The luteinisation of ovulatory follicle without a release of an oocyte.

About Luteinised unruptured follicle syndrome

LUFS stands for the luteinisation of ovulatory follicle without releasing an oocyte. Therefore, it can be considered as a form of anovulation belonging to anovulation functional problems category. Functional problems accounts for up to 15% cases of anovulation. As it is a disorder united with the start of so called luteal phase, it may be also characterized as luteal phase defect (LPD). It seems that LUFS is related to hormonal imbalance causing the detention of oocyte within the follicle even though the follicle itself transforms under LH (luteinizing hormone) influence into corpus luteum (Pic. 1). The oocyte detention prohibits the conception, yet menstrual cycle is in any other aspect undergoing normally without any side effects.

Regarding the importance of progesterone and its role in the ovulation, it is reasonable to assume that its lowered levels may be responsible for LUF to happen. As no oocyte is released and no conception happens, the uterus soon starts to produce prostaglandin \(\text{f}_2\alpha\) as if regular ovulation would happen and the menstruation cycle begins again without any obvious signs showing that there’s any kind of disturbance in the menstrual cycle.

LUF is observed in 10% of natural menstrual cycles in fertile women, but in stimulated cycles it is higher. The incidence of LUF has been reported to be 25–43% in infertile women.

Associated diseases
- PCOS
- Endometriosis
- Pelvic inflammatory disease
- Hyperprolactinemia (elevated levels of prolactin in blood)

**Complications**

There are no side complications related with this reproduction disorder except conception is not possible to happen if oocyte is held within the ovary after ovulation reducing the fertility possibilities.

**Risk factors**

Several investigations have shown that anti-inflammatory nonsteroidal drugs may be related with higher incidence of LUFS. Hormonal imbalance of gonadotropins (LH and FSH) is another risk factor.

**Impact on fertility**

Without a release of an oocyte, it is impossible for a woman to get pregnant in “old fashion” way, meaning that LUFS significantly reduce the fertility potential of a woman. Yet luteinised unruptured follicles syndrome is not affecting every ovulation so it may “just” take significantly longer time to get pregnant. There are various medical/assisted reproduction treatments available for LUFS, so it is no terminal condition which would exclude pregnancy completely.

**Prevention**

There’s no clear prevention for LUFS to happen. On the other hand, the quality of alimentation has quite great impact on hormonal balance of the body, including progesterone production. Proper supplementation with fatty acids may help to maintain the progesterone balance within the body.

**Symptoms**

No specific signs or symptoms related to LUFS.

**Therapies**
Self therapy

None verified.

Conventional medicine

Conventional therapy is mainly represented by hormonal therapy that includes administration of specific sex hormones - gonadotropins; hCG (human chorion gonadotropin) or/and hMG (menotropin; human menopausal gonadotropin). hCG is an analogue to LH which naturally induce ovulation so it can be used to trigger the ovulation. hMG maintains low levels of FSH and high levels of LH within post-menopausal women. This state corresponds with similar hormonal balance during natural ovulation and therefore its administration may help to trigger ovulation.

Hormonal therapy may be substituted or combined with specific drug administration. These medications include clomiphene citrate and letrozole, both up-regulating FSH concentration due to negative feedback on oestrogen levels. Clomiphene citrate inhibits oestrogen receptors in the hypothalamus, inhibiting negative feedback of oestrogen on gonadotropin release, leading to increased FSH levels with consequential maturation of follicle. Letrozole inhibits the conversion of androgens into the oestrogens stimulating the secretion of FSH.

As there seems to be a relation between hormonal balance, size of follicles and treatment outcomes, the stimulation of FSH inducing the growth of follicle may prove beneficial to a certain level.

Yet there is hormonal disturbance causing LUFS, it cannot be connected with any pathological conditions of participating glands that could be solved by surgical intervention.

Assisted reproduction

If conservative medical treatments fail to achieve a full term pregnancy, the physician may suggest the patient undergo in vitro fertilization (IVF). IVF and related assisted reproduction techniques generally start with stimulating the ovaries to increase egg production. After stimulation, the physician surgically extracts one or more eggs from the ovary, and unites them with sperm in a laboratory setting, with the intent of producing one or more embryos. Fertilization takes place outside the body, and the fertilized egg is reinserted into the woman’s reproductive tract, in a procedure called embryo transfer. Another option is the hormonal therapy inducing an ovulation which is followed by intrauterine insemination (IUI).
**Diagnoses**

**Polycystic ovary syndrome**
A condition in which a woman has an imbalance of female sex hormones. This may lead to changes in the menstrual cycle, cysts in the ovaries, trouble g
Learn more at: [www.fertilitypedia.org/therapy/diag/polycystic-ovary-syndrome](http://www.fertilitypedia.org/therapy/diag/polycystic-ovary-syndrome)

