

Spécificités obstétricales des grossesses issues d'AMP.

18^e journée de perfectionnement sur la prise en charge des couples infertiles.

07/04/17.

DR Florence Leperlier.



- En 2013: 23 651 enfants nés après AMP en France (*INSEE*)=2,9% des naissances.
- Ce taux augmente légèrement (2,6% en 2009, 2,7% en 2010, 2,8% en 2011).

Principal facteur de risque obstétrical : grossesses multiples.

- 16% d'accouchements multiples après FIV et ICSI.
- 11% d'accouchements multiples après IIU.



Collège de Gynécologie CML

Tableau AMP3. Inséminations, transferts d'embryons et accouchements multiples de 2010 à 2013*

	2010	2011	2012	2013
FIV/ICSI				
Nombre d'embryons transférés				
% 1 embryon transféré	28.3	31.5	34	37.3
% 2 embryons transférés	60.3	59.1	58.6	55.9
% 3 embryons transférés ou plus	10.4	9.4	7.4	6.8
Accouchements multiples				
Nombre d'accouchements uniques	9575	9924	10084	9873
Nombre d'accouchements gémellaires	2063	2108	1952	1882
Nombre d'accouchements triples et plus	28	27	28	26
% accouchements gémellaires	17.6	17.4	16.2	16
% accouchements triples et plus	0.2	0.2	0.2	0.2
TEC				
Nombre d'embryons transférés				
% 1 embryon transféré	46.8	48.9	53.2	56.8
% 2 embryons transférés	49.8	48	44.5	41.4
% 3 embryons transférés ou plus	3.5	3	2.3	1.8
Accouchements multiples				
Nombre d'accouchements uniques	2328	2513	2979	3221
Nombre d'accouchements gémellaires	250	259	270	340
Nombre d'accouchements triples et plus	3	3	6	3
% accouchements gémellaires	9.7	9.3	8.3	9.5
% accouchements triples et plus	0.1	0.1	0.2	0.1
IIU				
Accouchements multiples				
Nombre d'accouchements uniques	5496	5226	5511	5292
Nombre d'accouchements gémellaires	651	652	643	623
Nombre d'accouchements triples et plus	26	31	21	24
% accouchements gémellaires	10.5	11	10.4	10.5
% accouchements triples et plus	0.4	0.5	0.3	0.4

*Quelle que soit l'origine des gamètes

Pathologies de début de grossesse : GEU.

Santos-Ribeiro et al., 2016 ; 160000 grossesses après AMP ; 1,4%GEU.

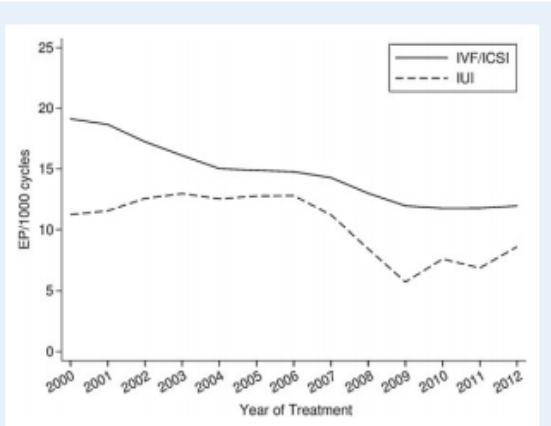


Figure 1 EP rates per 1000 cycles of IVF/ICSI ($n = 153\ 115$) and IUI ($n = 8852$) in the UK between 2000 and 2012. The incidence of EP decreased significantly over time for IVF/ICSI [incidence rate ratio (IRR) 0.96, 95% CI 0.95–0.97], but not for IUI (IRR 0.96, 95% CI 0.91–1.02); plotting smoothed by moving averages.

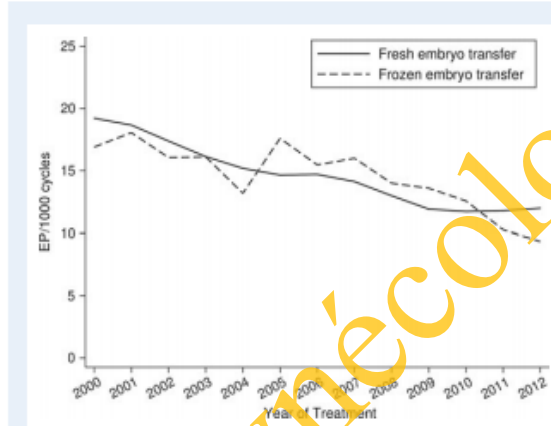


Figure 2 EP rates per 1000 transfer cycles of fresh ($n = 145\ 373$) and frozen ($n = 7772$) embryos in the UK between 2000 and 2012. The incidence of EP decreased significantly over time after fresh (IRR 0.96, 95% CI 0.94–0.97), but not following frozen (IRR 0.96, 95% CI 0.91–1.03) ETs; plotting smoothed by moving averages.

