Préservation de la fertilité dans un contexte d'endométriose

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Ferring	☑	☐	☐	☐	Unrestricted research grant and honoraria

Préservation de la fertilité dans un contexte d'endométriose

FERTILITE
PARIS CENTRE

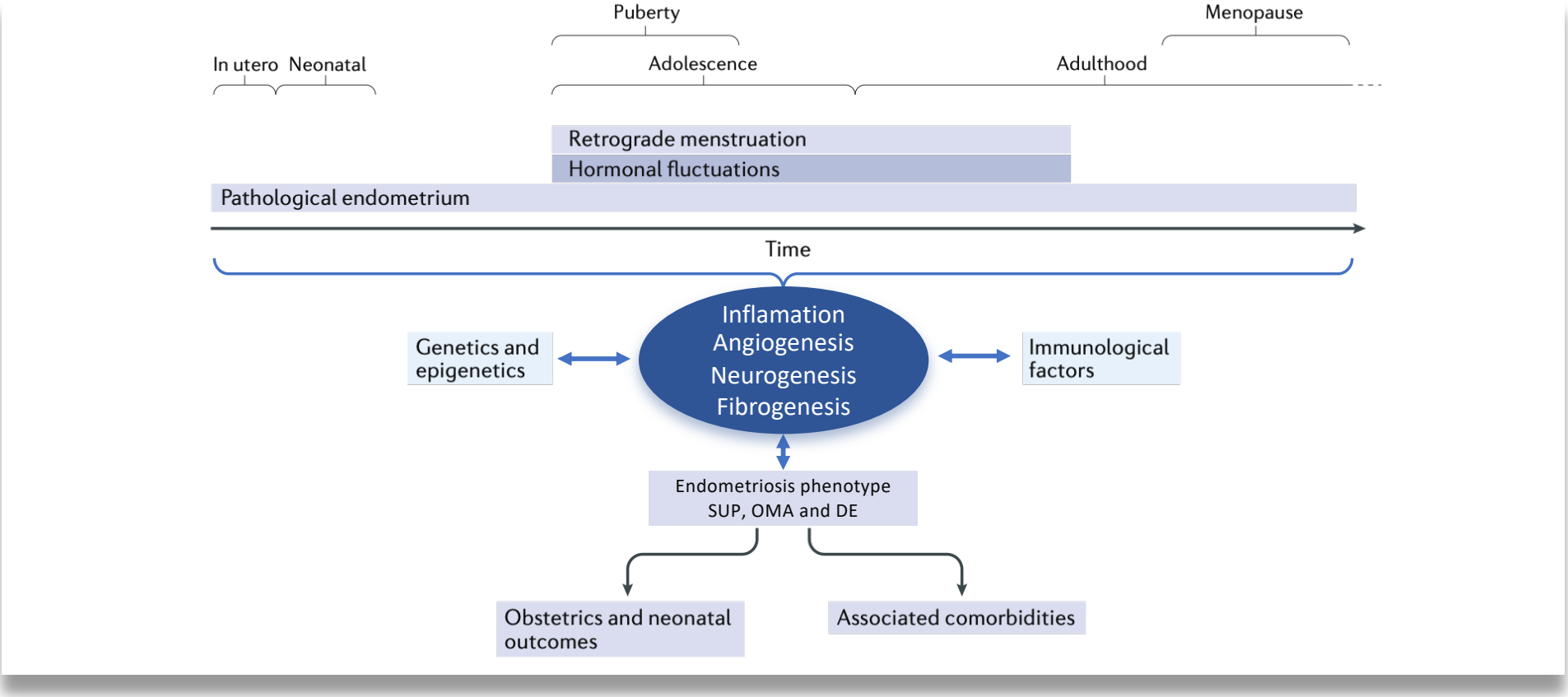
- Impact de l'endométriose sur la reserve ovarienne
- Etat des lieux
- Risques
- Pour qui ?

Préservation de la fertilité dans un contexte d'endométriose

FERTILITE
PARIS CENTRE

- Impact de l'endométriose sur la reserve ovarienne
- Etat des lieux
- Risques
- Pour qui ?

Endometriose: Une maladie pour la vie



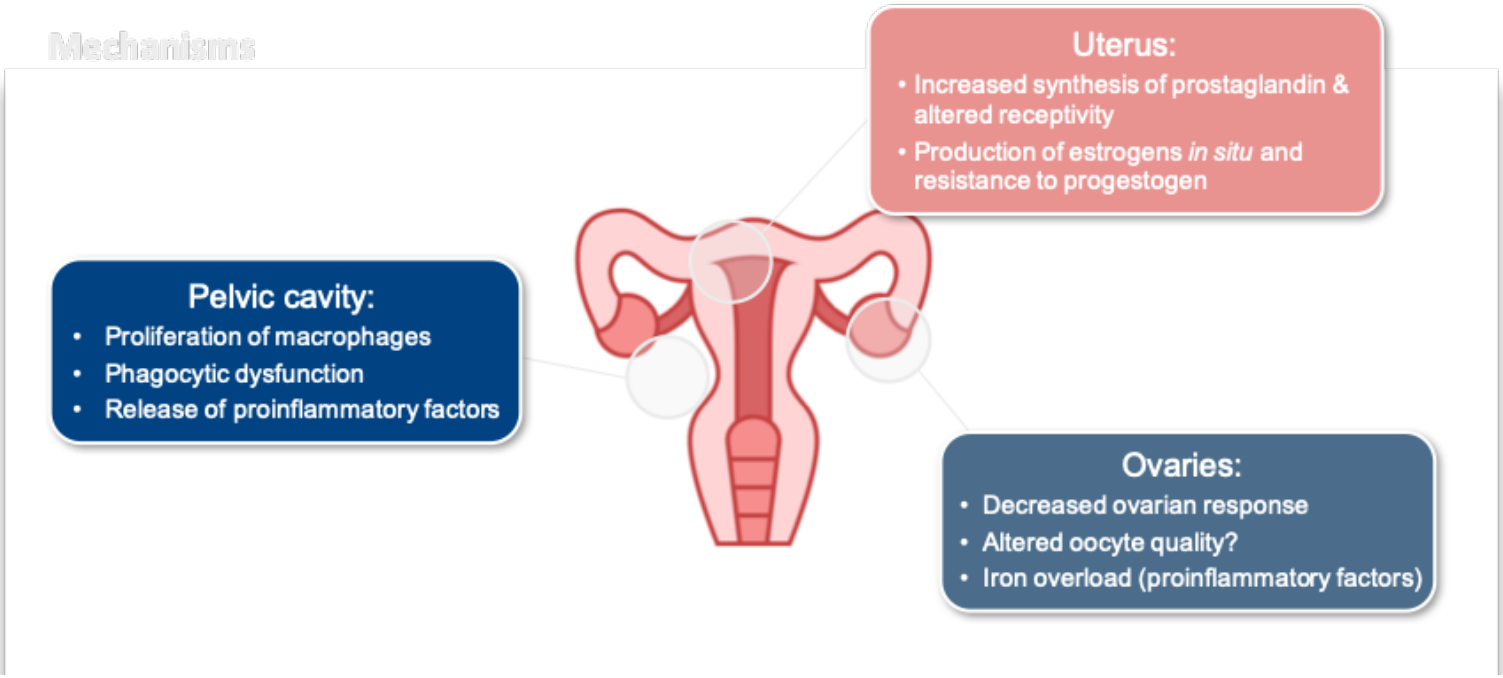
DE, deep endometriosis; OMA, ovarian endometrioma; SUP, superficial peritoneal endometriosis

Chapron C, Marcellin L, Boorghese B, Santulli P. Nat Rev Endocrinol 2019;15:666–82

Endometriose et infertilité

Pathologie responsable d'une infertilité dans > 1/3 des cas (même en l'absence de lésions ovariennes)

- Risque d'altération de la fertilité aggravé par la chirurgie, notamment la résection de lésions ovariennes



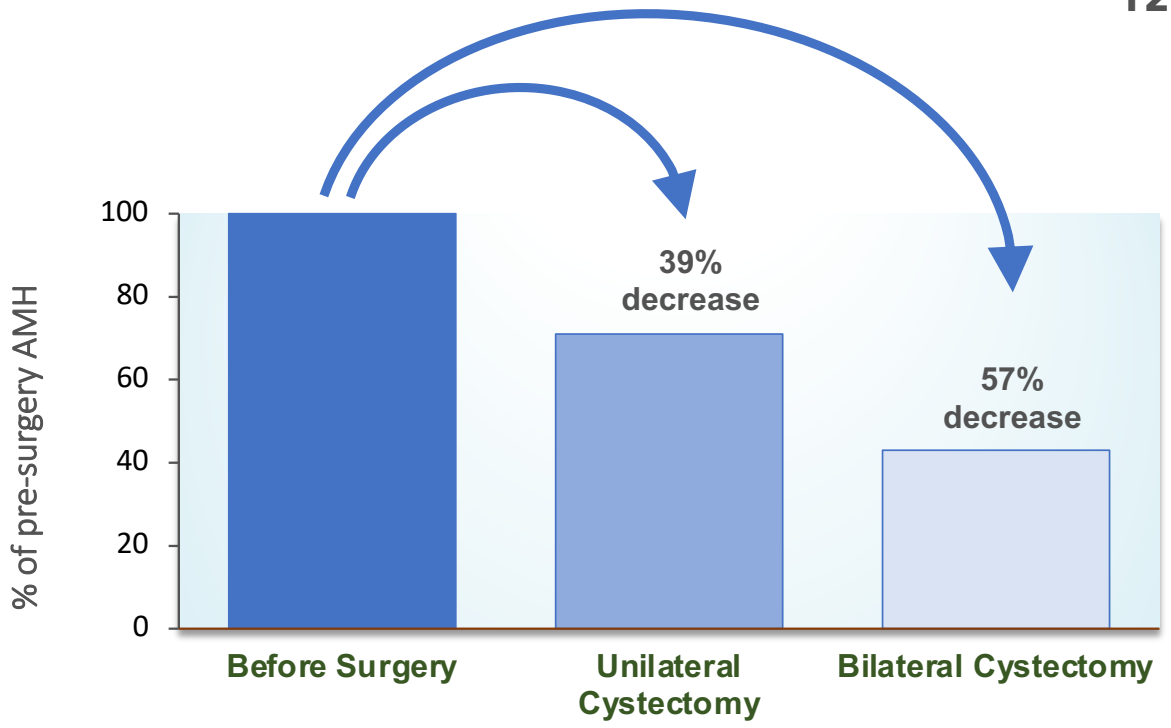
de Ziegler D, et al. Lancet 2010;376:730–38

