EMBRYO TRANSFER

- What elements really matter?

Filipa Barbosa

I declare no conflict of interest.

EMBRYO TRANSFER

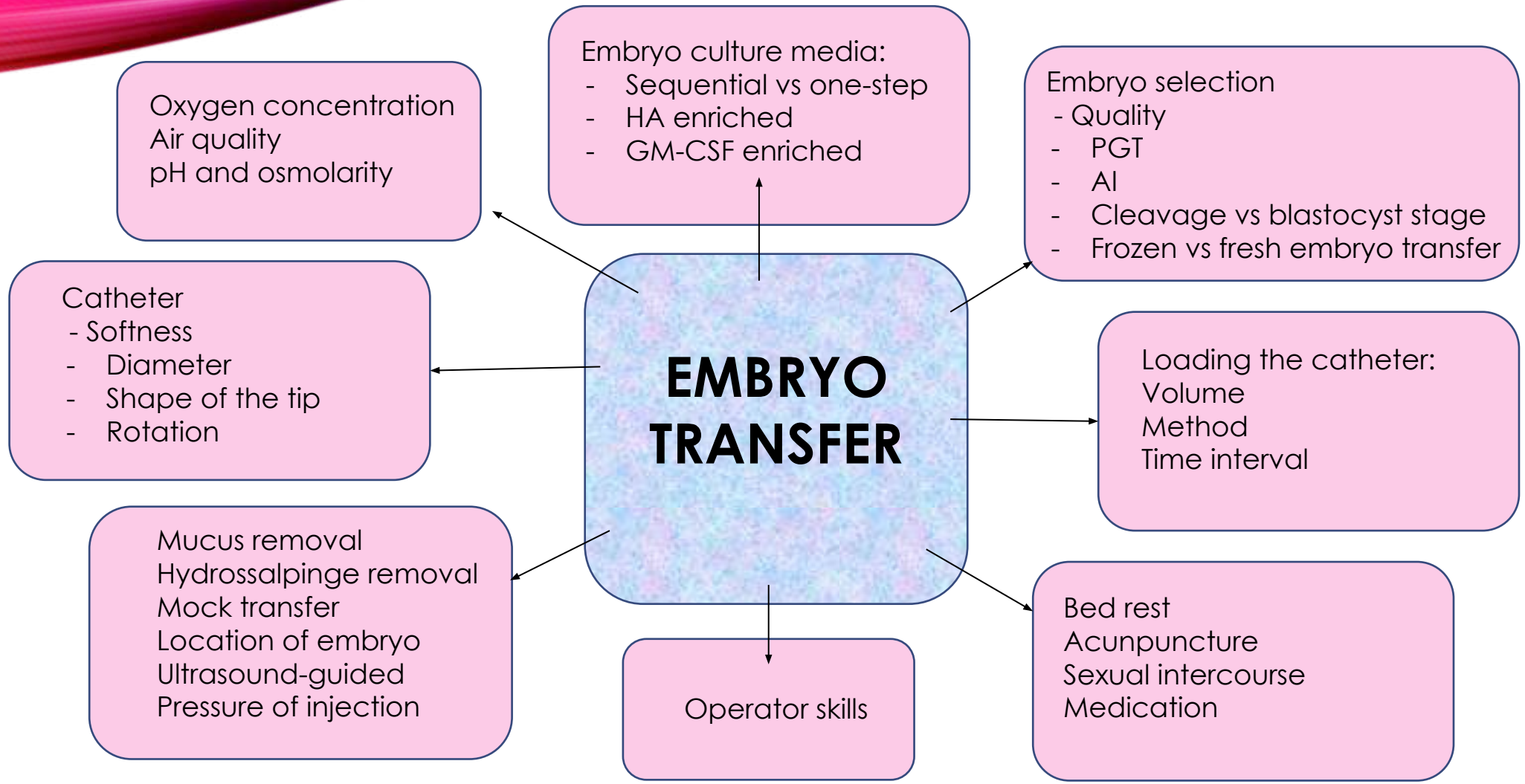
Refers to a step in the process of assisted reproduction in which embryos are placed into the uterus of a female with the intent to establish a pregnancy.

The final, and perhaps the most crucial, procedure in IVF.

Needs care and attention…

EMBRYO TRANSFER - EVOLUTION

Healy *et al,* 2015



What elements really matter?

human reproduction update

Interventions to optimize embryo transfer in women undergoing assisted conception: a comprehensive systematic review and meta-analyses

Practice of Embryo Transfer: Recomme
During and After

Bulent Tıras, MD[1] Pinar Ozcan Cenksoy, MD[2]

Performing the embryo transfer: a guideline

Practice Committee of the American Society for Reproductive Medicine
American Society for Reproductive Medicine, Birmingham, Alabama

Human Reproduction vol.14 no.3 pp.590–592, 1999

OPINION

What factors are important for successful transfer after in-vitro fertilization?

Embryo transfer success: It is in our hands

Yossi Mizrachi, M.D.[a] and Dana B. McQueen, M.D.[b]

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[b] Reproductive Medicine Associates, San Francisco, California

pact of difficult embryo
r on the success
a systematic review
ata-analysis

Tamar Matitashvili, Seifeldin Sadek and Gera
Embryo
Hassan M

Optimizing the technique of embryo t

Lindsay Mains, M.D., and Bradley J. Van Voorhis, M.D.

