

FERTILITY AFTER CERVICAL CANCER AND FERTILITY PRESERVATION OPTIONS

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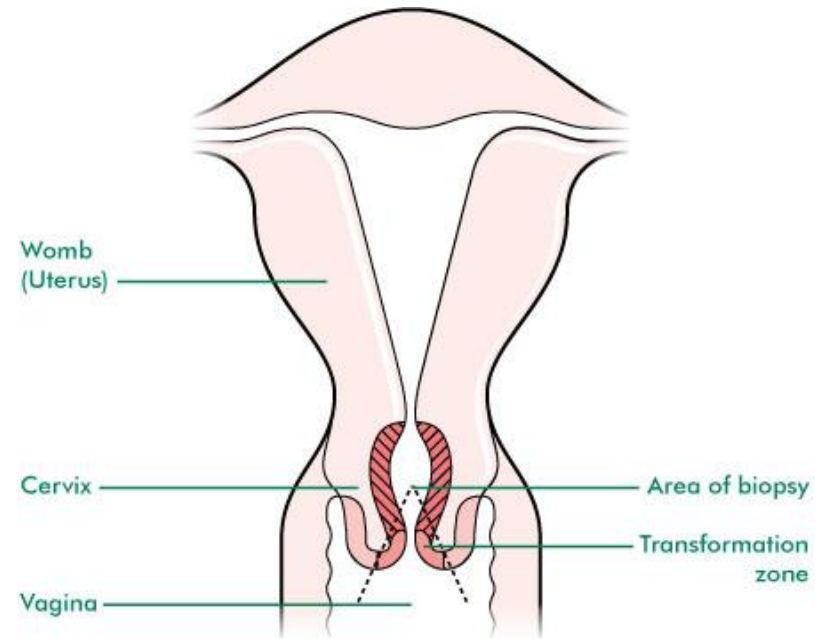
Atlanta, GA

Disclosure

- I have no relationships or financial compensation from any drug companies or industries

Fertility after cervical cancer surgery

- Scope of surgery
 - ▣ **Cone biopsy, LEEP**
 - Should have minimal impact on fertility unless complicated by uterine scarring or cervical stenosis, intrauterine insemination may help
 - Risk of preterm delivery (depth of cone, number of surgeries)



Simoens et al, BJOG, 2012
Kim et al, Gynecol Oncol, 2012
Mangler et al, J Perinat Med, 2012
Speiser et al, Int J Gynecol Cancer, 2011

Fertility after cervical cancer surgery

□ Trachelectomy

- Unclear fertility impact
 - One small study: 66% of women achieved pregnancy in 6 months
 - Probably does impact fertility however
- Risk of preterm delivery (cerclage may help)
 - Up to 50% may deliver preterm

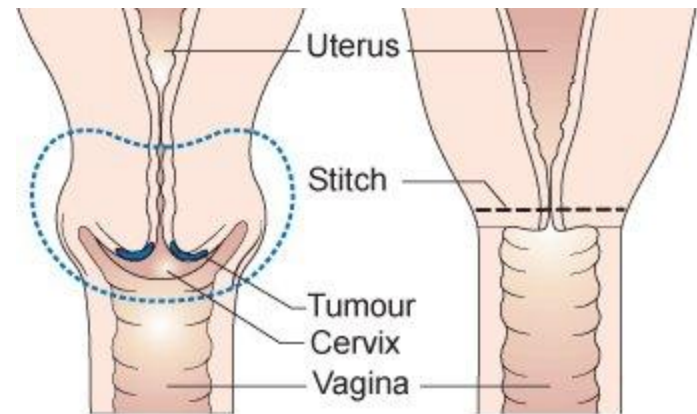
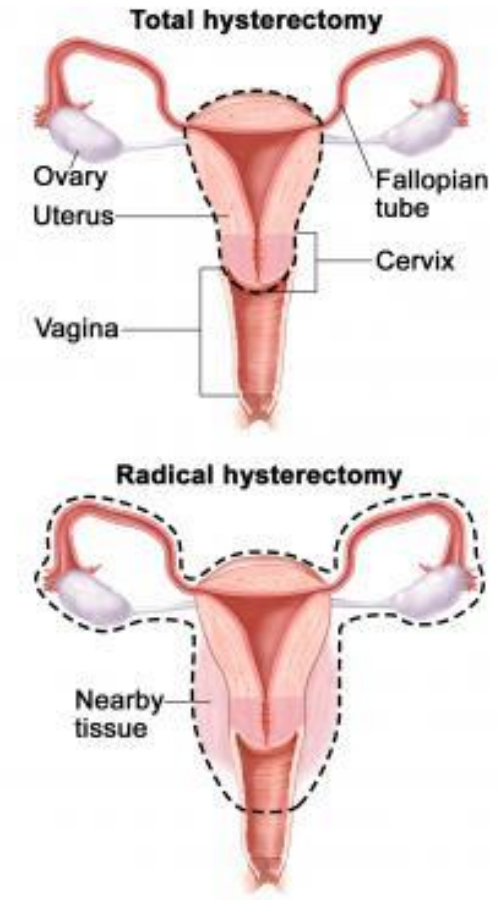