Endométriose et infertilité: Impact de la chirurgie

ENDOMETRIOME ET RESERVE OVARIENNE

12 months post-operative AMH decrease

Meta-analysis of 12 studies

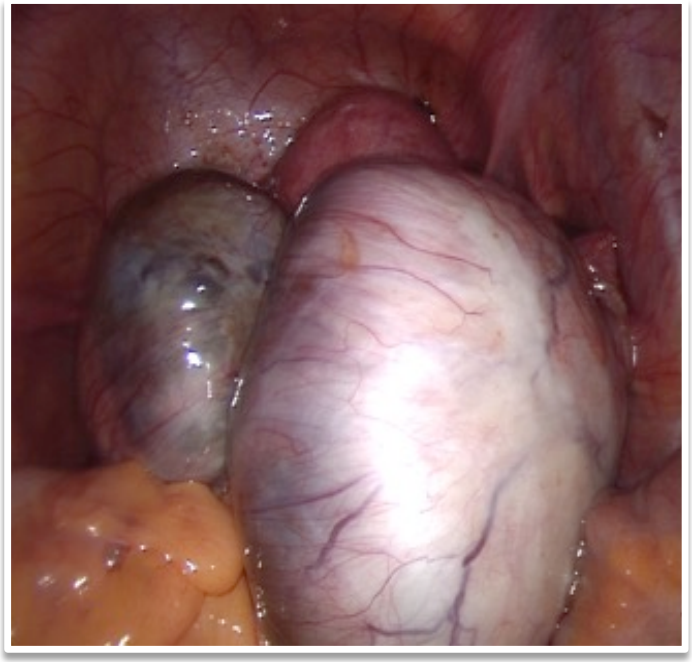


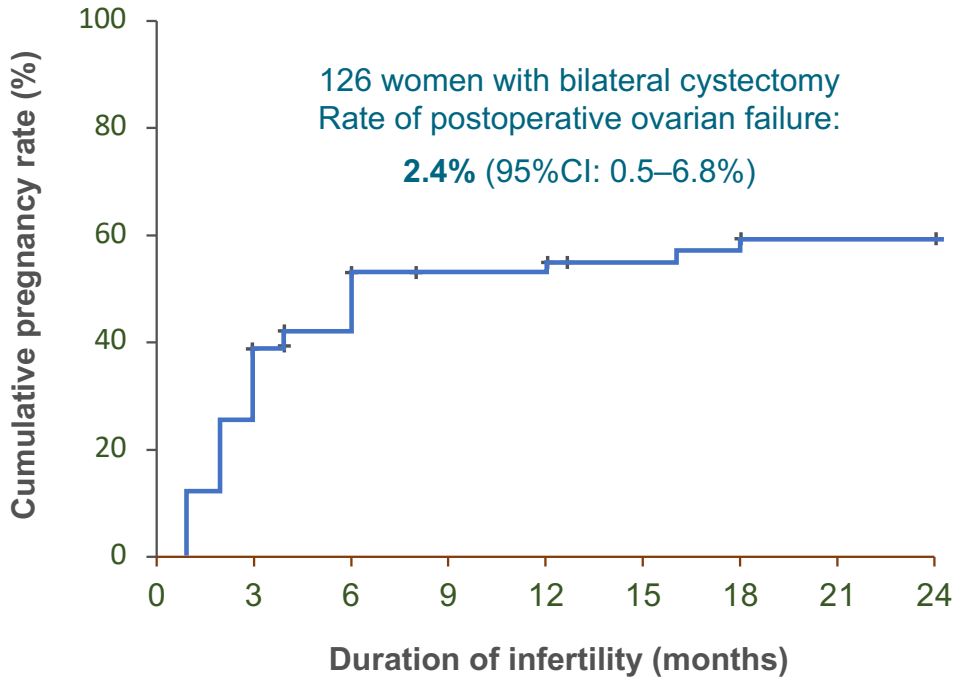
AMH, anti-Müllerian hormone

Younis JS et al. Hum Reprod Update 2019;25:375–91

Endometriome et chirurgie: Réserve ovarienne

EXCISION D'ENDOMETRIOMES BILATÉRAUX : Insuffisance ovarienne post-operatoire

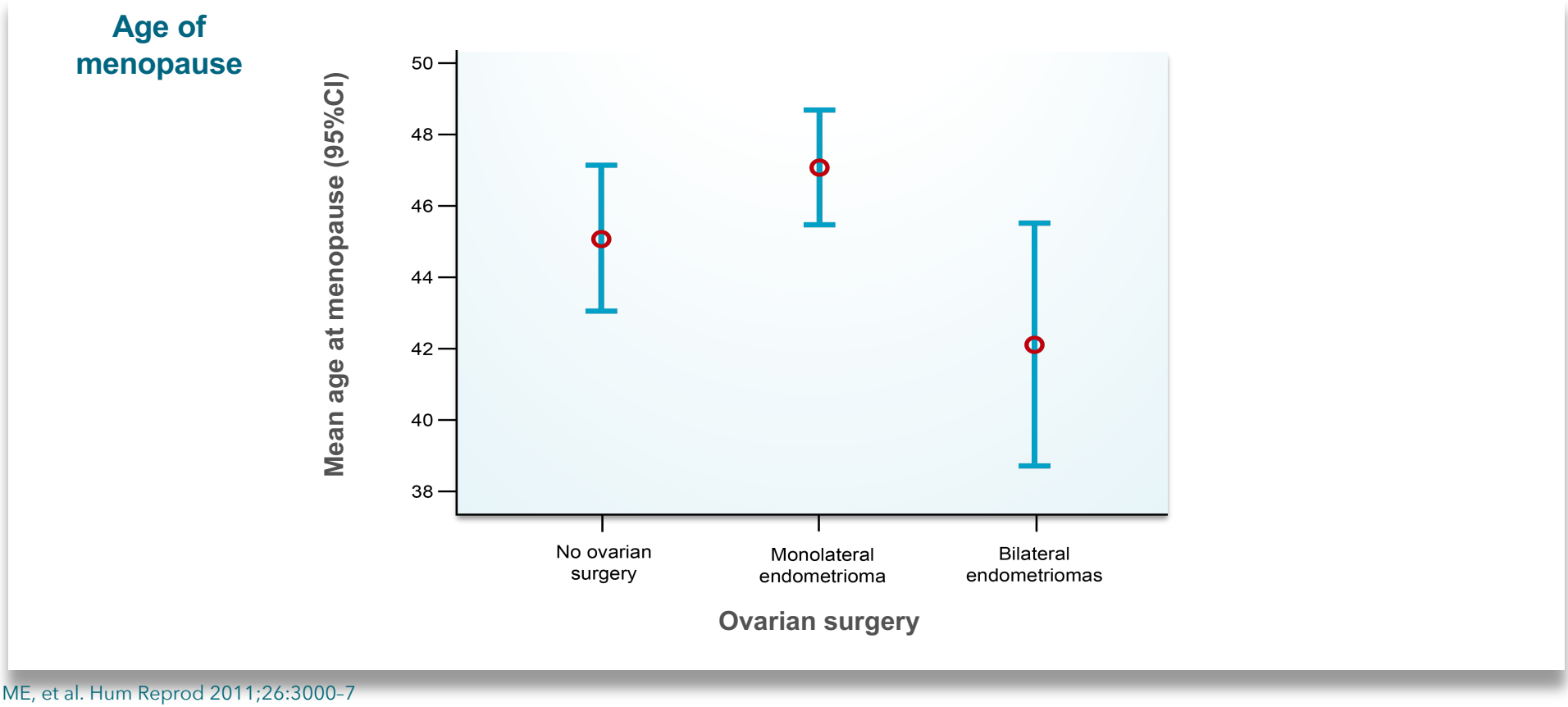




Busacca M, et al. Am J Obstet Gynecol 2006;195:421-25

Endometriome et chirurgie: Réserve ovarienne

EXCISION D'ENDOMETRIOMES BILATÉRAUX : Insuffisance ovarienne post-operatorie



Coccia ME, et al. Hum Reprod 2011;26:3000–7

Endométriome et chirurgie

RISQUE DE RECIDIVE POST OPERATOIRE

Recurrent endometriotic cysts in 74/277 subjects (27%)

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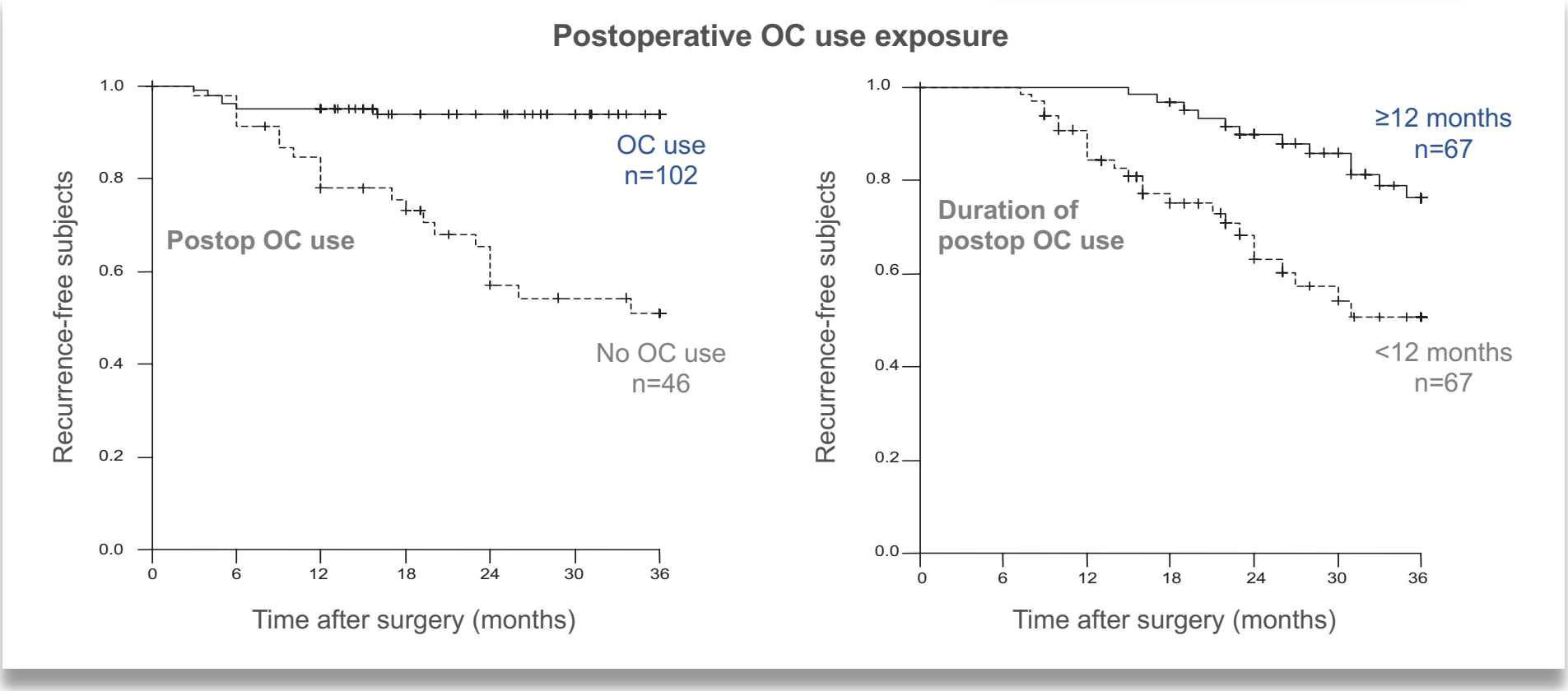

Vercellini P, et al. Am J Obstet Gynecol 2008;198:504.e1–5

Endométriome et réserve ovarienne

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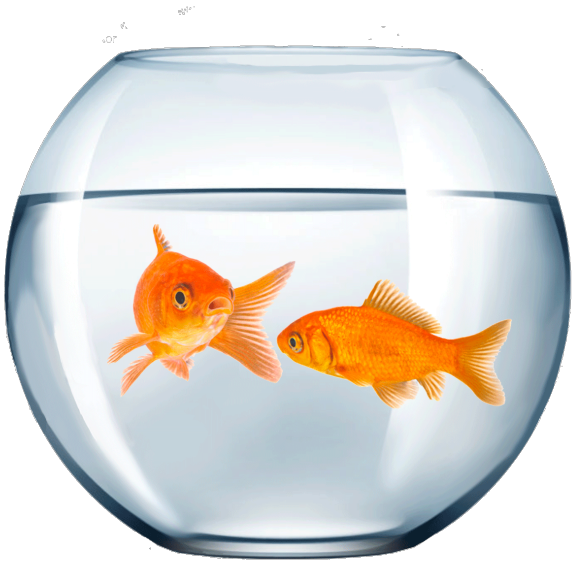
Impact de l'endométriose *'per se'* sur la réserve ovarienne ?