Division of Reproductive Endocrinology and Infertility, University of Iowa Hospitals and Clinics, Iowa City, Iowa

Embryo transfer techniques

Sotirios H. Saravelos, MD, MRCOG, Subspecialist Trainee in Reproductive Medicine [a,*],
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optimizing the success

Importance of embryo transfer technique in maximizing assisted reproductive outcomes

William B. Schoolcraft, M.D.

Colorado Center for Reproductive Medicine, Lone Tree, Colorado

RECOMMENDATIONS

Practice points

1. Assessment of biological and psychological stress prior to and post ET does not appear to predict reproductive outcomes.
2. Acupuncture at the time of embryo transfer does not appear to improve reproductive outcomes.
3. Removal of cervical mucous at the time of embryo transfer appears to improve reproductive outcomes.
4. A soft versus a hard embryo transfer catheter appears to be associated with improved reproductive outcomes.
5. Transabdominal ultrasound guidance during embryo transfer appears to improve reproductive outcomes, whereas the use of transvaginal or 3D ultrasound does not appear to convey any additional benefit.
6. Delayed embryo catheter removal does not seem to improve reproductive outcomes.
7. Embryo retention and re-transfer does not appear to be associated with a worse reproductive outcome.
8. Bed rest should not be recommended following embryo transfer.

Saravelos 2019

Table I. The relative importance of each factor as rated by the total, mean score and SD. The maximum possible score for each variable was 500

Priority		Mean score	SD	Total score
1	Removal of hydrosalpinges before treatment	6.8	2.8	340
2	Absence of bleeding/blood on catheter	6.6	2.5	330
3	Type of catheter used	6.1	2.7	255[a]
4	Not touching the fundus	5.8	3.2	292
5	Avoiding the use of a tenaculum	5.7	2.9	283
6	Removal of all mucus from cervix	5.2	3.2	258
7	Ultrasound details of cavity before treatment	4.3	2.8	216
8	Leaving catheter in place for at least 1 min	4.2	3.1	211
9	30 min rest after transfer	3.8	2.8	192
10	Dummy transfer before treatment	3.1	3.1	157
11	Ultrasonic monitoring of transfer	2.6	2.2	125
12	Antiprostaglandins to prevent contractions	1.9	1.5	93

[a]Only 42 clinicians responded to this question.

Kovacs, 1999

Table 2. Embryo transfer tips

- Ultrasound guidance with optimal full bladder
- Minimize waiting time for the procedure
- Mock transfer, pre-cycled and just before ET
- Routine removal of cervical mucus with a moist gauze and 10 cc syringe with saline medium
- Use echogenic catheters
- Minimize time intervals to avoid the exposure of the embryos to ambient conditions
- Gentle manipulation. Advance the catheter as a unit to the inner cervical os. From there on, advance only with the inner catheter.
- In difficult cases, try with wired inner catheter, stylet or obturators. Avoid to use a tenaculum!
- Distance from fundus should be 1,5 cm. Do not clinical touch!
- Minimum ejection speed
- Rotate the catheter 180°
- Pause to allows the embryos to settle away from the catheter tip
- Withdraw transfer catheter slowly
- Check catheter for retained embryos
- Retransfer immediately if it is needed
- Bed rest for 20 minutes

Urbina et al, 2015

RECOMMENDATIONS

Summary of the recommendations regarding different aspects of ET.

Practice	Recommendation	Strength of evidence[a]
Abdominal ultrasound guidance	Abdominal ultrasound guidance during ET improves the live birth rate.	Grade A
Vaginal ultrasound guidance	Vaginal ultrasound guidance during ET results in similar clinical pregnancy and live birth rates as abdominal ultrasound but can reduce the level of discomfort.	Grade A
Cervical mucus removal	Removal of the cervical mucus before ET may improve the live birth rate.	Grade B
Type of catheter	The use of soft ET catheters increases the live birth rate compared with that of firm catheters.	Grade A
Positioning of the external catheter	Low-quality evidence suggests that the external (guide) catheter should not be inserted beyond the internal cervical os.	Grade C
Location of embryo placement	When placing the embryo in the uterine cavity, the distance between the fundus and catheter tip should be >10 mm.	Grade B
Rate of injection	There is insufficient evidence to recommend on the rate of injection for embryo expulsion.	Grade C
Length of procedure	There is conflicting evidence regarding the impact of procedure length on reproductive outcome.	Grade C
Catheter rotation	There is conflicting evidence regarding the impact of catheter rotation during withdrawal on reproductive outcome.	Grade C
Timing of catheter withdrawal	Immediate catheter withdrawal is not associated with a lower clinical pregnancy or live birth rate.	Grade B

Note: ET = embryo transfer.
[a] Level of evidence is classified as follows:
Grade A: There is good evidence to support the recommendation, either for or against.
Grade B: There is fair evidence to support the recommendation, either for or against.
Grade C: There is insufficient evidence to support the recommendation, either for or against.
Mizrachi. Embryo transfer: the "who". Fertil Steril 2022.

Mizrachi *et al,* 2022

Table 1
Summary of 'Good' and 'Fair' evidence regarding the embryo transfer procedure (adopted from the ASRM guideline on embryo transfer).