Diagram showing the parts removed with a trachelectomy surgery
© CancerHelp UK

Fertility after cervical cancer surgery

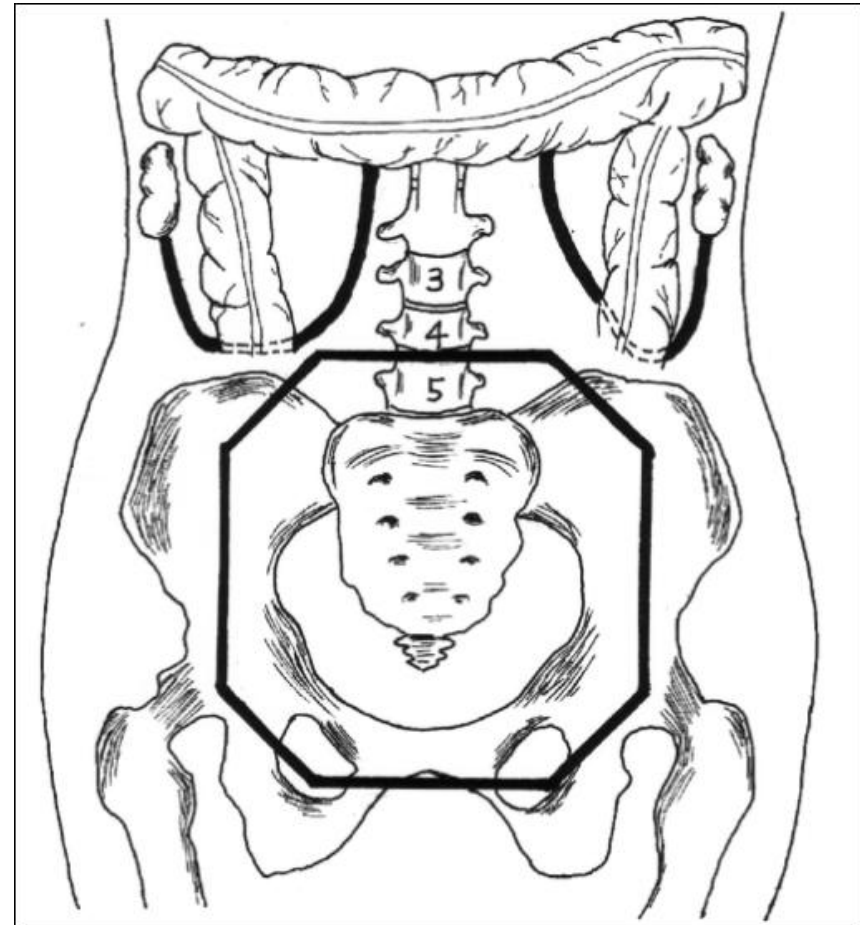
- Scope of surgery
 - ▣ **Radial hysterectomy without removing ovaries**
 - Should have normal ovarian function if not chemo/radiation afterwards but can be diminished
 - Removing one ovary may increase risk of early menopause
 - Option to use a gestational carrier
 - ▣ **Radical hysterectomy with removing ovaries or after chemo/radiation**
 - Option to use an egg donor with a gestational carrier



Fertility after cervical cancer surgery

▣ transposition of the ovaries

- Difficult to access ovaries to retrieve eggs, ovaries function less well, increased risk for early menopause
- best option is using an egg donor with a gestational carrier



Impact of radiation treatment

- Doses of $<2\text{Gy}$ will kill $\sim 50\%$ of the eggs
 - ▣ Cycles resume but at risk for early menopause
- Depends on age and dose, typical dose for whole pelvis external beam radiation is $\sim 40\text{ Gy}$
 - ▣ In young women, $10\text{-}20\text{Gy}$ may induced premature menopause
 - ▣ In older reproductive age women >40 , only 6 Gy may induce premature menopause
 - ▣ Risk of ovarian failure is almost certain after radiation

Impact of chemotherapy

- Depends on age and dose
- Alkylating agents are the most damaging
- Cisplatin and 5-FU are less damaging but can still significantly lower egg count

