XVII CONGRESSO PAULISTA DE UROLOGIA

3 A 6 DE SETEMBRO | 2022

Técnicas de obtenção de espermatozoides nas azoospermias obstrutivas

Edson Borges Jr.

Fertility Medical Group

Instituto Sapientiae

Ausência de Conflito de Interesse

Resolução do Conselho Federal de Medicina nº 1.595/2.000

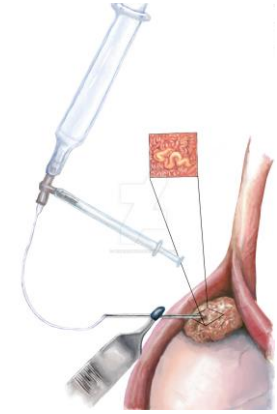
FERTILITY

RECUPERAÇÃO DE ESPERMATOZÓIDES NÃO EJACULADOS

ESPERMATOZÓIDES ESPIDIDIMÁRIOS

PERCUTANEOUS
EPIDYDIMAL
SPERM
ASPIRATION

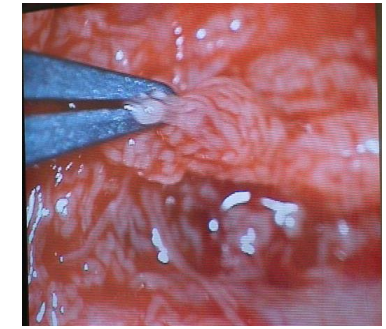
MICROSURGICAL
EPIDYDIMAL
SPERM
ASPIRATION