Variable/Intervention	Recommendation	Grade
Ultrasound guidance	Recommended	A
Soft embryo transfer catheter	Recommended	A
Bed rest	Not recommended	A
Acupuncture	Not recommended	B
Prophylactic antibiotics	Not recommended	B
Removing cervical mucus	Recommended	B
Embryo transfer to central or upper cavity	Recommended	B
Delayed catheter removal	Not recommended	B
Immediate re-transfer of retained embryos	Recommended	B

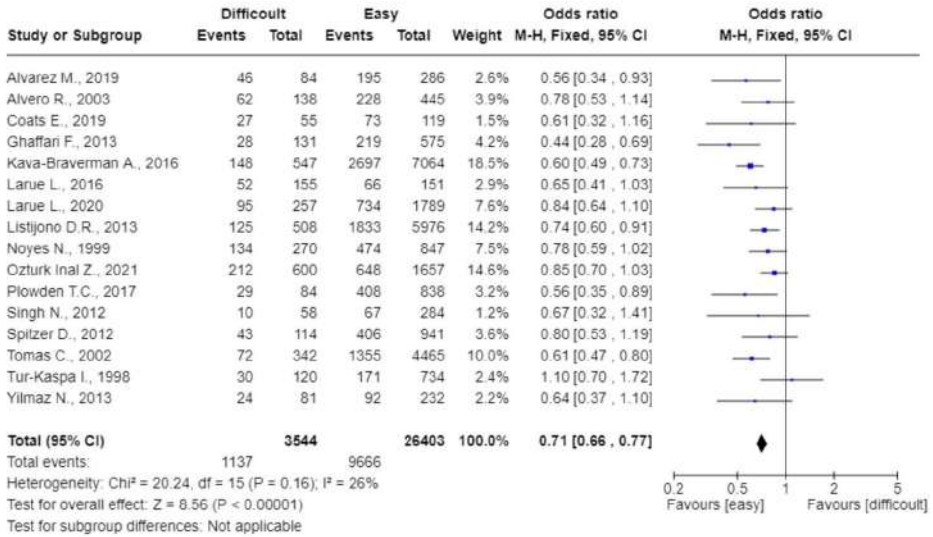
Saravelos 2019

- ✔ Ultrasound guidance
- ✔ No bed rest
- ✔ Soft embryo transfer catheter
- ✔ Presence of blood

The impact of difficult embryo transfer on the success of IVF: a systematic review and meta-analysis

Giulia Galati[1]✉, Marco Reschini[2], Laura Mensi[2], Camilla Di Dio[1], Edgardo Somigliana[2,3] & Ludovico Muzii[1]

2023



Study or Subgroup	Difficoult Events	Total	Easy Events	Total	Weight	Odds ratio M-H, Fixed, 95% CI
Alvarez M., 2019	46	84	195	286	2.6%	0.56 [0.34 , 0.93]
Alvero R., 2003	62	138	228	445	3.9%	0.78 [0.53 , 1.14]
Coats E., 2019	27	55	73	119	1.5%	0.61 [0.32 , 1.16]
Ghaffari F., 2013	28	131	219	575	4.2%	0.44 [0.28 , 0.69]
Kava-Braverman A., 2016	148	547	2697	7064	18.5%	0.60 [0.49 , 0.73]
Larue L., 2016	52	155	66	151	2.9%	0.65 [0.41 , 1.03]
Larue L., 2020	95	257	734	1789	7.6%	0.84 [0.64 , 1.10]
Listijono D.R., 2013	125	508	1833	5976	14.2%	0.74 [0.60 , 0.91]
Noyes N., 1999	134	270	474	847	7.5%	0.78 [0.59 , 1.02]
Ozturk Inal Z., 2021	212	600	648	1657	14.6%	0.85 [0.70 , 1.03]
Plowden T.C., 2017	29	84	408	838	3.2%	0.56 [0.35 , 0.89]
Singh N., 2012	10	58	67	284	1.2%	0.67 [0.32 , 1.41]
Spitzer D., 2012	43	114	406	941	3.6%	0.80 [0.53 , 1.19]
Tomas C., 2002	72	342	1355	4465	10.0%	0.61 [0.47 , 0.80]
Tur-Kaspa I., 1998	30	120	171	734	2.4%	1.10 [0.70 , 1.72]
Yilmaz N., 2013	24	81	92	232	2.2%	0.64 [0.37 , 1.10]
Total (95% CI)		**3544**		**26403**	**100.0%**	**0.71 [0.66 , 0.77]**
Total events:	1137		9666			

Heterogeneity: Chi² = 20.24, df = 15 (P = 0.16); I² = 26%
Test for overall effect: Z = 8.56 (P < 0.00001)
Test for subgroup differences: Not applicable

Figure 2. The effect of Difficult Embryo Transfer on the clinical pregnancy rate.

- Difficult ET was associated with a significant reduction in the chance of clinical pregnancy.
- The estimated impact is a relative reduction of **30%,** a rate that is clinically remarkable and relevant.
- In other words, difficult ET is associated to the wastage of a viable embryo able to implant in at least one in four women.

- ✔ Ultrasound guidance
- ✔ Perform a preliminary mock ET
- ✔ Consider pharmacological interventions that can temper the uterine contractility
- ✔ Postponing the transfer

(moderate)

EMBRYO TRANSFER

The role of the Embryologist…

human reproduction open

REVIEW

Evidence and consensus on technical aspects of embryo transfer

Arianna D'Angelo [1,*], Costas Panayotidis[2], Alessandra Alteri [3], Saria Mcheik [4], and Zdravka Veleva [5]

2022

- ET should be performed by practitioners who are competently trained (75 ETs over 2 years) in reproductive medicine. Competence should be assessed regularly through peer-to-peer observational audits

- The embryologist must be trained and have acquired embryo transfer experience under supervision before performing transfers independently. The embryologists who perform embryo transfers must pass a documented training process, confirming their high proficiency level (50 cases). Staff competence should be assessed by monitoring KPIs

Figure 4. Recommendations regarding quality assurance and performance. ET, embryo transfer; KPIs, key performance indicators.