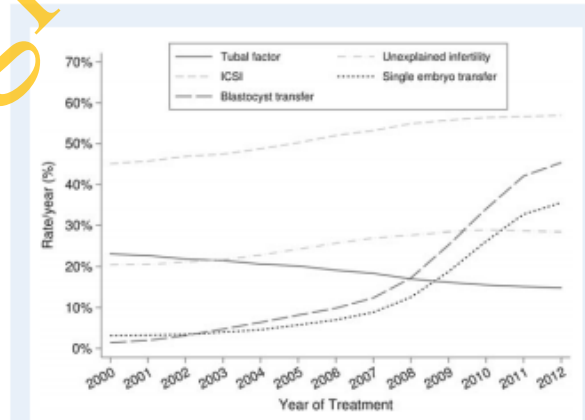
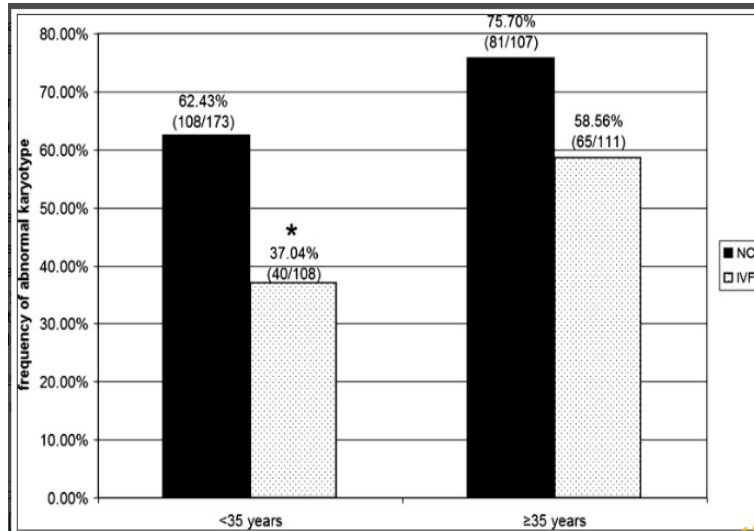


Figure 3 Trend of factors affecting occurrence of EP after IVF/ICSI ($n = 153\ 115$) in the UK between 2000 and 2012. Tubal factor significantly decreased over time (IRR 0.95, 95% CI 0.94–0.95), while unexplained infertility (IRR 1.03, 95% CI 1.03–1.03) and the number of cycles in which either ICSI (IRR 1.02, 95% CI 1.02–1.02), single embryo (IRR 1.31, 95% CI 1.30–1.31) or blastocyst (IRR 1.32, 95% CI 1.32–1.33) transfers were performed significantly increased; plotting smoothed by moving averages.



Pathologies de début de grossesse : FCS.



Pendina et al., 2014.

Fig. 1

The incidence of abnormal karyotype in miscarriages of patients aged < and ≥35 years who conceived naturally (NC) and who conceived through in vitro fertilization (IVF). *The incidence of cytogenetically abnormal miscarriages is significantly lower in IVF patients aged <35 years than in their NC counterparts ($p < 0.001$)

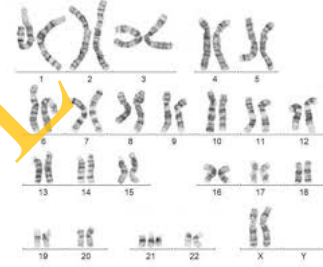
Hipp et al., 2016 ; 250 000 transferts ; 15% FCS.

“The adjusted risk of first trimester pregnancy loss was significantly higher for women with uterine factor infertility compared with those without uterine .The adjusted risk of loss was also higher among 30- to 34-year-old women with DOR and 38- to 40-year-old women with endometriosis.”

Dépistage combiné du 1^o trimestre après FIV ou FIV/ICSI.

- Dépistage plus à risque après AMP :
 - ✓ Femmes plus âgées.
 - ✓ Plus de risque d'anomalies chromosomiques après ICSI (*Gjerris et al, 2008*).
 - ✓ Plus de grossesse gémellaires et de « vanishing twin sd ».

Singletons.



- Marqueurs biochimiques :
- ❖ diminution du taux de **PAPP-A** de 0,8 MoM après transfert frais issu de FIV ou d'ICSI (Gjerris et al., 2012).
- ✓ Lié au nombre d'ovocytes recueillis? (*Tul and Novak-Antolic, 2006*).
- ✓ Ou à l'infertilité elle-même? (*Ranta et al., 2010*).

Table III First trimester Down's syndrome screening results for study groups and the reference group

Screening results	No infertility treatment				Assisted reproduction		
	TTP 0–12 months (n = 1164)	TTP 13–24 months (n = 112)	P	TTP ≥25 months (n = 70)	P	IVF (n = 39)	P
β-hCG (MOM)							
Geometric mean	0.97	1.05	0.14	0.94	0.73	0.91	0.80
Median	0.98	1.09	0.10	0.89	0.42	1.06	0.83
PAPP-A (MOM)							
Geometric mean	1.03	1.03	0.91	0.83	<0.01	0.84	<0.01
Median	1.03	1.01	0.77	0.89	<0.01	0.95	<0.01
NT (MOM)							
Geometric mean	0.98	0.96	0.61	0.94	0.39	1.02	0.19
Median	1.02	0.99	0.55	0.97	0.38	1.04	0.19
Screening-positive (N), %	24, 2.1%	3, 2.7%	0.66	9, 12.9%	<0.01	1, 2.6%	0.83

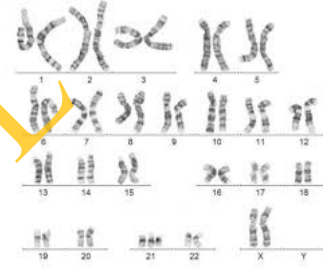
The significance of differences between geometric means were tested using t-tests after logarithmic transformation of the data and medians using non-parametric tests. ββ-hCG, hCG free beta subunit; PAPP-A, pregnancy-associated plasma protein A; MOM, multiple of median; NT, nuchal translucency; TTP, time-to-pregnancy.