ESPERMATOZÓIDES TESTICULARES

TESTICULAR
SPERM
ASPIRATION

Micro
TESTICULAR
SPERM
EXTRACTION



FERTILITY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MEDICAL MEDIA

FERTILITY

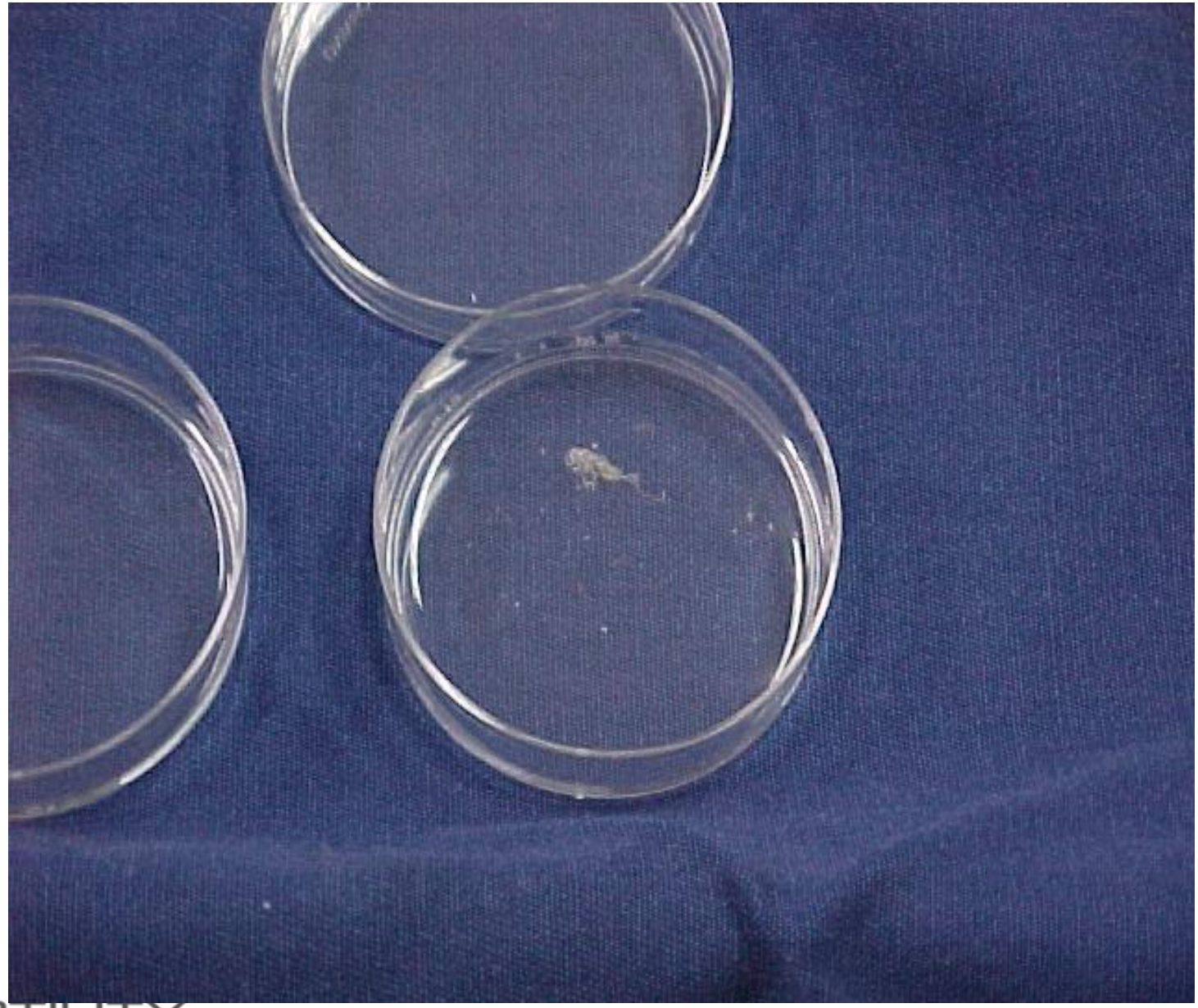
PESA

FERTILITY


FERTILITY

TESA

FERTILITY

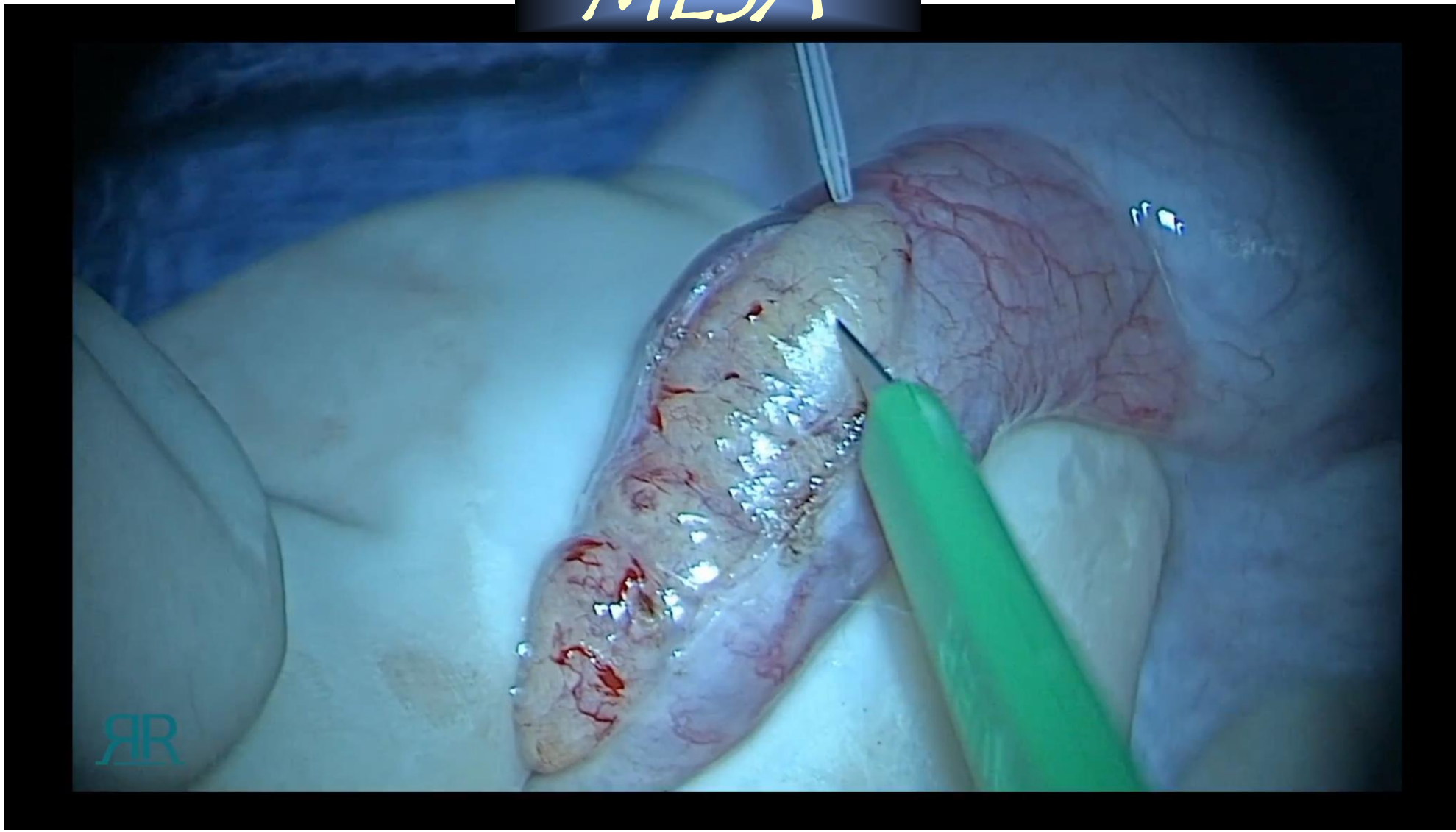


FERTILITY

MESA

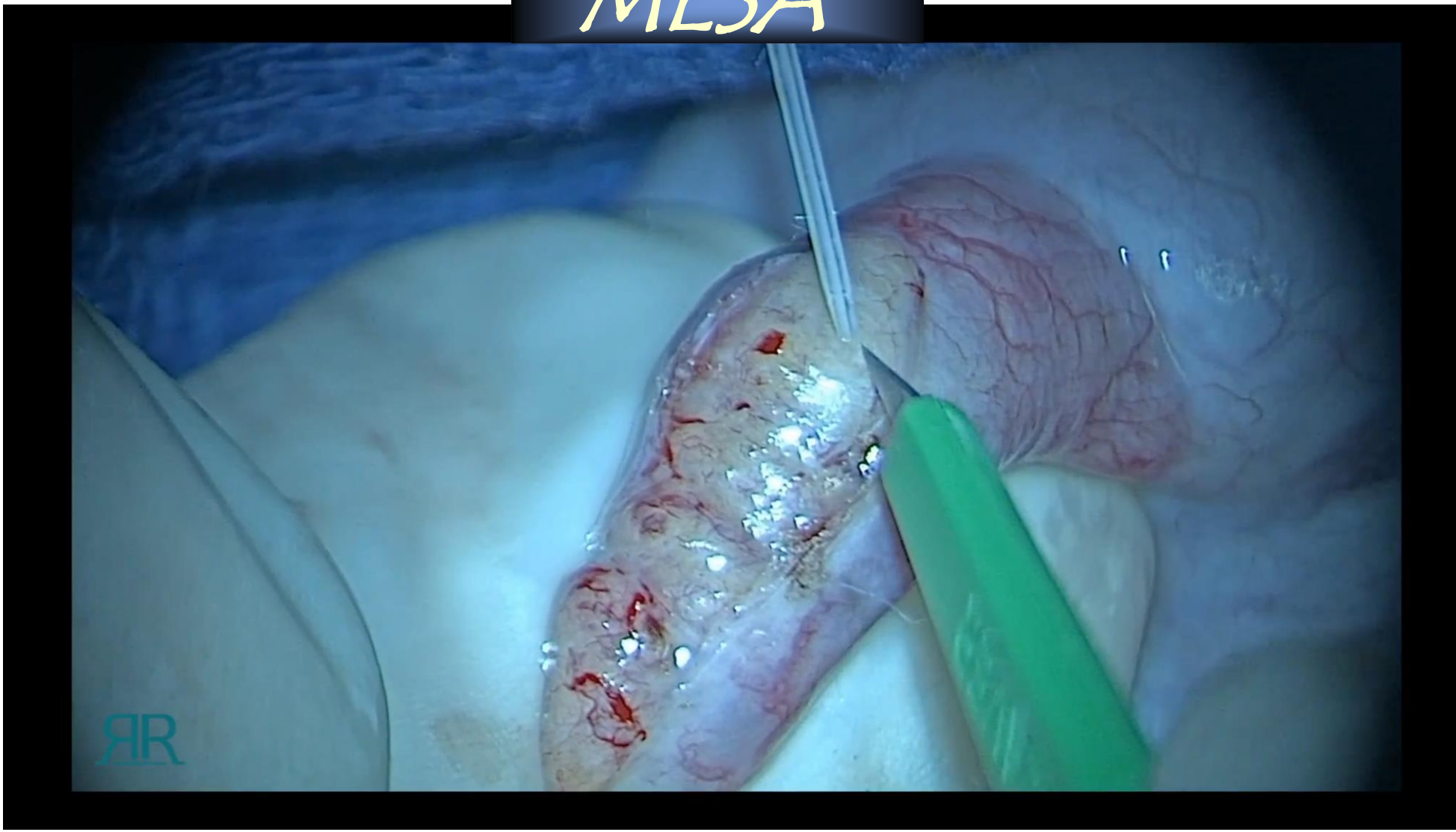
FERTILITY

MESA



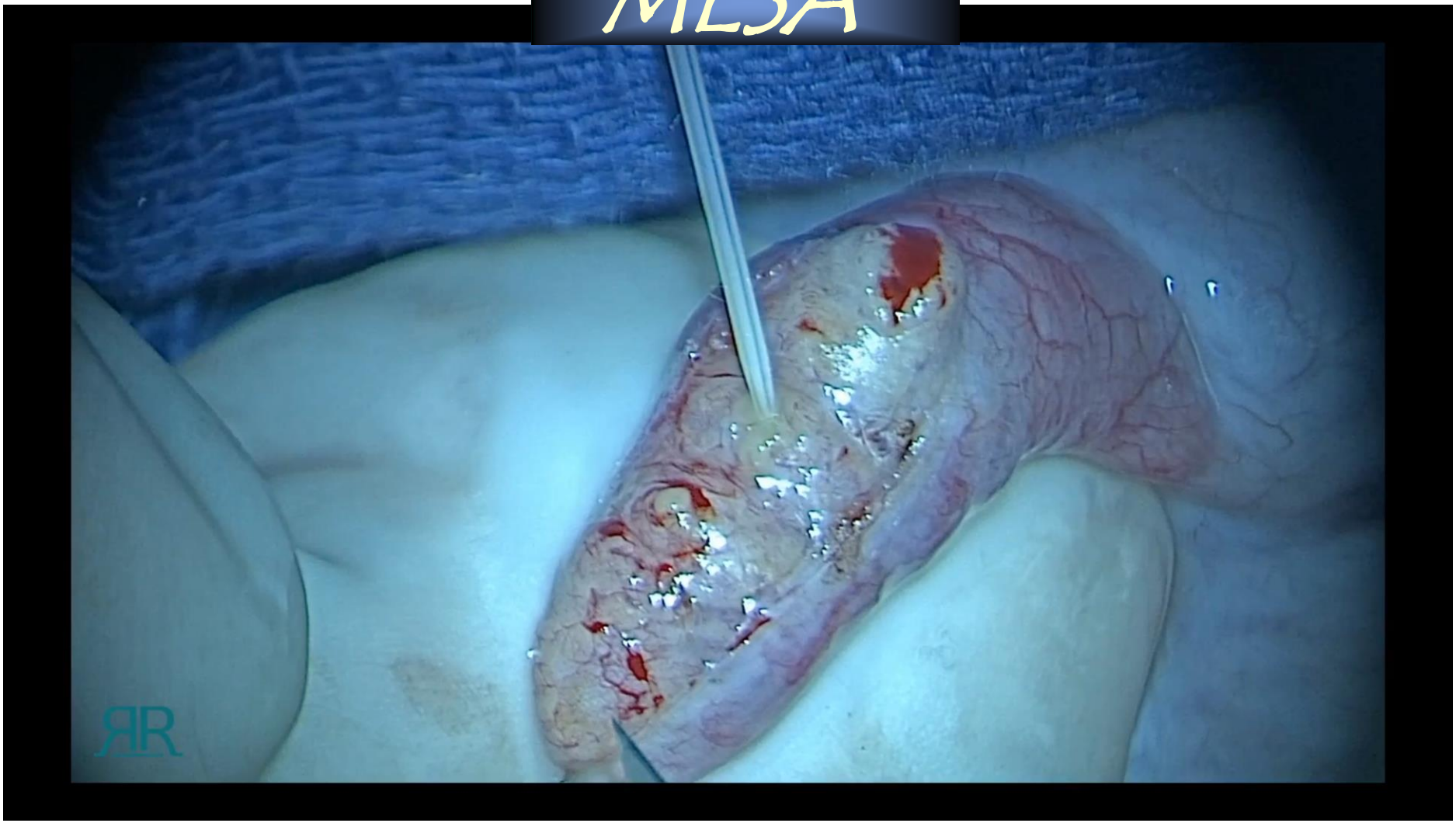
FERTILITY

MESA



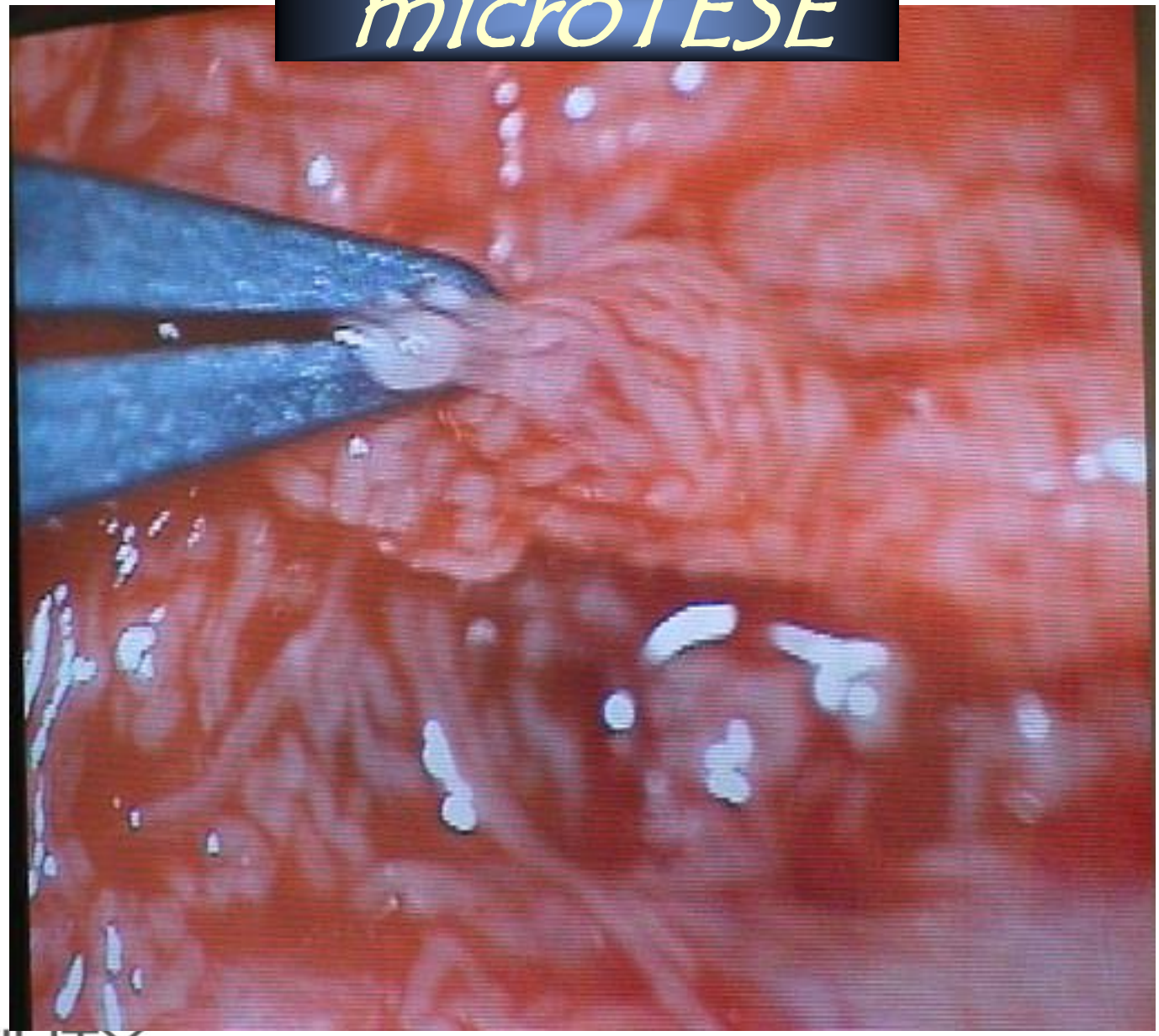
FERTILITY

MESA



FERTILITY

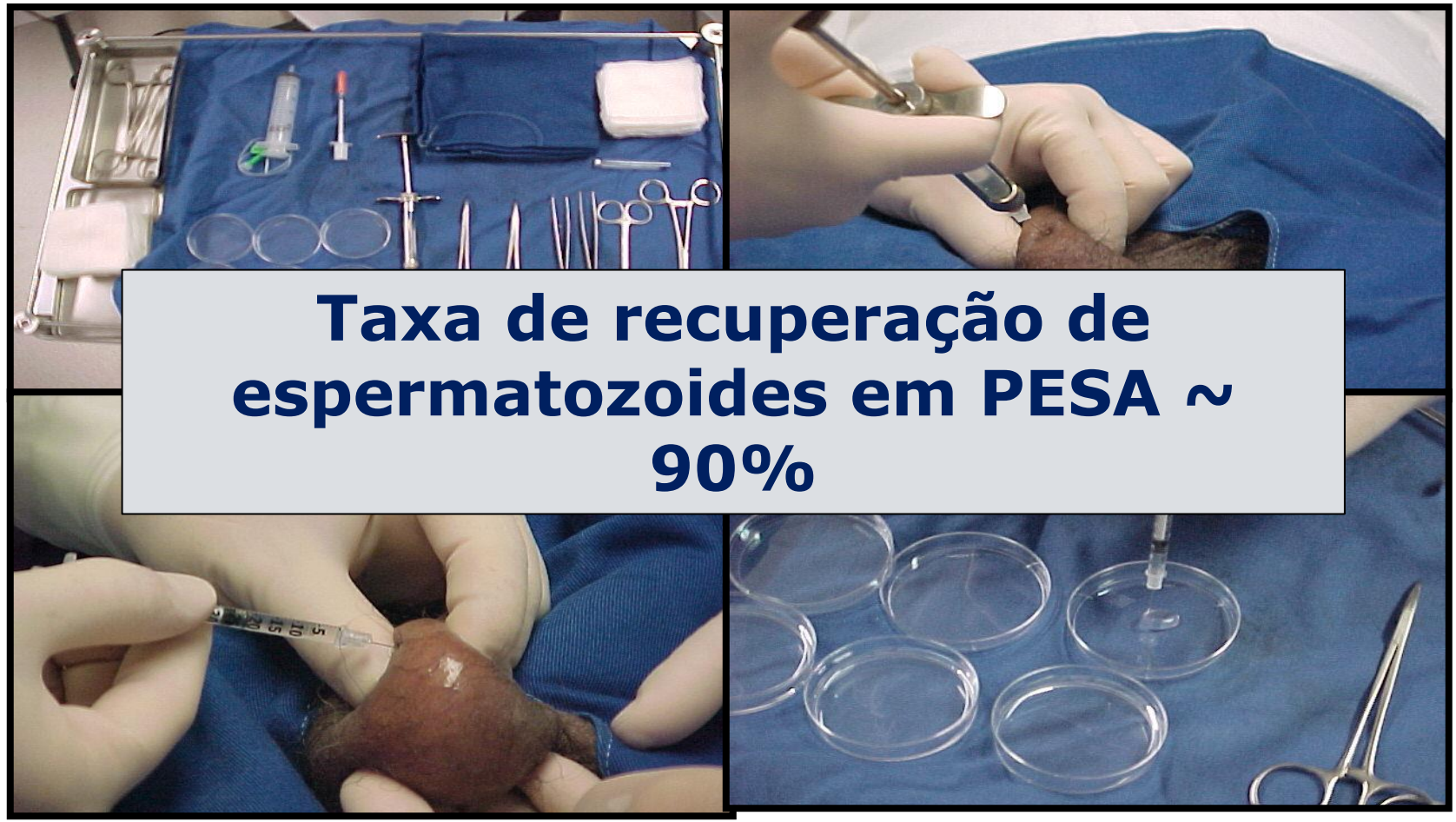
microTESE



FERTILITY

microTESE

FERTILITY



Taxa de recuperação de espermatozoides em PESA ~ 90%

FERTILITY

The Aging Male, Month 13(1):44-50, 2010 Edson Borges Jr., *et al.*

informa healthcare

[1]*Fertility – Assisted Fertilization Center, São Paulo, SP, Brazil,* [2]*Sapientiae Institute – Educational and Research Center in Assisted Reproduction, São Paulo, SP, Brazil, and* [3]*Institute of Biotechnology – Caxias do Sul University, Caxias do Sul, RS, Brazil*

ORIGINAL ARTICLE

Assisted reproductive technology outcomes in azoospermic men: 10 years of experience with surgical sperm retrieval

Table II. ICSI outcomes from patients with obstructive azoospermia when the injected spem were retrieved from the testicle (TESA) or epididymis (PESA).

Variable	Study group		
	OA-TESA (n=103)	OA-PESA (n=171)	*p* value
Normal fertilization rate (%)	57.9 ± 9.5 (48.5–67.5)	65.2 ± 4.1 (54.7–69.3)	*0.0017*
Abnormal fertilization rate (%)	13.2 ± 6.3 (6.5–19.5)	12.7 ± 5.3 (7.9–18.0)	0.9437
Fertilization failure rate (%)	28.9 ± 8.9 (20.2–37.8)	22.1 ± 6.0 (15.8–28.1)	0.1081
Non-cleaved rate (%)	9.87 ± 5.9 (4.2–15.8)	7.46 ± 3.9 (3.5–11.4)	0.4406
Pregnancy rate (%)	31.9 ± 9.0 (23.0–41.0)	32.5 ± 7.5 (25.9–40.0)	0.8803
Abortion rate (%)	38.8 ± 9.6 (29.6–48.4)	18.0 ± 5.8 (12.2–23.8)	*0.0387*
Implantation rate (%)	9.4 ± 5.6 (3.8–15.0)	10.5 ± 4.0 (5.5–14.5)	0.6054

Values in percentage expressed as mean ± SD (confidence interval of the frequencies).