QUANTITY

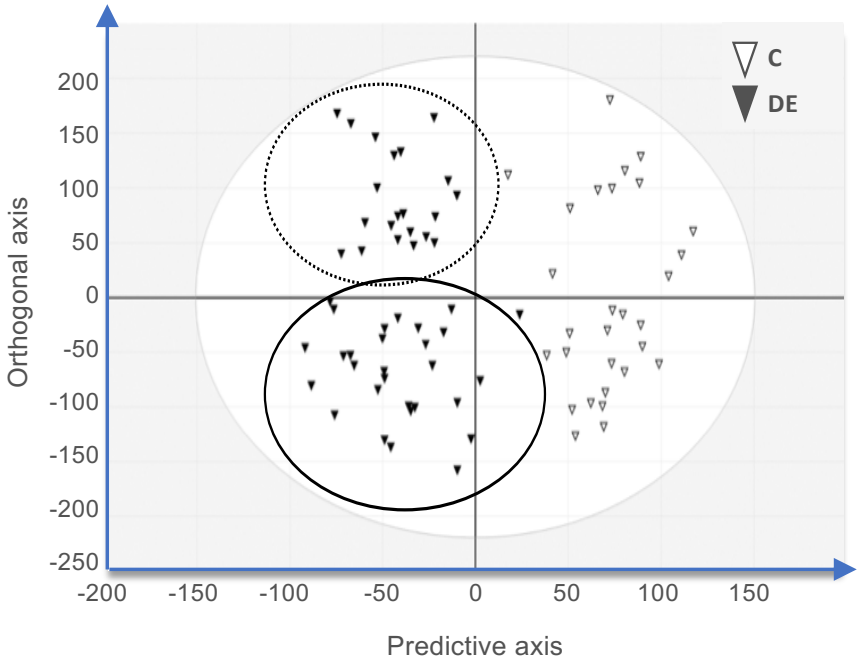


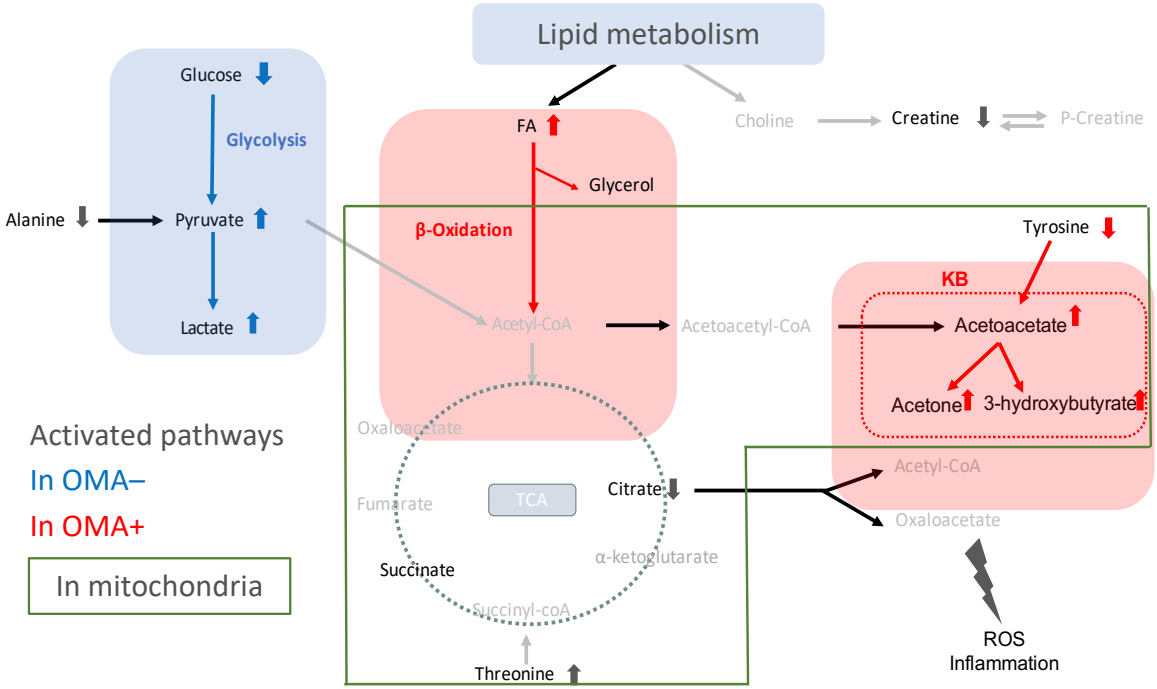
QUALITY

Endométriome et réserve ovarienne

QUALITE : Existence d'une altération de la qualité de la réserve ovarienne dans l'endométriose?

NMR follicular fluid metabolomics





Activated pathways

In OMA–

In OMA+

In mitochondria

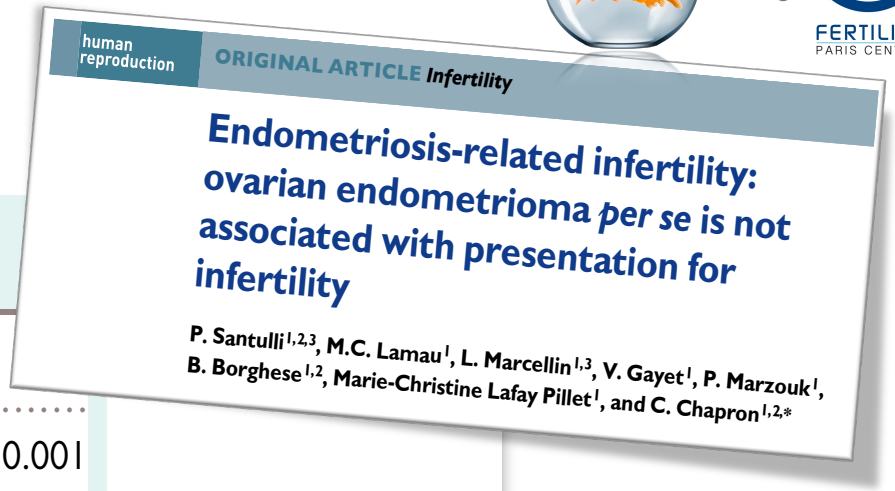
C, control (women with infertility caused by a tubal obstruction); DE, deep endometriosis; NMR, nuclear magnetic resonance; OMA, endometrioma

Pocate-Cheriet K, Santulli P, et al. Reprod Biomed Online 2020;41:1023–37

Endométriome et réserve ovarienne

FERTILITE PARIS CENTRE

QUALITE: OME non associé au tableau d'infertilité



Factors associated with presentation for infertility: multiple logistic regression model

Variable	OR (95% CI)	P
Age >32 years[a]	1.9 (1.4–2.5)	<0.001
Gravidity >0	0.7 (0.6–0.9)	<0.001
Peritoneal superficial endometriosis	3.1 (1.9–4.9)	<0.001
Previous history of surgery for endometriosis	1.9 (1.3–2.2)	<0.001

CI, confidence interval; OR, odds ratio; ASRM: American Society for Reproductive Medicine classification.
[a]Binary variable >32 versus ≤32 years.

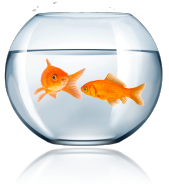
N=2208

Analyzed, n=870

OMA, endometrioma

Santulli P, et al. Hum Reprod 2016;31:1765-75

Endométriose et réserve ovarienne



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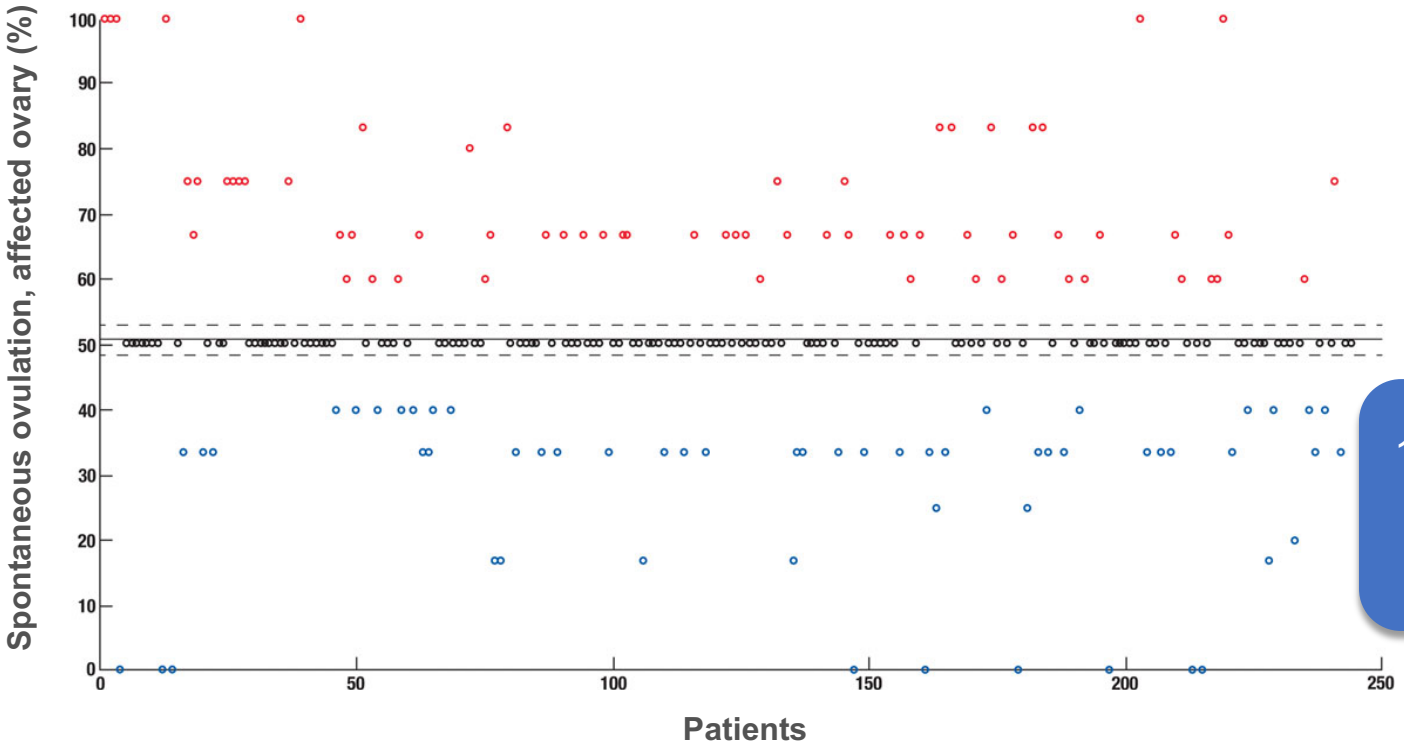
QUALITE: OME non responsable de l'infertilité