- ❖ **β-hCG** : valeurs plus basses ou équivalentes < 8SA et plus hautes entre 11 et 13SA (*Gjerris et al., 2012*).



- Détermination de l'âge gestationnel : différence d'AG estimé en échographie vs clinique plus importante après FIV (*Bonne et al., 2013*) : +0,84 J vs +2,36 J ($p < 0.0001$).
- Clarté nucale: pas de différence entre grossesses spontanées et après FIV.
- **Au total** : le taux de faux positifs du dépistage combiné après FIV est estimé entre 4,7 et 15,9% vs 3,1 à 8,6% pour une grossesse spontanée (% variables selon les études) ; cette différence persiste dans les études avec appariement sur l'âge maternel (*Engels et al., 2010*).
- Il existe une correction du risque combiné pré-définie dans les logiciels de calculs en cas de grossesse après FIV ou ICSI.
- Cette correction ne doit pas être appliquée en cas de transfert d'embryon congelé.

Jumeaux.



- Marqueurs biochimiques : résultats discordants dans la littérature concernant la variation des marqueurs après FIV en cas de grossesse gémellaire.
- Clarté nucale : pas de différence avec une grossesse gémellaire spontanée; corrélation entre les CN des deux fœtus (*Cuckle and Maymon., 2010*).
- Au total : le dépistage combiné est moins performant pour les grossesses gémellaires spontanées ou après FIV; il est recommandé d'utiliser uniquement les données échographiques et l'âge maternel.
- Cas particulier du « vanishing twin » : 12 à 30% des grossesses gémellaires post FIV (*Chasen et al., 2006*) : augmentation des taux des marqueurs biochimiques notamment PAPP-A, d'autant plus que la réduction spontanée intervient tard :

Si un 2° sac contenant un embryon arrêté est vu à l'écho de 12 SA : les marqueurs sont ininterprétables (*Spencer et al., 2010*).

Spécificité des grossesses singletons issues d'AMP.



Original article
Assisted reproductive technology and risk of adverse obstetric outcomes in dichorionic twin pregnancies: a systematic review and meta-analysis

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21 études prospectives + 28 études rétrospectives.
 160 000 singletons AMP vs 2 280 000 singletons spontanés.

TABLE 2

Meta-analysis of association between ART and pregnancy-related complications in singleton pregnancies.

Pregnancy-related complication	No. of studies	ART singletons (n)	SC singletons (n)	RR (95% CI) from fixed-effects models	RR (95% CI) from random-effects models	Measure of heterogeneity		
						<i>Q</i>	<i>P</i>	<i>I</i> ² (%)
Pregnancy-induced hypertension *	13	26,652	68,948	1.25 (1.17-1.34)	1.30 (1.04-1.62)	57.97	<.00001	79
Gestational diabetes mellitus *	9	3,468	60,858	1.31 (1.13-1.53)	1.31 (1.11-1.54)	8.53	.38	6
Placenta previa *	12	22,920	961,703	3.31 (2.96-3.70)	3.71 (2.67-5.16)	58.86	<.00001	81
Placental abruption *	1	15,578	80,396	1.83 (1.49-2.24)	1.87 (1.45-2.40)	7.70	.26	22
Premature rupture of membranes *	5	3,028	28,306	0.91 (0.81-1.03)	1.31 (0.72-2.38)	12.99	.01	69
Antepartum hemorrhage *	5	8,433	42,205	2.11 (1.86-2.38)	2.40 (1.79-3.21)	7.56	.11	47
Postpartum hemorrhage *	2	11,300	28,883	1.24 (1.13-1.36)	1.29 (1.06-1.57)	2.84	.09	65
Polyhydramnios *	2	2,316	23,846	1.74 (1.24-2.45)	1.74 (1.24-2.45)	0.35	.55	0
Oligohydramnios *	2	2,316	23,846	2.14 (1.53-3.01)	2.14 (1.53-3.01)	0.00	.97	0
Caesarean sections *	28	81,810	695,735	1.57 (1.54-1.59)	1.58 (1.48-1.70)	334.66	<.00001	92

Note: RR = relative risk.

Qin. Poor outcomes in assisted pregnancies. *Fertil Steril* 2016.

TABLE 3

Meta-analysis of association between ART and adverse pregnancy outcomes in singleton pregnancies.