F

The Aging Male, Month 13(1):44-50, 2010 Edson Borges Jr., *et al.*

informa healthcare

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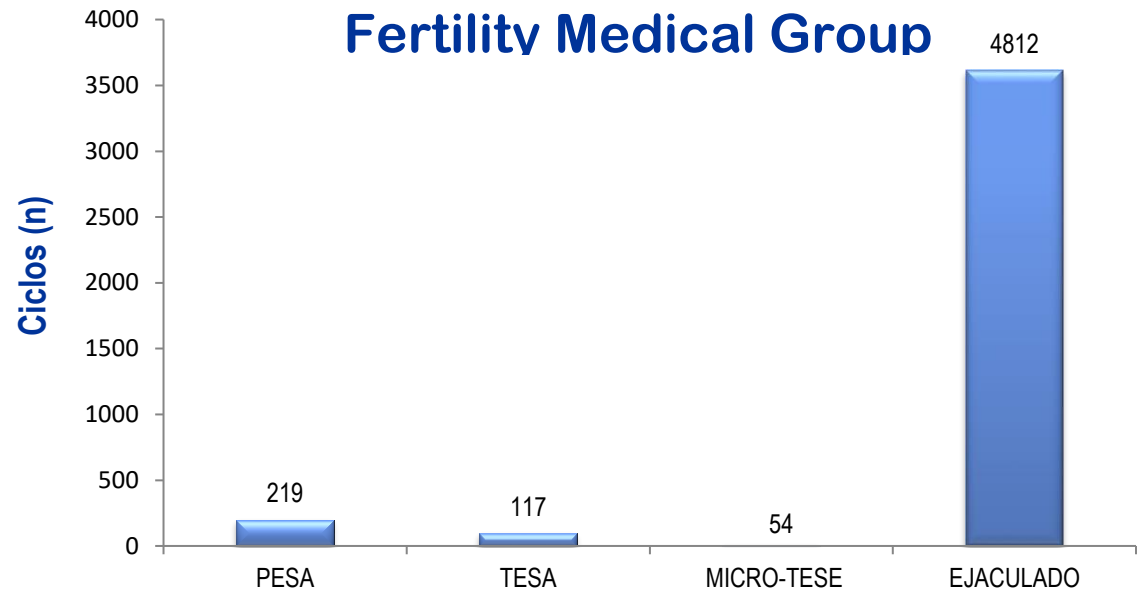
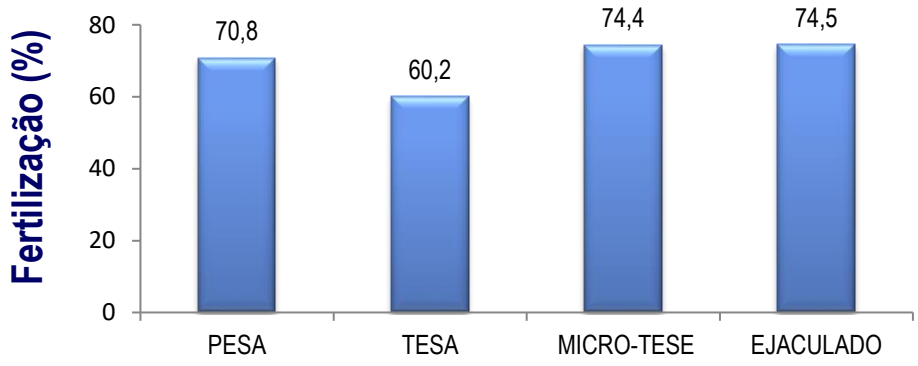


	PESA	TESA	MICRO-TESE	EJACULADO
Ciclos (n)	219	117	54	4812
Idade ± DP	34.9 ± 4.6	34.8 ± 5.4	32.2 ± 2.7	35.8 ± 4.7
Folículos ± DP	20.4 ± 15.4	18.1 ±11.3	15.9 ± 14.4	15.8 ± 12.4
Oocitos recuperados ± DP	14.2 ± 10.8	13.3 ± 9.3	11.0 ± 11.4	11.0 ± 9.0
Oocitos micromanipulados ± DP	9.8 ± 6.4	8.9 ± 5.1	8.0 ± 6.9	7.8 ± 5.8

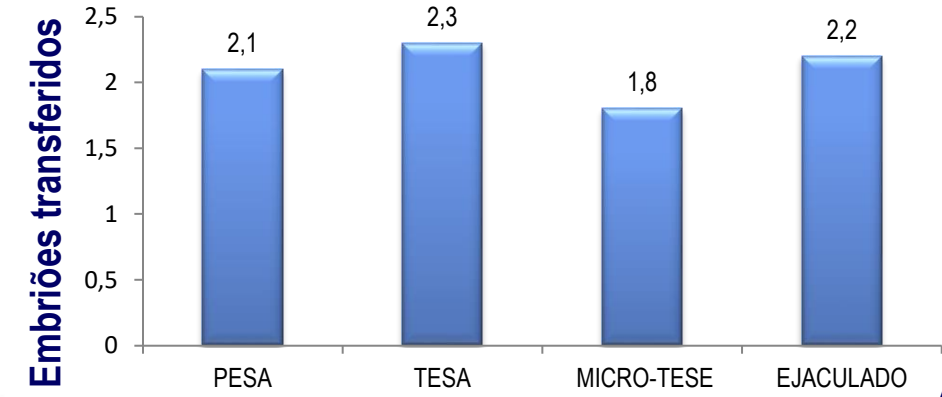
FERTILITY

Fertility Medical Group



	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

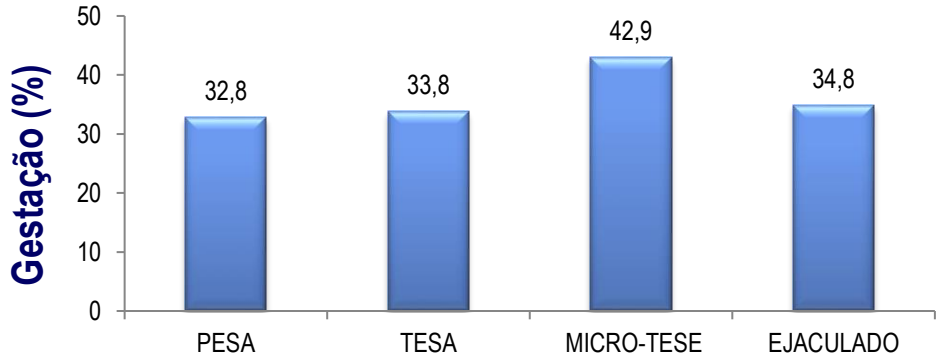


	P
PESA VS TESA	> 0.05
PESA VS MICRO-TESE	> 0.05
PESA VS EJACULADO	> 0.05
TESA VS MICRO-TESE	> 0.05
TESA VS EJACULADO	> 0.05
MICRO-TESE VS EJACULADO	> 0.05

ANOVA

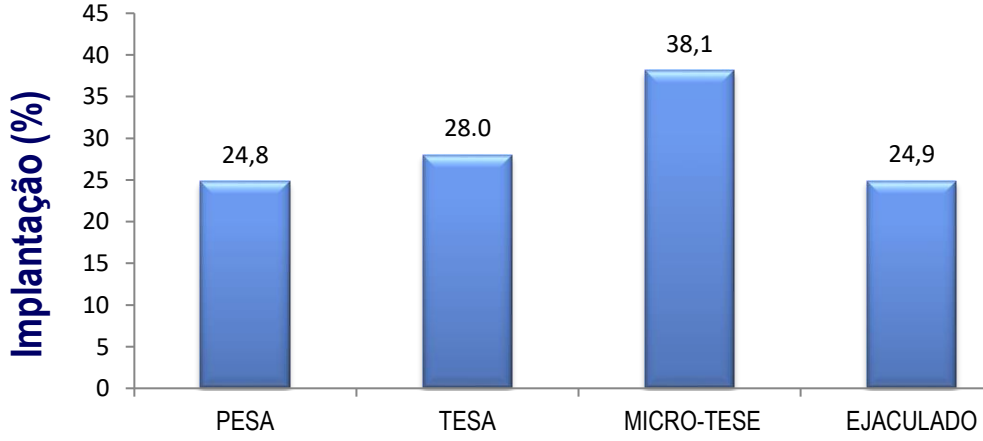
FERTILITY

Fertility Medical Group



	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



	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

Urology, *Volume 75, Issue 1*, *January 2010*, *Pages 87-91*

Infertility

Predictive Factors of Repeat Sperm Aspiration Success

Edson Borges, Jr., Daniela Paes de Almeida Ferreira Braga, Tatiana Carvalho de Sousa Bonetti, Fabio Firmback Pasqualotto, and Assumpto Iaconelli Jr.

- 189 pacientes AO=80 - ANO=109; 290 TESA
- TESA 1X: 143
- TESA 2X: 46
- TESA 3X: 42
- TESA 4X: 19

FERTILITY

Urology, *Volume 75, Issue 1*, *January 2010*, *Pages 87-91*

Infertility

Predictive Factors of Repeat Sperm Aspiration Success

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TESA attempt	*Positive sperm retrieval in a previous attempt*	*Negative sperm retrieval in a previous attempt*
Second	26/28 (92.8%)	3/18 (16.6%)
Third	23/28 (82.1%)	8/14 (57.1%)
Fourth	10/14 (71.4%)	2/5 (40.0%)

Cumulative sperm retrieval rate following a previous fail 35.1%

FERTILITY

MALE FACTOR

Fertility and Sterility® Vol. 83, No. 3, March 2005

Etiology-specific outcomes of intracytoplasmic sperm injection in azoospermic patients

Fábio F. Pasqualotto, M.D., Ph.D.,[a] *Lia Mara Rossi, B.Sc., M.Sc.,*[a,b] *Patrícia Guilherme, B.Sc., M.Sc.,*[a] *Valdemar Ortiz, M.D., Ph.D.,*[c] *Assumpto Iaconelli, Jr., M.D.,*[a] *and Edson Borges, Jr., M.D.*[a]

[a] Fertility – Center for Assisted Reproduction, São Paulo; [b] Jundiai Medical School, São Paulo; and [c] Department of Urology, Federal University of São Paulo, São Paulo, Brazil

	PESA	TESA
2PN (%)[a]	61.4	59.4
1 PN + 3 PN (%)	24.1	12.8
Gestação / ciclo (%)	31.76	22.66
Gestação / paciente (%)	**42.60***	**26.15**
Aborto (%)	**11.11**	**44.11***

MALE FACTOR

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	NOA	Vasectomia	Congenita	Infecção	P
Ciclos / pacientes	102 / 84	99 / 84	25 / 20	31 / 24	
Gestações	22	31	7	7	
2PN (%)	47.3	64.1 [a]	67.7 [a]	58.9	0.041
NF (%)	32.2 [b]	19.2	21.0	30.7 [b]	0.005
Gestação / ciclo (%)	21.56	31.31	28	22.58	0.812
Gestação / paciente (%)	26.2	36.1	35	29.2	0.812
Implantação (%)	12.5	13.4	28.5 [c]	12.9	0.032
Aborto (%)	45.6 [d]	25.8	28.57	28.57	0.614

Received: 30 December 2020 | Revised: 16 April 2021 | Accepted: 20 April 2021
DOI: 10.1111/and.14096

ORIGINAL ARTICLE

aNDROLOGIa WILEY

Does acquired obstructive azoospermia have less impact than congenital azoospermia on ICSI results? Systematic review and meta-analysis

Leonardo Seligra Lopes[1] | Willy Baccaglini[1] | Bruno von Muhlen[1] | Felipe Placco Araujo Glina[1] | Sergio Albertini Daiuto[1] | Cristiano Linck Pazeto[1] | Sidney Glina[1,2]

Comparing specifically post-vasectomy azoospermia and congenital groups, both presented:

- a similar fertilization rate (62.4% vs. 53.4%, respectively; OR 1.10; 95% CI, 0.79, 1.54; $p = .56$; $I_2 = 89\%$).
- a similar pregnancy rate per cycle (39.4% vs. 35.6%, respectively; OR 1.26; 95% CI, 0.96, 1.66; $p = .09$; $I_2 = 0\%$).
- Higher live birth rate was identified in the congenital group compared to vasectomy group (28.4% × 19.5%; OR 1.54; 95% CI, 1.11, 2.15; $p = .01$; $I_2 = 0\%$).

