

PLACE DE LA MORPHOLOGIE DES SPERMATOZOIDES EN AMP



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	NORMES OMS 1999	NORMES OMS 2010
pH	7,2-8,0	/
Volume	≥ 2,0 ml	≥1,5 ml
Vitalité	≥60%	≥ 58%
Numération	>20 M/ml >40 M/éjac	≥15 M/ml >39 M/éjac
Leucocytes	<1 M/ml	<1 M/ml
Mobilité 1 ^{ère} heure	mob a+b ≥50% mob a ≥25%	mob a+b ≥30% mob a+b+c ≥40%
Mobilité 4 ^{ème} h	mob a+ b > 50% mob1h	/
Morphologie	≥30% (David)	≥4% (Kruger) ≥15% (David)

INDICE DE FERTILITE (NbSptoProgNx/Ejac)	AMP
>1M	IIU
$\geq 0,3M$ et $< 1M$	FIVc
$< 0,3M$	ICSI

Cas particuliers

IIU si IF < 1M

-NbSptoProgEjac > 12 M
après TMS

ICSI si IF > 1M

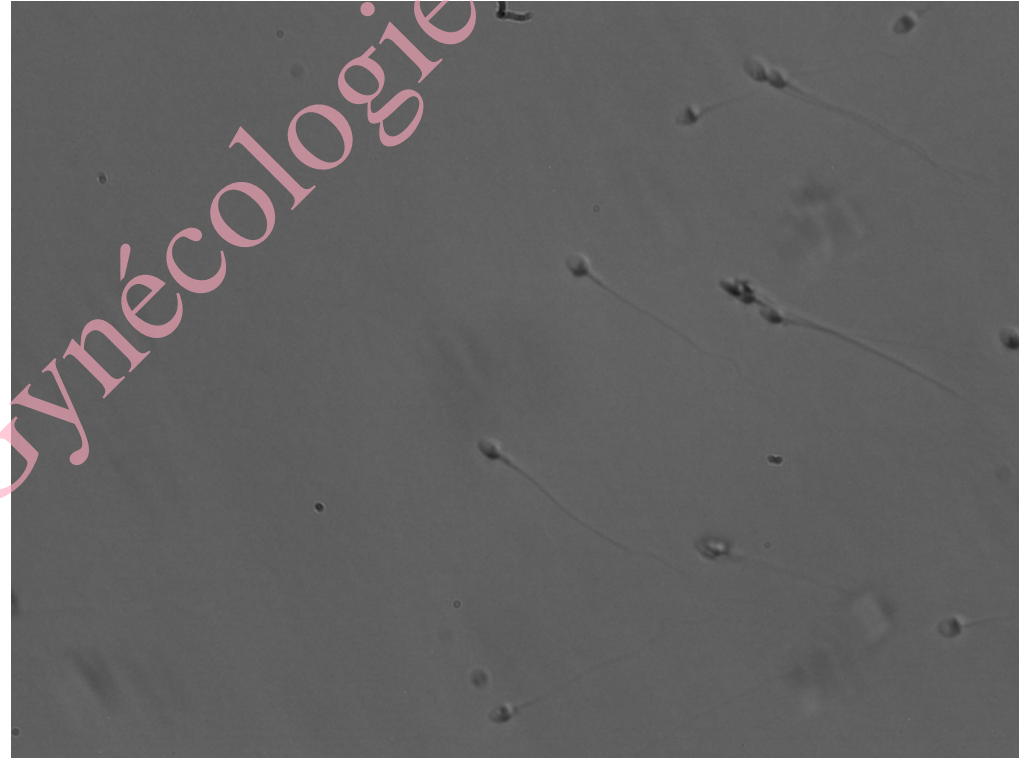
-EIAC₆ à sperme NI +
TH pos

ICSI si IF > 0,3M

- Survie SPZ à 24h < 10%

ICSI

- Corrélation SPZ et ICSI (De Vos,2003).
- Pré-Sélection SPZ x400 (x2-x3/Ovo).
- Sélection SPZ après immobilisation.
- Injection SPZ mob, tête ovale, abs vac , abs anomalie PI+Fg.



