
ANOVA



FERTILITY

Resultados clínicos e laboratoriais – *Fertility* (2010-2014)

“Origem do espermatozoide”



COMPARAÇÃO	VALOR DE P
PESA VS TESA	> 0.05
PESA VS MICRO-TESE	> 0.05
PESA VS EJACULADO	> 0.05
TESA VS MICRO-TESE	> 0.05
TESA VS EJACUALDO	> 0.05
MICRO-TESE VS EJACULADO	> 0.05

QUI-QUADADRO

COMPARAÇÃO	VALOR DE P
PESA VS TESA	> 0.05
PESA VS MICRO-TESE	> 0.05
PESA VS EJACULADO	> 0.05
TESA VS MICRO-TESE	> 0.05
TESA VS EJACUALDO	> 0.05
MICRO-TESE VS EJACULADO	> 0.05

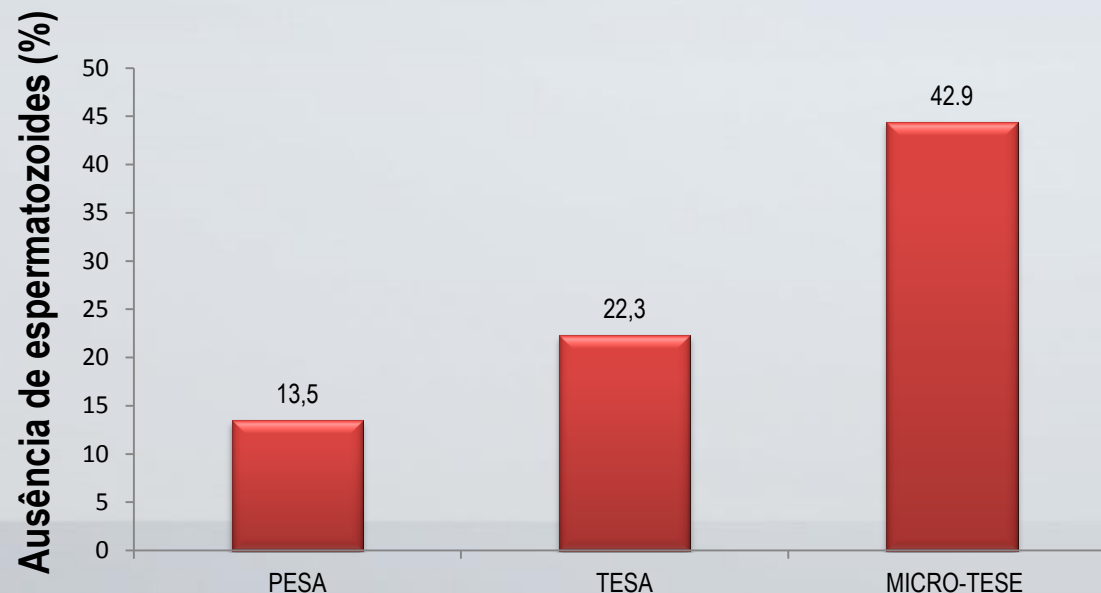
ANOVA



FERTILITY

Falha na recuperação do espermatozoide *Fertility* (2010-2014)

Técnica	Nº Ciclos	Ciclos com ausência de espermatozóide	% de falha
PESA	230	31*	13.5
TESA	85	19	22.3
microTESE	28	12	42.9



* 100% após
TESA

Azoospermia

```
graph LR; A[Azoospermia] --> B[Obstrutiva  
Recuperação espermática na maioria dos casos]; A --> C[Não obstrutiva  
Recuperação espermática em 50% dos casos]; B --> D[PESA]; C --> E["TESA  
microTESE"]
```

Obstrutiva

Recuperação
espermática na
maioria dos casos

PESA

Não obstrutiva

Recuperação
espermática em 50%
dos casos

TESA
microTESE

Total motile sperm count: a better indicator for the severity of male factor infertility than the WHO sperm classification system

J.A.M. Hamilton^{1,*}, M. Cissen¹, M. Brandes³, J.M.J. Smeenk²,
J.P. de Bruin¹, J.A.M. Kremer³, W.L.D.M. Nelen³,
and C.J.C.M. Hamilton¹