N=244

- ***183 (75%) DE***

Follow-up 6 months

1,199 cycles of spontaneous ovulation

105 (43.2%) spontaneous pregnancy

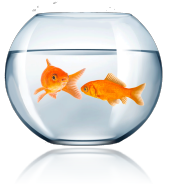
76 (41.5%) with DE

DE, deep endometriosis; OMA, endometrioma

Leone Roberti Maggiore U, et al. Hum Reprod 2015;30:299-307

Endométriose et réserve ovarienne

QUALITY: Endométriose n'est pas responsable d'aneuploidie



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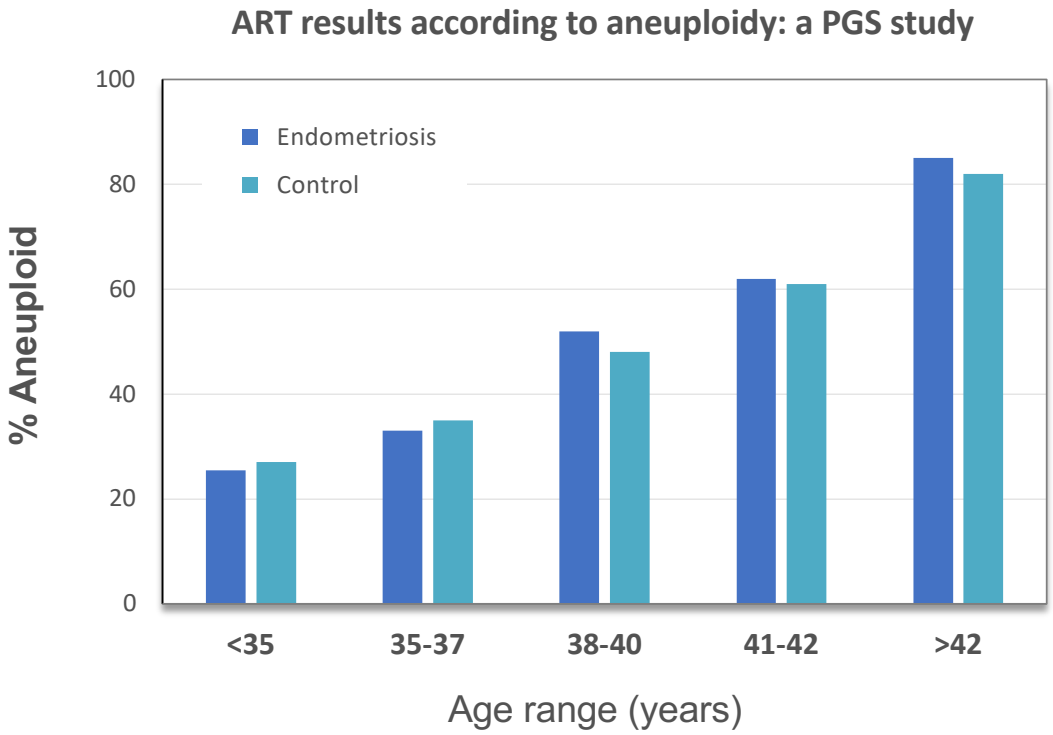


- Endometriosis patients:
  1,880 blastocysts from 305 patients
- Controls (general IVF population):
  23,054 blastocysts from 3,798 patients

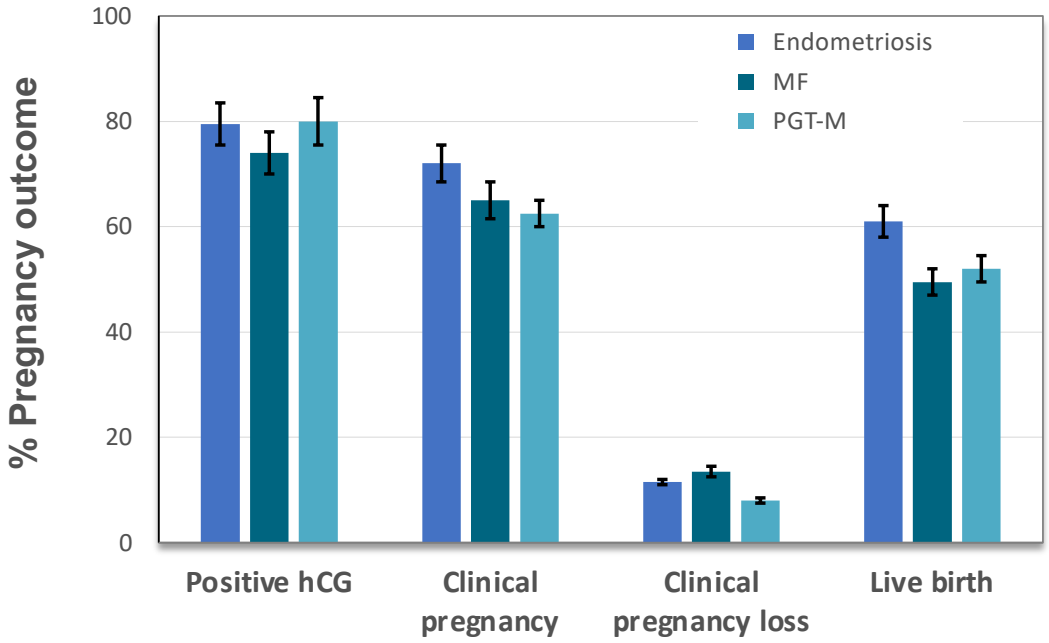
No significant difference between endometriosis and control in any age group

ART, assisted reproductive technology; PGS, preimplantation genetic screening

Juneau C, et al. Fertil Steril 2017;108:284–88

Endometriose et réserve ovarienne

QUALITE: Endométriose n'influence pas les taux de naissance en FIV



- Endometriosis patients: 54 FET in 39 patients
- Male factor controls (MF): 355 FET in 253 patients
- Non infertile controls (PGT-M): 50 FET in 36 patients

Retrospective
Euploid FET
No Endometriosis staging

FET, frozen embryo transfer; MF, male factor; PGT-M, preimplantation genetic testing for monogenic disorders

Bishop LA, et al. Fertil Steril 2021;115:416–22

Endométriose et réserve ovarienne

QUANTITE

FERTILITE
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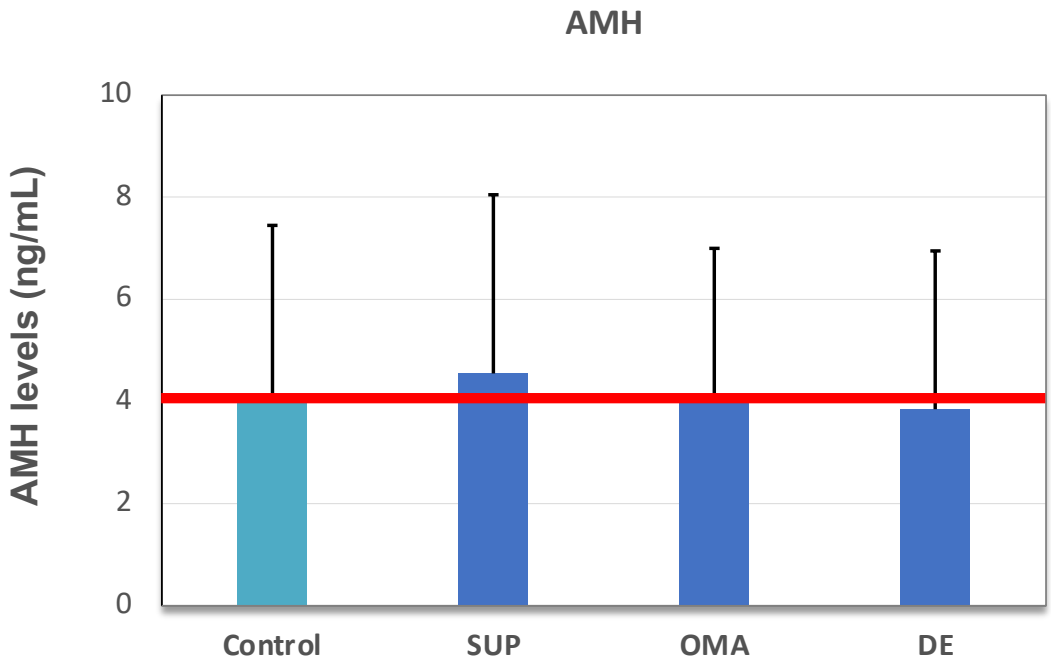

AMH, anti-Müllerian hormone; DE, deep endometriosis; OMA, ovarian endometrioma; SUP, superficial peritoneal endometriosis

Streuli I, et al. Hum Reprod 2012;27:3294–303

Endométriose et infertilité : AMP

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QUANTITE: La réponse à la stimulation est réduite chez les femmes avec antécédents de chirurgie

Logistic regression analysis of the risk factors for poor response to hyperstimulation (≤ 3 oocytes retrieved or cycle cancelled)						
	Univariate logistic regression analysis			Multiple logistic regression analysis[a]		
OMA status	OR	95% CI	P-value	OR	95% CI	P-value
Presence of OMA and no previous surgery for OMA *versus* no OMA	1.3	0.8–2.0	0.211	1.5	0.9–2.2	0.147
Presence of OMA with previous history of surgery for OMA *versus* no OMA	2.4	1.3–4.6	0.004	2.1	1.1–4.0	0.033

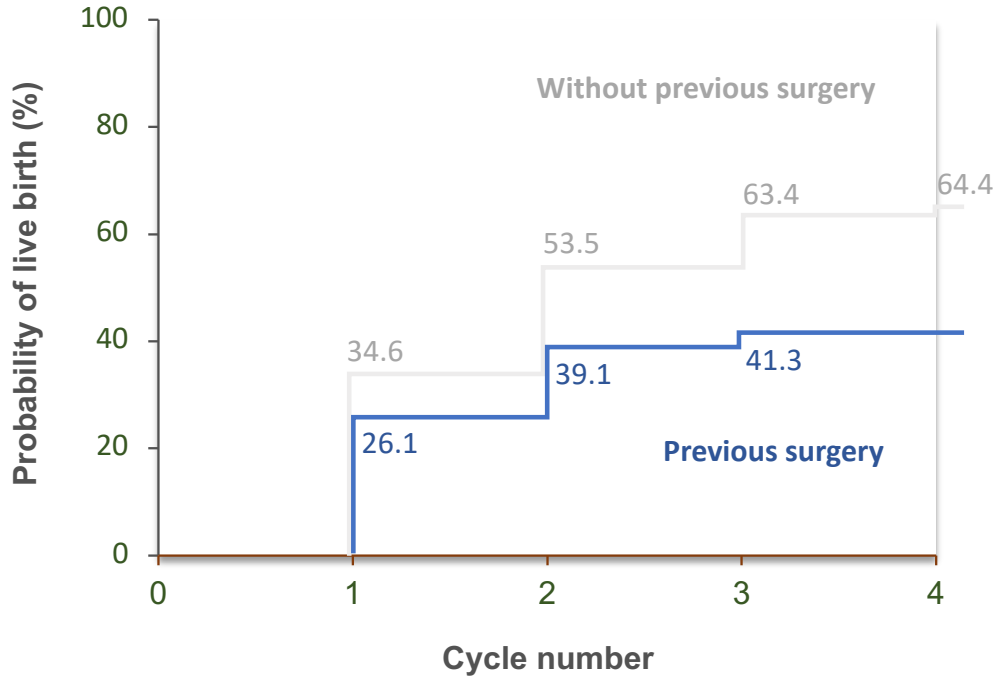
[a]Variables included in multiple logistic regression analysis: age, AMH, dose of gonadotrophin