Journal of Assisted Reproduction and Genetics
https://doi.org/10.1007/s10815-020-01940-1

REVIEW

Impact on using cryopreservation of testicular or epididymal sperm upon intracytoplasmic sperm injection outcome in men with obstructive azoospermia: a systematic review and meta-analysis

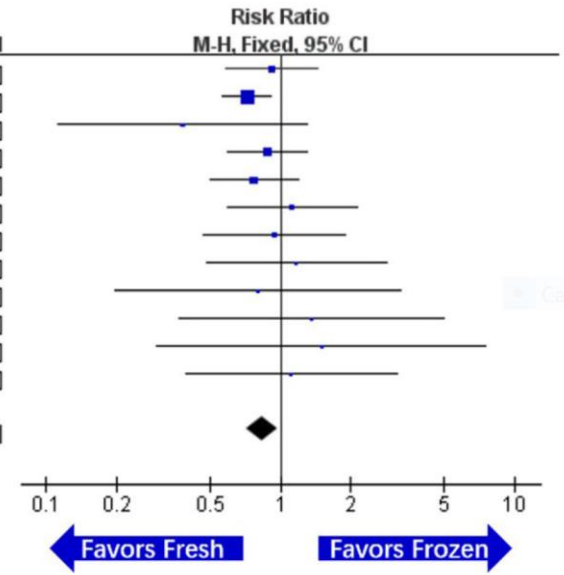
Hanchao Liu[1] · Yun Xie[1] · Linzhi Gao[2] · Xiangzhou Sun[1] · Xiaoyan Liang[2] · Chunhua Deng[1] · Yong Gao[3] · Guihua Liu[2]

b

Study or Subgroup	Experimental Events	Experimental Total	Control Events	Control Total	Weight	Risk Ratio M-H, Fixed, 95% CI
Aamir Javed et al., 2019	22	65	27	73	12.2%	0.92 [0.58, 1.44]
Gianpiero D.Palermo et al., 1999	52	112	83	129	36.9%	0.72 [0.57, 0.91]
H. Shibahara et al., 1999	3	13	3	5	2.1%	0.38 [0.11, 1.31]
Herman Tournaye et al., 1999	28	100	46	145	18.0%	0.88 [0.59, 1.31]
Jas Kalsi et al., 2010	15	42	80	173	14.9%	0.77 [0.50, 1.19]
Jason R. Kovac et al., 2014	6	11	17	35	3.9%	1.12 [0.59, 2.13]
S.J.Silber et al., 1995	4	7	20	33	3.3%	0.94 [0.47, 1.89]
Selahittin Cayan et al., 2001	7	19	6	19	2.9%	1.17 [0.48, 2.83]
Shevach Friedler et al., 1998b	2	8	5	16	1.6%	0.80 [0.20, 3.25]
Shevach Friedler et al., 1998a	5	11	2	6	1.2%	1.36 [0.37, 5.02]
Simon Wood et al., 2002	3	13	2	13	1.0%	1.50 [0.30, 7.55]
Zsolt Nagy et al.,1995	3	9	12	40	2.1%	1.11 [0.39, 3.14]
Total (95% CI)		**410**		**687**	**100.0%**	**0.84 [0.72, 0.97]**
Total events	150		303			

Heterogeneity: Chi² = 6.19, df = 11 (P = 0.86); I² = 0%

Test for overall effect: Z = 2.29 (P = 0.02)



Epididymal
Clinical pregnancy rate

Journal of Assisted Reproduction and Genetics
https://doi.org/10.1007/s10815-020-01940-1

REVIEW

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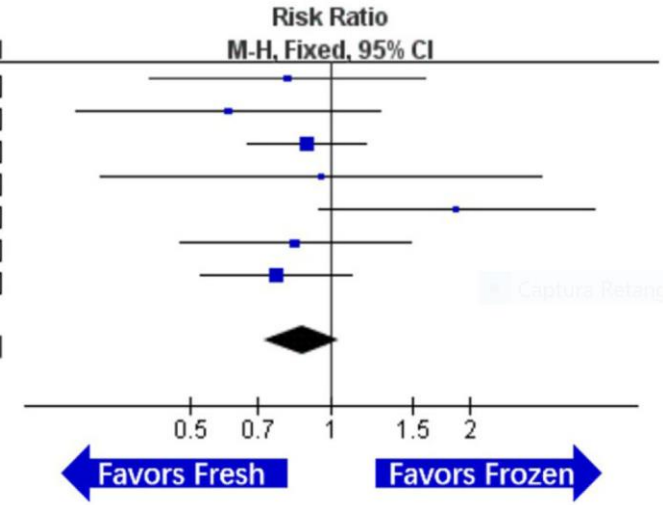
b

Study or Subgroup	Experimental Events	Total	Control Events	Total	Weight	Risk Ratio M-H, Fixed, 95% CI
Amr Abdel Raheem et al., 2013	14	41	8	19	8.5%	0.81 [0.41, 1.60]
Bin Wu et al., 2005	5	12	11	16	7.3%	0.61 [0.29, 1.28]
Guanling Yu et al., 2018	27	49	66	107	32.2%	0.89 [0.67, 1.20]
Helga Habermann et al., 2000	8	25	3	9	3.4%	0.96 [0.32, 2.84]
Jas Kalsi et al., 2010	9	15	9	28	4.9%	1.87 [0.95, 3.68]
Meric Karacan et al., 2013	13	45	23	67	14.4%	0.84 [0.48, 1.48]
Yong-Seog Park et al., 2003	37	109	31	70	29.3%	0.77 [0.53, 1.11]
Total (95% CI)		**296**		**316**	**100.0%**	**0.87 [0.72, 1.05]**
Total events	113		151			

Heterogeneity: Chi² = 6.33, df = 6 (P = 0.39); I² = 5%

Test for overall effect: Z = 1.45 (P = 0.15)



Tesicular
Clinical pregnancy rate

FERTILITY

RBMO

ELSEVIER

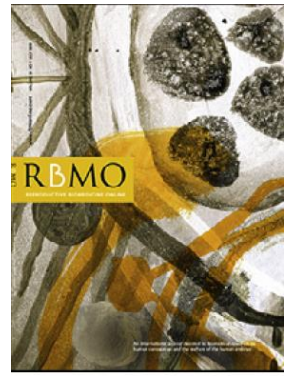
ARTICLE

The obstructive interval predicts pregnancy rates in post-vasectomy patients undergoing ICSI with surgical sperm retrieval

BIOGRAPHY

Edson Borges Jr obtained his MD degree in 1984 (University of Campinas), PhDs in urology in 2005 (Federal University of São Paulo) and in gynaecology in 2007 (São Paulo State University). He is founder and managing partner of Fertility Medical Group and director at Sapientiae Institute, São Paulo, Brazil.

Edson BorgesJr[1,2,*], Daniela Paes de Almeida Ferreira Braga[1,2], Assumpto Iaconelli Jr[1,2], Amanda Souza Setti[1,2]



RBMO VOLUME 39 ISSUE 1 2019

TABLE 2 INFLUENCE OF THE OBSTRUCTIVE INTERVAL ON SSR OUTCOMES

				95% CI	
SSR parameter[a]	**Estimate (β)**	**SE**	***P*-value**	**Lower bound**	**Upper bound**
Presence of spermatozoa during PESA	−0.032	0.012	0.009	−0.056	−0.009
Presence of motile spermatozoa during PESA	−0.031	0.012	0.010	−0.054	−0.008
Need to convert to TESA	0.012	0.004	0.003	0.004	0.019

CI = confidence interval; PESA = percutaneous epididymal sperm aspiration; SE = standard error; SSR = surgical sperm retrieval; TESA = testicular sperm aspiration.

[a] Adjusted for paternal age, smoking habit, previous vasectomy reversal attempt, hormonal profile and abnormalities found in the male partner physical examination.

TABLE 4 INFLUENCE OF THE OBSTRUCTIVE INTERVAL ON THE OUTCOMES OF ICSI WITH SSR

				95% CI	
ICSI outcome	**Estimate (β)**	**SE**	***P*-value**	**Lower bound**	**Upper bound**
Fertilization rate[a]	–0.098	0.302	NS	–0.696	0.500
Day 2 high-quality embryos rate[a]	–0.001	0.003	NS	–0.007	0.005
Day 3 high-quality embryos rate[a]	0.001	0.003	NS	–0.003	0.007
Blastocyst development rate[a]	–0.011	0.004	0.014	–0.019	–0.002
Clinical pregnancy rate[b]	–0.016	0.007	0.031	–0.031	–0.001
Implantation rate[b]	–1.107	0.530	0.039	–2.157	–0.056
Miscarriage rate[b]	0.006	0.009	NS	–0.012	0.025

[a] Adjusted for maternal and paternal ages, paternal smoking habit, previous vasectomy reversal attempt, paternal hormonal profile and abnormalities found in the male partner physical examination, and number of retrieved oocytes.
[b] Adjusted for the same variables cited above plus number of transferred embryos.CI = confidence interval; ICSI = intracytoplasmic sperm injection; NS = not significant; SE = standard error; SSR = surgical sperm retrieval.

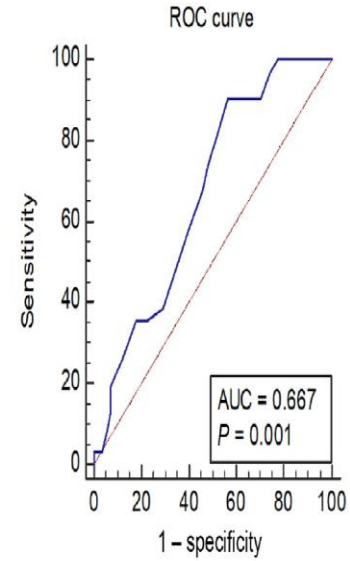


FIGURE 1 Receiver operating characteristic (ROC) curve for predicting clinical pregnancy using obstruction interval as test variable.

JBRA Assisted Reproduction 2020;**24**(1):87-88
doi: 10.5935/1518-0557.20190068

Case report

Successful twin pregnancy with intracytoplasmic sperm injection using surgical sperm retrieval after 25 years of vasectomy: a case report

Edson Borges Jr.[1,2], Amanda Souza Setti[1,2], Daniela Paes de Almeida Ferreira Braga[1,2], Assumpto Iaconelli Jr.[1,2]

[1]Fertility Medical Group, São Paulo, SP - Brazil.
[2]Instituto Sapientiae - Centro de Estudos e Pesquisa em Reprodução Humana Assistida, São Paulo, SP - Brazil.

The couple from this clinical case consisted of a 55 years old male with an obstructive interval of 25 years post vasectomy, and a 38 years old female partner.

A clinical pregnancy was confirmed by the detection of two gestational sacs with foetal heartbeats.

FERTILITY

https://fertility.com.br/aulas-ministradas/

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Obrigado!

Dr. Edson Borges Jr.
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E-mail: edson@fertility.com.br

FERTILITY
MEDICAL GROUP

FERTILITY


FERTILITY


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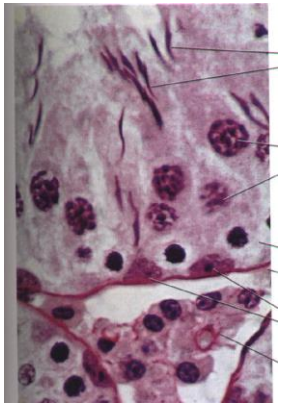
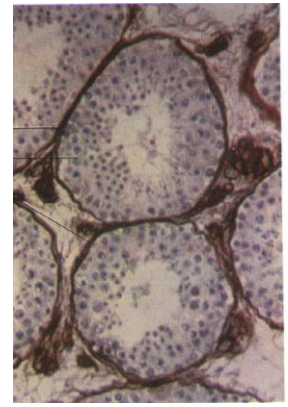


