

Fertility preservation in young patients with colorectal cancer

By

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No disclosure

Case scenario

❖ 28-year-old newly married woman diagnosed with locally advanced rectal cancer nCRT planned

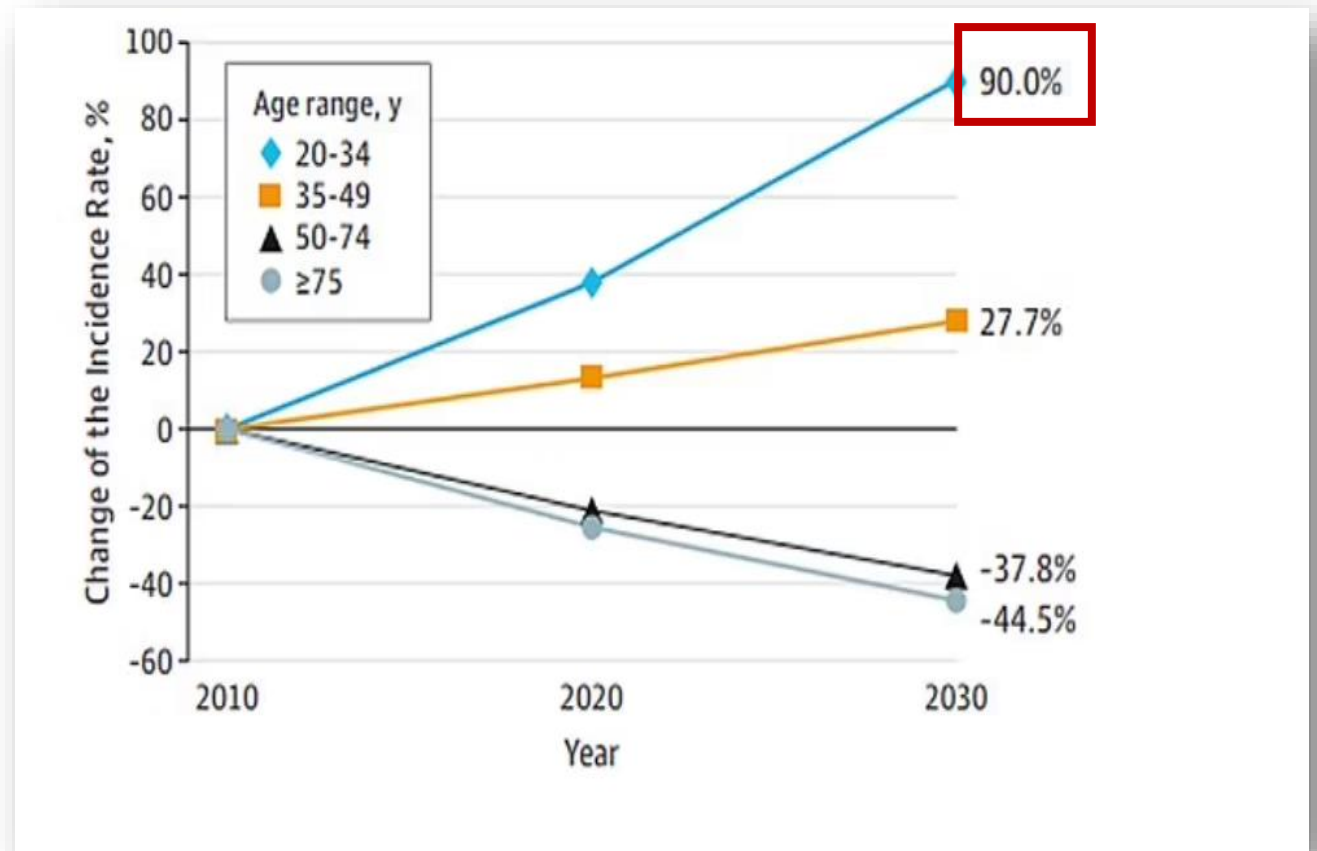
Her first question wasn't "Will I survive?"

"Will I ever have children?"



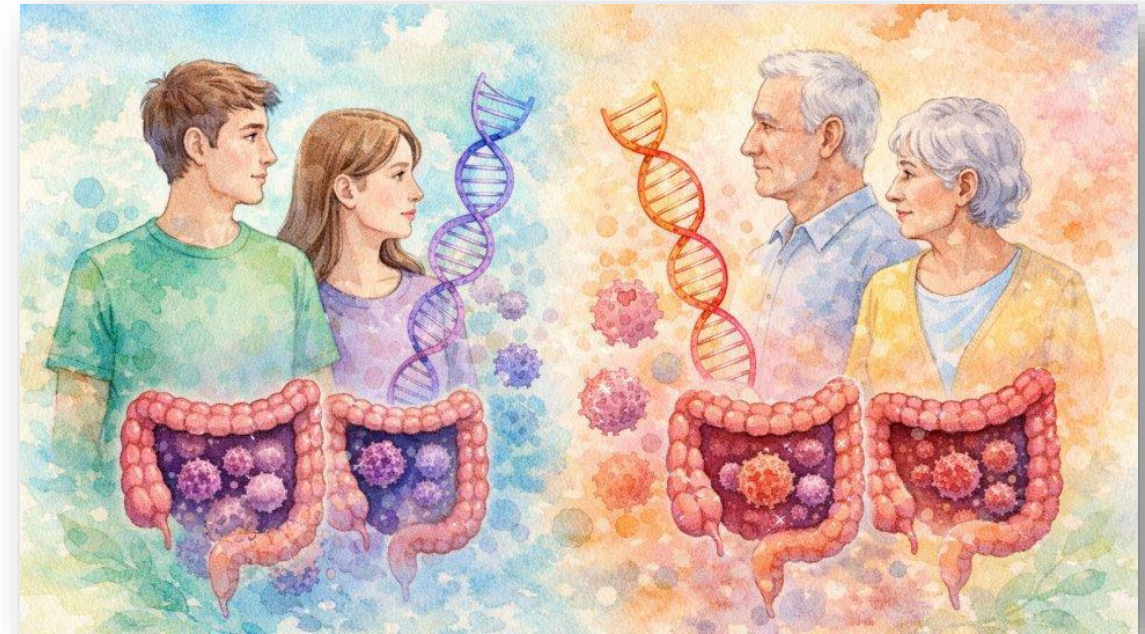
Why Does Fertility Matter?