AMH, anti-Müllerian hormone; CI, confidence interval; OMA, endometrioma; OR, odds ratio

Bourdon M…, Santulli P, Chapron C. PLoS One 2018;13:e0202399

Endométriose et infertilité : AMP

Antécédent de chirurgie de l'endométriose



N=101 bowel DE infertile women

(88% associated adenomyosis)

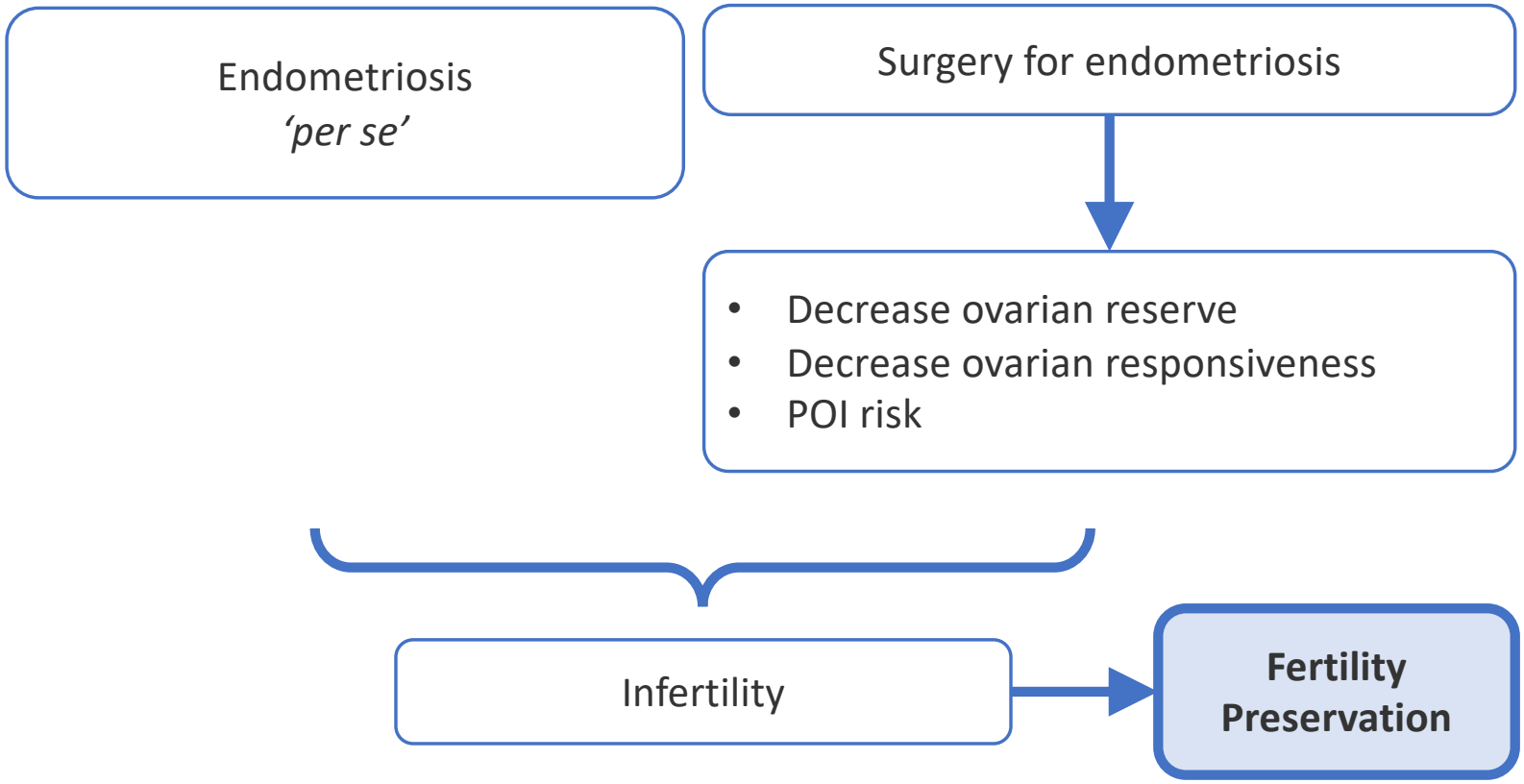
(73% associated OMA)

DE, deep endometriosis

Maignien C, Santulli P, et al. Fertil Steril 2021;115:692-701

Préservation de la fertilité dans l'endométriose

RATIONALE



Préservation de la fertilité dans un contexte d'endométriose

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Impact de l'endométriose sur la reserve ovarienne

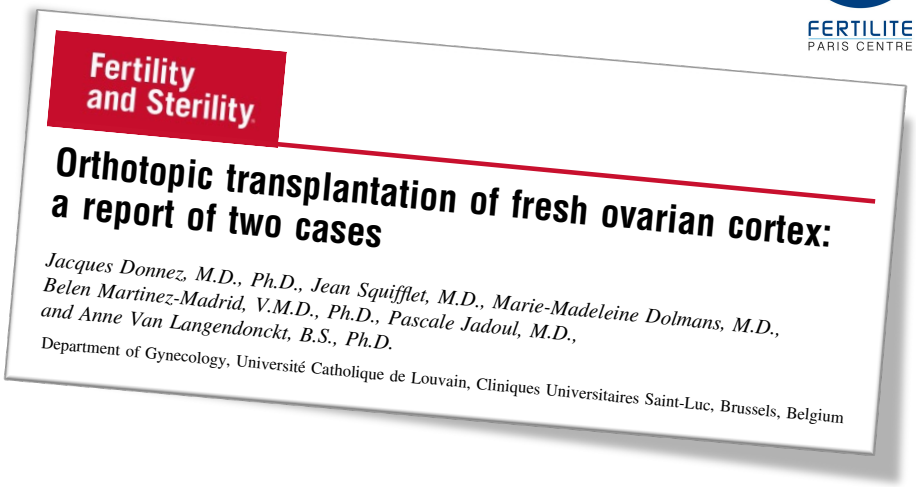
Etat des lieux

Risques

Pour qui ?

Préservation de la fertilité et endométriose

OVARIAN CORTEX


Fertility and Sterility

Orthotopic transplantation of fresh ovarian cortex: a report of two cases

Jacques Donnez, M.D., Ph.D., Jean Squifflet, M.D., Marie-Madeleine Dolmans, M.D., Belen Martinez-Madrid, V.M.D., Ph.D., Pascale Jadoul, M.D., and Anne Van Langendonckt, B.S., Ph.D.

Department of Gynecology, Université Catholique de Louvain, Cliniques Universitaires Saint-Luc, Brussels, Belgium

- N=2, severe endometriosis
  - Left oophorectomy for recurrent endometriosis
- Ovarian cortex reimplanted in the heterolateral orthotopic site
- Biopsies of the grafted tissue taken 3 months after reimplantation
  - Viable primordial follicles found
  - Presence of a neovascular capillary network demonstrated

La réimplantation de cortex ovarien permet la survie des follicules primordiaux et peut représenter une méthode alternative pour la PF lorsque l'ovariectomie est obligatoire.

Donnez J, et al. Fertil Steril 2005;84:1018

Preservation de la fertilité et endométriose

FERTILITE PARIS CENTRE

OVARIAN CORTEX

Ovarian transplan-tation cases	Indications for ovarian cryopreserv-ation	Date of freezing	Date of transplan-tation	Duration of banking (months)	Age at time of freezing	Age at time of transplan-tation	Transplanta-tion site	Outcome	Duration of endocrine function (months)
Case 1	Endometriosis	July 1998	February 1999	6	28	29	Orthotopic (left pelvic peritoneum)	Endocrine function, ovulation	9
Case 2	Breast cancer (chemotherapy)	May 1997	February 2003	6	30	36	Heterotopic (beneath skin of abdomen)	Embryo development	62*
Case 3	Hodgkin's lymphoma	March 2002	August 2004	2	29	31	Heterotopic (beneath skin of abdomen)	Spontaneous pregnancy and live birth after transplantation	42*

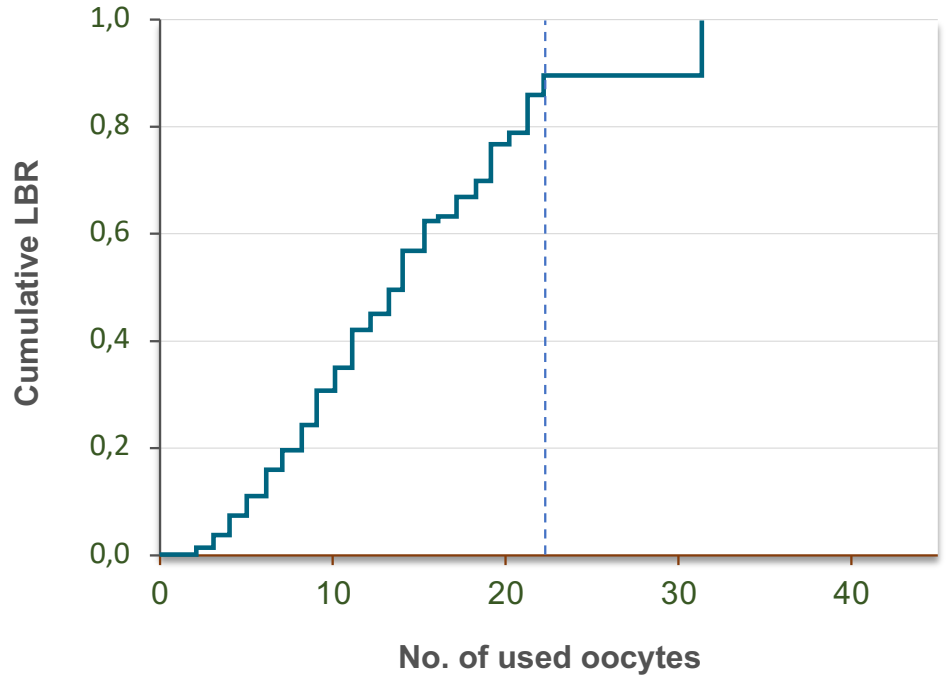
*Continuing ovarian function at time of report

Oktay K, et al. Fertil Steril 2010;93:762-68.