Biópsia Testicular



- Possibilidade de congelar espermatozoides / tecido testicular

- Diagnóstico de CA *in situ* (CIS): 1 - 3% pacientes com inferilidade masculina

- Realização com técnica microcirúrgica no momento do ICSI

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ESPERMATOZOIDE EJACULADO

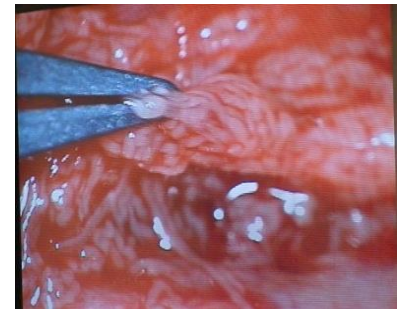
Espermatozoide do epidídimo

PERCUTANEOUS
EPIDYDIMAL
SPERM
ASPIRATION

Espermatozoide do testículo

TESTICULAR
SPERM
. ASPIRATION
. EXTRATION

MICRO
TESTICULAR
SPERM
EXTRACTION



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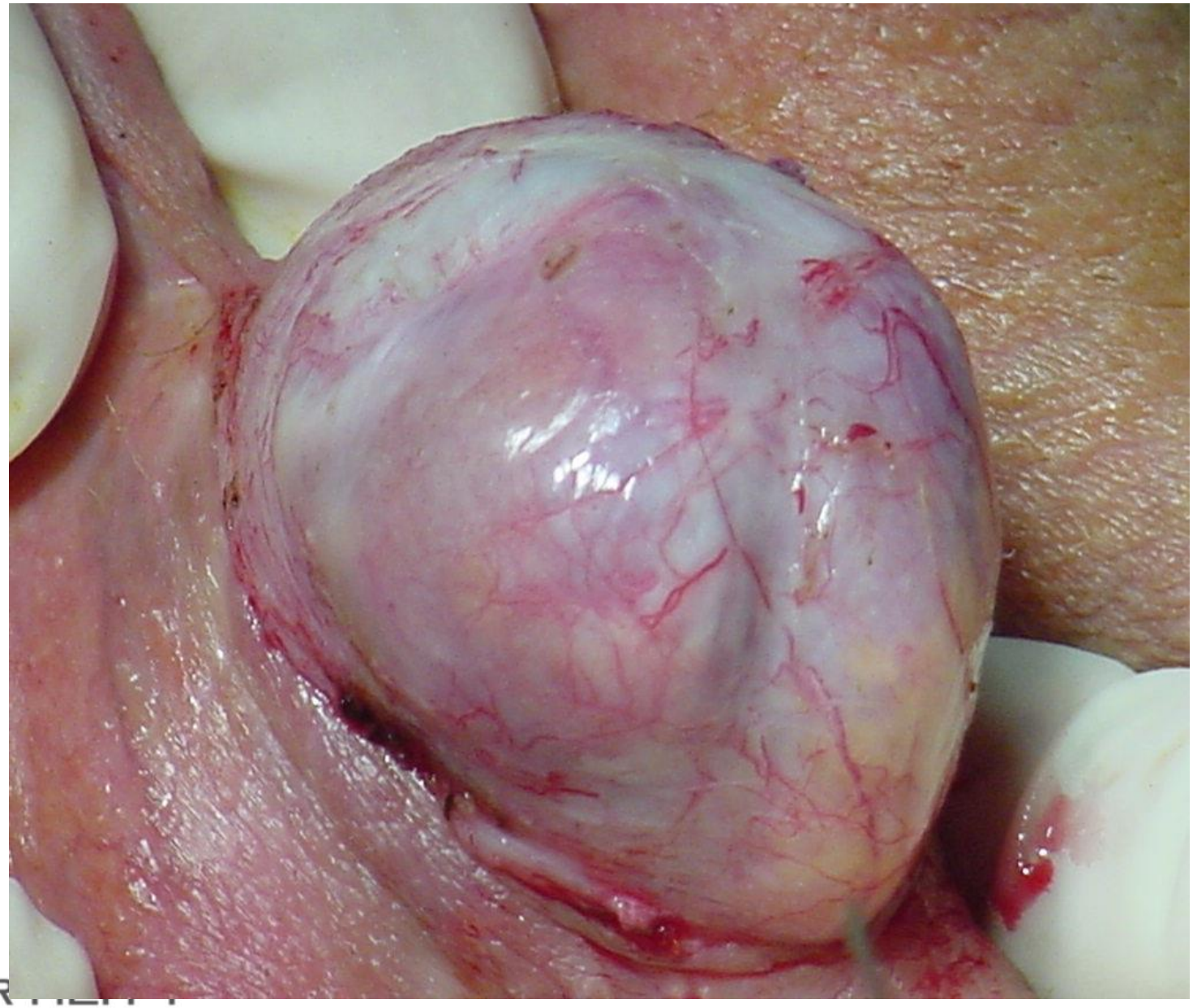