(moderate)

ASSISTED REPRODUCTION TECHNOLOGIES

Embryo catheter loading and embryo culture techniques: results of a worldwide web-based survey 2014

Mindy S. Christianson · Yulian Zhao · Gon Shoham · Irit Granot · Anat Safran · Ayatallah Khafagy · Milton Leong · Zeev Shoham

- 265 units from 71 countries
- Distribution by continent: Europe, 37.1 % (59, 700 cycles); North America 29.0 % (46, 700 cycles); Asia 19.5 % (31, 400 cycles); Africa 5.5 % (8,900 cycles); Australia 5.3 % (8,700 cycles) and South America 3.6 % (5,900 cycles)
- Questionnaire focusing on embryo catheter loading, transfer methods and embryo culture techniques

(moderate)

- **Embryo catheter loading**: the most commonly-reported method was medium-air-embryo-air-medium (42 %)
- **Final volume** of the catheter is up to 0.3 ml, (68%), with only 19 % using 0.3-0.5 ml and 1 % using 0.5-0.7 ml
- **Embryo transfer media**: the use of sequential media is highly dominant with 40 % of units reporting its use. Less often utilized are one-step media (12 %) and both types of media (6 %).
- **Time** that the embryos remain in the catheter: 30–60 s (49%), for 41 % they remain in the catheter 15–30 s and 9 % report the embryos stay in the catheter more than 60 s.
- Every center, 100 %, reported **checking the catheter** after the transfer to make sure there is not a remaining embryo

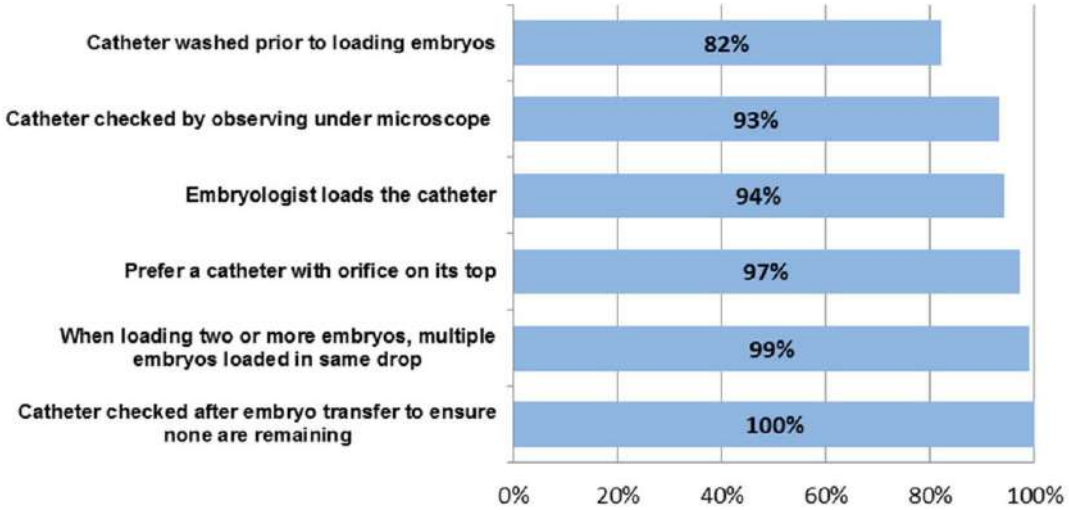


Fig.1. Common catheter loading practices among 80 % or more of respondents. Christianson *et al,* 2014

Great variability and lack of agreement regarding many aspects of these areas.

Article

Air fluid versus fluid-only models of embryo catheter loading: a systematic review and meta-analysis 2007

Dr Ahmed Abou-Setta

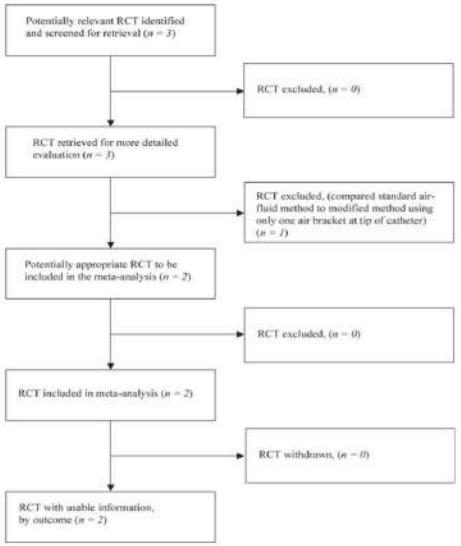


Figure 1. QUOROM statement flow diagram. RCT = randomized controlled trial.

- Systematic review
- Determine the beneficial or detrimental effect of using air bubbles to bracket the embryo-containing medium during embryo transfer

In conclusion, there is insufficient evidence to suggest the superiority of the air–fluid or fluid-only methods during embryo loading.