- **Best option: preserve eggs/embryos before exposure to chemo and radiation**

Fertility preservation options

- **Egg or embryo freezing** prior to chemo/radiation
 - ▣ Takes 2-4 weeks (may delay treatment)
 - ▣ Expensive: egg freezing ~\$6,000, embryo freezing ~\$13,000
 - ▣ FSH injections given for 10 days to stimulate egg production by ovaries
 - ▣ Egg retrieval performed (transvaginal ultrasound guided needle under anesthesia)
 - ▣ Eggs either frozen or fertilized with sperm and then frozen

Fertility preservation options

- **Ovarian tissue or whole ovary freezing**
 - Tissue can be reimplanted later, some patients may resume ovulating
 - Highly experimental, not widely available
 - Not effective/warranted if patient had radiation treatment or hysterectomy

Fertility preservation options

LupronDepot[®]
(leuprolide acetate for depot suspension)

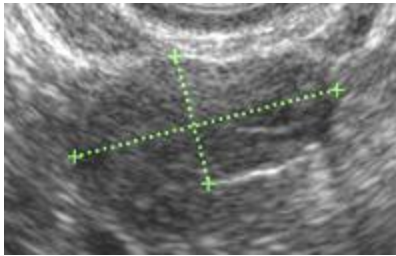
- **Depo Lupron treatment**
 - ▣ Lupron treatment during chemotherapy may partially protect ovaries from chemotherapy (controversial)
 - ▣ Not as effective as egg/embryo freezing before treatment
 - ▣ Not effective with radiation treatment

Evaluating a patient for fertility

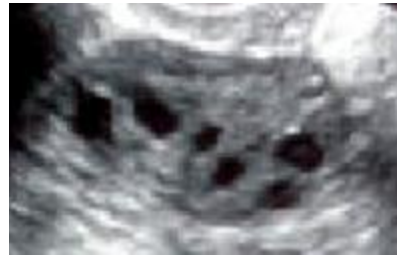
- What factors are involved?
 - Hysterectomy?
 - Exposure to radiation/chemo?
 - Other infertility issues (sperm, fallopian tubes, age)
- Assessing ovarian reserve
- Patient's comfort level with third party reproduction
 - Gestational carrier (“surrogate”)
 - Egg donor (known or anonymous)

Ovarian reserve testing

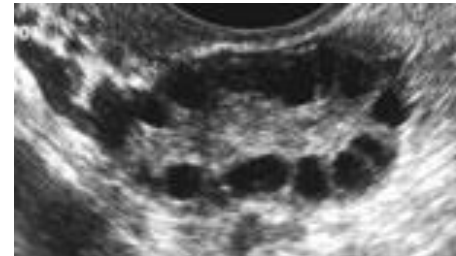
- Blood tests: FSH, estradiol, AMH
- Ultrasound: antral follicle count



Low



Normal



High

Success rates with frozen embryos

Thawed Embryos From Non-Donor Oocytes

	<35	35-37	38-40	41-42	>42
Number of Transfers	11858	5865	4411	1521	1088
Percentage of transfers resulting in live births	38.7	35.1	28.5	21.4	15.3
Average number of embryos transferred	1.9	1.9	2.1	2.2	2.1
Percentage of live births with twins	32.4	27.2	22.1	16.9	9.6
Percentage of live births with triplets or more	1.5	1.5	1.1	1.1	0.9

- Age is the most important indicator of success with IVF

Success rates with frozen eggs

- Harder to predict
- Egg freezing is still relatively new compared to embryo freezing
- Depends on age, number of eggs collected, fertilization rate, quality of embryos
- Allow for woman without a partner yet to preserve fertility without committing to the use of donor sperm

Success rates with egg donation

Donor Oocytes (all ages)

	Thawed Embryos	Fresh Embryos
Number of Transfers	6183	9321
Percentage of transfers resulting in live births	34.8	55.6
Average number of embryos transferred	2.0	1.9

- The patient's age no longer affects success rates
- Most center's require the patient to be <50 yo

Success rates with gestational carriers

	<35	35-37	38-40	41-42	>42
Number of cycles	300	184	231	101	43
Percentage of cycles resulting in pregnancies	55.3	46.2	39.4	28.7	20.9
Percentage of cycles resulting in live births	48.7	38.0	29.9	16.8	4.7

- Probability of pregnancy is determined by age of genetic mother (intended parent)
- Requires legal consultation, check state laws
- Preferable to use compassionate/known gestational carrier when possible

Additional resources

- IVF success rates, or to find a clinic near you:
 - www.cdc.gov/art
 - www.sart.org
- Fertility after cancer and preservation information:
 - www.fertilehope.org
 - www.resolve.org
 - <http://oncofertility.northwestern.edu/patients>