¹Jeroen Bosch Hospital, 's-Hertogenbosch, The Netherlands ²St. Elisabeth Hospital, Tilburg, The Netherlands

³Radboud University Medical Center, Nijmegen, The Netherlands

- **Definição: $TMSC = \text{volume} \times \text{conc/ml} \times \% A+B / 100\%$**
- ✓ TMSC: pré-processamento seminal
- ✓ WHO e TMSC em gestação espontânea
- ✓ Seguimento de 3 anos
- ✓ $TMSC > 20 \times 10^6$: normal
- ✓ 1.177 casais

Total motile sperm count: a better indicator for the severity of male factor infertility than the WHO sperm classification system

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- ✓ Grupo I: TMSC < 1 milhão de espermatozóides
- ✓ Grupo II: TMSC 1 – 5 milhões de espermatozóides
- ✓ Grupo III: TMSC 5 – 10 milhões de espermatozóides
- ✓ Grupo IV: TMSC 10 – 20 milhões de espermatozóides
- ✓ Grupo V: TMSC normal e anormal em coletas diferentes (normalizado)
- ✓ Normal: TMSC > milhões de espermatozóides

Table IV Chance of spontaneous pregnancy in relation to the TMS groups.

TMS group	0–1	1–5	5–10	10–20	Normalized	Unexplained normal
0–1	1	0.734 (0.437–1.234)	0.371 (0.215–0.640)	0.383 (0.226–0.651)	0.521 (0.259–1.049)	0.171 (0.105–0.280)
1–5		1	0.505 (0.307–0.832)	0.522 (0.321–0.847)	0.709 (0.365–1.377)	0.233 (0.149–0.365)
5–10			1	1.032 (0.634–1.681)	1.403 (0.723–2.722)	0.461 (0.296–0.719)
10–20				1	1.359 (0.712–2.594)	0.447 (0.298–0.671)
Normalized					1	0.329 (0.180–0.600)
Unexplained						1

Odds ratios (95% CI), after adjustment for female and male age, duration and type of infertility and the results of the PCT, using binary logistic regression analysis.

Data are bold if significant.

Total motile sperm count: a better indicator for the severity of male factor infertility than the WHO sperm classification system

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³Radboud University Medical Center, Nijmegen, The Netherlands

Total Motile Sperm Count (Número Total de Espermatozóides Móveis - NTEM): 3 grupos com prognósticos diferentes:

- TMSC < 5 milhões de espermatozóides
- TMSC 5 - 20 milhões de espermatozóides
- TMSC > 20 milhões de espermatozóides