● (low)

ORIGINAL ARTICLE
http://dx.doi.org/10.5653/cerm.2015.42.4.175
pISSN 2233-8233 · eISSN 2233-8241
Clin Exp Reprod Med 2015;42(4):175-180

CERM

The effect of embryo catheter loading technique on the live birth rate

2015

Marjan Omidi, Iman Halvaei, Esmat Mangoli, Mohammad Ali Khalili, Mohammad Hossein Razi
Research and Clinical Center for Infertility, Shahid Sadoughi University of Medical Sciences, Yazd, Iran

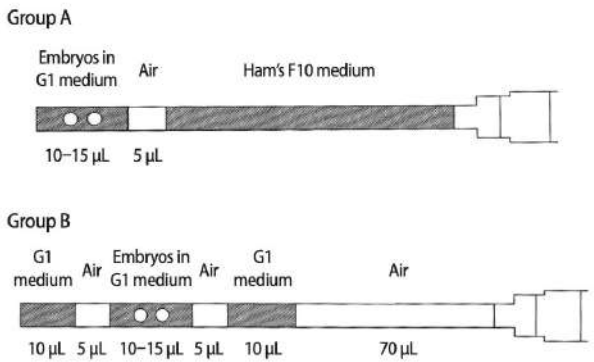


Figure 1. Catheter loading techniques in groups A and B.

401 cases → 207 fresh ET cycles
401 cases → 194 FET cycles

- Center-well dish with 500 µL G1 medium (Vitrolife AB, Gothenburg, Sweden) and 3 mL of Ham's F-10 medium
- Dish placed in a 37°C incubator with 5% O2 and 6% CO2 overnight

(low)

Table 1. Comparison of clinical and laboratory characteristics between groups A and B in fresh embryo transfer cycles

Parameter	Group A (n = 81)	Group B (n = 126)	*p*-value
Age of male partner (yr)	34.7 ± 4.9	34.2 ± 5.6	0.3
Age of female partner (yr)	31.1 ± 5.2	30.3 ± 5.2	0.4
Cause of infertility			0.8
Male factor	34	50	
Female factor	21	35	
Both factors	21	29	
Unexplained	5	12	
Stimulation protocol			0.09
Agonist	24	24	
Antagonist	57	102	
IVF/ICSI	2/79	4/122	0.7
No. of oocytes	11.1 ± 5.8	9.8 ± 5.5	0.1
No. of embryos formed	5.2 ± 2.9	5.3 ± 3.5	0.8
No. of transferred embryos	2.2 ± 0.6	2.2 ± 0.6	0.5
Embryo quality			0.3
High	54	74	
Low	27	52	
Difficulty of transfer			0.1
Easy	56	75	
Moderate	22	36	
Difficult	3	15	
Endometrial thickness (mm)	9.2 ± 1.8	9.4 ± 1.6	0.4
Chemical pregnancy rate	21/81 (25.9)	42/126 (33.3)	0.2
Implantation rate	19/81 (23.4)	39/126 (30.9)	0.2
Clinical pregnancy rate	15/18 (83.3)	32/37 (86.5)	0.7
Live birth rate	9/15 (60)	25/32 (78.1)	0.1

Values are presented as mean ± standard deviation or number (%).
IVF, *in vitro* fertilization; ICSI, intracytoplasmic sperm injection.

Table 2. Comparison of clinical and laboratory characteristics between groups A and B in frozen-thawed embryo transfer cycles

Parameter	Group A (n = 86)	Group B (n = 108)	*p*-value
Age of male partner (yr)	36.07 ± 5.9	35 ± 6.1	0.1
Age of female partner (yr)	31.7 ± 6.1	31.3 ± 4.7	0.7
Cause of infertility			0.1
Male factor	30	42	
Female factor	33	38	
Both factors	21	18	
Unexplained	2	10	
No. of transferred embryos	2.2 ± 0.6	2.3 ± 0.6	0.2
Embryo quality			0.4
High	44	62	
Low	42	46	
Difficulty of transfer			0.5
Easy	36	54	
Moderate	31	35	
Difficult	19	19	
Endometrial thickness (mm)	8.4 ± 0.6	8.7 ± 1.1	0.1
Chemical pregnancy rate	28/86 (32.6)	33/108 (30.6)	0.8
Implantation rate	24/86 (27.9)	28/108 (25.9)	0.8
Clinical pregnancy rate	18/19 (94.7)	18/23 (78.3)	0.1
Abortion rate	6/17 (35.3)	2/18 (11.1)	0.1
Live birth rate	10/17 (58.8)	16/18 (88.9)	0.06

Values are presented as mean ± standard deviation or number (%).

EL technique did not have a significant effect on pregnancy and live birth rates in either fresh ET or FET cycles.

Reproduction & Fertility | T Matitashvili *et al.* | 3:2 | 103–109

RESEARCH

The effect of embryo catheter loading technique on pregnancy rate

2022

Tamar Matitashvili, **Seifeldin Sadek** and **Gerard Celia**

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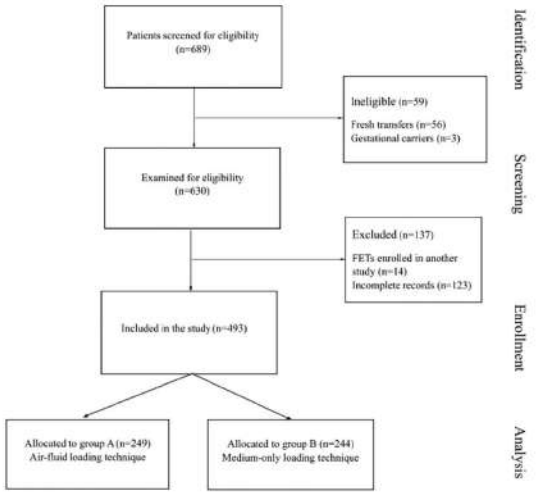

Figure 1 Flowchart showing the number of patients during each stage of the study.