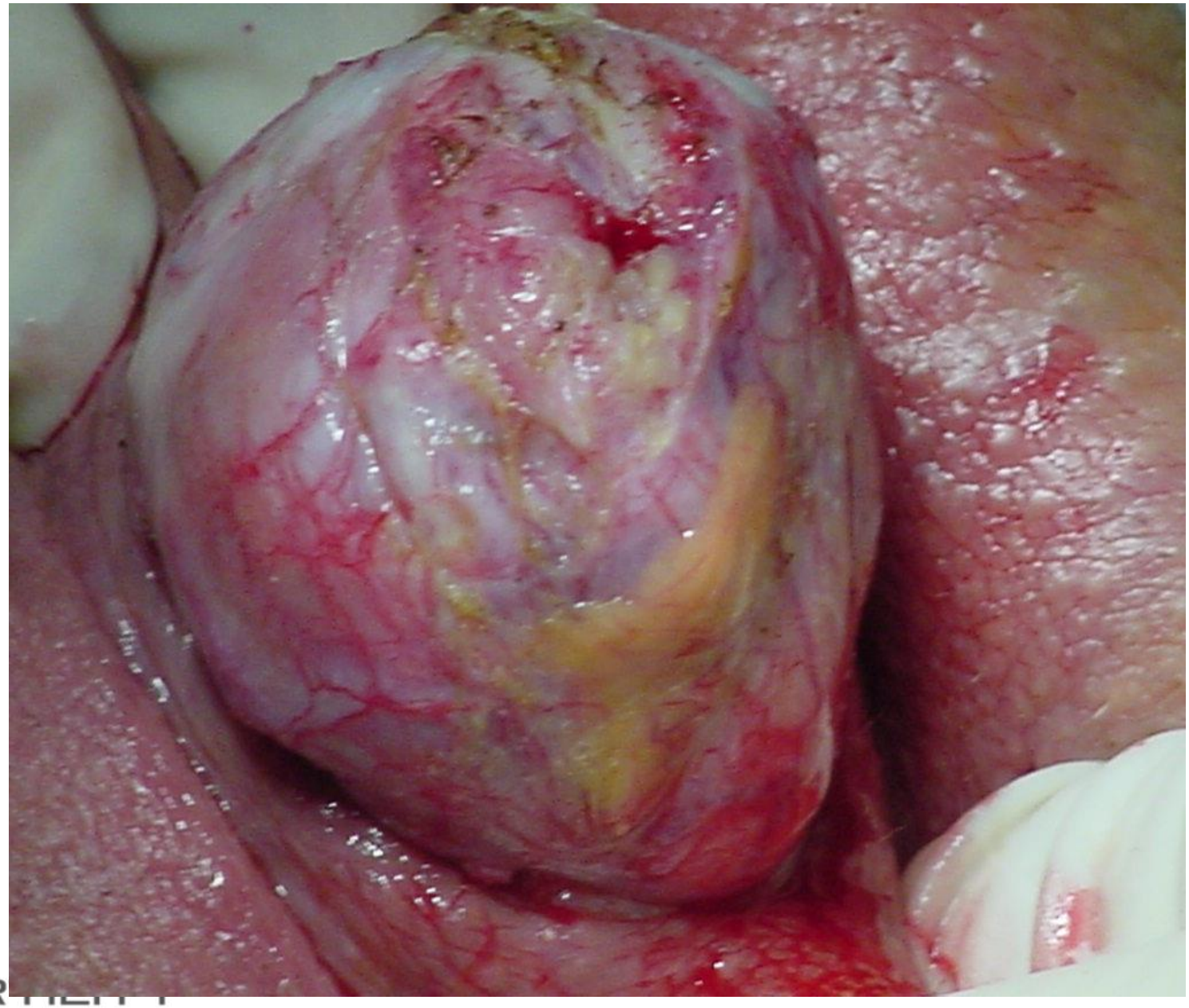

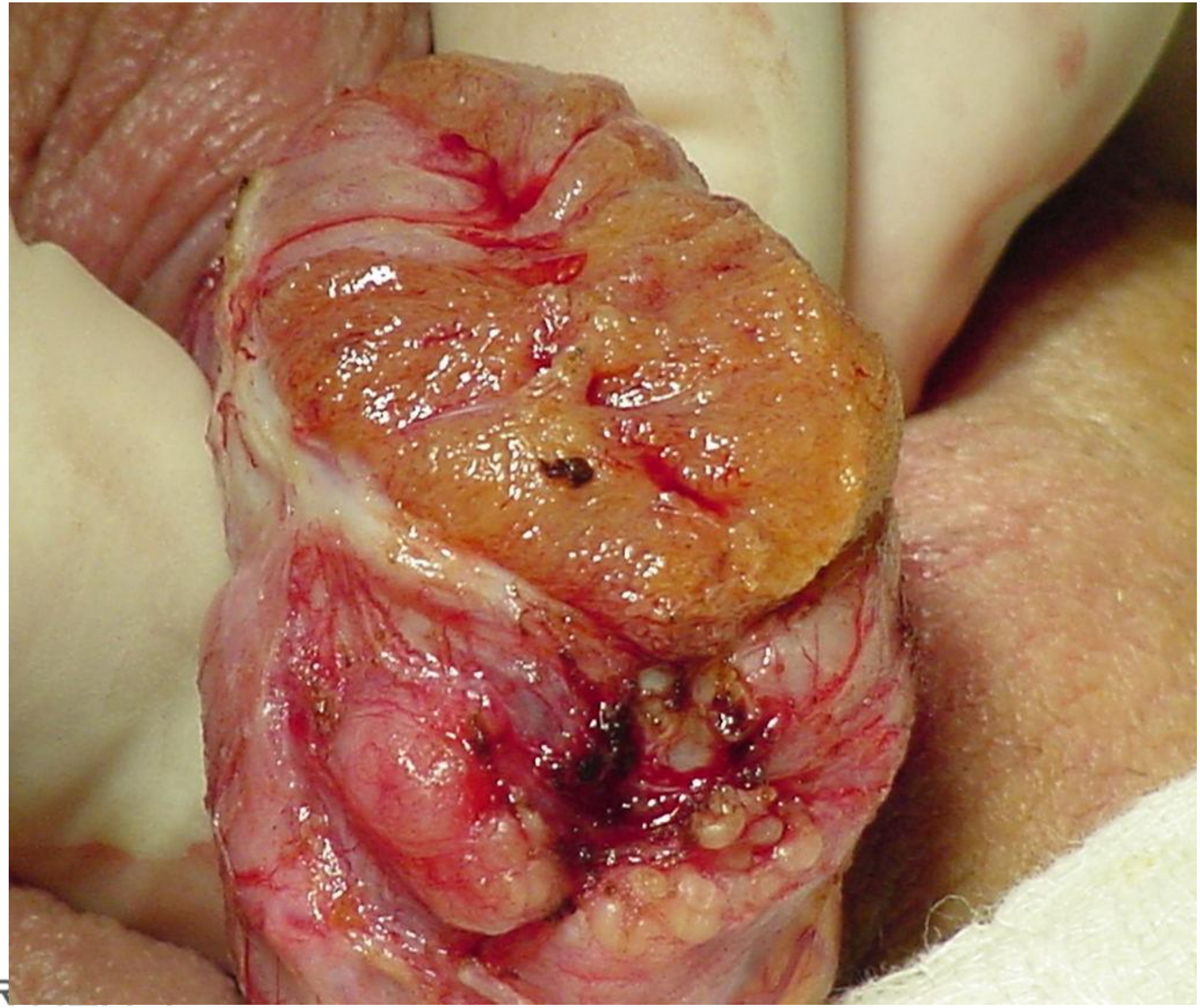

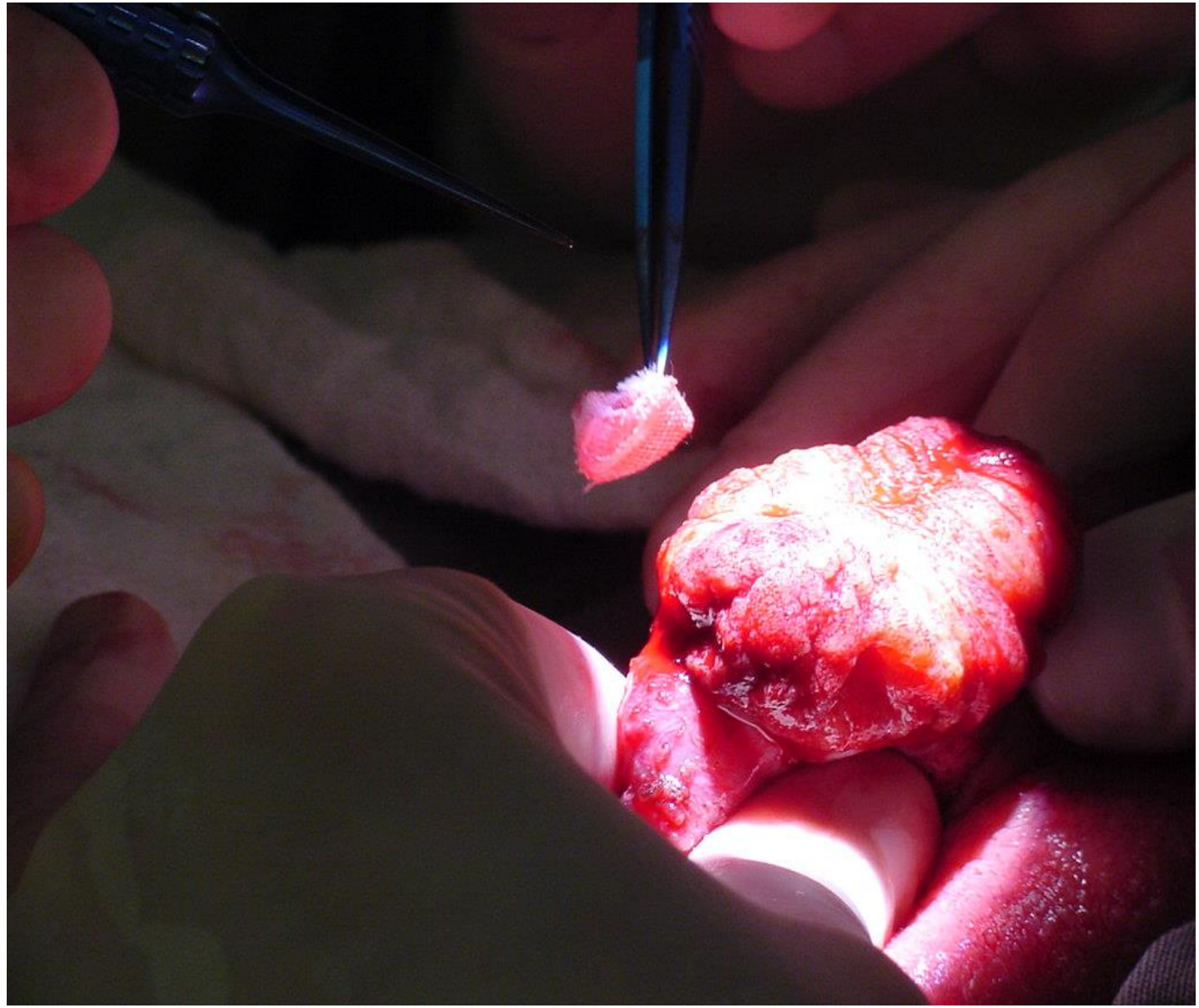

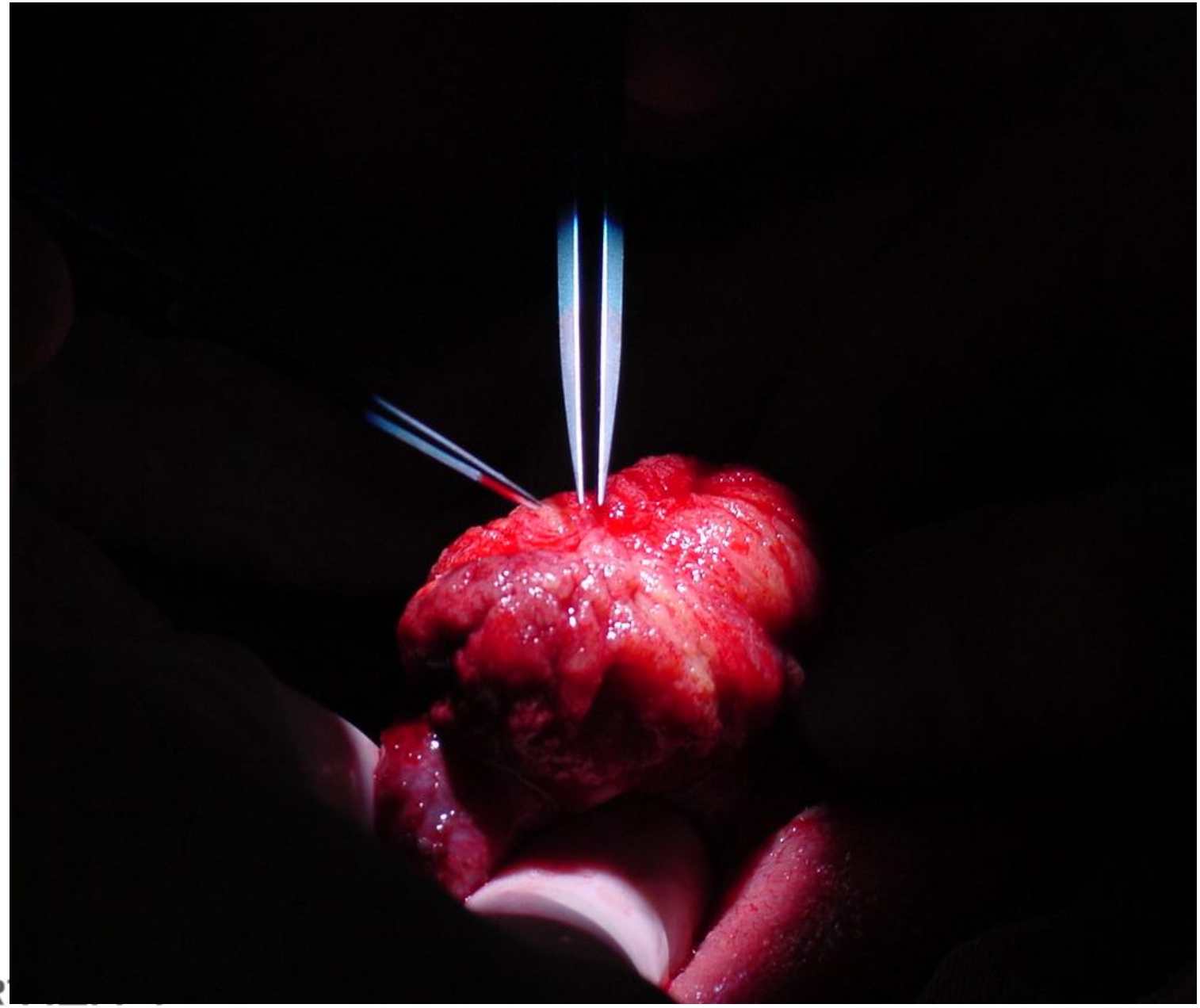

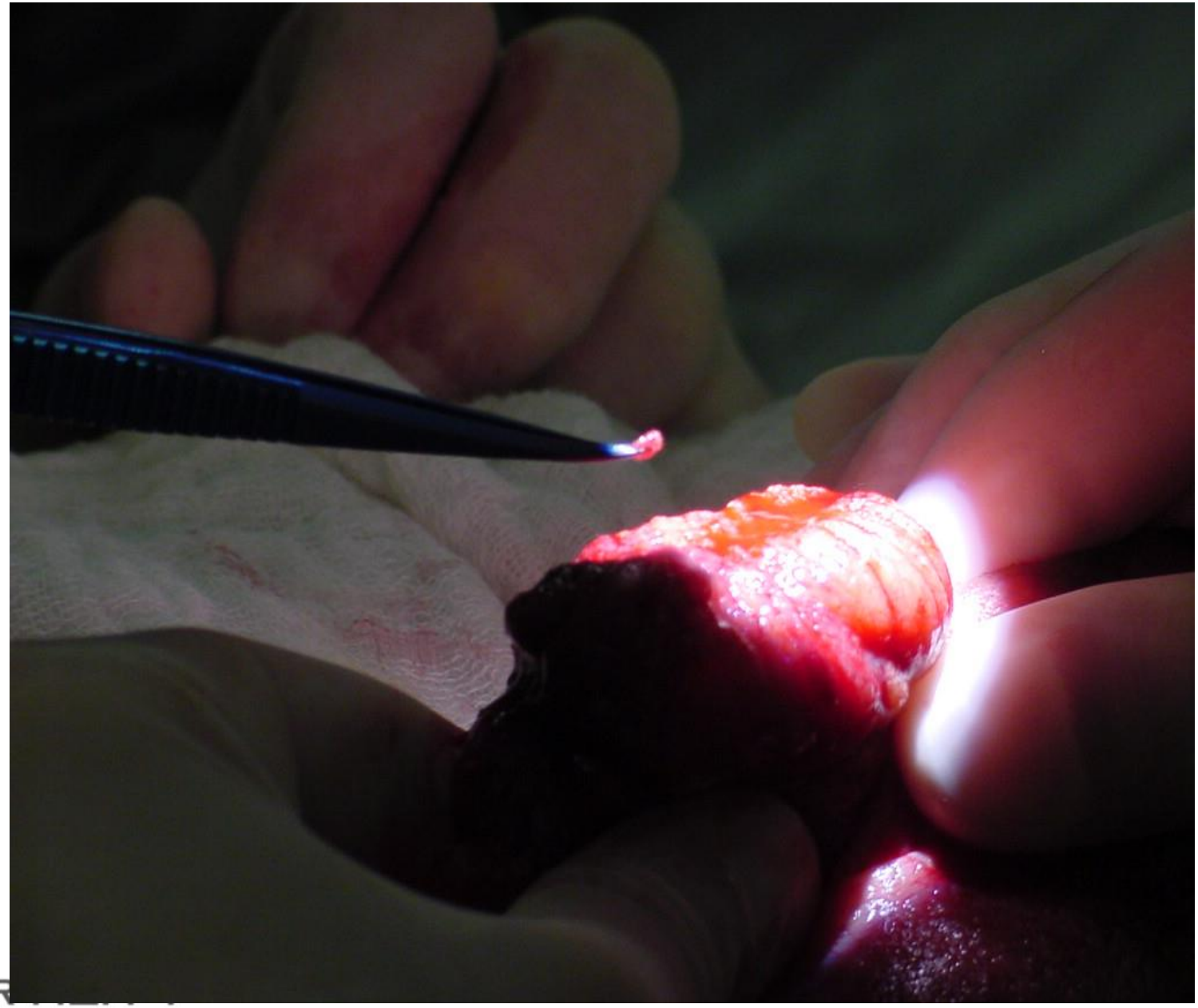

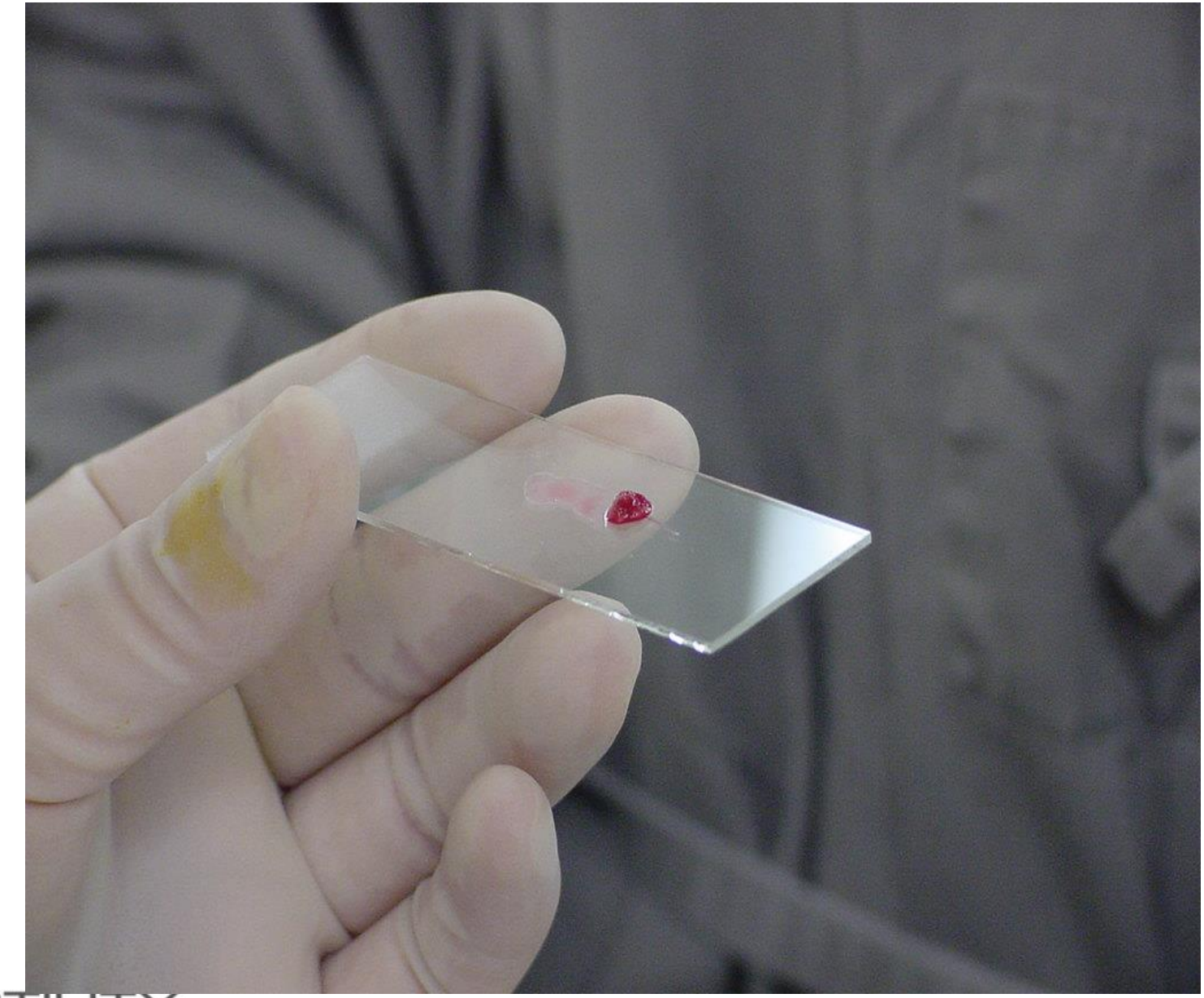

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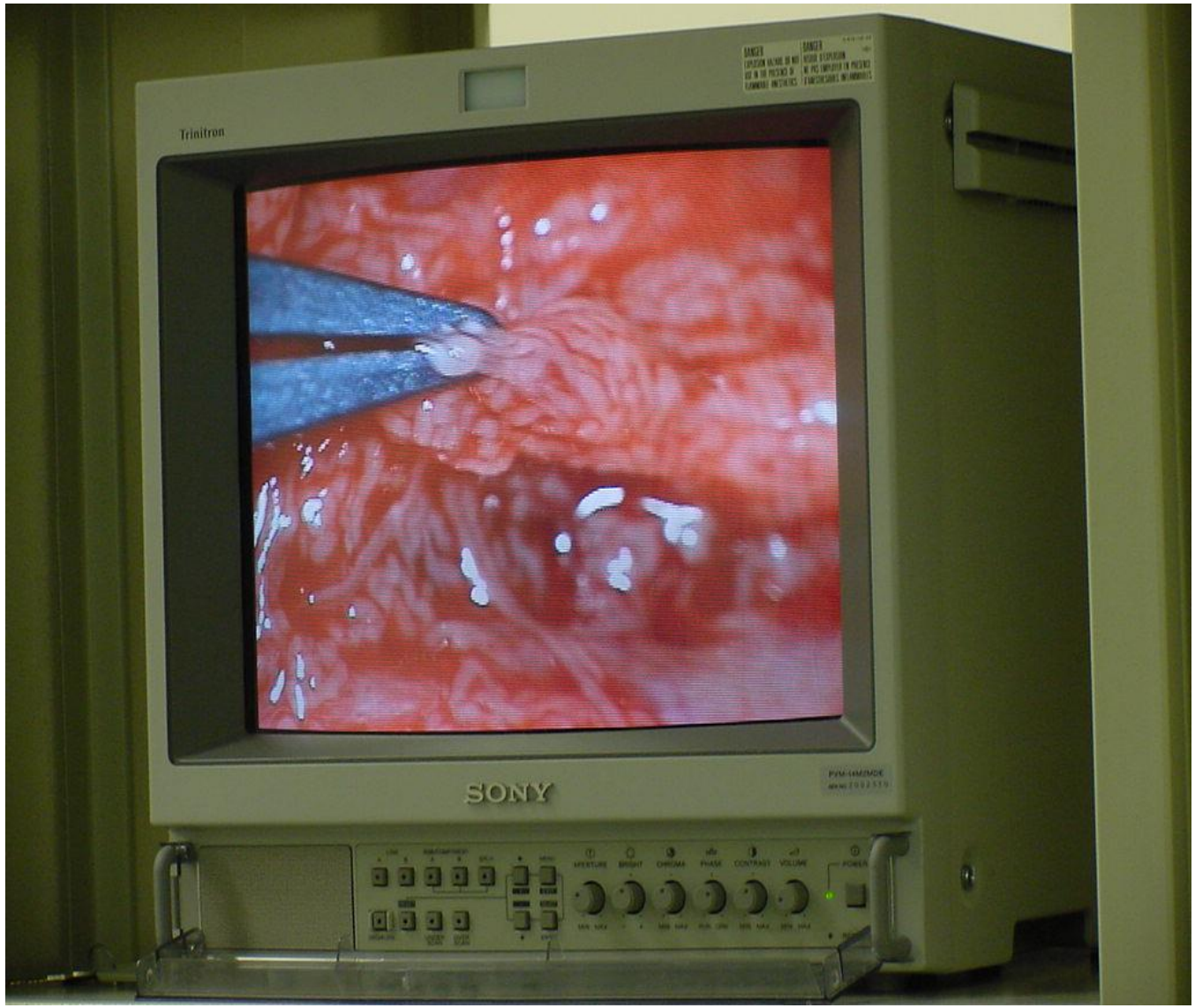

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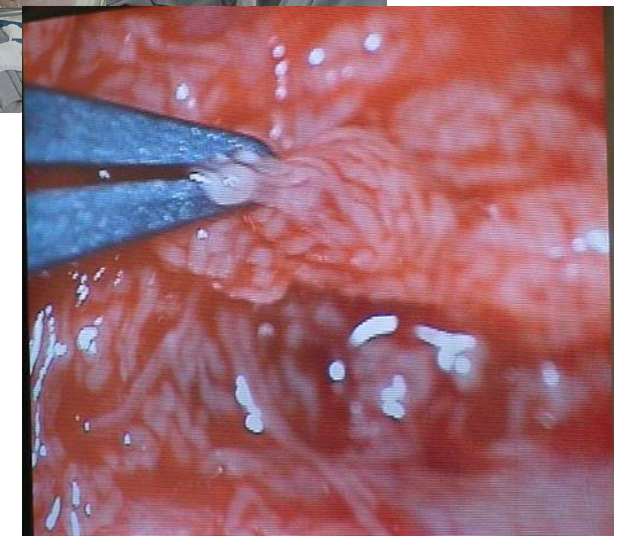
PESA / TESA / microTESE



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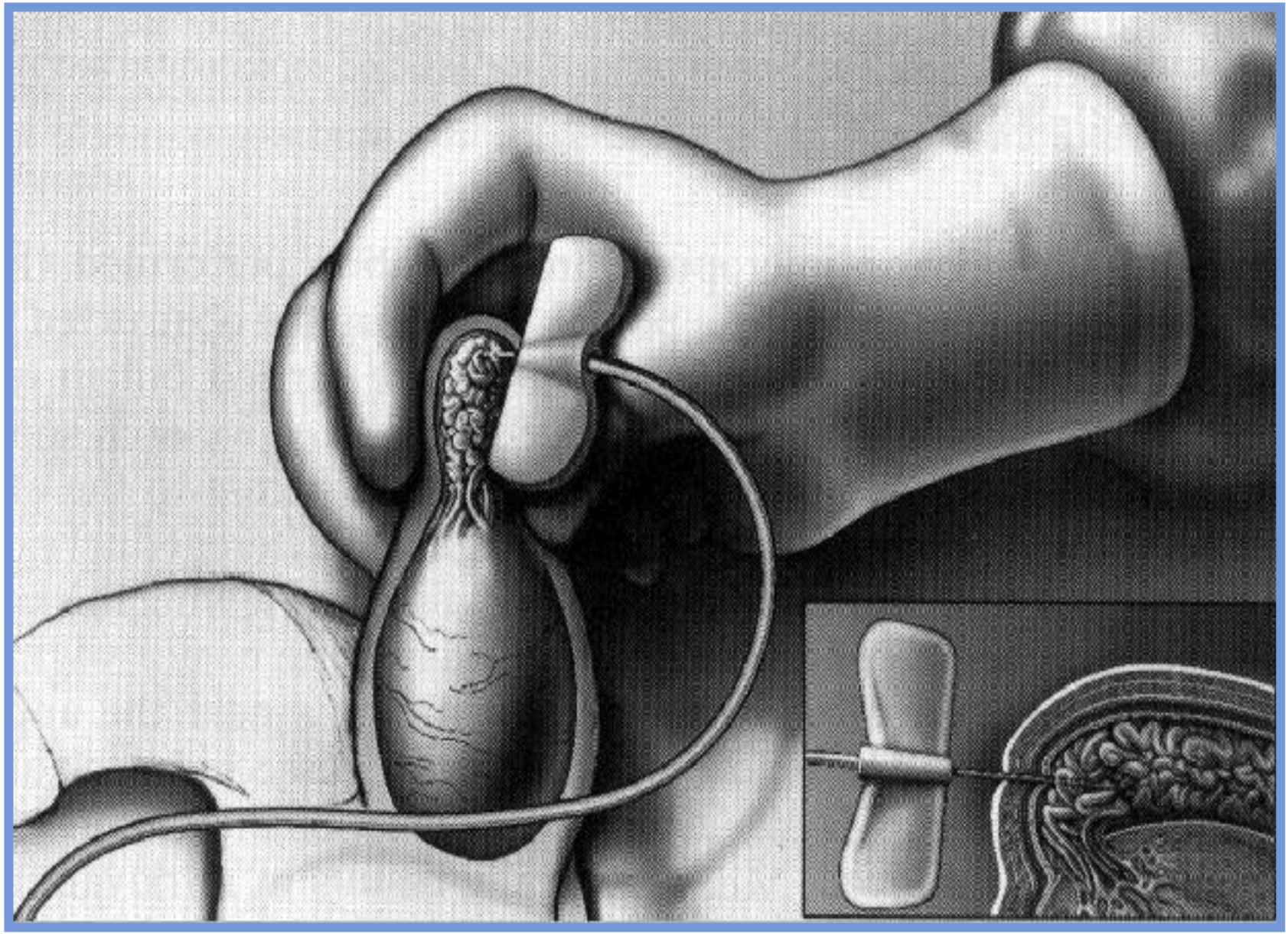

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FERTILITY

Human Reproduction, Vol.33, No.7 pp. 1218–1227, 2018
Advanced Access publication on May 17, 2018 doi:10.1093/humrep/dey101

human reproduction ORIGINAL ARTICLE *Andrology*

Pregnancy after vasectomy: surgical reversal or assisted reproduction?