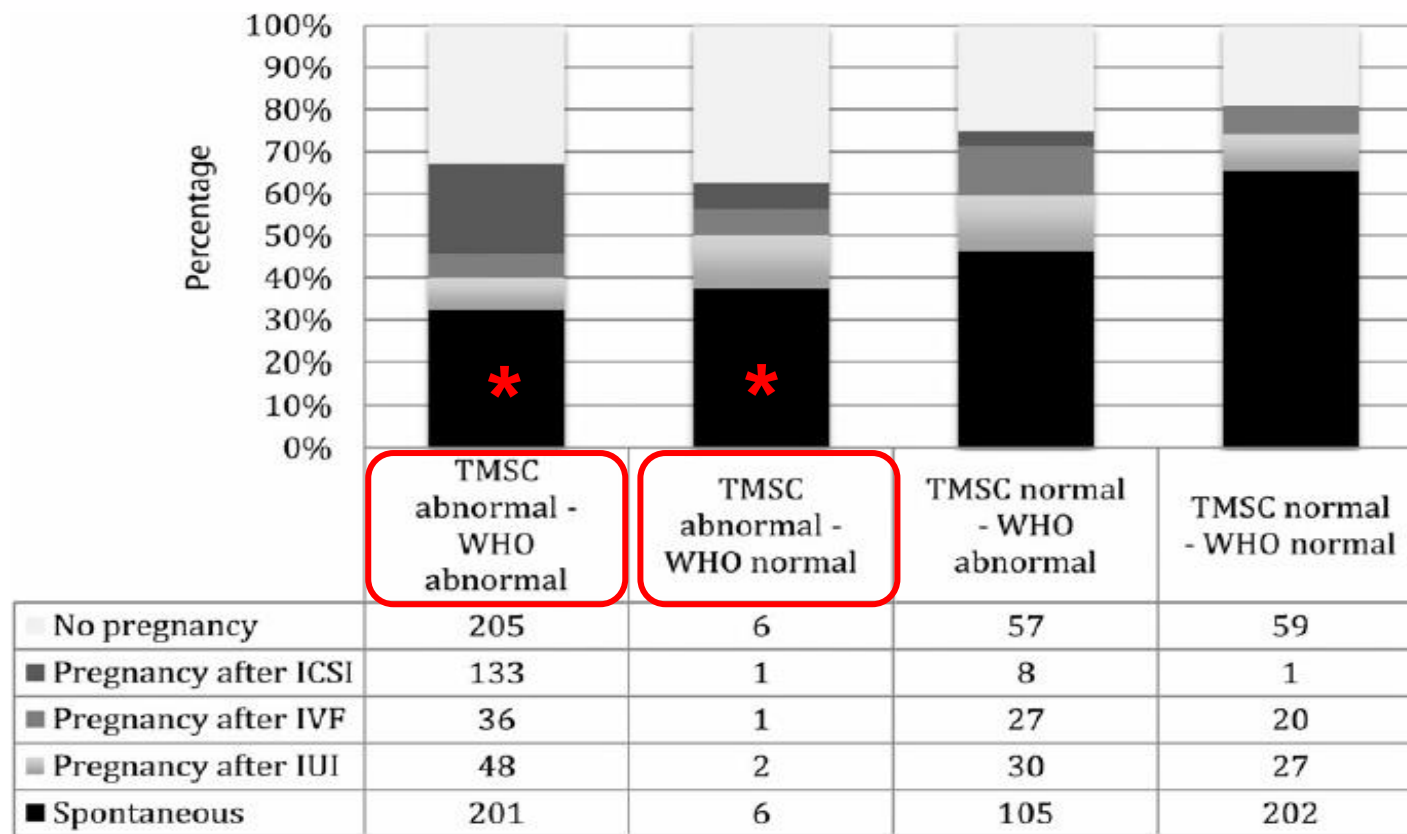


Figure 4 Results showing where the TMSC and WHO classification systems overlap or disagree. The bars on the right and left show the outcome if the two systems are in agreement. The middle bars show the outcome if both systems give contradictory results. TMSC normal – WHO normal = 'real unexplained' infertility.