- Day 5 embryo transfer
- Exclusively FET cycles
- Center-well ET dish containing 1-2 mL EmbryoGlue or Global Total HP (Cooper Surgical)
- Soft-pass and Sydney catheters (CookMedical)

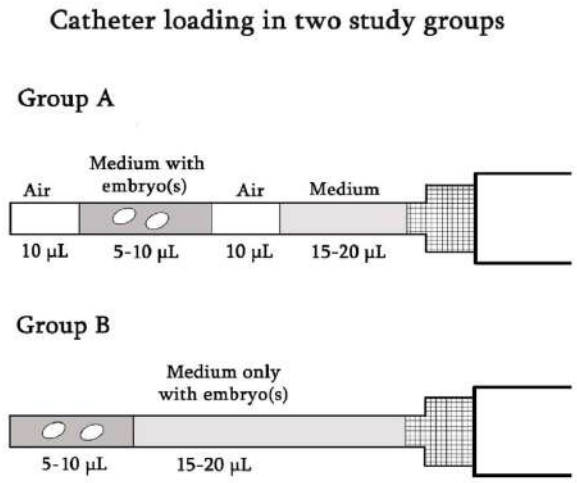

Figure 2 Embryo catheter loading techniques.

● (low)

Table 1 Baseline characteristics of patients in both groups. Data are mean ± S.E. or *n* (%) unless otherwise specified.

Variable	Group A	Group B	*P*-value
Age	35.34 ± 4.7	35.35 ± 4.9	0.99
BMI (kg/m²)	28.44 ± 6.8	28.11 ± 6.6	0.64
Diagnosis			0.94
Male factor	70	66	
Unexplained	23	32	
Tubal factor	43	45	
Ovulatory dysfunction	58	51	
Endometriosis	17	17	
Diminished ovarian reserve	50	51	
Other	15	14	
Endometrial thickness (mm)	10.5 ± 2.1	10.3 ± 1.9	0.40
Estradiol level on CD 15 (pg/mL)	925.7 ± 497.5	967.7 ± 528.5	0.46
Progesterone level on CD 16 (ng/mL)	24.7 ± 116.6	24.4 ± 85.3	0.98
Trigger medication			
HCG	178	160	0.18
Lupron	39	52	0.13
Positive pregnancy test rate (%)	139/249 (55.8)	140/244 (57.3)	0.40
Clinical pregnancy rate (%)	117/249 (47)	119/244 (48.7)	0.36

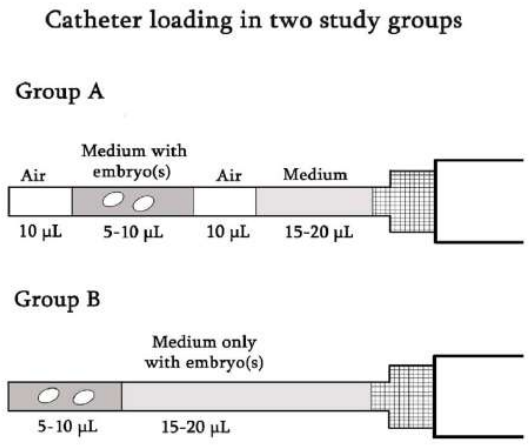

Figure 2 Embryo catheter loading techniques.

Table 2 Laboratory characteristics of patients in both groups. Data are mean ± S.E. or *n* (%) unless otherwise specified.

Variable	Group A	Group B	*P*-value
No of oocytes retrieved	14.68 ± 8.2	15.38 ± 8.4	0.37
No of metaphase II oocytes retrieved	9.81 ± 6.8	9.83 ± 6.6	0.97
Number of embryos transferred			0.04
1 embryo	175	198	
2 embryos	74	46	
Embryo quality scores			0.48
A	110	68	
B	99	147	
C	39	28	
Pre-implantation genetic testing			0.07
Yes	90	105	
No	159	138	
Difficult embryo transfer	27	32	0.49
Blood on catheter	14	19	0.37
Catheter used for embryo transfer			0.08
Soft pass	169	144	
Sydney	80	100	

No significant difference was observed between the two loading techniques concerning positive pregnancy test and clinical pregnancy rates.

ASSISTED REPRODUCTION TECHNOLOGIES

Low versus high volume of culture medium during embryo transfer: a randomized clinical trial

George A. Sigalos [1,2] · Yannis Michalopoulos [2] · Athanasios G. Kastoras [2] · Olga Triantafyllidou [2] · Nikos F. Vlahos [1]