Adverse pregnancy outcome	No. of studies	ART singletons (n)	SC singletons (n)	RR (95% CI) from fixed-effects models	RR (95% CI) from random-effects models	Measure of heterogeneity		
						<i>Q</i>	<i>P</i>	<i>I</i> ² (%)
Preterm birth *	36	133,336	1,289,549	1.70 (1.67-1.74)	1.71 (1.59-1.83)	171.67	<.00001	80
Very preterm birth *	25	128,547	1,253,013	2.75 (2.62-2.88)	2.12 (1.73-2.59)	234.52	<.00001	90
Low birth weight *	36	130,147	1,062,445	1.69 (1.64-1.73)	1.61 (1.49-1.75)	175.76	<.00001	80
Very low birth weight *	30	127,088	980,322	2.18 (2.06-2.30)	2.12 (1.84-2.43)	88.63	<.00001	67
Small for gestational age *	14	81,990	753,771	1.49 (1.44-1.54)	1.35 (1.20-1.52)	72.20	<.00001	82
Perinatal mortality *	22	106,267	1,262,997	1.57 (1.46-1.70)	1.64 (1.41-1.90)	38.24	.01	45
Congenital malformations *	28	17,697	724,300	1.32 (1.27-1.36)	1.37 (1.29-1.45)	45.43	.01	41
Intrauterine growth restriction	2	708	1,240	1.08 (0.60-1.97)	1.11 (0.32-3.94)	4.49	.03	78

Qin. Poor outcomes in assisted pregnancies. *Fertil Steril* 2016.



Spécificité des grossesses multiples issues d'AMP.

- ✓ Europe : 21,8% des naissances issues d'AMP en Europe (Nyboe Andersen et al., 2005).
- ✓ USA : 44% jumeaux, 9,3% triplets, 0,6% haut rang (Reynolds et al., 2003).

Fertility and Sterility
Volume 103, Issue 6, June 2015, Pages 1492–1508 e7

Original article
Pregnancy-related complications and adverse pregnancy outcomes in multiple pregnancies resulting from assisted reproductive technology: a meta-analysis of cohort studies

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Received 25 January 2015, Revised 2 March 2015, Accepted 16 March 2015, Available online 22 April 2015

39 études
38 000 g.multiples AMP vs 107 000 g.multiples spontanées.

TABLE 2

Meta-analysis of association between assisted reproductive technology and pregnancy-related complications in multiple pregnancies.

Pregnancy-related complications	Number of studies (n)	ART multiples (n)	SC multiples (n)	RR (95% CI) from		Measure of heterogeneity		
				fixed-effects models	random-effects models	Q	Pvalue	I ² (%)
Postpartum haemorrhage	10	1,399	2,849	1.28 (0.99–1.66)	1.28 (0.99–1.66)	6.43	.70	0
Placenta previa	8	2,491	2,505	1.52 (0.94–2.44)	1.52 (0.94–2.44)	6.91	.44	0
Placental abruption	5	2,191	1,903	1.04 (0.42–2.59)	1.01 (0.36–2.85)	4.87	.30	18
Premature rupture of membranes *	11	3,201	2,932	1.20 (1.05–1.37)	1.21 (1.05–1.41)	11.73	.30	15
Pregnancy-induced hypertension *	12	1,300	31,578	1.11 (1.04–1.19)	1.13 (1.02–1.26)	11.72	.39	6
Gestational diabetes mellitus *	10	2,430	5,826	1.87 (1.52–2.30)	1.78 (1.25–2.55)	15.65	.07	42
Anemia during pregnancy	8	2,468	2,259	1.07 (0.93–1.23)	1.15 (0.90–1.48)	17.37	.02	60
Oligohydramnios	3	2,058	845	1.40 (0.36–5.36)	1.40 (0.36–5.36)	1.57	.46	0
Polyhydramnios	7	2,872	2,449	1.10 (0.76–1.59)	1.08 (0.61–1.90)	11.11	.09	46

Note: ART = assisted reproductive technology; CI = confidence interval; RR = relative risk; SC = spontaneously conceived.
Qin. Obstetric risk after assisted conception. Fertil Steril 2015.

TABLE 3

Meta-analysis of association between assisted reproductive technology and adverse pregnancy outcomes in multiple pregnancies.

Pregnancy-related complications	Number of studies (n)	ART multiples (n)	SC multiples (n)	RR (95% CI)		Measure of heterogeneity		
				from fixed-effects models	from random-effects models	Q	Pvalue	I ² (%)
Preterm birth *	26	32,937	96,300	1.10 (1.09–1.12)	1.08 (1.03–1.14)	143.96	<.00001	83
Very preterm birth *	19	31,069	97,929	1.21 (1.06–1.37)	1.18 (1.04–1.34)	85.64	<.00001	79
Low birth weight *	22	31,031	90,169	1.04 (1.03–1.06)	1.04 (1.01–1.07)	39.33	.009	47
Very low birth weight *	18	30,335	89,547	1.11 (1.06–1.16)	1.13 (1.01–1.25)	44.68	.0003	62
Intrauterine growth restriction	3	870	952	1.21 (0.94–1.57)	1.10 (0.73–1.67)	3.17	.20	37
Small for gestational age	7	11,943	31,588	0.92 (0.89–0.96)	0.85 (0.68–1.07)	19.71	.003	70
Congenital malformations *	35	35,669	103,026	1.05 (1.01–1.10)	1.11 (1.02–1.22)	48.33	.05	30
Perinatal mortality	22	21,972	66,851	0.92 (0.84–1.01)	1.04 (0.87–1.24)	38.72	.01	46
Neonatal respiratory distress syndrome	4	1,005	3,043	1.14 (0.94–1.39)	0.99 (0.64–1.54)	9.99	.02	70

Note: ART = assisted reproductive technology; CI = confidence interval; RR = relative risk; SC = spontaneously conceived.
Qin. Obstetric risk after assisted conception. Fertil Steril 2015.