**Anovulation**
Failure of the ovaries to release an oocyte over a period of time generally exceeding 3 months.
Learn more at: [www.fertilitypedia.org/therapy/diag/anovulation](http://www.fertilitypedia.org/therapy/diag/anovulation)

**Endometriosis**
A state in which pieces of the tissue alike to the lining of the uterus (endometrium) grow in other parts of the body.
Learn more at: [www.fertilitypedia.org/therapy/diag/endometriosis](http://www.fertilitypedia.org/therapy/diag/endometriosis)

**Pelvic Inflammatory Disease**
Infection of the upper part of the female reproductive system and a common complication of some sexually transmitted diseases.

**Hyperprolactinemia**
The presence of abnormally high levels of prolactin in the blood.
Learn more at: [www.fertilitypedia.org/therapy/diag/hyperprolactinemia](http://www.fertilitypedia.org/therapy/diag/hyperprolactinemia)

**Organs**

**Ovary**
The ovum-producing organs of the internal female reproductive system
Learn more at: [www.fertilitypedia.org/edu/organisms/ovary](http://www.fertilitypedia.org/edu/organisms/ovary)

**Reproductive cells**

**Oocyte**
A female germ cell involved in reproduction.
Learn more at: [www.fertilitypedia.org/edu/reproductive-cells/oocyte](http://www.fertilitypedia.org/edu/reproductive-cells/oocyte)

**Biological control**
**Follicle-stimulating hormone**
FSH is a hormone secreted by the anterior pituitary gland. It regulates the development, growth, pubertal matur and reproductive functions of the body.
Learn more at: [www.fertilitypedia.org/edu/biological-control/follicle-stimulating-hormone](http://www.fertilitypedia.org/edu/biological-control/follicle-stimulating-hormone)

**Luteinizing hormone**
A hormone, that stimulates ovulation and the development of the corpus luteum in females, and the production of androgens in males.
Learn more at: [www.fertilitypedia.org/edu/biological-control/luteinizing-hormone](http://www.fertilitypedia.org/edu/biological-control/luteinizing-hormone)

**Progesterone**
Steroid hormone, secreted by the ovaries, whose function is to prepare the uterus for the implantation of a fertilized ovum and to maintain pregnancy.
Learn more at: [www.fertilitypedia.org/edu/biological-control/progesterone](http://www.fertilitypedia.org/edu/biological-control/progesterone)

**Reproductive functions**

**Ovulation**
The release of egg(s) from the ovaries.
Learn more at: [www.fertilitypedia.org/edu/reproductive-functions/ovulation](http://www.fertilitypedia.org/edu/reproductive-functions/ovulation)

**Symptoms**

**Hormonal imbalance of gonadotropins (LH and FSH)**
Abnormal levels of one of the gonadotropin hormones, LH and FSH.

**Low level of progesterone**
Learn more at: [www.fertilitypedia.org/edu/symptoms/low-level-of-progesterone](http://www.fertilitypedia.org/edu/symptoms/low-level-of-progesterone)

**Therapies**

**Egg donation**
Process by which a woman donates eggs for purposes of assisted reproduction or biomedical research.
Learn more at: [www.fertilitypedia.org/edu/therapies/egg-donation](http://www.fertilitypedia.org/edu/therapies/egg-donation)

**Hormonal therapy of luteinised unruptured follicle**
Learn more at: [www.fertilitypedia.org/edu/therapies/hormonal-therapy-of-luteinised-unruptured-follicle](http://www.fertilitypedia.org/edu/therapies/hormonal-therapy-of-luteinised-unruptured-follicle)
**ICSI**
A micromanipulative fertilization technique in which a single sperm is injected directly into an egg.
Learn more at: [www.fertilitypedia.org/edu/therapies/icsi](http://www.fertilitypedia.org/edu/therapies/icsi)

**Intrauterine insemination**
A process of injecting of washed sperm into the uterus with a catheter for treatment of infertility.
Learn more at: [www.fertilitypedia.org/edu/therapies/intrauterine-insemination](http://www.fertilitypedia.org/edu/therapies/intrauterine-insemination)

**Standard IVF**
A process in which an egg is fertilised by sperm outside the body: in vitro. Own or donated gametes may be used.
Learn more at: [www.fertilitypedia.org/edu/therapies/standard-ivf](http://www.fertilitypedia.org/edu/therapies/standard-ivf)

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**Gallery**

*Pic. 1: Regular ovulation (AB1) vs. anovulation implicated by LUFS (AB2)*

Diagram showing FSH (1), oestrogen (2), LH (3) and progesterone (4) levels in relation to ovulation and creation of corpus luteum.

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