- Increasing CRC incidence in young adults
- Better survival
- Quality of life
- Survivorship
- Future family planning



Epidemiology:

- YOCRC tends to occur in patients < 50 years.
- Commonly present with distal disease.
- More likely to be advanced or metastatic.
- Should be treated aggressively.
- More likely to receive multi-agent CTH at all stages.
- More likely to receive radiation therapy than older adults.



How Colorectal Cancer Treatment Affects Fertility?



[Volume 107, Issue 5](#)
[April 2020](#)

[Article Contents](#)

JOURNAL ARTICLE

Effect of radiotherapy for rectal cancer on female sexual function: a prospective cohort study

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[A Svanström Röjvall](#) ✉, [C Buchli](#), [M Bottai](#), [M Ahlberg](#), [A Flöter-Rådestad](#), [A Martling](#), [J Segelman](#)

BJS, Volume 107, Issue 5, April 2020, Pages 525–536,
<https://doi.org/10.1002/bjs.11373>

Published: 01 April 2020 **Article history** ▼

Conclusion

Preoperative RT was associated with impairment in sexual function in women with rectal cancer. This needs to be considered when discussing choice of treatment and rehabilitation. In younger women, undetectable AMH levels after RT indicate an irreversible loss of ovarian follicles.

The Role of Surgery in Infertility:

Injury/Risk	Fertility-Related Consequence	Time at Risk	Means of Avoidance
Male			
Superior hypogastric plexus injury (sympathetic fibers)	Retrograde/absent ejaculation	High ligation of the inferior mesenteric artery	Ligation of the inferior mesenteric artery should be performed 1–2 cm distal to the origin
Hypogastric nerves (sympathetic fibers)	Retrograde/absent ejaculation	Posterior mobilization of the rectum	Careful dissection close to the fascia propria of the rectum; maintain visualization
Pelvic plexus (mixed sympathetic and parasympathetic fibers)	Retrograde/absent ejaculation Erectile dysfunction	Lateral mobilization of the rectum	Avoid finger dissection; avoid clamping the middle rectal pedicle; divide lateral ligaments as close to specimen as possible
Cavernous plexus/nervi erigentes (parasympathetic fibers)	Erectile dysfunction	Anterior mobilization of the rectum	Leave prostatic capsule in place
Female			
Direct damage to ovaries, fimbriae, or fallopian tubes	Mechanical ovarian dysfunction	Pelvic dissection	Direct visualization during dissection; avoid blunt dissection
Pelvic adhesions	Fallopian tube occlusion; distorted anatomic relation of ovaries, fimbriae, and fallopian tubes; restriction of pelvic blood supply	Pelvic dissection	Laparoscopic as opposed to open procedure, when feasible

Pelvic Sequelae

Possible long-term effects

1. Ovarian Damage



- Scarring and inflammation
- Cyst formation
- Reduced ovarian reserve

2. Uterine Damage



- Endometrial damage
- Fibrosis and scarring
- Impaired uterine function

3. Pelvic Adhesions



- Scar tissue formation
- Adhesion between organs
- Chronic pelvic pain, infertility, and bowel obstruction

4. Premature Ovarian Failure

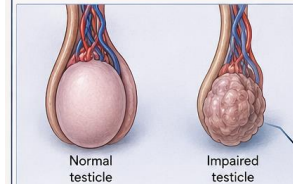


- Decreased ovarian function
- Reduced estrogen production
- Infertility, early menopause symptoms (hot flashes, mood changes, bone loss)

These changes can affect fertility; hormonal function, and quality of life.

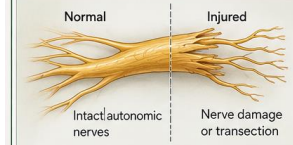
Early diagnosis and management are essential.

1. Testicular Dysfunction

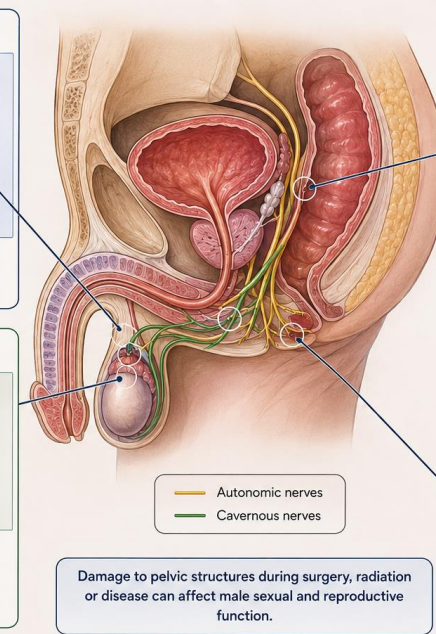


- Reduced testosterone production
- Impaired spermatogenesis
- Testicular atrophy

3. Autonomic Nerve Injury



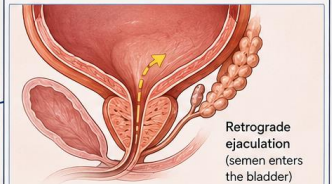
- Damage to sympathetic (hypogastric) or parasympathetic (pelvic splanchnic) nerves
- Impaired signaling to sexual organs
- Affects erection and ejaculation



Autonomic nerves
Cavernous nerves

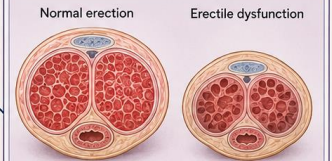
Damage to pelvic structures during surgery, radiation or disease can affect male sexual and reproductive function.