U. Valerie[1], S. De Brucker[2], M. De Brucker[1,3,*], V. Vloeberghs[1], P. Drakopoulos[1], S. Santos-Ribeiro[1], and H. Tournaye[1]

[1]Department of Gynaecology and Fertility, Universitair Ziekenhuis Brussel, Laarbeeklaan 101, B1090 Brussels, Belgium [2]Department of Urology, Universitair Ziekenhuis Brussel, Laarbeeklaan 101, B1090 Brussels, Belgium [3]Department of Obstetrics and Gynaecology, CHU Tivoli, Avenue Max Buset, B7100 La Louvière, Belgium

- Recanalisation of the vas seems to be a reasonable alternative for patients who do not wish to undergo immediate IVF/ICSI.
- In those who opt for ART immediately, the cumulative pregnancy rates seem comparable but the pregnancies occurred earlier.

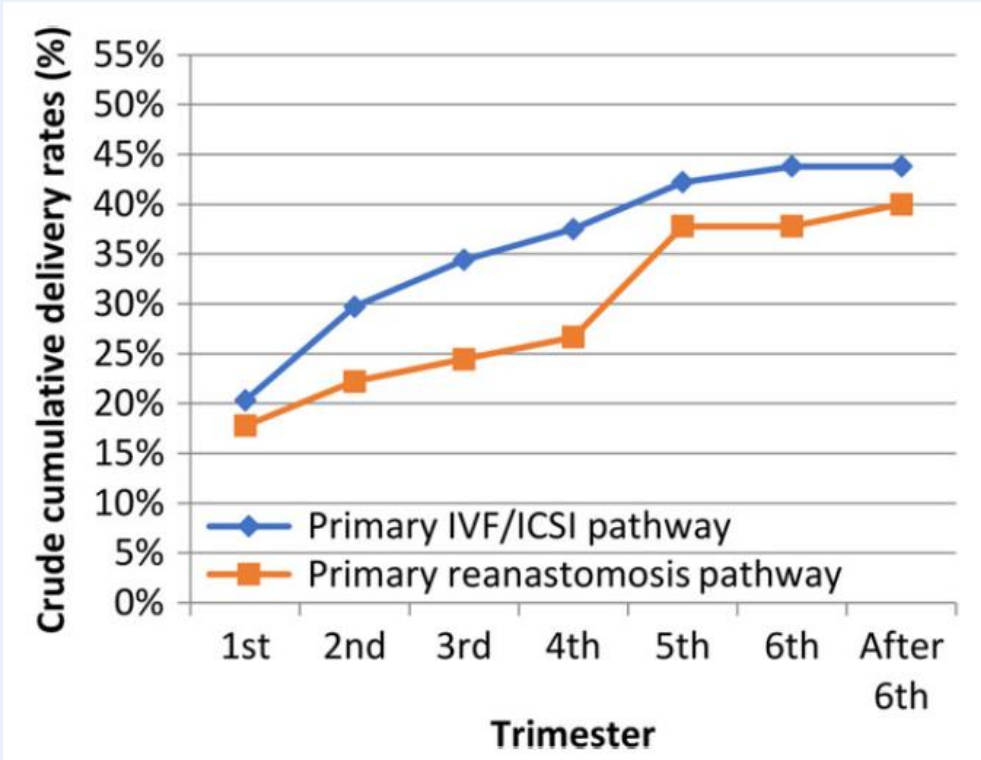
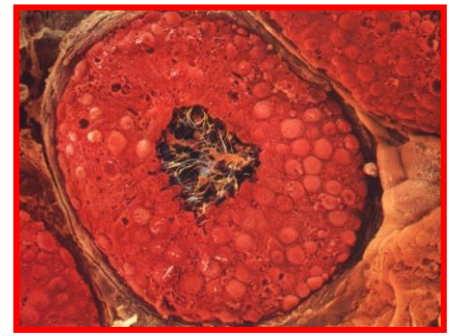


Figure 3 Crude cumulative delivery rates in the primary IVF/ICSI pathway ($n = 64$) and the primary reanastomosis pathway ($n = 45$).