- ✓ Biais : grossesses gémellaires monochoriales=2% après AMP vs 22% si grossesses spontanées.

Pourquoi ces différences?

- ✓ Liées aux techniques d'AMP?
 - Hyper stimulation contrôlée?
 - Manipulation des gamètes? ICSI?
 - Culture prolongée?
 - Congélation embryonnaire?
- ✓ Liées à l'infertilité?
 - Les populations sont elles comparables?
 - Quels biais dans les causes d'infertilité?

Hyperstimulation ovarienne contrôlée?

Reprod Biomed Online. 2006 Oct;13(4):591-9.

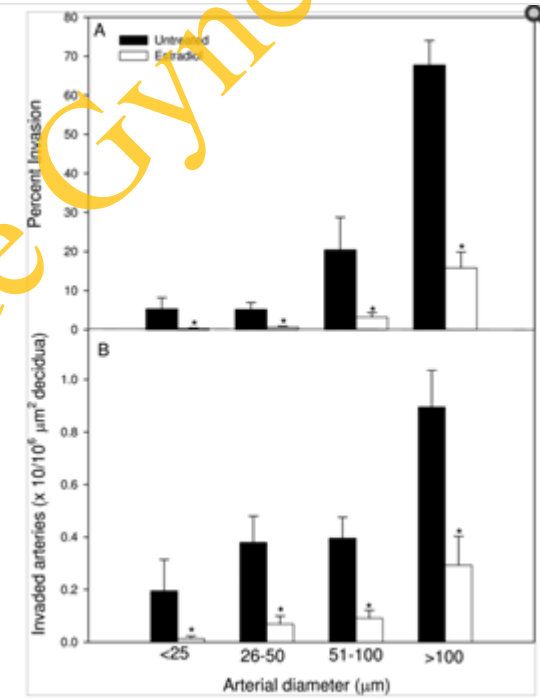
Defective implantation and placentation: laying the blueprint for pregnancy complications.

Norwitz ER¹.

Endocrinology. 2008 Oct;149(10):5078-87. doi: 10.1210/en.2008-0116. Epub 2008 Jun 19.

Suppression of extravillous trophoblast vascular endothelial growth factor expression and uterine spiral artery invasion by estrogen during early baboon pregnancy.

Bonagura TW¹, Pepe GJ, Enders AC, Albrecht ED.





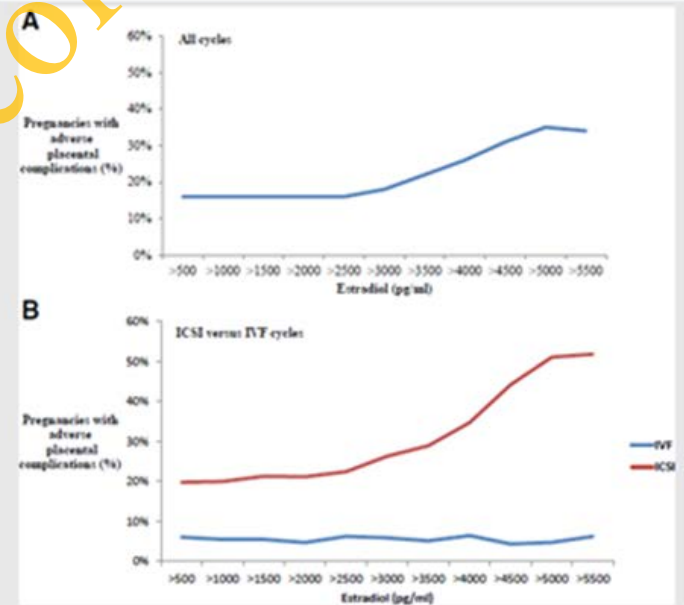
Original article

Are intracytoplasmic sperm injection and high serum estradiol compounding risk factors for adverse obstetric outcomes in assisted reproductive technology?

1600 cycles FIV ou ICSI
500 singletons nés.

- ✓ Pré-éclampsie, RCIU, petit poids de naissance.
- ✓ Cut-off=3000pg/mL E2.

FIGURE 1



Greater than efficiency curves evaluating the effect of estradiol (E_2) on adverse placental outcomes. The occurrence of adverse outcomes was calculated for each E_2 threshold in increments of 500 pg/mL. (A) All cycles in the study. (B) All cycles in the study broken down into intracytoplasmic sperm injection (ICSI) versus IVF.

Keyser. ICSI, E_2 , and obstetric risks. *Fertil Steril* 2016.