2. Ejaculatory Dysfunction



- Impaired emission of semen
- Retrograde ejaculation
- Infertility

4. Erectile Dysfunction

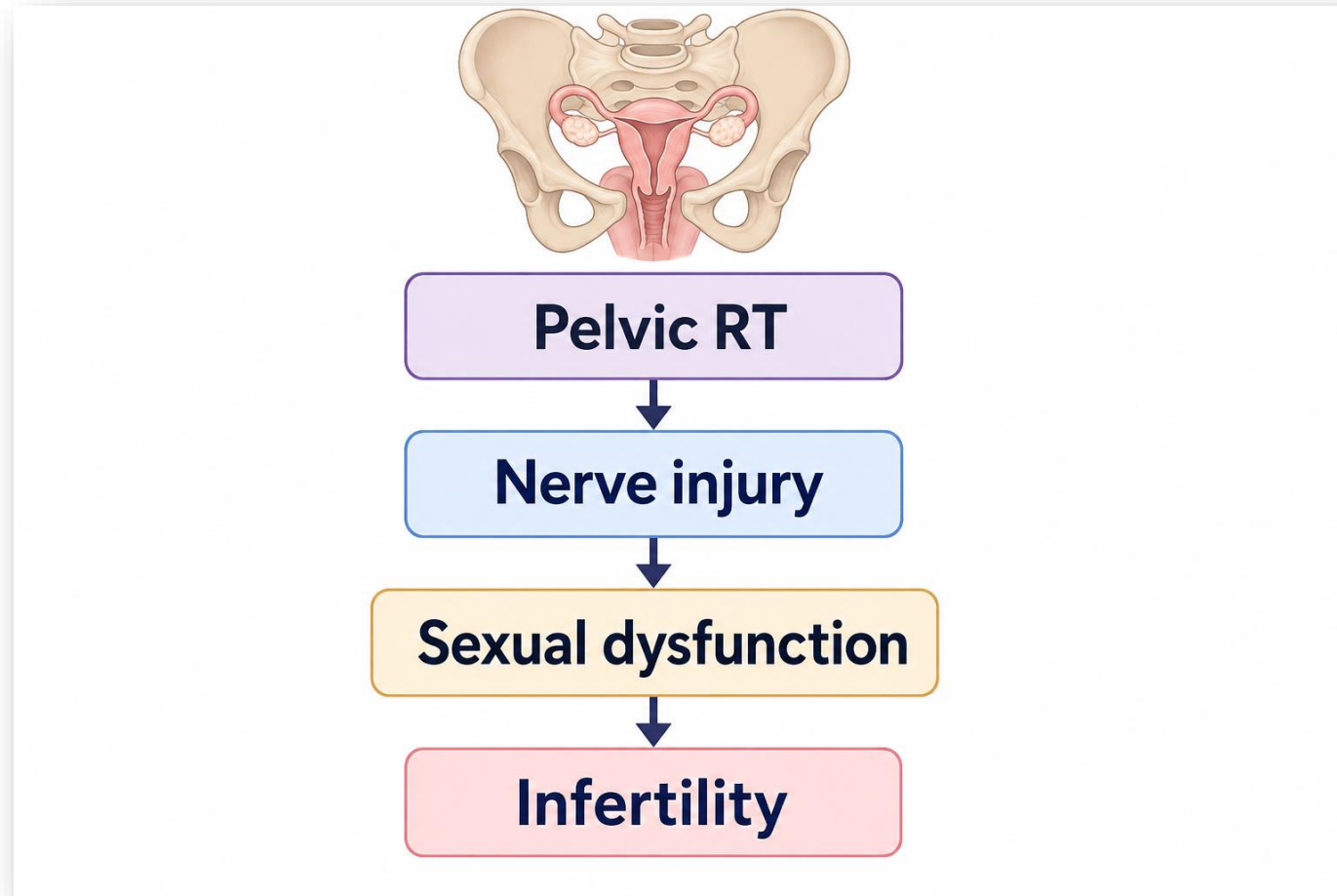


- Reduced blood flow to penile tissues
- Impaired nerve signaling
- Inability to achieve or maintain erection

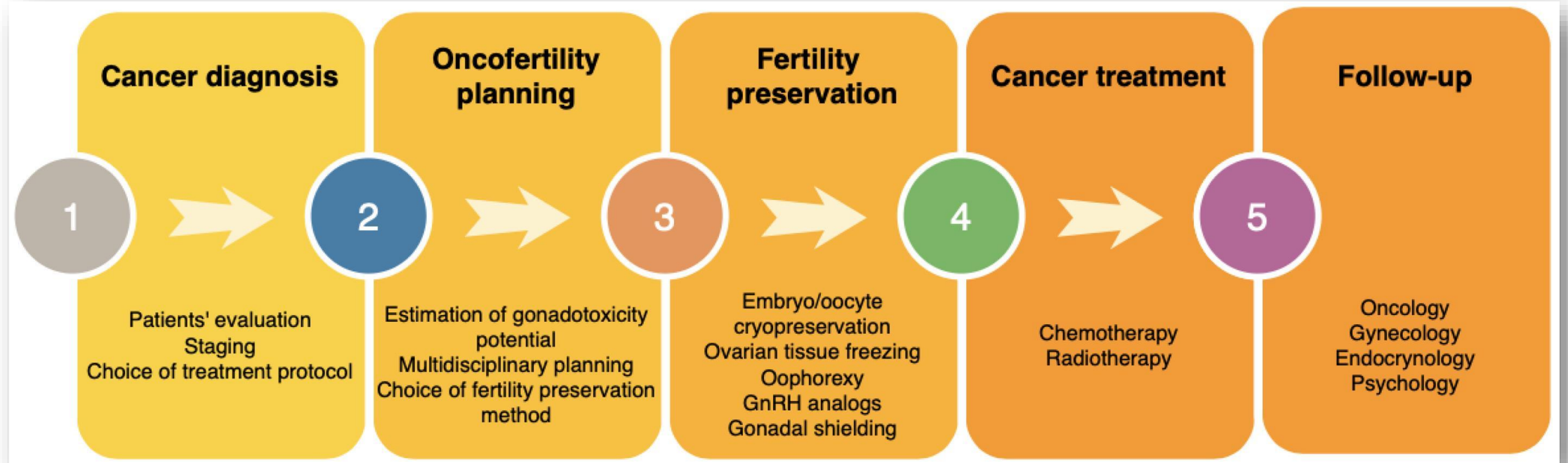


These complications can significantly affect quality of life, relationships, and fertility. Early recognition and nerve-sparing strategies are essential.