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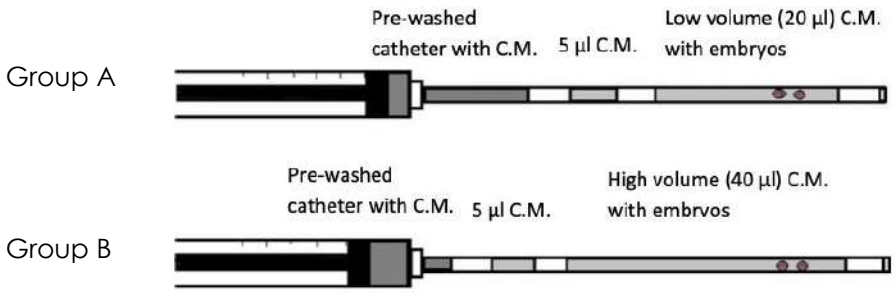
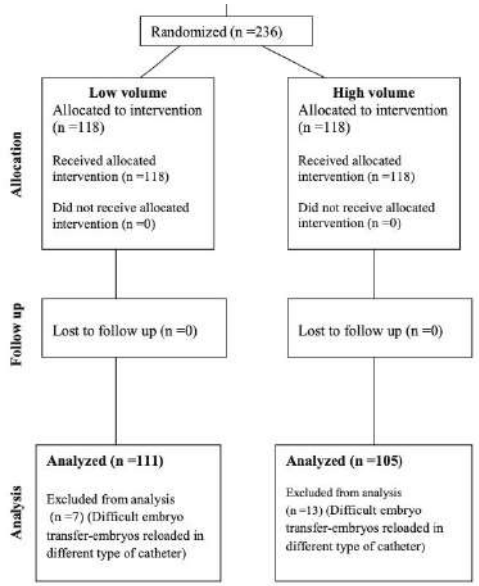


- All catheters were kept in the incubator for 20 min at 37.0 °C prior to loading
- Ultrasoft catheter with an echogenic tip (Ultrasoft Frydman Set Echo, CCD, France)
- Performed on day 3



(low)

	Group A ($n = 111$)	Group B (n = 105)	p value
Peak estradiol-E2 on the day of hCG (pg/ml)	2123 ± 1157	2203 ± 1025	0.59
Total gonadotrophin dose (IUs)	1924 ± 556	1884 ± 510	0.58
Ooocyte retrieval (n)	8.7 ± 5.0 ($n = 809$)	9.3 ± 4.8 ($n = 975$)	0.37
Fertilization rate (n)	71.1% ($n = 686$)	70.5% ($n = 687$)	0.92
Number of embryos transferred (n)	2.3 ± 0.6 ($n = 253$)	2.3 ± 0.6 ($n = 245$)	1.00
Embryo quality (%)			
em. Q I	135 (53.4%)	144 (58.8%)	0.45
em. Q II	84 (33.2%)	74 (30.2%)	
em. Q III	34 (13.4%)	27 (11.0%)	
Number of embryos vitrified (n)	1.6 ± 2.4 ($n = 179$)	1.7 ± 2.3 ($n = 175$)	0.76
Clinical pregnancy rate (CPR) (n)	46.8% ($n = 52$)	54.3% ($n = 57$)	0.27
Implantation rate (IR) (n)	23.7% ($n = 60$)	27.8% ($n = 68$)	0.30
Ongoing pregnancy rate (OPR) (n)	33.3% ($n = 37$)	40.0% ($n = 42$)	0.31

Group A = low volume, Group B = high volume

Values are mean ± standard deviation or no. (%)

No statistically significant differences observed.
Higher volume of culture medium to load the embryo into the catheter during embryo transfer does not influence the clinical outcome in fresh IVF cycles.

Influence of the time interval between embryo catheter loading and discharging on the success of IVF

R.Matorras, R.Mendoza, A.Expósito and F.J.Rodriguez-Escudero 2004

- ET was carried out at day 2 or day 3
- The ‘three-drop’ procedure
- Frydman catheter

Table II. Duration of the interval loading discharging embryos (ILDE), cycle characteristics and cycle results

	<30 s (n = 113)	31–60 s (n = 214)	61–120 s (n = 76)	>120 s (n = 47)	P
Woman’s age (years)	34.01 ± 3.04	34.40 ± 2.83	33.97 ± 3.57	33.93 ± 3.73	Ns
Infertility duration (years)	5.21 ± 2.54	5.07 ± 2.66	5.19 ± 2.54	5.20 ± 2.61	Ns
Primary infertility (%)	91.1	89.7	89.5	89.4	Ns
ICSI (%)	53.1	50.9	57.8	57.5	Ns
Obtained oocytes	11.00 ± 6.13	12.28 ± 6.22	12.22 ± 6.20	13.23 ± 5.83	Ns
Inseminated oocytes	9.30 ± 5.30	10.29 ± 5.30	9.92 ± 5.08	10.46 ± 4.03	Ns
Fertilized oocytes	5.30 ± 3.97	6.03 ± 4.07	5.34 ± 3.63	5.74 ± 3.16	Ns
Transferred embryos	3.05 ± 1.06	3.12 ± 0.99	3.07 ± 1.09	3.14 ± 0.85	Ns
Transferred class I embryos	1.95 ± 1.00	2.10 ± 0.98	2.37 ± 0.98	2.17 ± 0.99	Ns
% of non easy transfers	2.6	0.5	1.3	19.1	<0.001
Pregnancy rate (%)	38.9	33.2	31.6	19.1	<0.05
Implantation rate (%)	21.2	15.4	15.9	9.4	<0.01
Pregnancy rate excluding non-easy transfers (%)	40.0	33.3	32.0	19.4	<0.05
Implantation rate excluding non easy transfers (%)	21.4	15.4	16.2	8.8	<0.01

- At 120s there was a remarkable decrease in the pregnancy and implantation rates.
- We recommend that, when possible ILDE should be shortened, ideally to under 30s.