Préservation de la fertilité et endométriose

Ovarian stimulation → Oocyte vitrification

Cumulative probability of live birth for endometriosis patients according to the number of oocytes used



485 women with endometriosis and fertility preservation
IVI - from January 2007 to July 2018

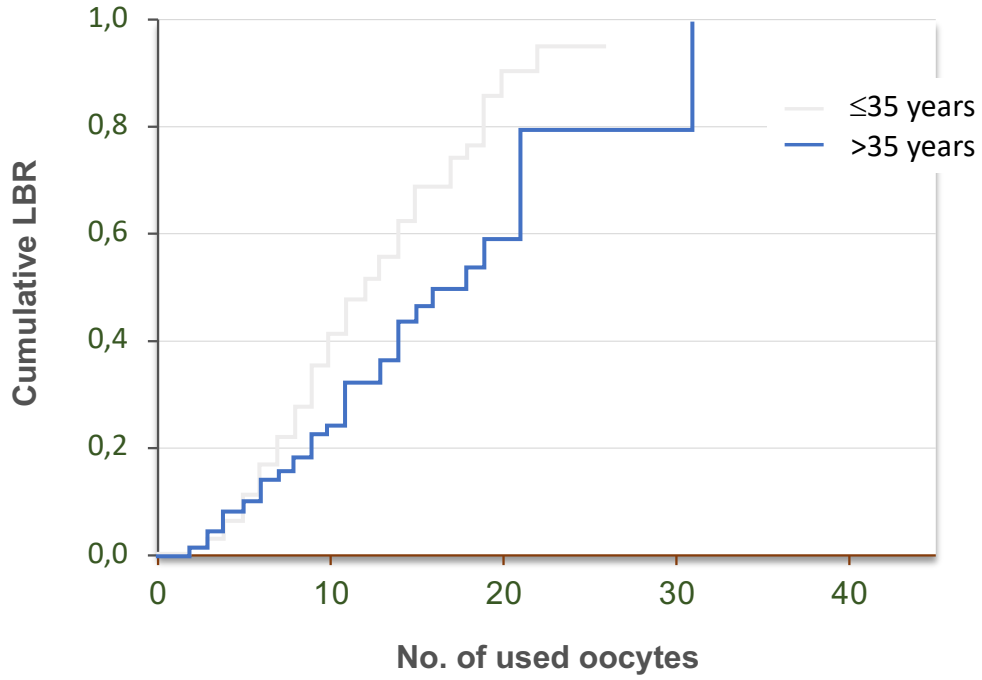
Using 22 oocytes
Endometriosis CLBR:
89.5% (95%CI 80.0–99.1%)
EFP CLBR:
59.9% (95%CI 51.4–68.6%)
(log-rank [Mantel–Cox] P < 0.00001)

CI, confidence interval; CLBR, cumulative live birth rate; EFP, elective fertility preservation (control); LBR, live birth rate
Cobo A, et al. Reprod Biomed Online 2021;42:725-32

Préservation de la fertilité et endométriose

Ovarian stimulation: IMPACT DE L'AGE

Cumulative probability of live birth for endometriosis patients according to the number of oocytes used



485 women with endometriosis and fertility preservation
IVI - from January 2007 to July 2018

Using ~20 oocytes
≤35 y CLBR:
95.4% (95%CI 87.2–103.6%)
>35 y CLBR:
79.6% (95%CI 58.1–101.1%)
(log-rank [Mantel–Cox] P < 0.002)

CI, confidence interval; CLBR, cumulative live birth rate; LBR, live birth rate
Cobo A, et al. Reprod Biomed Online 2021;42:725-32

Préservation de la fertilité et endométriose

Ovarian stimulation: IMPACT DE LA CHIRURGIE

485 women with endometriosis and fertility preservation
IVI - from January 2007 to July 2018

Outcomes	≤ 35 years of age		> 35 years of age	
	No surgery	Surgery	No surgery	Surgery
Number of patients	120	140	133	92
Mean age (y)	32.6 ± 2.4[a]	31.0 ± 2.7[b]	38.6 ± 2.1[c]	37.9 ± 1.6[d]
Number of OS cycles	1.6 ± 1.0[a]	1.9 ± 1.1[a]	1.8 ± 1.2[b,c]	1.7 ± 1.0[c]
Number of MII oocytes/cycle	8.6 ± 6.9[a]	5.1 ± 4.8[b]	4.7 ± 4.4[b,c]	4.4 ± 4.1[c]
Number of MII oocytes/patient	12.5 ± 9.8[a]	9.1 ± 5.3[b]	8.5 ± 5.0[b,c]	7.4 ± 4.8[c]
Clinical pregnancy rate (%)	55.0[a]	44.4[a]	47.9[a,b]	36.7[b]
Ongoing pregnancy rate (%)	48.6[a]	34.6[b]	35.2[b,c]	25.5[c]
CLBR/patient (%)	87 (72.5)[b]	74 (52.8)[b]	37 (27.8)[c]	27 (29.3)[c]

- The mean storage time was 1.7 ± 0.4 years
- Return rate 485/1044 patients (46.5%)
- **Global CLBR 225/485 (46.4%)**

161/260
62%

64/225
28%

Different superscripts on the same line indicate statistical differences (P<0.05). CLBR, cumulative live birth rate; MII, metaphase II; OS, ovarian stimulation
Cobo A, et al. Fertil Steril 2020;113:836-44

Preservation de la fertilité et endométriose

FERTILITE PARIS CENTRE

NOTRE EXPERIENCE

146 women with endometriosis and fertility preservation
258 cycles - Cochin-Port Royal - from April 2015 to January 2019

	No previous surgery for endometriosis N=93	Previous surgery for endometriosis N=53	p-value
Age (years)	30.8 ± 4.7	32.8 ± 3.2	0.02 [mw]
BMI (kg/m^2)	22.2 ± 3.7	22.9 ± 3.8	0.18 [mw]
Patient's ovarian reserve: AFC	13.1 ± 8.1	11.2 ± 6.5	0.09 [mw]
AMH	2.2 ± 1.7	1.6 ± 1.8	<0.01 [mw]
Endometriosis phenotype during FP: OMA	13/93 (14.0)	4/36 (11.1)	
DE	80/93 (86.0)	32/36 (88.9)	
DE with associated OMA	64/80 (80.0)	25/32 (78.1)	0.89[k]
OMA superior to 5 cm	28/77 (36.4)	1/29 (3.4)	< 0.01[k]
Mean endometriomas size (cm)	9.3 ± 17.0	2.9 ± 1.7	<0.01[mw]
Total number of cycles	155	103	
Mean number of cycles per women	1.7 ± 0.7	2.0 ± 1.07	0.18 [mw]
Mean number of oocytes retrieved per cycle	9.0 ± 6.4	6.7 ± 4.9	0.001 [mw]
Mean number of MII oocytes per cycle	7.0 ± 4.6	5.2 ± 4.3	0.001 [mw]
Total mean number of oocytes retrieved per women	14.8 ± 8.1	11.6 ± 8.0	0.024 [mw]
Total mean number of MII oocytes per women	11.7 ± 6.4	9.4 ± 6.8	0.035 [mw]

AFC, antral follicle count; AMH, anti-Müllerian hormone; DE, deep endometriosis; FP, fertility preservation; MII, metaphase II; OMA, endometrioma
Santulli, Bourdon, Chapron, et al. RBMO (2021)

Endométriose et réserve ovarienne

FERTILITE
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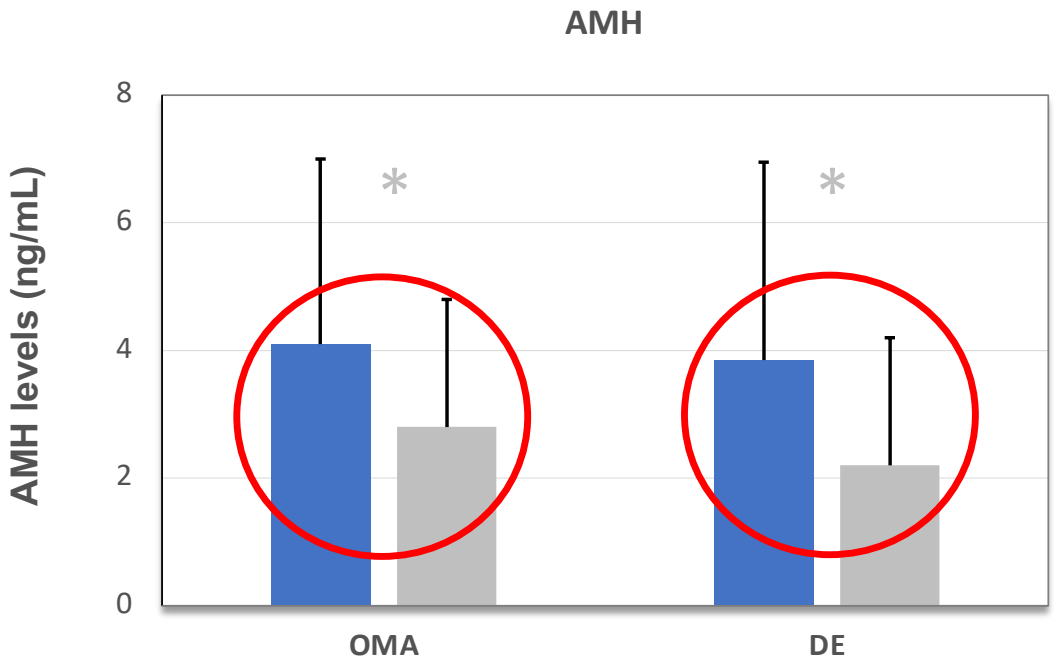
QUANTITE



N=726

- No prior OMA surgery
- Prior OMA surgery

Previous OMA surgery
OR= 3.0 (1.40-6.41); p=0.01

AMH, anti-Müllerian hormone; DE, deep endometriosis; OMA, ovarian endometrioma; SUP, superficial peritoneal endometriosis
Streuli I, et al. Hum Reprod 2012;27:3294–303

Préservation de la fertilité et endométriose

NOTRE EXPERIENCE: Dépendant du nombre de cycles de SOC

146 women with endometriosis and fertility preservation
258 cycles - Cochin-Port Royal - from April 2015 to January 2019

Parameters*	Estimate	95% CI	P-value
AMH level	1.91	1.19 to 2.65	<0.001
Total number of cycles performed	2.79	1.31 to 4.27	<0.001
Previous surgery for endometriosis (± OMA)	-2.86	-5.47 to -0.25	0.032

*Parameters included in the multivariable analysis:

- Woman's age
- Ovarian reserve parameters (AMH, AFC)
- Endometriosis phenotype at fertility preservation (absence, isolated OMA or DE ± OMA)
- Total number of OS cycles performed during the study period
- History of surgery for endometriosis (± OMA)

AFC, antral follicle count; AMH, anti-Müllerian hormone; CI, confidence interval; DE, deep endometriosis; OMA, endometrioma
Santulli, Bourdon, Chapron, et al. RBMO (2021)

Préservation de la fertilité dans un contexte d'endométriose

FERTILITE
PARIS CENTRE

Impact de l'endométriose sur la reserve ovarienne

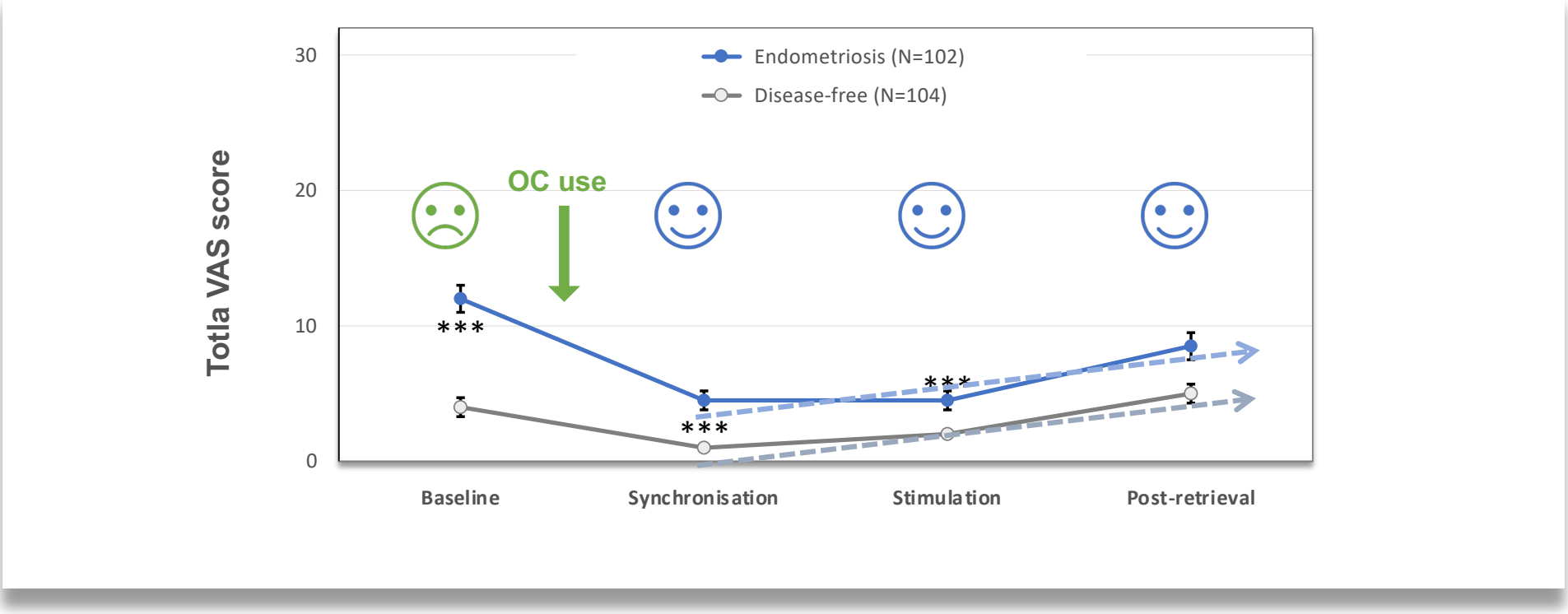
Etat des lieux

Risques

Pour qui ?