Rectal Cancer Challenges:

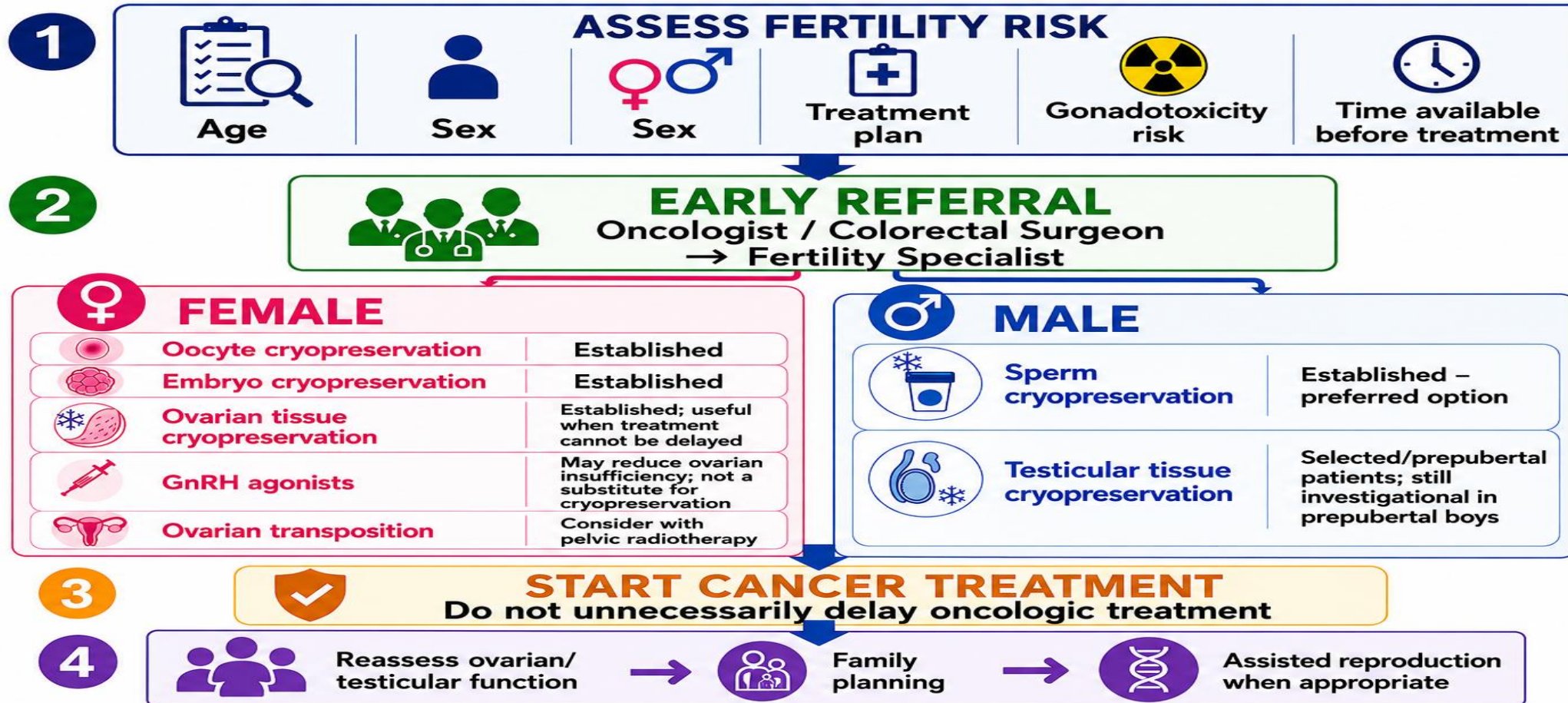


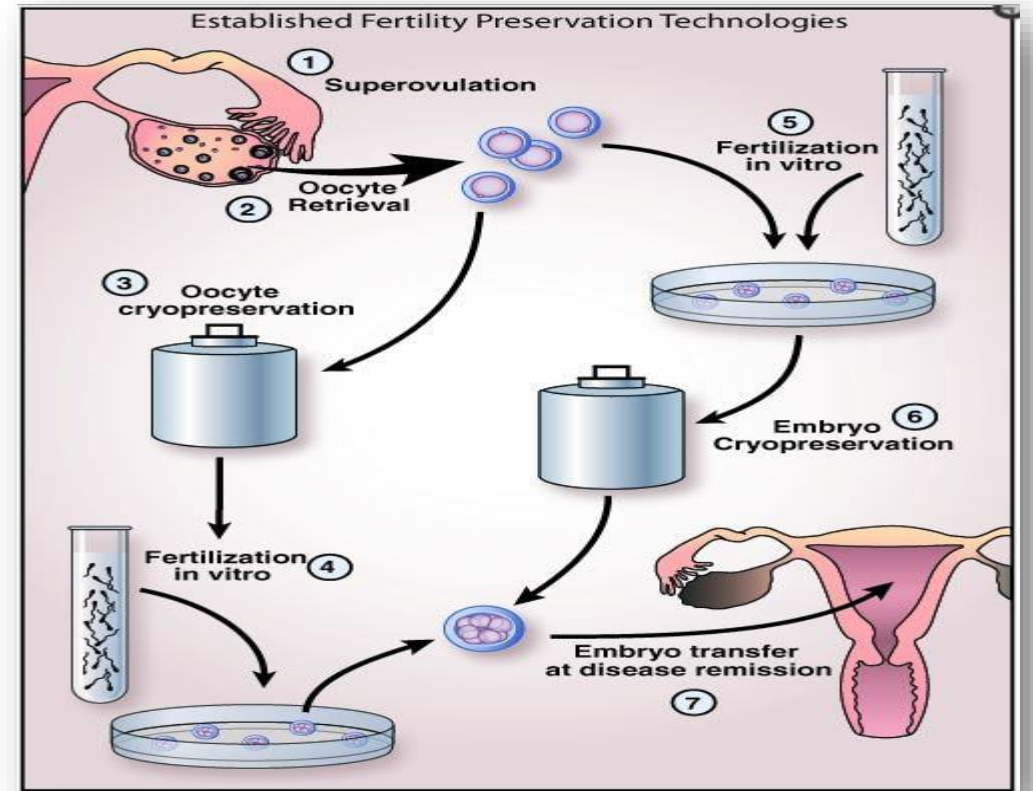
The road map:



Options for fertility preservation

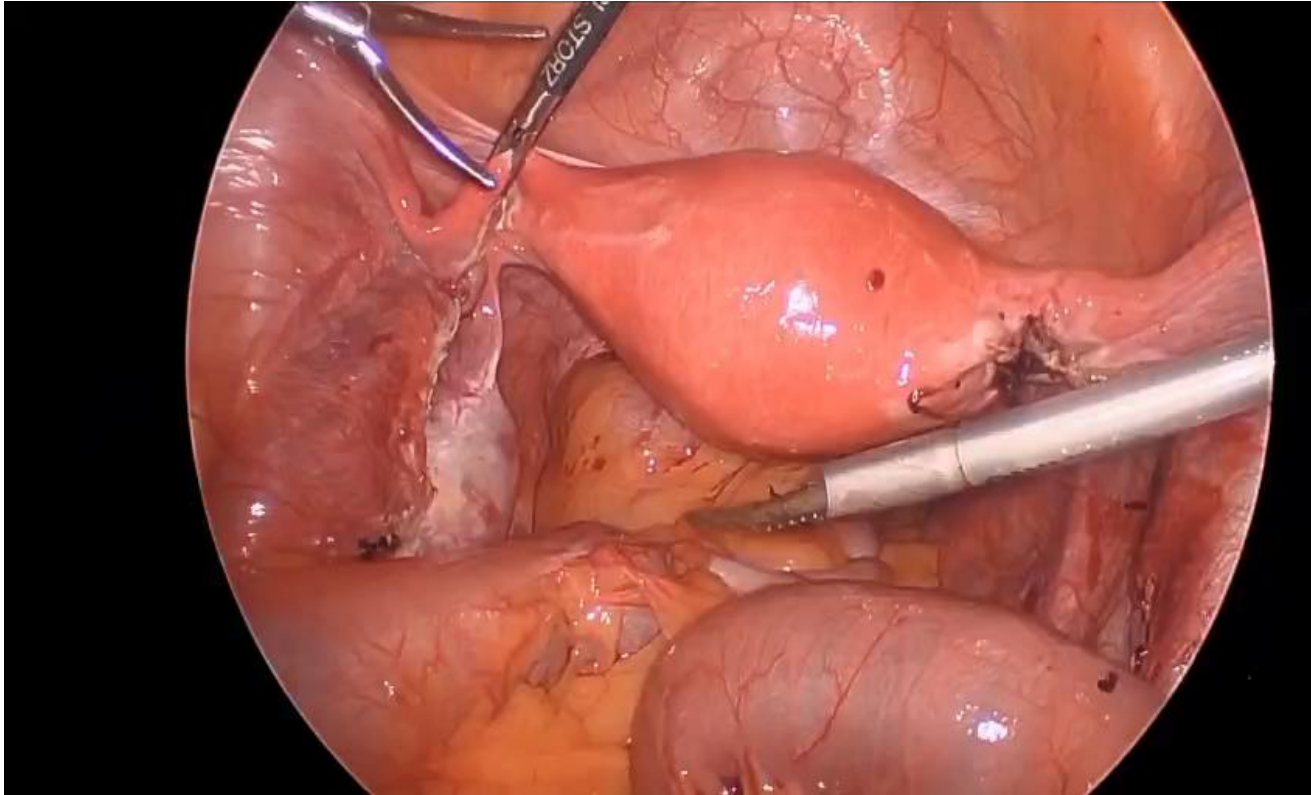
Decision algorithm:



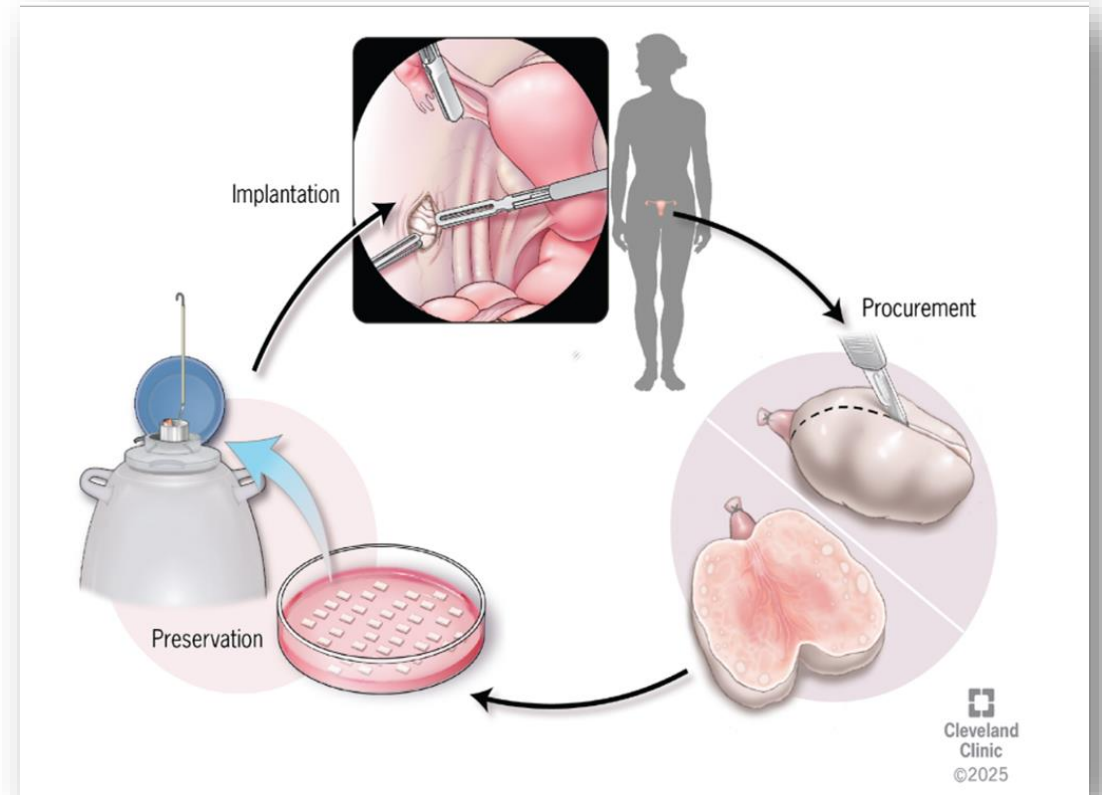


Oocyte and embryo cryopreservation

Surgical options for fertility preservation:



Ovarian transposition



Ovarian tissue cryopreservation and transplantation

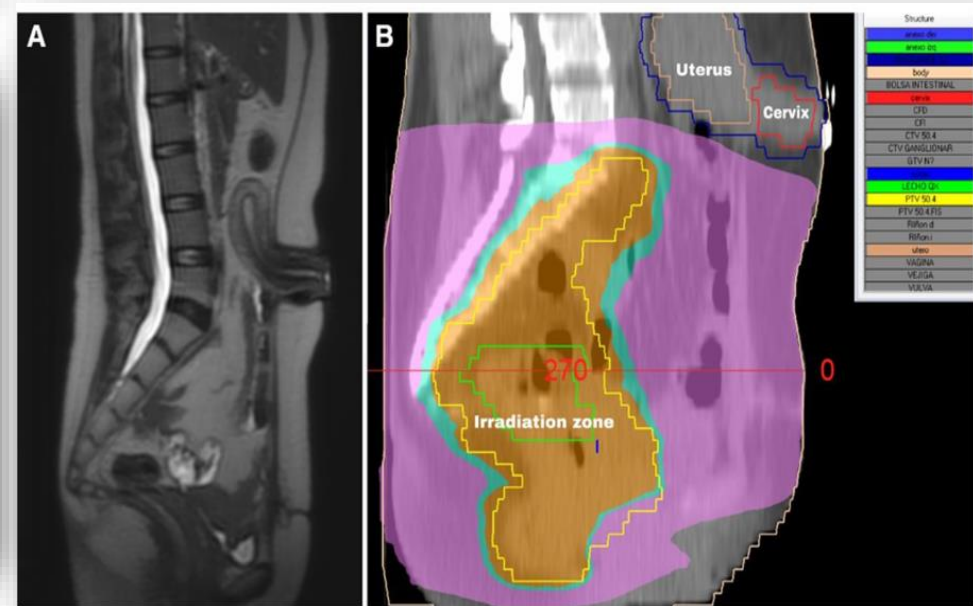
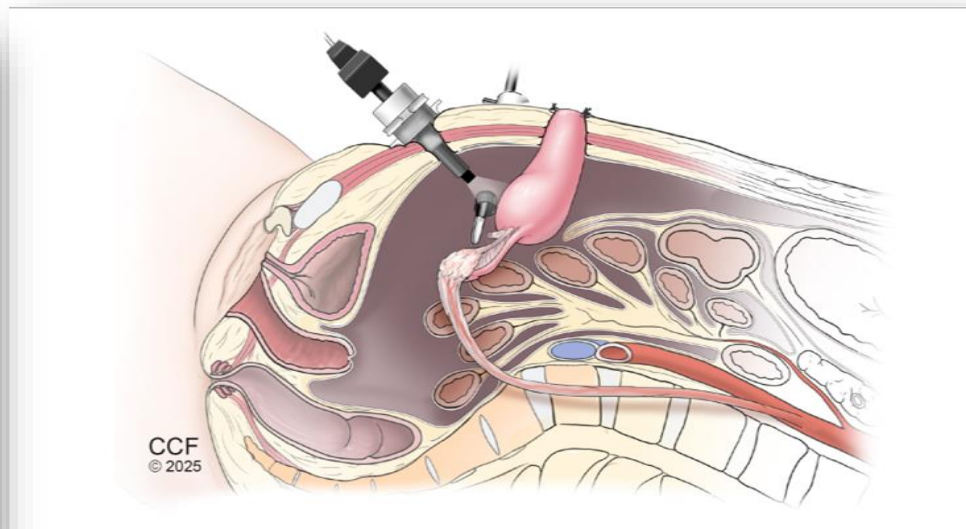
Uterine transposition for fertility preservation prior to pelvic irradiation: an initial Egyptian case series



Basel Refky^{1,2}, Mohamed Abdelkhalek^{1*} , Mohamed Hamdy¹, Khalid Atallah¹, Amr Abuzenah^{1,3}, Amira Zaidan^{1,4}, Sahar Elhawari^{1,5}, Basma Gadelhak⁶, Alaa Ismail⁷, Hisham Ahmed Abou-Taleb⁷ and Khaled Gaballa¹

Results Six patients underwent uterine transposition. Three of them were done through open technique, with successful repositioning. The other three patients underwent laparoscopic uterine transposition, one of them underwent repositioning and still receiving chemotherapy for Ewing's sarcoma, the other two patients are still receiving radiation therapy after transposition. Unfortunately, one of them died of disease and adjuvant therapy complications four months after laparoscopic uterine transposition.

Conclusion Uterine transposition is a feasible procedure with safe outcomes. The preliminary results carry a promising hope for better fertility preservation in young patients undergoing radiation for pelvic malignancies.



