Ovarian Tissue Cryopreservation in Young Children: Postoperative Safety and Treatment-Timing Outcomes

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INTRODUCTION

- Ovarian tissue cryopreservation (OTC) is the only established fertility preservation option for prepubertal children requiring gonadotoxic treatment.
- Published pediatric OTC cohorts generally report low short-term surgical morbidity, but most are weighted toward older children and adolescents.
- Children younger than 5 years remain underrepresented despite age-related differences in anatomy, physiology, anesthetic risk, and perioperative resilience.
- Age-specific evidence on complication severity and the impact of OTC on oncologic treatment timing remains limited.

AIM

To evaluate age-specific postoperative safety and oncologic treatment timing after OTC in children aged ≤14 years, with particular emphasis on patients <5 years.

METHODS

- **Design**: Single-center retrospective cohort study.
- **Setting**: Tertiary medical center, January 2010–January 2025.
- **Population**: Children aged ≤14 years undergoing OTC for fertility preservation.
- **Age groups**: 0–4, 5–9, and 10–14 years.
- **Procedure**: Predominantly laparoscopic unilateral ovarian tissue retrieval; an open approach was used when OTC was performed during another procedure requiring laparotomy.
- **Primary outcomes:**
  - Any postoperative complication within 30 days, graded using the pediatric Clavien–Dindo classification.
  - Postponement of planned oncologic treatment attributable to OTC.
- **Analysis**: Nonparametric group comparisons, logistic regression, penalized logistic regression for rare events, and multivariable linear regression where appropriate.

STRENGTHS & LIMITATIONS

STRENGTHS	LIMITATIONS
Relatively large pediatric OTC cohort with dedicated analysis of children <5 years	Retrospective, single-center design may be subject to selection or documentation bias
Use of standardized pediatric complication severity grading	Low event rates limit precision for rare complications
Direct evaluation of treatment timing after OTC	Restricted to short-term perioperative outcomes

RESULTS

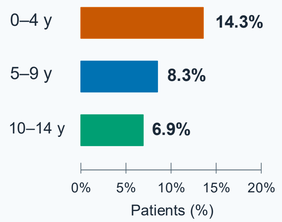
OVERALL COHORT

- **161** children underwent OTC
- **57.1%** chemotherapy before OTC
- **17.4%** aged 0–4 years
- **2.6±0.99** Mean age (years) in youngest subgroup

POSTOPERATIVE COMPLICATIONS

Overall complication rate: 14/161 (8.7%).
Most frequent events were fever, hematoma, infection, and bleeding.

Composite postoperative complication rate by age group:



Composite complication rates did not differ significantly across age groups (P=0.53).

No association with postoperative complications:

- Age group / increasing age
- Prior chemotherapy
- Concomitant / combined procedure
- Length of hospital stay
- Chemotherapy delay

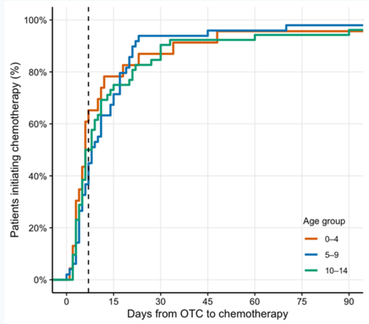
COMPLICATION SEVERITY

Grade I–II: (86%)	Grade III: (14%)

No grade IIIa, IV, or V complications were observed.
No ICU admission, reoperation, readmission, or perioperative mortality occurred.

TREATMENT TIMING

Time from OTC to chemotherapy by age group:



- Median postoperative hospitalization stay: **1 day**
- Mean delay among postponed cases: **5.6±1.4 days**
- Median time to treatment after OTC: **7 days**

Treatment postponements occurred in 8 patients (6.1%); no delays were attributable to postoperative complications.

CONCLUSIONS

- OTC was associated with low short-term postoperative morbidity, predominantly minor complications, and brief hospitalization.
- Children <5 years did not experience a significantly greater overall complication burden or longer interval to chemotherapy than older children.
- Treatment delays were uncommon, short, and unrelated to postoperative complications.

WIDER IMPLICATIONS

- OTC is surgically safe, including in children younger than 5 years.
- OTC did not delay chemotherapy initiation or resumption.
- Supports age-inclusive counseling and timely access to fertility preservation.