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Corkum, Kristine KS, Rhee, Daniel DS, Wafford, Eileen, Demeestere, Isabelle, Dasgupta, Roshni, Baertschiger, Reto, Malek, Marcus M, Aldrink, Jennifer Hall, Heaton, Todd, Weil, Brent R, Madonna, Mary Beth, & Lautz, Timothy

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**Article. Version publiée - Published version.**

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**Citation APA:**

Corkum, K. K., Rhee, D. D., Wafford, E., Demeestere, I., Dasgupta, R., Baertschiger, R., Malek, M. M., Aldrink, J. H., Heaton, T., Weil, B. R., Madonna, M. B., & Lautz, T. (2019). Fertility and hormone preservation and restoration for female children and adolescents receiving gonadotoxic cancer treatments: A systematic review. *Journal of pediatric surgery*, 54(11), 2200-2209.  
doi:10.1016/j.jpedsurg.2018.12.021

**DOI: 10.1016/j.jpedsurg.2018.12.021**

**Also available at: <http://hdl.handle.net/2013/ULB-DIPOT:oai:dipot.ulb.ac.be:2013/300205>**

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## Journal of Pediatric Surgery

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# Fertility and hormone preservation and restoration for female children and adolescents receiving gonadotoxic cancer treatments: A systematic review<sup>☆</sup>



Kristine S. Corkum<sup>a,b</sup>, Daniel S. Rhee<sup>c</sup>, Q. Eileen Wafford<sup>d</sup>, Isabelle Demeestere<sup>e</sup>, Roshni Dasgupta<sup>f</sup>, Reto Baertschiger<sup>g</sup>, Marcus M. Malek<sup>h</sup>, Jennifer H. Aldrink<sup>i</sup>, Todd E. Heaton<sup>j</sup>, Brent R. Weil<sup>k</sup>, Mary Beth Madonna<sup>l</sup>, Timothy B. Lautz<sup>a,b,\*</sup>

<sup>a</sup> Department of Surgery, Northwestern University Feinberg School of Medicine, Chicago, IL, USA

<sup>b</sup> Division of Pediatric Surgery, Ann and Robert H. Lurie Children's Hospital of Chicago, Chicago, IL, USA

<sup>c</sup> Department of Surgery, Johns Hopkins Hospital, Baltimore, MD, USA

<sup>d</sup> Galter Health Sciences Library, Northwestern University Feinberg School of Medicine, Chicago, IL, USA

<sup>e</sup> Research Laboratory in Human Reproduction, Université Libre de Bruxelles, (ULB), Brussels, Belgium

<sup>f</sup> Department of Surgery, Cincinnati Children's Medical Center

<sup>g</sup> Division of Pediatric Surgery, Department of Surgery, Dartmouth Hitchcock Medical Center, Lebanon, NH, USA

<sup>h</sup> Division of Pediatric General and Thoracic Surgery, UPMC Children's Hospital of Pittsburgh, Pittsburgh, PA, USA

<sup>i</sup> Division of Pediatric Surgery, Nationwide Children's Hospital, Department of Surgery, The Ohio State University College of Medicine, Columbus, OH

<sup>j</sup> Division of Pediatric Surgery, Memorial Sloan Kettering Cancer Center, New York, NY

<sup>k</sup> Department of Surgery, Boston Children's Hospital, Boston, MA

<sup>l</sup> Department of Surgery, Rush University Medical Center

### ARTICLE INFO

#### Article history:

Received 4 November 2018

Received in revised form 1 December 2018

Accepted 7 December 2018

#### Key words:

Fertility preservation

Ovarian tissue cryopreservation

Pediatric

Oocyte harvest

Ovarian auto-transplantation

Ovarian transposition

### ABSTRACT

**Background/Purpose:** The purpose of this systematic review by the American Pediatric Surgical Cancer Committee was to summarize evidence from the current medical literature regarding fertility restoration and hormone replacement for female children and adolescents treated with gonadotoxic treatments.

**Methods:** Using PRISMA guidelines, questions were addressed by searching Medline, Cochrane, Embase Central and National clearing house databases using relevant search terms. Eligible studies included those that addressed ovarian tissue cryopreservation (OTC), oocyte harvest, ovarian transposition, and ovarian tissue auto-transplantation for females under the age of 20. Four reviewers independently screened studies for eligibility, extracted data and assessed the risk of bias. Study outcomes were summarized in a narrative synthesis.

**Results:** Two thousand two hundred seventy-six studies were identified by database search and manual review and 2185 were eliminated based on defined exclusion criteria. Ninety-one studies served as the basis for the systematic review. There were 1019 patients who underwent OTC with ages ranging from 0.4 to 20.4 years old, with 298 under the age of 13. Twenty patients aged 13–20 years old underwent successful oocyte harvest. Thirty-seven children underwent ovarian transposition as a means of fertility preservation. Eighteen patients underwent auto-transplantation of thawed ovarian cortical tissue that was harvested before the age of 21 years resulting in 10 live births.

**Conclusions:** Clinically accepted and experimental fertility preservation options such as OTC, oocyte cryopreservation, and ovarian transposition are available to females aged 20 years and younger who are at risk for premature ovarian insufficiency and infertility due to gonadotoxic treatments. There is a large cohort of pediatric-aged patients, with a wide variety of diagnoses and treatments, who have undergone fertility preservation. Currently, fertility and hormone restoration experience for patients who were 20- years of age or younger at the time of fertility preservation remains limited.

**Level of Evidence:** IV.

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**Abbreviations:** OTC, ovarian tissue cryopreservation; IVF, *in vitro* fertilization; IVM, *in vitro* maturation; PRISMA-P, Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols; ASRM, American Society of Reproductive Medicine; MI, Metaphase I; MII, Metaphase II.

<sup>☆</sup> For the Cancer Committee of the American Pediatric Surgical Association.

\* Corresponding author at: Ann & Robert H Lurie Children's Hospital of Chicago, Northwestern University, 225 East Chicago Ave, Box 63, Chicago, IL 60611. Tel.: +1 312 227 4210.

E-mail address: [tlautz@luriechildrens.org](mailto:tlautz@luriechildrens.org) (T.B. Lautz).