Uterine transposition

Guidelines recommendations:

Fertility Preservation in People With Cancer: ASCO Guideline Update

H. Irene Su, MD¹ ; Christina Lacchetti, MHSc² ; Joseph Letourneau, MD³; Ann H. Partridge, MD⁴ ; Rubina Qamar, MD⁵ ; Gwendolyn P. Quinn, PhD⁶ ; Joyce Reinecke, JD⁷; James F. Smith, MD⁸; Megan Tesch, MD⁴ ; W. Hamish Wallace, MD, FRCPCH⁹ ; Erica T. Wang, MD¹⁰; and Alison W. Loren, MD¹¹ 

DOI <https://doi.org/10.1200/JCO-24-02782>

Fertility preservation in males

3.1. **Sperm cryopreservation:** Cryopreservation of ejaculated sperm (sperm banking) should be offered prior to initiating cancer-directed therapy. Health care clinicians should discuss sperm banking with all pubertal and postpubertal males prior to receiving cancer treatment. (Evidence quality: High; Strength of recommendation: **Strong**)

Qualifying Statement for Recommendation 3.1: More sperm samples will provide greater flexibility in future fertility treatments, ie, inseminations versus IVF. While fertility clinicians empirically recommend a minimum of three ejaculates of sufficient quality, achieving this may not be feasible for all patients. Clinicians should adopt a flexible approach and collect as many ejaculates as possible before the start of gonadotoxic therapy. Importantly, any cryopreserved sperm can offer a chance for biological parenthood.

3.2. **Testicular sperm extraction (TESE):** TESE with sperm cryopreservation should be offered to pubertal and post-pubertal males who cannot produce a semen sample, before cancer treatment begins. (Evidence quality: High; Strength of recommendation: **Strong**)

3.3. **Hormonal gonadoprotection:** Hormonal suppression therapy should not be offered to males as an approach for preserving fertility. It is not effective and therefore not recommended. (Evidence quality: High; Strength of recommendation: **Strong**)

3.4. Other methods to preserve male fertility: Other methods, such as **testicular tissue cryopreservation in pre-pubertal males and reimplantation** or grafting of human testicular tissue, should be performed only as part of clinical trials or approved experimental protocols. (Evidence quality: Very low; Strength of recommendation: **Strong**)

3.5. Post-treatment setting: Males should be advised of a potentially higher risk of genetic damage in sperm collected soon after initiation and completion of antineoplastic and/or radiation therapy. It is strongly recommended that sperm be collected before initiation of treatment because the quality of the sample and sperm DNA integrity may be compromised after a single treatment. Although sperm counts and quality of sperm may be diminished even before initiation of therapy, and even if there may be a need to initiate chemotherapy quickly such that there may be limited time to obtain optimal numbers of ejaculate specimens, these concerns should not dissuade patients from banking sperm. Intracytoplasmic sperm injection allows the future use of a very limited amount of sperm; thus, even in these compromised scenarios, fertility may still be preserved. (Evidence quality: Low; Strength of recommendation: **Strong**)

Fertility preservation in females: ASCO

Fertility preservation option	Recommendation	Notes/limitation
Embryo cryopreservation	As a routine (strong)	
Oocyte cryopreservation	Strong	Females do not have a male partner, do not wish to use donor sperm, or have religious or ethical objections to embryo freezing
Posttreatment setting	Cryopreservation may be offered in a post-treatment setting	Ovarian insufficiency or infertility
In vitro maturation (IVM)	Conditional	Emerging method
Ovarian transposition	Strong	Remigration
Uterine transposition	Conditional	Experimental
Ovarian suppression (GnRHa)	Conditional	patients with oncologic emergencies requiring urgent chemotherapy
Ovarian tissue cryopreservation and transplantation	Strong	in prepubertal patients

Su, H. I., Lacchetti, C., Letourneau, J., Partridge, A. H., Qamar, R., Quinn, G. P., ... & Loren, A. W. (2025). Fertility preservation in people with cancer: ASCO guideline update. *Journal of Clinical Oncology*, 43(12), 1488-1515.

SPECIAL ARTICLE

Fertility preservation and post-treatment pregnancies in post-pubertal cancer patients: ESMO Clinical Practice Guidelines[†]

M. Lambertini^{1,2}, F. A. Peccatori³, I. Demeestere⁴, F. Amant^{5,6}, C. Wyns⁷, J.-B. Stukenborg⁸, S. Paluch-Shimon⁹, M. J. Halaska¹⁰, C. Uzan¹¹, J. Meissner¹², M. von Wolff¹³, R. A. Anderson¹⁴ & K. Jordan¹², on behalf of the ESMO Guidelines Committee*