AMP 2007-10 () :12 derniers mois	ICSI
PO	495 (167)
Echec fécond (≥5 Met 2)	1,1% (1,2%)
Tf	450 (142)
G clinique (n)	143 (63)
G clin/Tf (%)	31,8 (44,4%)

MSOME

(Motile Sperm Organelle Morphology Examination)

- Analyse fine du noyau (x6600).
 - Ovale, lisse.
 - L : 4,75 0,28 μ m,
 - I : 3,28 0,20 μ m.
- Chromatine : normale si vacuole \leq 4% tête.



Bartoov et al, NJE 2001

- 1^{ère} étude IMSI (Intracytoplasmic Morphologically selected Sperm Injection).
- 24 couples , échec d'au moins 5 cycles d'ICSI.
- Sélection SPZ normaux (x6600).
- 14 G, 58% G clinique/cycle IMSI.

ANNEE	OBJECT ETUDE	RESULTATS
Bartoov et al, J Andro, 2002	-100 couples -MSOME post ICSI	-Corrélation % noyau Nx et G -Abs G si <20% SPZ noyaux Nx
Bartoov et al, Fertil Steril, 2003	-Etude cas témoin appariée -100 couples, 2 échec ICSI -IMSI/ICSI	-IMSI : 66,0% G /PO, 9% FCS. -ICSI : 30% G /PO, 33% FCS (p≤0,01).
Berkovitz et al, Human Reprod, 2005	-Etude cas témoin appariée -76 couples. -IMSI. -SPZ Nx/ SPZ ANx	-IMSI SPZ Nx : 52,6% G /PO, 10% FCS -IMSI SPZ ANx: 18,4% G /PO, 57,1% FCS. (p≤0,05)
Berkovitz et al, Human Reprod, 2006	-Etude cas témoin appariée -56 couples -IMSI -SPZ Nx/ SPZ large vacuole	-IMSI SPZ NI: 50% G /PO, 7%FCS -IMSI SPZ VAC+ : 18% G/PO, 80% FCS (p≤0,01)
Antinori et al, RBMO,2007	-Etude randomisée -446 couples -IMSI/ICSI	-IMSI : 39,2% G/PO -ICSI : 26,5% G /PO (p≤0,004)
Rives et al, Andrologie, 2009 :	-Origine large vacuoles (≥13% surface SPZ) -20 patients	-↑% frag ADN, ↑% aneuploidies → défaut maturation nucléaire pdt spermiogénèse

**Blastocyst development after sperm selection
at high magnification is associated with size and
Number of nuclear vacuoles,
Vanderzwalmen et al, RBMO 2008.**



Figure 1. Grading of spermatozoa into four groups according to the presence or size of the vacuoles. Grade I: normal form and no vacuoles (A). Grade II: normal form and ≤ 2 small vacuoles (B, C). Grade III: normal form, >2 small vacuoles or at least one large vacuole (D, E); Grade IV: large vacuole and abnormal head shapes or other abnormalities (F). Original magnification $\times 6600$.

Table 1. (a) Outcome of embryo development in a group of 25 patients after sibling oocytes were injected with grade I, grade II, grade III and grade IV spermatozoa. (b) Chi-squared test results.

a	Grade I	Grade II	Grade III	Grade IV
Type of injected spermatozoa				
No. injected oocytes	16	70	59	19
Percentage (no.) of embryos per injected oocyte				
Zygotes	87.5 (14)	90.0 (63)	94.9 (56)	52.6 (10)
Day-3 embryos	87.5 (14)	88.6 (62)	93.2 (55)	47.4 (9)
Good quality day-3 embryos	43.8% (7)	42.9 (30)	33.9 (20)	21.1 (4)
Blastocysts	56.3% (9)	61.4 (43)	5.1 (3)	0 (0)
Good quality blastocysts	37.5% (6)	37.1 (26)	1.7 (1)	0 (0)

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Table 4. Outcome of selecting 30 grade I and II spermatozoa at $\times 400$ or $\times 6600$ magnification in relation to the percentage of normal spermatozoa present in the sample and assessed at $\times 6600$ magnification.