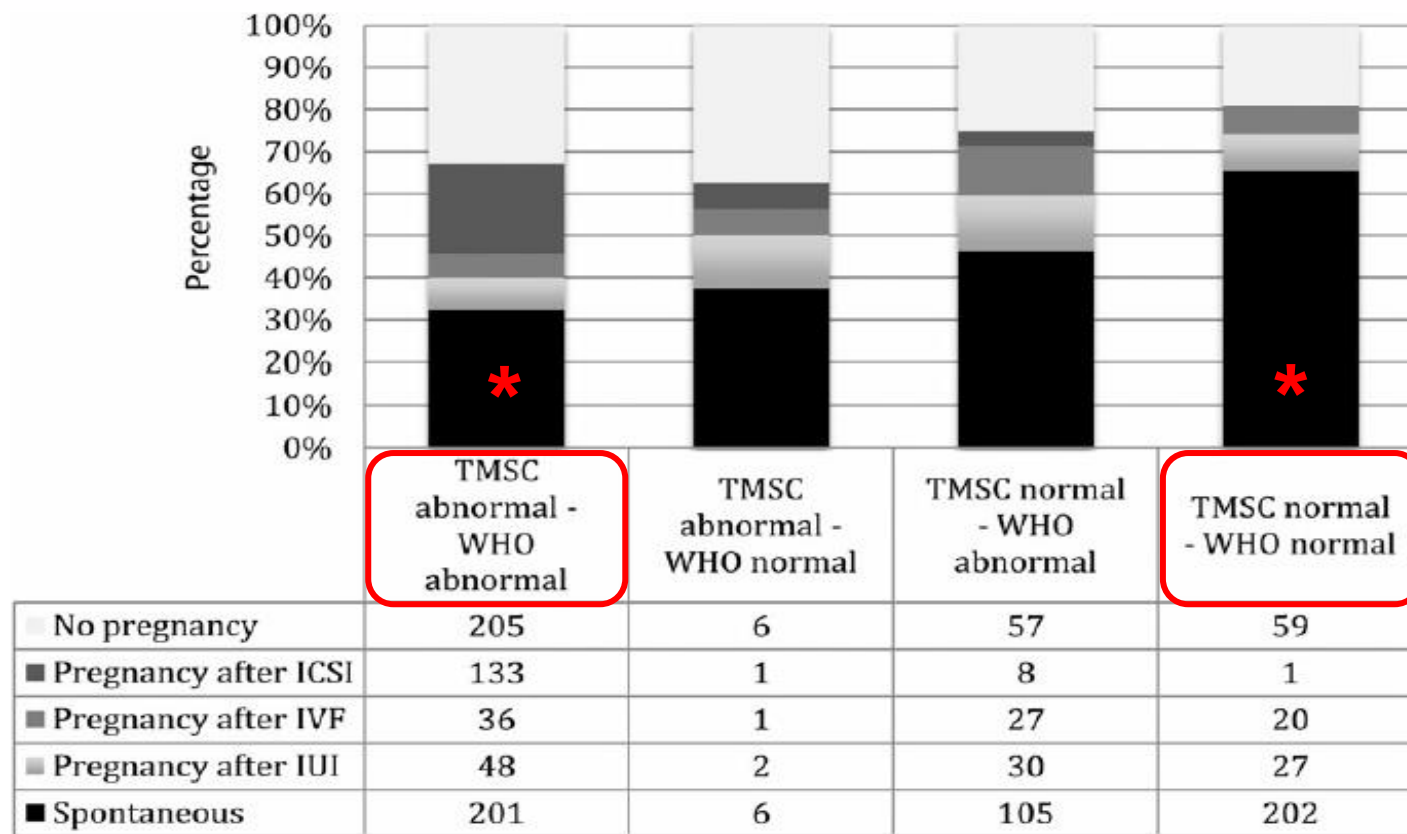


Figure 4 Results showing where the TMSC and WHO classification systems overlap or disagree. The bars on the right and left show the outcome if the two systems are in agreement. The middle bars show the outcome if both systems give contradictory results. TMSC normal – WHO normal = 'real unexplained' infertility.



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ARTICLE

Cost-effectiveness of assisted conception for male subfertility



Lobke M Moolenaar ^{a,b,c,*}, Maarje Cissen ^d, Jan Peter de Bruin ^d,
Peter GA Hompes ^b, Sjoerd Repping ^a, Fulco van der Veen ^a,
Ben Willem J Mol ^{a,e}

✓ Mulheres ~30 anos

✓ TMSC

Comparações:

▪ IIU x FIV x ICSI

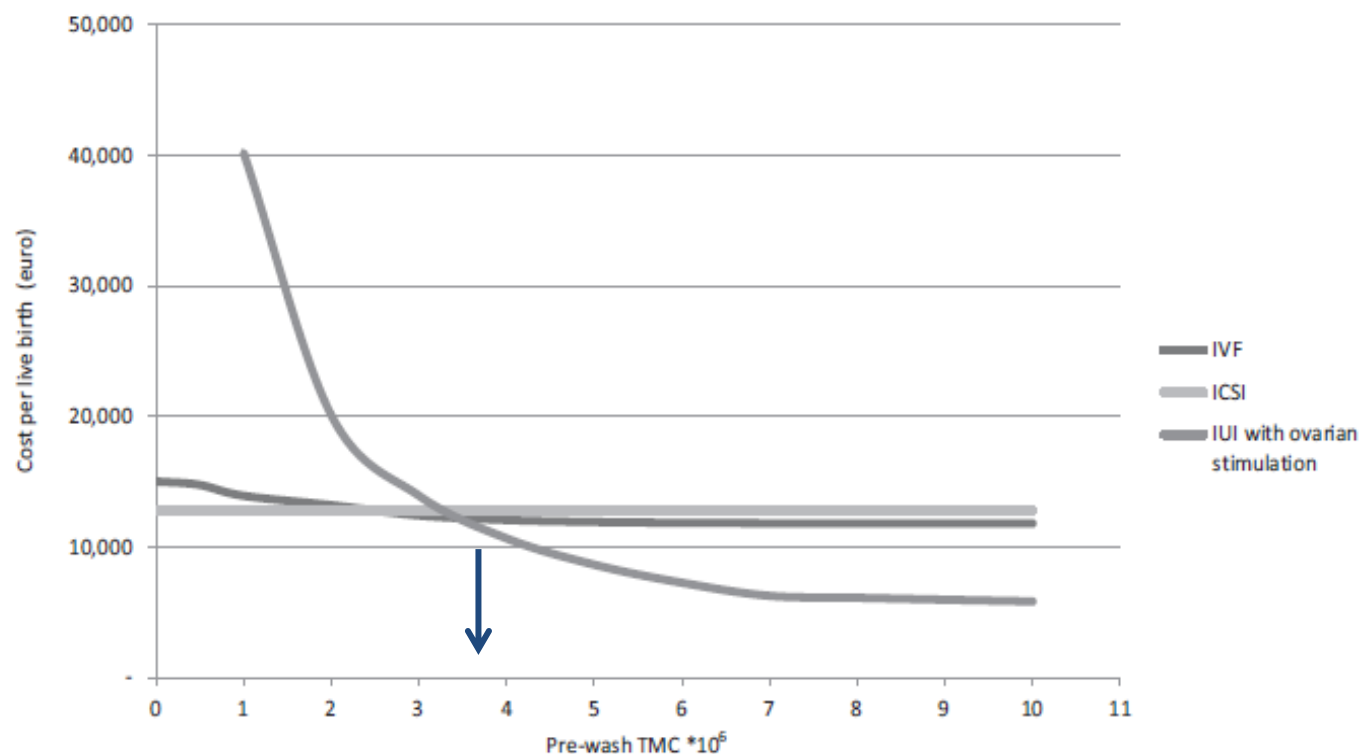


Figure 1 Cost per live birth. IUI = intrauterine insemination; ICSI = intracytoplasmic sperm injection; TMC = total motile count.

TMSC ($\times 10^6$)	IUI	FIV/ICSI
0,1	0%	21,8%
10,0	10,2%	27,7%

Approaches to improve the diagnosis and management of infertility

human
reproduction
update

Human Reproduction Update, Vol.15, No.4 pp. 391–408, 2009

P. Devroey^{1,4}, B.C.J.M. Fauser² and K. Diedrich³ on behalf of the
Evian Annual Reproduction (EVAR) Workshop Group 2008[†]

❖ *fator masculino leve/moderado:*

FIV / ICSI = 6 ciclos IIU

❖ *ESCA: eficiência IIU??*

ICSI leva < falha fertilização

Intrauterine insemination

The ESHRE Capri Workshop Group¹

Although widely utilized, there is little evidence of the effectiveness in male infertility (Bensdorp *et al.*, 2007), and one large trial found that stimulated IUI was not effective in the treatment of unexplained infertility (Steures *et al.*, 2006).

REPRODUÇÃO ASSISTIDA

"QUANDO INDICAR"

● **COITO PROGRAMADO:**

. TMSC > 20 milhões, morfologia estrita > 4 %

● **INSEMINAÇÃO ARTIFICIAL (IIU):**

. TMSC > 5 milhões, morfologia estrita > 4%

● **FERTILIZAÇÃO "IN VITRO" (FIV):**

. TMSC 1 - 5 milhões, morfologia estrita > 4%,
falha em 3 IIU

● **INJEÇÃO INTRA-CITOPLASMÁTICA (ICSI):**

. TMSC < 1 milhão, morfologia estrita < 4%,
. falha de fertilização FIV,
. ESCA

Obrigado !

Edson Borges Jr.

edson@fertility.com.br