ASSOCIATION OF EMBRYO TRANSFER CATHETER MANEUVERS ON CLINICAL PREGNANCY AND LIVE BIRTH

Authors: Applebaum J (1), Yin S (1), Ginsburg ES (1), Lanes A (1)

Affiliations: (1) Center for Infertility and Reproductive Surgery, Department of Obstetrics and Gynecology, Brigham and Women's Hospital, Boston, MA, USA

Background
There is no universal approach to performing an embryo transfer (ET), with nearly half of in vitro fertilization (IVF) clinics lacking a standardized protocol [1]. Data on the relationship between ET catheter maneuvers and pregnancy outcomes are limited. Common techniques include bending the catheter, extending the outer sheath over the inner catheter, and retaining the outer sheath beyond the internal cervical os before introducing an embryo-loaded inner catheter. These maneuvers vary among providers. Survey data report that 30.5% of fertility specialists routinely retain the outer sheath, 21.6% extend the outer sheath, and 18.1% bend the catheter [1]. The effect of these maneuvers on clinical pregnancy (CP) and live birth (LB) remains unclear.

Objective
To determine whether specific ET catheter maneuvers are associated with CP and LB.

Materials and Methods
This retrospective cohort study included all IVF and intracytoplasmic sperm injection cycles resulting in a fresh or frozen ET at a single academic institution from 2013-2024. ETs were categorized as non-afterload or afterload. Non-afterload techniques included: direct (straight outer sheath and inner catheter inserted together without outer sheath manipulation), outer sheath extended over the inner catheter, outer sheath curved, and outer sheath both curved and extended. Afterload techniques included: straight afterload (outer sheath retained, inner catheter removed, embryo loaded through another inner catheter), and curved afterload (curved outer sheath retained, inner catheter removed, embryo loaded through another inner catheter). A visual depiction of the ET catheter maneuvers is displayed in Figure 1. Only the first ET per patient was analyzed. Gestational carriers were excluded. All ETs used the CooperSurgical Wallace® SureView soft catheter. Adjusted log binomial regression assessed associations with CPR and LBR.

Results
Among 7,882 ETs, 3626 (46.0%) were direct, 153 (1.9%) curved, 691 (8.8%) extended, 802 (10.2%) curved and extended, 526 (6.7%) straight afterload, and 2087 (26.5%) curved afterload. CP and LB rates for all afterload techniques were 37.3% and 35.2%, compared to 42.0% and 40.4% for all non-afterload techniques. After adjusting for age, body mass index, uterine factor infertility, perceived difficulty, stylet use, fresh versus frozen ET, embryo stage, embryo quality, donor oocyte use, and year, afterload techniques had a lower adjusted relative risk (aRR) of CP (aRR 0.91, 95% CI 0.85-0.98) and LB (aRR 0.88, 95% CI 0.81-0.96) compared to the direct technique. Specifically, curved afterload ETs were associated with lower CP (aRR 0.91, 95% CI 0.85-0.98) and LB (aRR 0.92, 95% CI 0.86-0.99). Straight afterload ETs had a lower aRR of LB (aRR 0.89, 95% CI 0.81-0.99), but not CP (aRR 0.93, 95% CI 0.85-1.02). Non-afterload outer sheath extension, curvature, and both were not associated with CP and LB differences.

Conclusions
Afterload techniques are associated with lower CP and LB compared to the direct technique. Afterload techniques should be reserved for cases in which patient anatomy necessitates their use, as routine application may reduce success.

Support
Not applicable

References

1. Toth TL, et al. Embryo transfer techniques: an American Society for Reproductive Medicine survey of current Society for Assisted Reproductive Technology practices. *Fertil Steril*. 2017;107(4):1003-1011.

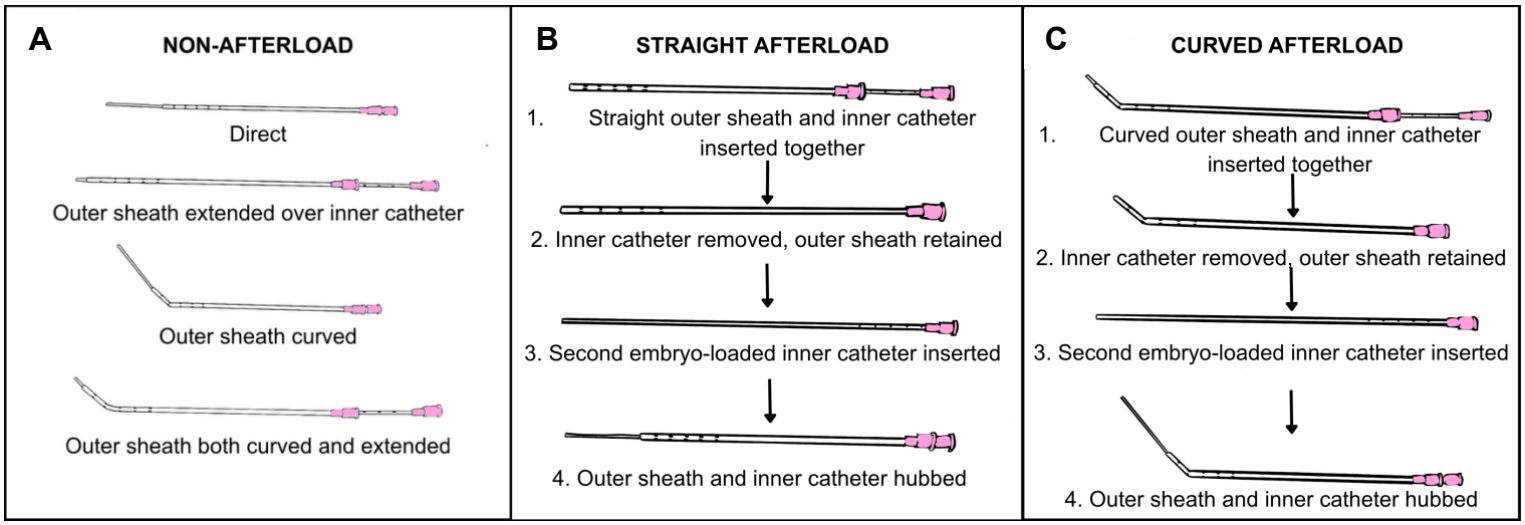

Fig 1. Visual depiction of a) non-afterload techniques consisting of direct, outer sheath extended, outer sheath curved, and outer sheath both curved and extended, b) straight afterload technique, and c) curved afterload technique.