AZOOSPERMIA OBSTRUTIVA (excretora)

- *CONGÊNITA*
  - Agenesia congênita bilateral dos ductos deferentes



- *ADQUIRIDA*
  - Processos inflamatórios-infecciosos dos epidídimos / traumas
  - Vasectomia
  - Neurológica
  - Obstrução ductos ejaculatórios

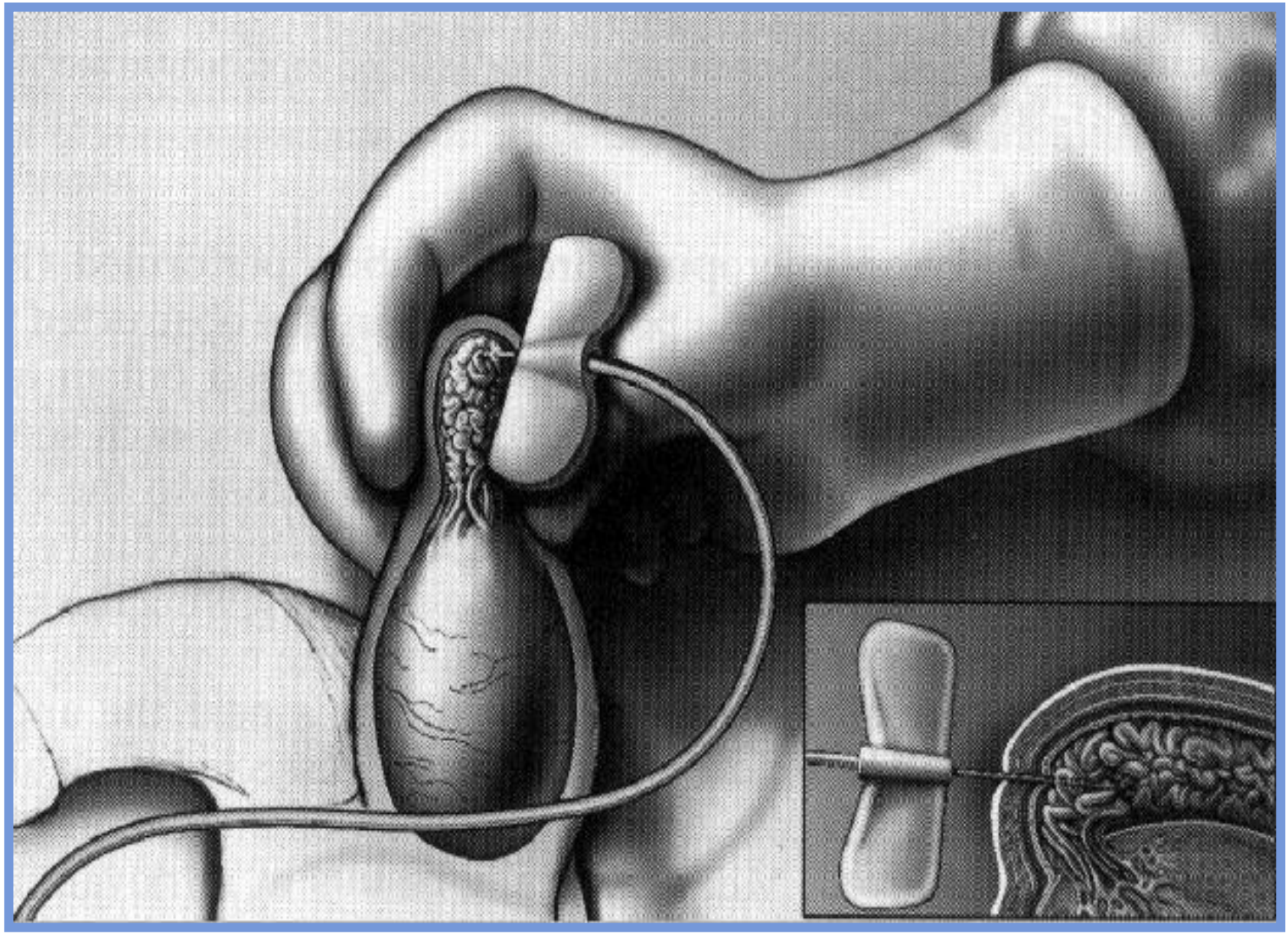
FERTILITY

TESE MICROCIRURGICA
MicroTESE

PETER SCHLEGEL. *HUMAN REPROD*, 14: 131-135, 1999

SHERMAN J. SILBER. *HUMAN REPROD*, 15: 2278-2284, 2000

FERTILITY



FERTILITY

REVERSÃO DA VASECTOMIA

XXXVIII CONGRESSO EIRO LOGIA
DF
EMBRO | 2021

TABLE 2 Operative outcomes of the vasovasostomy and the vasoepididymostomy

First Author	Year	Patient number	Mean patient's age (years)	Mean obstructive interval (years)	Surgical procedure	Anastomosis method	Operative time (min)	Patency rate (%)	Pregnancy rate (%)
Bolduc[38]	2007	747	37	6.8	MVV	1 layer	–	86	33
Patel[39]	2008	106	40	8.2	MVV	1 layer/2 layer	–	98	–
Jee[40]	2010	25	39	7.1	MVV	1 layer	106	96	40
		25	39	6.9	LAVV	1 layer	78	72	28
Peng[41,a]	2011	73	31	–	MVE	LIVE	–	72	33
Parekattil[42]	2012	28	–	–	MVV	2 layer	97	80	–
Schwarzer[43]	2012	1303	41	8.2	MVV/MVE	3 layer	110	89	59
Li[44]	2013	34	39	9.2	MVV/MVE	2 layer	120	94	68
Mul[28]	2014	1229	41	10.0	MVV/MVE	1 layer/2 layer	–	84	–
Chen[6,a]	2014	62	31	–	MVV/MVE	2 layer	–	57	29
Kavoussi[45]	2015	27	–	–	MVV/MVE	1 layer/2 layer	141	89	22
Nyame[34]	2016	86	40	8.0	MVV	2 layer	165	89	–
		20	43	9.5	MVV	1 layer	120	93	–
Wang[46,a]	2017	56	28	24.1	MVV	2 layer	–	88	43

LAVV, loupe-assisted vasovasostomy; LIVE, longitudinal intussusception vasoepididymostomy; MVE, microscopic vasoepididymostomy; MVV, microsco
[a]Report for only the patients with obstructive azoospermia following childhood herniorrhaphy.

38
21

Vasovasostomy and vasoepididymostomy: Review of the procedures, outcomes, and predictors of patency and pregnancy over the last dec
Takeshi Namekawa | Takashi Imamoto | Mayuko Kato | Akira Kmiya | Tomohiko Ichikawa
Reprod Med Biol. 2018;1–13.

patency rate=87%
pregnacy rate=49%

MALE FACTOR

Fertility and Sterility® Vol. 83, No. 3, March 2005

Etiology-specific outcomes of intracytoplasmic sperm injection in azoospermic patients

Fábio F. Pasqualotto, M.D., Ph.D.,[a] Lia Mara Rossi, B.Sc., M.Sc.,[a,b] Patrícia Guilherme, B.Sc., M.Sc.,[a] Valdemar Ortiz, M.D., Ph.D.,[c] Assumpto Iaconelli, Jr., M.D.,[a] and Edson Borges, Jr., M.D.[a]

[a] Fertility – Center for Assisted Reproduction, São Paulo; [b] Jundiai Medical School, São Paulo; and [c] Department of Urology, Federal University of São Paulo, São Paulo, Brazil

	NOA	Vasectomia	Congenita	Infecção	P
Ciclos / pacientes	102 / 84	99 / 84	25 / 20	31 / 24	
Gestações	22	31	7	7	
2PN (%)	47.3	64.1 [a]	67.7 [a]	58.9	0.041
NF (%)	32.2 [b]	19.2	21.0	30.7 [b]	0.005
Gestação / ciclo (%)	21.56	31.31	28	22.58	0.812
Gestação / paciente (%)	26.2	36.1	35	29.2	0.812
Implantação (%)	12.5	13.4	28.5 [c]	12.9	0.032
Aborto (%)	45.6 [d]	25.8	28.57	28.57	0.614

Journal of Assisted Reproduction and Genetics
https://doi.org/10.1007/s10815-020-01940-1

REVIEW

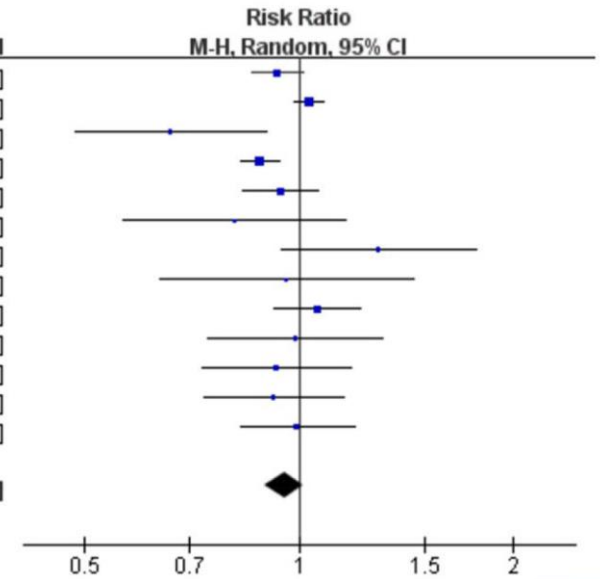
Impact on using cryopreservation of testicular or epididymal sperm upon intracytoplasmic sperm injection outcome in men with obstructive azoospermia: a systematic review and meta-analysis

Hanchao Liu[1] · Yun Xie[1] · Linzhi Gao[2] · Xiangzhou Sun[1] · Xiaoyan Liang[2] · Chunhua Deng[1] · Yong Gao[3] · Guihua Liu[2]

a

Study or Subgroup	Experimental Events	Experimental Total	Control Events	Control Total	Weight	Risk Ratio M-H, Random, 95% CI
Aamir Javed et al., 2019	311	474	431	613	14.0%	0.93 [0.86, 1.01]
Gianpiero D.Palermo et al., 1999	747	1006	1027	1429	16.7%	1.03 [0.98, 1.08]
H. Shibahara et al., 1999	34	75	35	51	3.4%	0.66 [0.48, 0.90]
Herman Tournaye et al., 1999	684	1255	1125	1821	15.7%	0.88 [0.83, 0.94]
Jason R. Kovac et al., 2014	91	124	241	310	11.0%	0.94 [0.84, 1.07]
Paul Devroey et al., 1995	28	68	39	77	2.6%	0.81 [0.57, 1.16]
Rakesh K. Sharma et al., 1997	20	30	52	101	3.3%	1.29 [0.94, 1.78]
Robert D.Oates et al., 1996	28	103	41	145	2.1%	0.96 [0.64, 1.45]
Selahittin Cayan et al., 2001	194	313	139	238	9.8%	1.06 [0.92, 1.22]
Shevach Friedler et al., 1998a	62	114	33	60	3.9%	0.99 [0.74, 1.31]
Shevach Friedler et al., 1998b	51	98	75	134	4.9%	0.93 [0.73, 1.18]
Simon Wood et al., 2002	57	96	58	90	5.5%	0.92 [0.74, 1.15]
Zsolt Nagy et al.,1995	59	106	306	547	7.1%	0.99 [0.83, 1.20]
Total (95% CI)		**3862**		**5616**	**100.0%**	**0.96 [0.90, 1.02]**
Total events	2366		3602			

Heterogeneity: Tau² = 0.01; Chi² = 29.03, df = 12 (P = 0.004); I² = 59%
Test for overall effect: Z = 1.40 (P = 0.16)



Epididymal Fertilization rate

Journal of Assisted Reproduction and Genetics
https://doi.org/10.1007/s10815-020-01940-1

REVIEW

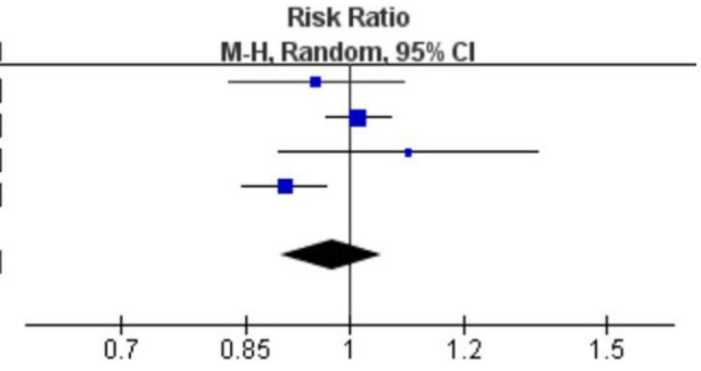
Impact on using cryopreservation of testicular or epididymal sperm upon intracytoplasmic sperm injection outcome in men with obstructive azoospermia: a systematic review and meta-analysis

Hanchao Liu[1] · Yun Xie[1] · Linzhi Gao[2] · Xiangzhou Sun[1] · Xiaoyan Liang[2] · Chunhua Deng[1] · Yong Gao[3] · Guihua Liu[2]

a

Study or Subgroup	Experimental Events	Experimental Total	Control Events	Control Total	Weight	Risk Ratio M-H, Random, 95% CI
Bin Wu et al., 2005	100	147	174	243	19.2%	0.95 [0.83, 1.09]
Guanling Yu et al., 2018	582	802	1313	1838	36.3%	1.02 [0.96, 1.07]
Helga Habermann et al., 2000	152	238	50	86	11.5%	1.10 [0.90, 1.35]
Yong-Seog Park et al., 2003	789	1370	610	958	33.1%	0.90 [0.85, 0.97]
Total (95% CI)		**2557**		**3125**	**100.0%**	**0.97 [0.90, 1.06]**
Total events	1623		2147			

Heterogeneity: $Tau^2 = 0.00$; $Chi^2 = 9.01$, df = 3 (P = 0.03); $I^2 = 67\%$
Test for overall effect: Z = 0.65 (P = 0.52)



Testicular Fertilization rate