Semen sample evaluated by spermozytogram	Percentage (no.) of grade I and II after:		
	Selection of spermatozoa and IMSI evaluation (spermozytogram approach)	Pre-selection at $\times 400$ followed by IMSI evaluation (ICSI selection approach)	Direct IMSI selection and evaluation (IMSI selection approach)
1	47 (100)	50 (30) 15	100 (30) 30
2	48 (100)	73 (30) 22	100 (30) 30
3	47 (100)	67 (30) 20	100 (30) 30
Average	47	63	100
4	26 (100)	40 (30) 12	100 (30) 30
5	33 (100)	47 (30) 14	100 (30) 30
6	29 (100)	70 (30) 21	100 (30) 30
7	38 (100)	43 (30) 13	93 (30) 28
8	39 (100)	43 (30) 13	53 (30) 16
Average	33	49	89
9	19 (100)	30 (30) 9	67 (30) 20
10	16 (100)	23 (30) 7	40 (30) 12
11	13 (100)	27 (30) 8	67 (30) 20
12	11 (100)	33 (30) 10	53 (30) 16
13	7 (100)	20 (30) 6	63 (30) 19
14	3 (100)	13 (30) 4	57 (30) 17
15	1 (100)	7 (30) 2	40 (30) 12
Average	10	22	55
Total	25 (379/1500)	39 (176/450)	76 (340/450)

ICSI = intracytoplasmic sperm injection; IMSI = intracytoplasmic morphologically selected sperm injection.

Semen samples 1-3: $>40\%$ normal sperm forms; semen samples 4-8: between 20 and 40% normal sperm forms and semen samples 9-15 $<20\%$ normal sperm forms.

IMSI et IMSI « LIGHT »

- **IMSI**

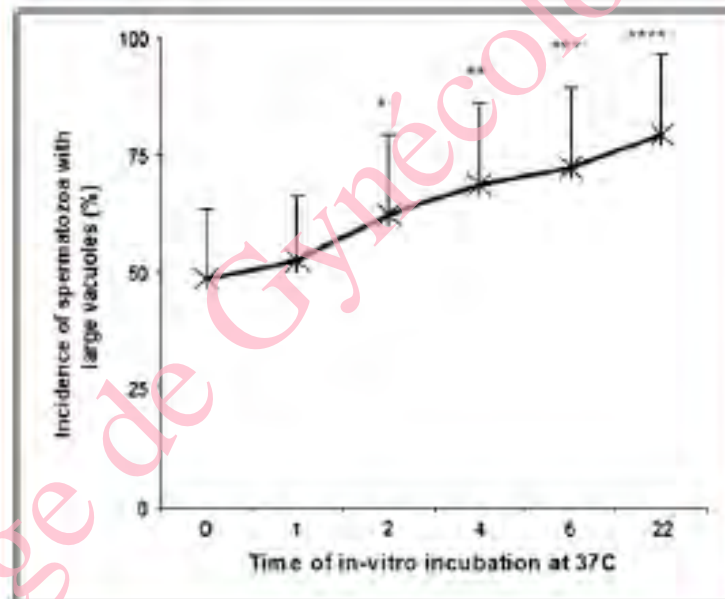
- Sélection X6600
- Echec implantation ICSI?
- % Frag ADN SPZ↑?
- Tératospermies sévères?
 - 10% ICSI.
 - **Temps+++.**

- **IMSI « light » (en évaluation)**

- Pré-sélection SPZ x600 (X2-x3 /Ovo).
- Sélection SPZ classe I-II (X3000).
 - 90% ICSI.
- **Pré-sélection (15-30mn) + sélection (15-30mn) .**

FIGURE 3

Incidence of spermatozoa with large nuclear vacuoles obtained in 16 sperm samples after 0, 2, 4, 6, and 22 hours of in vitro incubation at 37°C:
*significantly different from the initial state and from 1 hour of incubation ($P \leq .01$); **significantly different from 2 hours of incubation ($P \leq .01$); ***significantly different from 4 hours of incubation ($P \leq .04$); ****significantly different from 6 hours of incubation ($P \leq .02$).



Peer: Sperm nuclear morphology changes at 37°C. *Fertil Steril* 2007.

Peer et al, Fertil Steril, 2007.

CONCLUSION

- ↑ % ICSI, IMSI ou IMSI light en AMP
→ rôle clé morphologie SPZ .

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