ICSI?



J Obstet Gynaecol Can. 2006 Mar;28(3):220-50.

Pregnancy outcomes after assisted reproductive technology.

[Article in English, French]

Allen VM¹, Wilson RD, Cheung A; Genetics Committee of the Society of Obstetricians and Gynaecologists of Canada (SOGC); Reproductive Endocrinology Infertility Committee of the Society of Obstetricians and Gynaecologists of Canada (SOGC).

- ✓ Plus d'anomalies chromosomiques héritées ou de novo chez les enfants nés d'ICSI avec sperme chirurgical.
- ✓ Pas d'étude comparant le devenir obstétrical FIV vs ICSI.

Collège de Gynécologie

CMV

Collège de Gynécologie

Culture prolongée?



Gynecol Endocrinol. 2015 Jun;31(6):469-72. doi: 10.3109/09513590.2015.1006615. Epub 2015 Apr 21.

Obstetric and perinatal outcome from single cleavage transfer and single blastocyst transfer: a matched case-control study.

Oron G¹, Navot D, Son WY, Holzer H, Buckett W, Tulandi T.

A cohort of 3522 fresh SETs using non-donor oocytes in women ≤ 40 years old from August 2010 to December 2013. Live births were matched by maternal age, body mass index, smoking and parity. Adjustments were made for gender of the baby and embryo quality. Obstetric and perinatal outcomes including **birth weight, low birth weight, small for gestational age, preterm delivery, preeclampsia, placental abruption and neonatal complications** were compared.

Extended culture was not associated with increased adverse obstetric and perinatal outcome in pregnancies resulting from fresh SETs in this study.

Congélation/vitrification embryonnaire?



Vol.28, No.8 pp. 2093–2100, 2013

1 on April 7, 2013 doi:10.1093/humrep/det104

ORIGINAL ARTICLE Embryology

Obstetric and neonatal outcomes after transfer of vitrified early cleavage embryos

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Table II Obstetric and neonatal outcomes in singleton pregnancies after transfer of vitrified, slow freeze and fresh Day 3 embryos.

	Vitrified (n = 545)	Slow freeze (n = 986)	Fresh (n = 1914)	Test between groups, P-value	
				Vitrified versus slow freeze	Vitrified versus fresh
Maternal age (years)	32.4 ± 3.5 (22–45)	32.1 ± 3.1 (22–44)	31.9 ± 3.3 (21–43)	0.537	0.429
BMI (kg/m ²)	21.4 (18.3–24.0)	21.6 (17.4–24.3)	21.6 (18.1–24.1)	0.775	0.801
Primiparous	295 (54.1%)	523 (53.0%)	1072 (56.0%)	0.683	0.436
Educational level, university	218 (40.0%)	366 (37.1%)	861 (45.0%)	0.267	0.039
Babies born	545	986	1914		
Live borns	543	982	1907		
Gender					
Male	276 (50.6%)	491 (49.8%)	959 (50.1%)	0.752	0.825
Female	269 (49.4%)	495 (50.2%)	955 (49.9%)		
Spontaneous vaginal delivery	60 (11.0%)	107 (10.9%)	189 (9.9%)	0.977	0.837
Vacuum or forceps extraction	2 (0.4%)	3 (0.3%)	7 (0.4%)		
Caesarean delivery	483 (88.6%)	876 (88.8%)	1718 (89.8%)		
Hypertensive disorder	27 (5.0%)	41 (4.2%)	74 (3.9%)	0.469	0.259
Hypertension	6 (1.1%)	8 (0.8%)	13 (0.7%)	0.569	0.321
Pre-eclampsia	21 (3.9%)	33 (3.3%)	61 (3.2%)	0.607	0.445
Gestational diabetes	18 (3.3%)	29 (2.9%)	55 (2.9%)	0.695	0.602
Placenta previa	2 (0.4%)	5 (0.5%)	6 (0.3%)	1.0	1.0
Abruptio placenta	1 (0.2%)	3 (0.3%)	5 (0.3%)	1.0	1.0
Gestational age (weeks)	38.7 ± 1.7 (25.6–42.5)	38.7 ± 1.7 (24.3–42.6)	38.7 ± 1.7 (25–42.8)	>0.05	>0.05
32–37	41 (7.5%)	91 (9.2%)	149 (7.8%)	0.255	0.840
28–32	4 (0.7%)	8 (0.8%)	6 (0.3%)	1.0	0.243
<28	1 (0.2%)	1 (0.1%)	4 (0.2%)	1.0	1.0
Birthweight (g) *	3455.3 ± 482.0 (790–5450)	3352.3 ± 500.7 (810–5100)	3355.8 ± 490.9 (750–5400)	0.0001	0.0001
1500–2500	10 (1.8%)	34 (3.5%)	49 (2.6%)	0.070	0.329
<1500	2 (0.4%)	6 (0.6%)	8 (0.4%)	0.719	1.0
SGA	8 (1.5%)	20 (2.0%)	35 (1.8%)	0.433	0.571
Apgar score < 7 at 5 min	15 (2.8%)	45 (4.6%)	56 (2.9%)	0.088	0.831
Transferred to NICU	44 (8.1%)	71 (7.2%)	153 (8.0%)	0.535	0.952
Perinatal mortality	2 (0.4%)	4 (0.4%)	7 (0.4%)	1.0	1.0
Stillborns	0	1	1		
Early neonatal mortality	2	3	6		

SGA: small for gestational age; NICU: neonatal intensive care unit.