Préservation de la fertilité et endométriose

Douleurs pendant la SOC

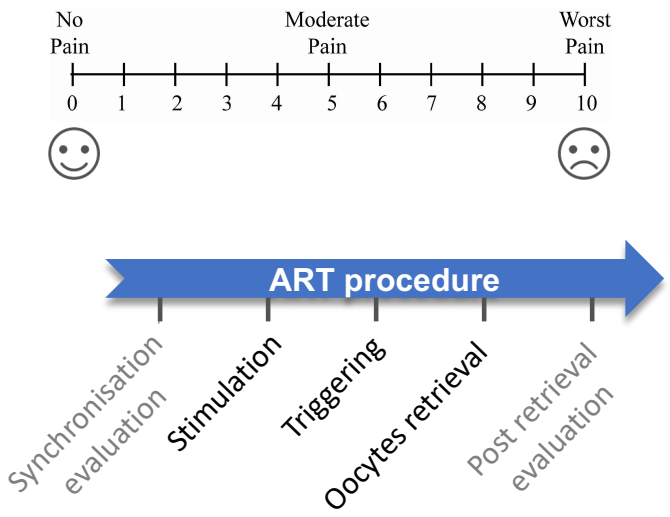


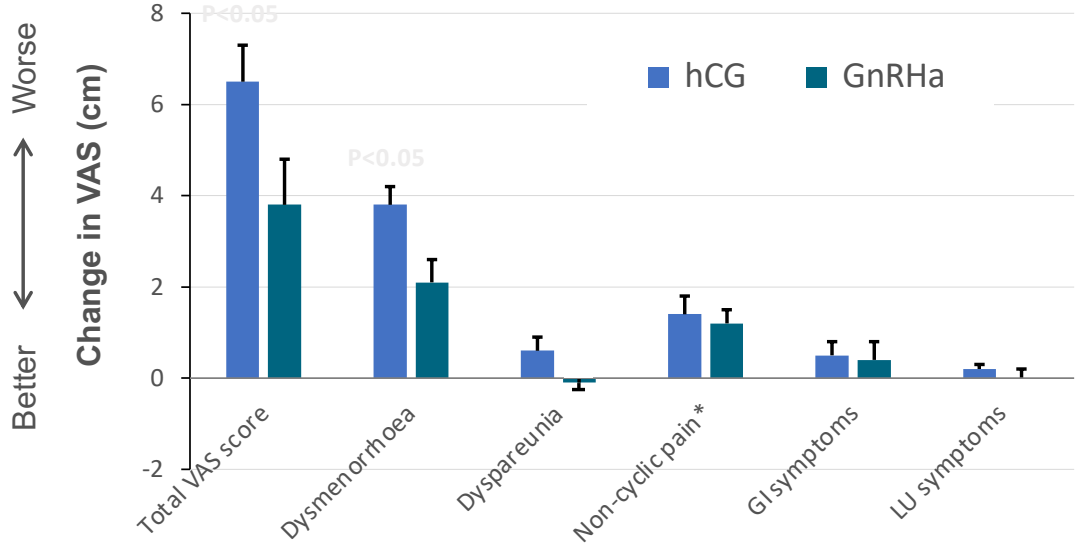
OC, oral contraceptive; VAS, visual analogue scale

Santulli P, Bourdon M , et al. Fertil Steril 2016;105:978–87.e4

Preservation de la fertilité et endométriose

Douleurs pendant la SOC





Increasing pain between post retrieval and synchronization		
hCG triggering (n=70)	GnRHa triggering (n=57)	P value
58 (82.86)	36 (63.15)	0.012 [k]

*Chronic pelvic pain
GI, gastrointestinal; GnRHa, gonadotrophin-releasing hormone agonist; hCG, human chorionic gonadotrophin; VAS, visual analogue scale
Bourdon M, et al. Reprod Sci 2017;24:1325-33

Preservation de la fertilité et endométriose

INFECTION PELVIENNE APRÈS LE PRÉLÈVEMENT D'OVOCYTES

ART in global population	Oocyte retrieval	Post procedure infection
Bennett SJ et al. J Assist Reprod Genet (1993)	2 670	18 (0.67%)
Dicker D et al. Fertil Steril (1993)	3 656	9 (0.24%)
Moini A et al. J Assist Reprod Genet (2005)	5 958	10 (0,16%)
TOTAL	**12 284**	**37 (0.30%)**
ART in endometrioma women	**Oocyte retrieval**	**Post procedure infection**
Tsai YC et al. J Assist Reprod Genet (2005)	108	2 (1.9%)
Benaglia L et al. Fertil Steril (2008)	214	0 (0.0%)
Villette et al. Fertil Steril (2016)	513	2 (0.38%)
TOTAL	**835**	**4 (0.48%)**

Difficultés d'accès aux ovaires/follicules

Endométriomes volumineux

Cohorte prospective de patientes en FIV:
- *56 avec OME (10-45 mm)*
- *227 témoins*

Table 3 – Oocyte retrieval data in the exposed and non-exposed population.[a]

Characteristics	Exposed (n = 56)	Non-exposed (n = 227)	P-value
Dislocated ovaries[b], n (%)	6 (11)	30 (13)	NS
Number of developed follicles over 11 mm	7 (5–12)	10 (5–14)	NS
Number of oocytes retrieved	4 (2–8)	6 (3–11)	0.03
Oocytes retrieved/developed follicles, % (%)	61 (40–80)	67 (50–87)	NS
Incomplete aspiration	8 (14)	10 (4)	0.01
Difficult oocyte retrieval[c]	5 (9)	8 (4)	NS

[a] Data are reported as number (%) or median (interquartile range).
[b] At least one dislocated ovary.
[c] Retrieval was considered difficult if physicians reported a difficult or very difficult retrieval for at least one of the two ovaries.
NS, not statistically significant.

- Transfixion of the OMA :14% (n=8), 95% CI = 7 to 25%
- Accidental contamination of follicular fluid : 16% (n=9), 95% CI = 8 to 27%

Benaglia, Reprod BioMed Online, 2018

Les volumineux endometriomes

➢ **Pas d'impact de la taille de l'OME**

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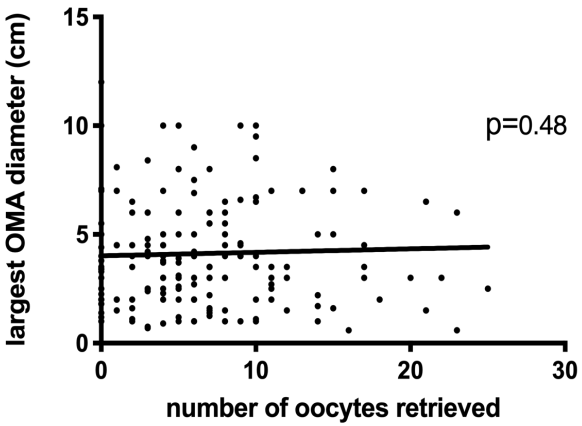
1er cycle de FIV/ICSI dans une cohorte prospective de 182 patientes avec OMEs +/- DIE associée:
- Comparaison des résultats selon la taille des OMEs

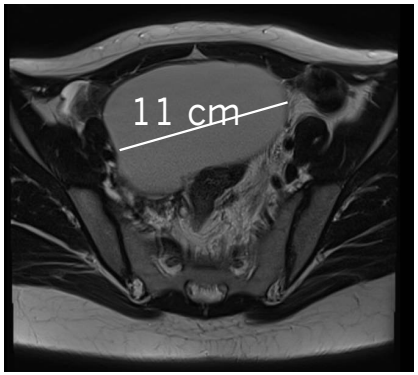


	OMA < 2 cm n = 32	2 ≤ OMA < 4 cm n = 70	4 ≤ OMA < 6 cm n = 37	6 ≤ OMA < 8 cm n = 27	OMA ≥ 8 cm n = 16	p-value
Total dose of gonadotrophin (IU)	2,279 ± 740	2,543 ± 928	2,546 ± 639	2,510 ± 938	2,677 ± 1052	0.432 kw
Duration of stimulation (day)	9.8 ± 1.7	9.6 ± 1.5	10 ± 1.7	9.7 ± 2.1	9.4 ± 1.1	0.706 kw
Estradiol level on triggering day (pg/mL)	1,513 ± 985	1,706 ±1005	1,570 ± 794	1,450 ± 865	1,917 ± 1246	0.476 kw
Mean number of oocytes retrieved	8.4 ± 5.7	7.3 ± 5.4	6.6 ± 3.9	8.6 ± 5.8	7.1 ± 3.6	0.635 kw
Mean number of mature oocytes obtained	7.3 ± 5.1	6.4 ± 5.2	6.1 ± 4.0	8.1 ± 6.0	6.4 ± 3.9	0.674 kw
Mean number of zygotes obtained	6.2 ± 4.1	5.5 ± 4.5	5.3 ± 3.6	6.7 ± 5.6	5.6 ± 3.5	0.867 kw
cCPR per cycle	11/32 (34.4)	25/70 (35.7)	11/37 (29.7)	12/27 (44.4)	7/16 (43.8)	0.798 k
Miscarriage rate per cycle	3 (9.4)	4 (5.7)	0 (0)	3 (11.1)	3 (18.8)	0.126 k
cOPR per cycle	10 (31.3)	25 (35.7)	11 (29.7)	10 (37)	5 (31.3)	0.957 k
cLBR per cycle	8/32 (25)	23/70 (32.9)	11/37 (29.7)	9/27 (33.3)	4/16 (25)	0.913 k

Bourdon, in press, 2021

Difficultés d'accès aux ovaires/follicules

Endométriomes volumineux



➢ Que faire en pratique ?