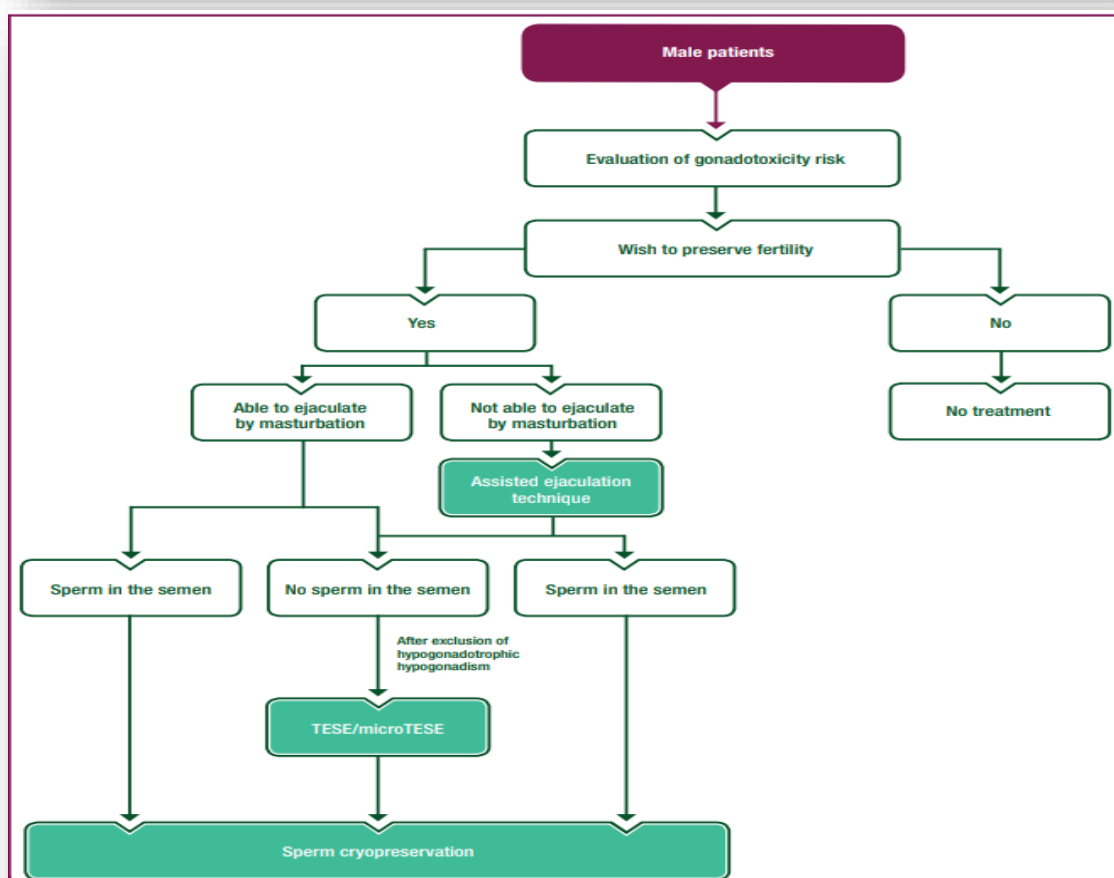


Figure 1. Management flowchart for fertility preservation in male patients. microTESE, microsurgical testicular sperm extraction; TESE, testicular sperm extraction.

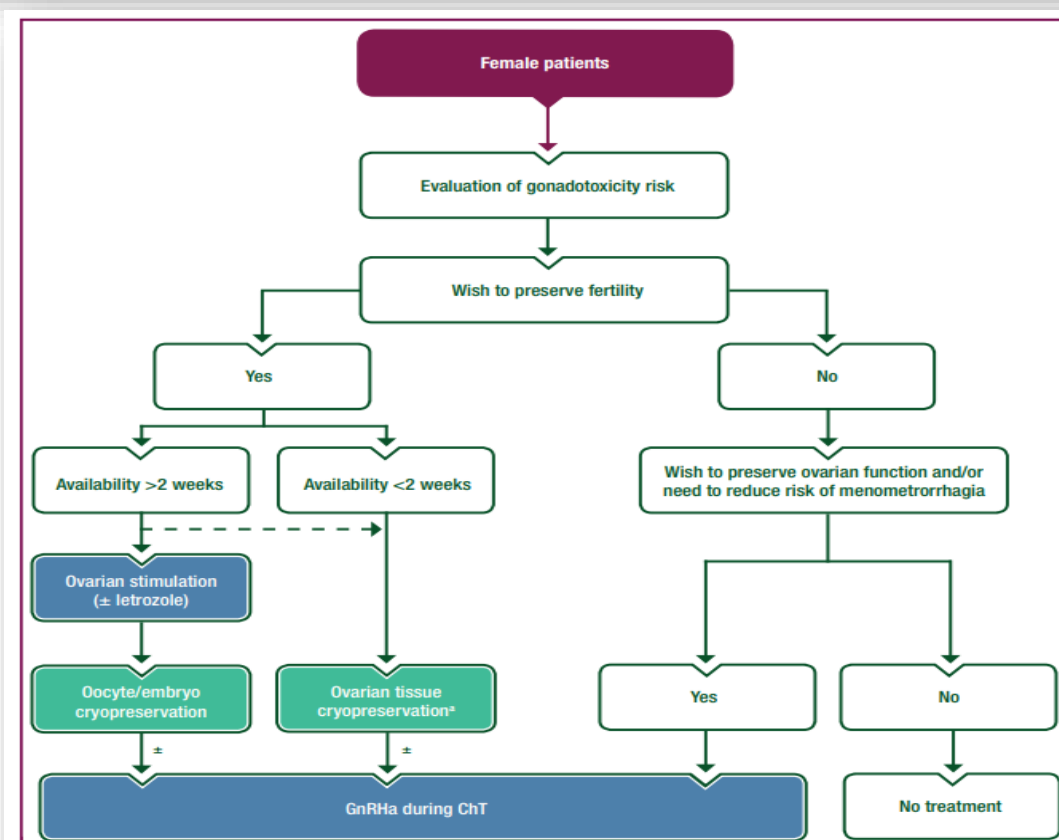


Figure 2. Management flowchart for ovarian function and/or fertility preservation in female patients.

ChT, chemotherapy; GnRHa, gonadotropin-releasing hormone agonist.

*To be offered preferably in women ≤36 years of age and to be considered with particular caution in cases of acute leukaemia, or any solid tumour or haematological disease with pelvic involvement.

Future horizons:

- **Artificial ovary:** Bioengineered tissue supporting follicle survival, maturation, and ovarian function.
- “These technologies are promising, but most remain experimental and are not yet established clinical options.”
- optimize oocyte/embryo selection.
- **In vitro gametogenesis (IVG):** Experimental generation of oocytes or sperm from stem cells in the laboratory.

Oktay, K. et al., (2018). Fertility preservation in patients with cancer: ASCO clinical practice guideline update. Journal of Clinical Oncology, 36(19), 1994-2001., Ishii T, et al. In vitro gametogenesis: a new frontier in reproductive medicine. Nat Rev Mol Cell Biol. 2022., Coticchio G, et al. Artificial intelligence in assisted reproductive technology. Hum Reprod Update. 2023.

Take Home Messages:

- **Early decision** about fertility **BEFORE** treatment.
- **Early referral** means more options.
- **Individualize the plan:** There is no one-size-fits-all strategy.
- Fertility preservation is a **multidisciplinary responsibility**.
- We treat the cancer, but we should also protect the patient's future

**Thank
You**