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Which one has a better obstetric and perinatal outcome in singleton pregnancy, IVF/ICSI or FET?: a systematic review and meta-analysis

J. Zhao, B. Xu, Q. Zhang and Y. P. Li*

13 études cohorte.
127 000 transferts.

IVF/ICSI is associated with a high risk of preterm birth (OR = 1.14, 95 % CI: 1.02, 1.28) and low birth weight (OR = 1.48, 95 % CI: 1.37, 1.60). There was no significant difference in the risk of perinatal mortality (OR = 1.11, 95 % CI: 0.85, 1.46) between FET and IVF/ICSI. Singleton pregnancy after FET was associated with higher cesarean section rate compared with IVF/ICSI (OR = 0.85, 95 % CI: 0.80, 0.91).

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Infertilité : facteur confondant principal?

Adverse obstetric and perinatal outcomes of singleton pregnancies may be related to maternal factors associated with infertility rather than the type of assisted reproductive technology procedure used

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TABLE 3

Comparison of adverse obstetric outcomes between the group that underwent specific types of ART procedures and the corresponding matched controls.

Outcome	Ovulation stimulation		IUI		IVF-ET	
	OR	95% CI	OR	95% CI	OR	95% CI
Pregnancies						
PIH	1.03	0.87–1.28	0.88	0.70–1.09	0.74	0.62–0.89
Eclampsia	0.65	0.16–2.73	0.41	0.09–1.85	0.31	0.08–1.15
Placenta abruption	1.35	0.88–2.08	0.98	0.59–1.62	1.21	0.79–1.87
Placenta previa *	1.77	1.24–2.54	1.46	1.03–2.08	2.2	1.68–2.87
Placenta accretion	0.6	0.28–1.31	1.51	0.80–2.84	2.67	1.42–5.03
PTD < 37 wk of gestation *	1.29	1.15–1.45	1.16	1.01–1.33	1.29	1.16–1.45
PTD < 34 wk of gestation *	1.31	1.11–1.54	1.22	1.01–1.47	1.33	1.13–1.57
Type of delivery						
Spontaneous cephalic *	0.91	0.83–0.99	0.87	0.79–0.96	0.75	0.69–0.81
Instrumental	0.95	0.82–1.11	1.07	0.91–1.26	1.01	0.87–1.16
Elective cesarean	1.06	0.93–1.20	1.09	0.95–1.26	1.38	1.23–1.55
Emergency cesarean	1.11	0.99–1.25	1.11	0.98–1.26	1.19	1.07–1.32
Other	1.68	1.11–2.55	1.2	0.66–2.16	0.82	0.47–1.44
Postpartum hemorrhage	1.24	0.99–1.56	1.23	0.95–1.60	1.46	1.18–1.81
ICU admission	0.36	0.04–3.48	0.77	0.20–2.98	0.19	0.02–1.60
Maternal death	0.54	0.05–5.99	1.13	0.10–12.45	0.47	0.04–5.14
Infants						
Birth weight, g						
< 2,500 *	1.35	1.21–1.50	1.17	1.04–1.32	1.27	1.15–1.40
< 1,500 *	1.36	1.13–1.64	1.23	0.99–1.52	1.3	1.08–1.57
< 1,000	1.77	1.34–2.32	1.38	1.01–1.88	1.44	1.09–1.90
SGA	1.45	1.21–1.73	1.27	1.04–1.55	1.12	0.94–1.33
UmA pH < 7.00	0.6	0.25–1.49	1.26	0.59–2.70	0.93	0.45–1.92
Apgar score (5 min) < 7	1.11	0.87–1.41	1.24	0.95–1.62	1.18	0.93–1.49
Neonatal resuscitation	1.29	1.17–1.43	1.06	0.94–1.19	1.23	1.12–1.35
NICU admission	1.1	0.98–1.24	0.96	0.84–1.11	1.12	1.00–1.26
Infant death	1.23	0.87–1.75	1.22	0.83–1.80	1.25	0.89–1.78

Note: 95% CI = 95% confidence interval; ICU = intensive care unit; NICU = neonatal intensive care unit; OR = odds ratio; PIH = pregnancy-induced hypertension; PTD = pre-term delivery; SGA = small for gestational age; UMa = umbilical artery.

Hayashi ART procedures and perinatal outcomes. *Fertil Steril* 2012.

Infertility and the risk of adverse pregnancy outcomes: a systematic review and meta-analysis

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Submitted on February 29, 2012; resubmitted on May 30, 2012; accepted on July 6, 2012

20 000 nés après délai à concevoir >12
mois vs 1M couples fertiles.

Table II Summary of results by type of pooling: comparing study outcomes by pooling crude, matched and adjusted data.