- **Drainage d'OME par voie transvaginale** écho-guidée **avant la ponction**
- à discuter pour les OME volumineux (≥ 7-8 cm)

Etude rétrospective sur 236 patientes avec OME en FIV:
- *GnRHa (3 mois) puis FIV*
- *GnRHa (3 mois) + drainages itératifs puis FIV*

Pre-ART intervention: GnRH-a + OMA aspiration vs. GnRH-a

	Experimental group (n = 134)	Control group (n = 102)	*P*
No. of retrieved oocytes (n)	8.13 ± 4.32	6.46 ± 3.48	0.001
No. of embryos transferred			0.311
1	18	9	
2	93	77	
3	23	16	
2PN fertility rate (%)	87.46	72.46	0.041
Cleavage rate (%)	70.33	74.86	0.092
High-quality embryo rate (%)	62.37	52.32	0.003
Implantation rate (%)	29.35	20.71	0.037
Clinical pregnancy rate (%)	47.76	39.21	0.031
Abortion rate (%)	6.25	22.50	0.049

Guo, Contemp Clin Trials, 2012

Préservation de la fertilité dans un contexte d'endométriose

FERTILITE
PARIS CENTRE

Impact de l'endométriose sur la reserve ovarienne

Etat des lieux

Risques

Pour qui ?

Preservation de la fertilité et endométriose

VALIDITE DE LA STRATEGIE DE PF

Conditions	Quality of the FP program (no./ quality of eggs)	Negative effects of new surgery on OR	Likelihood that the frozen eggs will be used	Overall validity of the FP programme
Bilateral endometriomas	++	Relevant	High	++
Previous monolateral excision of endometriomas, contralateral recurrence	+	Relevant	Very high	++
Previous surgery for bilateral endometriomas, no endometriomas recurrence	+	None	High	+
Previous surgery for bilateral endometriomas, monolateral recurrence	+/-	Relevant	Very high	+
Previous surgery for bilateral endometriomas, bilateral recurrences	+/-	Relevant	Very high	+
Previous monolateral excision of endometriomas, ipsilateral recurrence	++	Modest	High	+
Unilateral endometriomas	+++	Modest	Low	+
Deep peritoneal endometriosis without endometriomas	+++	None	Low	+

FP, fertility preservation; OR, ovarian reserve

Somigliana E, et al. Hum Reprod 2015;30:1280-86

Preservation de la fertilité et endométriose

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ESHRE guideline

Fertility Preservation			
59	In case of extensive ovarian endometriosis, clinicians should discuss the pros and cons of fertility preservation with women with endometriosis. The true benefit of fertility preservation in women with endometriosis remains unknown.	⊕○○○	Strong recommendation

Fertility preservation		
85	The GDG recommends that adolescents with endometriosis are informed of the potential detrimental effect of ovarian endometriosis and surgery on ovarian reserve and future fertility.	GPP
86	Fertility preservation options exist and the GDG recommends that adolescents are informed about them, although the true benefit, safety, and indications in adolescents with endometriosis remain unknown.	GPP

Preservation de la fertilité et endométriose

FRENCH guideline

Indications for fertility preservation for endometriosis

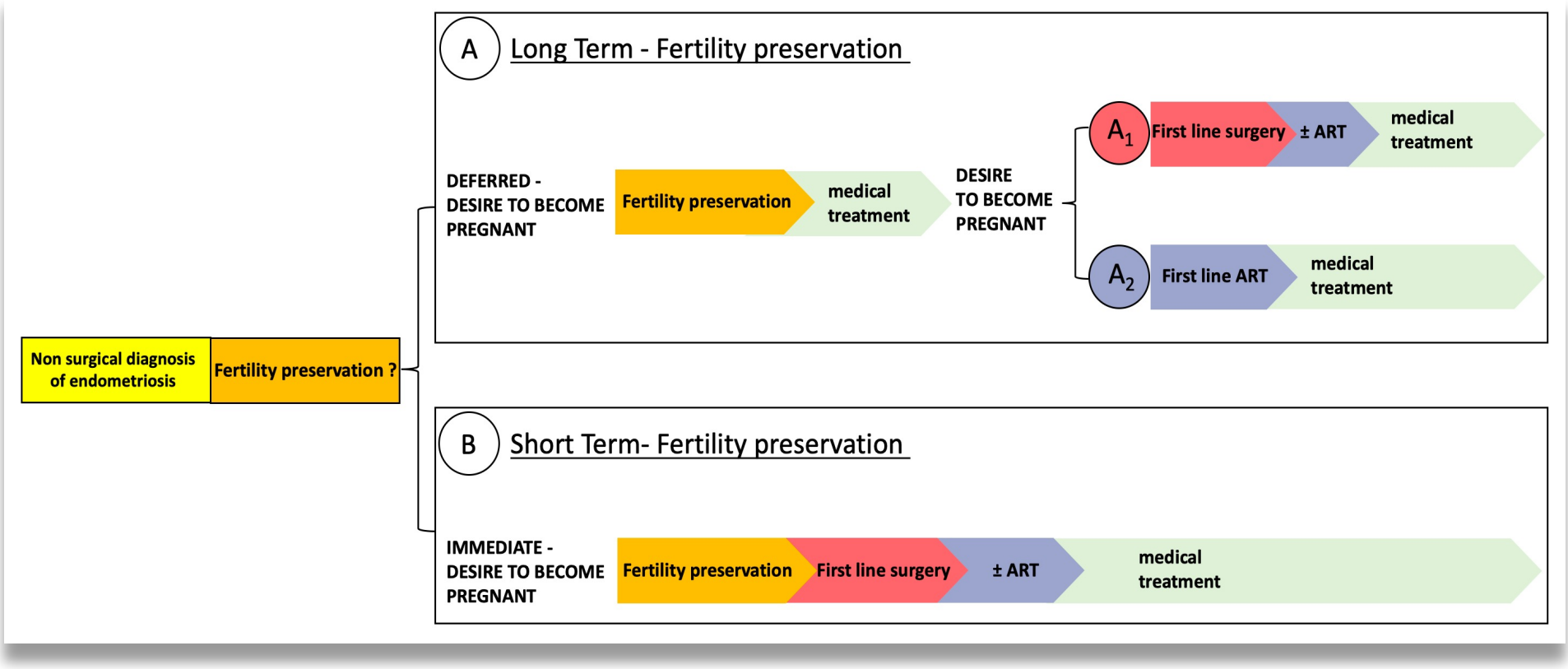
12	Fertility preservation should be proposed for bilateral endometriomas > 3 cm.
13	It is not advised to propose fertility preservation for a first episode of unilateral endometrioma < 3 cm in a woman with an ovarian reserve normal for her age.
14	For a first episode of unilateral endometrioma > 3 cm, it is advised to assess the indication for fertility preservation on a case-by-case basis according to age and ovarian reserve.
15	It is proposed to discuss fertility preservation for a recurrent unilateral endometrioma.
16	It is advised to propose fertility preservation for an endometrioma on a single ovary.
17	When ovarian stimulation for fertility preservation is indicated for endometrioma(s), it is proposed to act if possible before cystectomy to increase the number of oocytes cryopreserved, if the ovaries are easily accessible for retrieval.
18	It is not advised to propose fertility preservation for minimal to mild endometriosis that does not affect the ovaries.
19	When ovarian stimulation for fertility preservation is indicated for endometrioma(s), drainage should be performed in first line if the endometriomas are too bulky and/or if they prevent easy access to the ovaries for retrieval.

	Round 1 (n = 86) n (%)	Round 2 (n = 75) n (%)
Status		
Physicians	80 (93)	72 (96)
Patients	6 (7)	3 (4)
Age (median) (Q1–Q3)	46 (37–54) (n = 81, 5 missing data)	46 (41–54) (n = 74, 2 missing data)
If physicians, years of experience (range)	17 (12–26) (n = 78, 2 missing data)	16.5 (12–25.25) (n = 74, 2 missing data)
If physicians, specialty		
Gynecology-obstetrics	54 (63)	46 (61)
Embryologist	16 (19)	16 (21)
Endocrinology	5 (6)	5 (7)
Radiology	3 (3)	3 (4)
Midwife	2 (2)	2 (3)

Courbiere B, et al. J Clin Med 2021;10:38

Fertility preservation in endometriosis

LONG- AND SHORT-TERM STRATEGY



Santulli, Bourdon, Chapron et al., RBMO 2021

Fertility preservation in endometriosis

TAKE-HOME MESSAGES

FERTILITE
PARIS CENTRE

- L'endométriose, et notamment la chirurgie de lésion(s) ovarienne(s) peuvent être responsable d'infertilité
- La vitrification ovocytaire est la meilleure option de FP pour endométriose
- La PF doit être réalisée tant que possible avant une chirurgie pour endométriose
- La PF doit être proposée et réalisée tant que possible avant 35 ans en cas:
  - **D'endométriomes bilatéraux**
  - **Récurrence**
  - RO altérée
  - Endométriose profonde
- Le nombre d'ovocytes vitrifiés est proportionnel au chance de naissance

  ➔ Cumul ovocytaire

Preservation de la fertilité et endométriose

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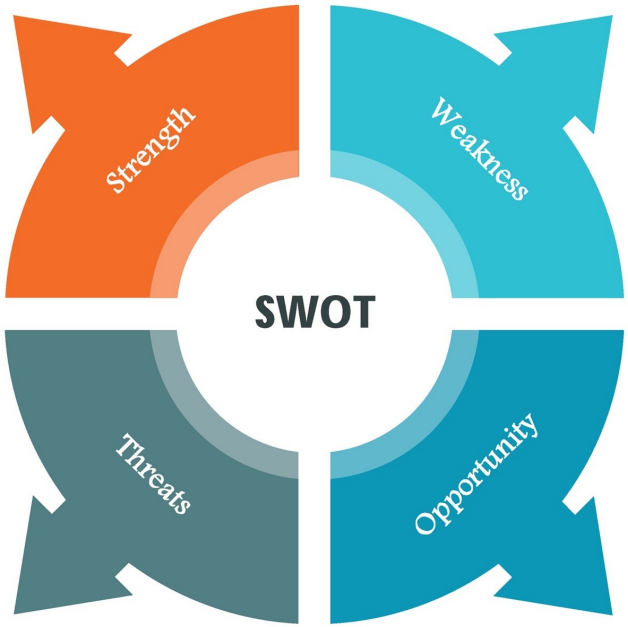
STRENGTH

- Preservation of own oocytes for future use
- High survival rate of vitrified thawed oocytes
- Clinical outcomes comparable using fresh vs. vitrified oocytes
- OHSS free stimulation protocols using GnRHa triggering
- Double stimulation to maximize the number of oocytes retrieved
- Aneuploïdy rates of embryos similar in women with and without endometriosis

WEAKNESS

- Few case series/no clinical studies
- Ovarian reserve assessment inaccurate in case of hormonal treatment or large endometriomas
- Lack of fertility tests - Ovarian reserve does not predict infertility or pregnancy
- Costs, lack of insurance coverage /no cost-effectiveness analysis
- Oocyte accumulation sometimes necessary
- Risk of complication (haemorrhage, ovarian abscess)
- Need for an efficient vitrification program (intercenter variability, manual, non-automated process with interoperator variability



THREATS

- Psychological impact
- Impact on reproductive decisions
- Lack of data on the impact on repeated stimulations on endometriosis symptoms and severity
- Potential impact of endometriosis on oocyte quality
- Lack of data on the survival rate - reproductive potential of oocytes preserved specifically in women with endometriosis/endometriomas

OPPORTUNITY

- Pro-fertility counselling
- Identification of women at risk
- Preserve oocytes before impact on ovarian reserve (age, endometriomas surgery)
- Preserve oocyte in women with a good ovarian reserve, avoiding multiple stimulations
- Avoid IVF at a older age with less oocytes
- Avoid egg donation in women at risk of poor ovarian response or premature ovarian failure

Streuli I, et al. Eur J Obstet Gynecol Reprod Biol 2018;229:172-178

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