(very low)

ASSISTED REPRODUCTION TECHNOLOGIES

Every second counts: the association of embryo transfer duration with live birth following 2267 single, euploid, frozen embryo transfer

Blake Vessa[1,2] · Devika Sachdev[1,2] · Leah Roberts[3] · Kara Scarpetti[1] · Christine Whitehead[1] · Maria Costantini[1] · Paul Bergh[1] · Marie Werner[1,2] · Kassie Bollig[1,4]

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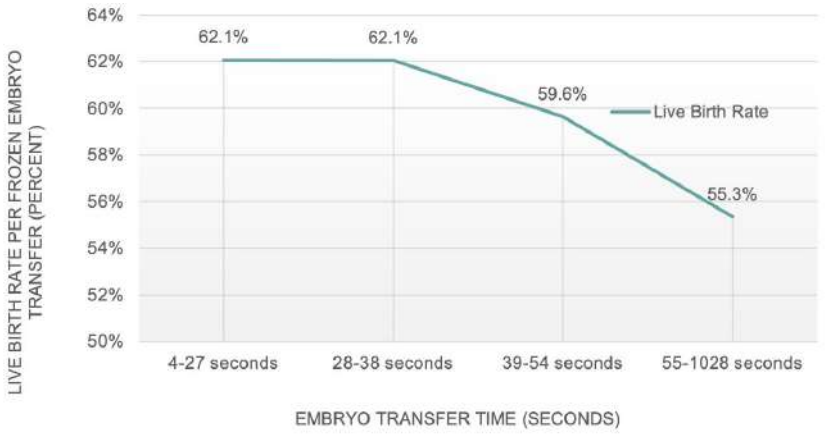

Longer transfer times may expose embryos to:

- **suboptimal conditions** (such as temperature and pH fluctuations)
- **uterine contractions**
- **mechanical stress,** which could impact their long-term viability and ability to initially implant

Transfers with the longest duration were associated with a significantly decreased probability of live birth.

(moderate)

TEMPERATURE

RBMO

ELSEVIER

SHORT COMMUNICATION

Embryos are exposed to a significant drop in temperature during the embryo transfer procedure: a pilot study

Nick Macklon[1,2,*], Olga Delikari[1], Giuseppina Lamanna[1], Alison Campbell[3], Simon Fishel[3,4], Zaloa Larreategui Laiseca[5], Marcos Ferrando Serrano[5], Charlotte Coat[6], Peter Svalander[7]

2021

- 29 simulated embryo transfer procedures in five IVF clinics
- data-logging thermometer (Fluke 54 II B) and an insulated thermocouple probe type k with a sheath diameter of 0.25 mm (TC Ltd, Uxbridge, UK) placed at a standardized distance (3 mm) from the tip of an embryo transfer catheter (Wallace Sure View®)
- temperature stress during embryo transfer could influence non-disjunction events during mitotic division, resulting in aneuploidy or mosaicism.

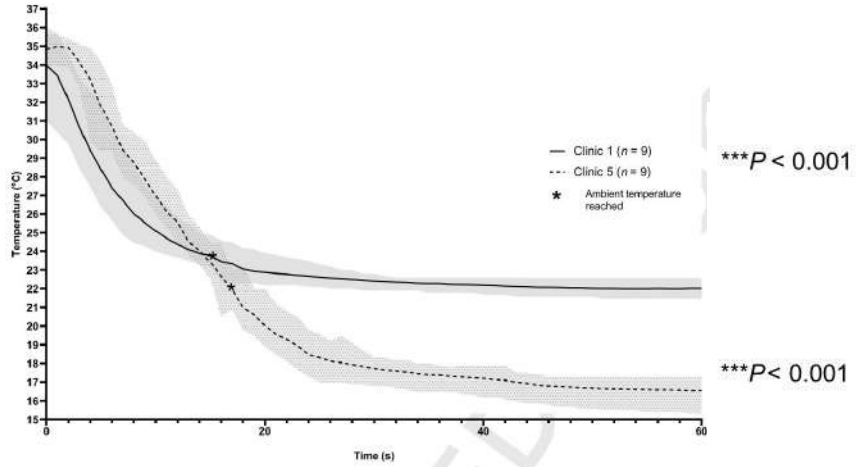

Figure 1. Representative data of the drop in temperature during simulated embryo transfer procedures in clinic 1 and 5. Shaded area = SD. Ambient temperatures in the procedure rooms, indicated by an asterisk, were reached inside the embryo transfer catheter in less than 20 s. Statistical significance (loading temperature versus temperature 60 s after loading) was calculated using the Mann–Whitney U test. Macklon et al, 2021

✔ Loading embryos in a temperature controlled- chamber

✔ Minimizing the duration of transport from the laboratory to the patient

TAKE HOME MESSAGES

Presence of blood in the catheter is also associated with decreased PR and a higher incidence of retained embryos.

There was insufficient evidence to suggest the superiority of the **air–fluid or fluid-only methods** during embryo loading.

The time needed to load the embryo until it is released in the uterus should **not exceed 120 seconds** or it can harm ET outcome.

The volume with the embryo and culture medium should be **up to 0,3mL** (no less than 0,10mL or up to 0,6mL).

The **accurate description** of materials and methods is essential for scientific reporting.

It would be worthwhile to focus on maximizing the IVF success rate by **standardizing the ET protocol**.

Although **several factors** are involved in embryo transfer, there is still little evidence about most of them.

Grazie mille!