Outcomes	Total number of studies	Pooled crude data			Pooled matched data			Pooled adjusted data		
		Number of studies	I ² value (%)	OR; 95% CI	Number of studies (I ²)	I ² value (%)	OR; 95% CI	Number of studies (I ²)	I ² value (%)	OR; 95% CI
PTB <37 weeks *	14	14	33.2	1.38; 1.25–1.54	5	33.0	1.39; 1.20–1.62	8	3.0	1.31; 1.21–1.42
SGA *	9	9	36.8	1.24; 1.12–1.36	2	0.0	1.16; 0.97–1.37	4	54.5	1.17; 1.03–1.33
LBW *	8	8	19.8	1.30; 1.16–1.45	4	0.0	1.50; 1.27–1.78	6	0.0	1.34; 1.21–1.48

Infertility and reproductive disorders: impact of hormonal and inflammatory mechanisms on pregnancy outcome

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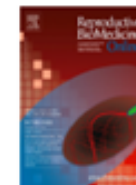
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Submitted on March 31, 2015; resubmitted on July 28, 2015; accepted on September 3, 2015



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REVIEW

Pregnancy complications in spontaneous and assisted conceptions of women with infertility and subfertility factors. A comprehensive review

Stefano Palomba ^{2,*}, Susanna Santagni ², Karen Gibbins ^D,
Giovanni Battista La Sala ^{2,C}, Robert M Silver ^D

- **OPK :**

- ✓ FCS (*Wang et al., 2016*).
- ✓ HTA gravidique (12,7%vs5,2%) et PE (8%vs2%) (*Palomba et al., 2014*).
- ✓ Diabète gestationnel (aOR3,2 95%CI 1,4-7,3) (*Sterling et al., 2016*).

- **Fibromes utérins :**

- ✓ FCS/fibrome sous-muqueux (RR=1,7 95%CI 1,4-2,1) (*Pritts et al., 2009*).
- ✓ Nn prématurée/fibrome interstitiel >5cm (+ 10%) (*Shavell et al., 2012*).
- ✓ MFIU <32SA (aOR4,2 95%CI 1,2-14,7) (*Lai et al., 2012*).

- **Endométriose :**

- ✓ FCS (RR=1,2 95%CI 1,2-1,3)
- ✓ GEU (RR=1,9 95%CI 1,8-2,1) (*Hansen et al., 2014*)
- ✓ Nn prématurée (6,8%vs5%) (*Stephansson et al., 2009*)
- ✓ Placenta praevia (aOR=4,5 95%CI 1,2-16,5)(*Lin et al., 2015*).

- **Adénomyose :**

- ✓ Nn prématurée (OR=5 95%CI 2,2-11,4) et RPM (OR=5,5 95%CI 1,7-17,7) (*Mochimaru et al., 2015*).

- **Malformations utérines :**

- ✓ FCS (RR=2,9 95%CI 2,0-4,1) . Nn prématurée (RR=2,1 95%CI 1,5-3,1) . FCT/cloison utérine (RR=3,7 95%CI 1,6-8,9) (*Chan et al., 2011*).

Effet population?

- ✓ Âge maternel :
(Laopaiboon et al., 2014)

360 000 singletons.

Table 3. Association between maternal age and adverse pregnancy outcomes

Outcomes	Maternal age (years) aOR* (95% CI)		
	35-39	40-44	≥45
Maternal**			
MNM	1.5 (1.3, 1.8)	2.2 (1.7, 2.8)	3.5 (2.2, 5.5)
MD	1.7 (1.2, 2.6)	2.6 (1.4, 4.7)	4.3 (1.5, 12.1)
SMO	1.6 (1.4, 1.8)	2.3 (1.8, 2.9)	3.7 (2.4, 5.6)
Neonatal***			
Preterm birth (<37 weeks)	1.2 (1.1, 1.2)	1.4 (1.2, 1.5)	1.3 (0.9, 1.6)
Stillbirths	1.5 (1.4, 1.7)	1.8 (1.5, 2.1)	2.1 (1.5, 2.8)
Early neonatal mortality	1.3 (1.0, 1.4)	1.4 (1.1, 1.8)	1.4 (0.7, 2.7)
Perinatal mortality	1.4 (1.3, 1.5)	1.7 (1.5, 1.9)	1.9 (1.5, 2.6)
Low birth weight (<2500 g)	1.1 (1.0, 1.1)	1.4 (1.3, 1.5)	1.2 (0.9, 1.5)
NICU admission***	1.2 (1.1, 1.2)	1.6 (1.4, 1.7)	1.1 (0.8, 1.5)
Apgar score <7 at 5 minutes	1.0 (0.9, 1.1)	1.4 (1.2, 1.6)	1.6 (1.2, 2.3)

- ✓ BMI : (Marchi et al., 2015) « Narrative analysis of the 22 reviews included show gestational diabetes, pre-eclampsia, gestational hypertension, depression, instrumental and caesarean birth, and surgical site infection to be more likely to occur in pregnant women with obesity compared with women with a healthy weight. »

Conclusion.

- Plus de complications obstétricales après AMP.
- Effet plus marqué chez les singletons.
- Incidence surtout de la population infertile et des causes de l'infertilité plutôt que des techniques d'AMP elles-mêmes.

Merci.



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