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**TINKERING IN THE WOMB: FETAL SURGERY**  
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**Resume:** *prenatal surgery is an invasive procedure performed on a fetus. Using highly sophisticated surgical procedures, specialists are now able to treat certain disabling conditions like heart defects, urinary blockages, bowel obstructions, airway malformations and life-threatening birth defects during fetal development instead of after birth, and to offer new hope to families.*

**Keywords:** *fetal surgery, congenital defects, risks, ethical issues.*

**Topicality.** Unfortunately, in our days many diseases are becoming younger and younger. Even an unborn child is at risk. For parents it is extremely hard to understand that the condition of their desired child cannot undergo therapy until after birth. Fetal surgery allows doctors to intervene earlier. Today, fetal therapy is recognized as one of the most promising fields in pediatric medicine, and prenatal surgery is becoming an option for a growing number of babies with birth defects.

**Aim:** I based my research on studying different cases of serious children's problems that cannot wait to be fixed after birth.

**Tasks:**

1. To find out the most common types of prenatal surgery.
2. To estimate the prospects.
3. To discuss ethical issues.
4. To pay attention to the risks.

**Materials and methods.** I studied scientific literature to find out aspects of prenatal surgery with the help of network sources and analysed its benefits and risks, including ethical issues.

**Results and consideration.** When carrying out my research I tried to reveal the advantages and disadvantages of fetal surgery. As the field of fetal medicine continues to

advance, more and more babies will be treated before they are born. Birth defects which are successfully treated with fetal therapies include:

- Amniotic band syndrome
- Bronchopulmonary sequestration of the lung
- Congenital cystic adenomatoid malformation of the lung (CCAM)
- Congenital diaphragmatic hernia (CDH)
- Congenital high airway obstruction syndrome (CHAOS)
- Intrauterine transfusion (IUT)
- Lower urinary tract obstruction (LUTO)
- Mediastinal teratoma
- Neck mass
- Pulmonary agenesis
- Sacrococcygeal teratoma
- Spina bifida (myelomeningocele)
- Twin reversed arterial perfusion sequence (TRAP sequence)
- Twin-twin transfusion syndrome (TTTS) ) [2].

There are 3 common types of fetal surgery: open fetal surgery, minimally invasive fetoscopic surgery, fetal image-guided surgery. Open fetal surgery is known to be the most invasive and risky type, as the mother is given anesthesia and the fetus is also given medications as needed for pain control and to prevent movement. Open fetal surgery may be used for several conditions:

1. Open fetal repair for myelomeningocele ( Spina bifida)
2. Resection of a chest or neck mass
3. Resection of a sacrococcygeal teratoma
4. Congenital diaphragmatic hernia (CDH) [1].

In minimally invasive fetoscopic surgery, the surgeon makes a pencil-tip-sized incision and inserts a small telescope called a phetoscope into the uterus. The phetoscope allows for a telescopic view into the uterus.

In case of fetal image-guided doctors use ultrasound to guide them as they perform "fetal manipulations," such as placing a catheter in the bladder, abdomen, or chest without an incision to the uterus or use of an endoscope [5].

In the future, fetal surgery may be used together with advances in stem cell research. By providing therapy in utero, doctors have a better chance of treating a disease before debilitating symptoms appear. In addition, the fetus has a poorly developed immune system, so it is more likely to accept foreign cells. Lastly, because of the fetus's small size, relatively high doses of cells can be delivered, making the therapy more likely to succeed [6].

Today fetal reduction, or the systematic killing of one or more fetuses in order to save those remaining, also raises ethical issues. Treating a fetus as a patient creates a situation that has never existed before. In the past, experimental treatments for the seriously ill could be justified on the grounds that the patient had everything to gain and nothing to lose. With fetal surgery, that may hold true for the fetus, of course, but the benefits and risks to the mother are far less obvious. Many mothers are willing to do

whatever is necessary to give birth to a healthy baby. Yet major abdominal surgery and general anesthesia pose risks to the mother.

Research studies have shown that fetal surgery does not interfere with a woman's future fertility. Still, ethicists argue that a woman must always have the freedom to choose against fetal surgery. They fear that as the procedures gain acceptance and it proves more successful, women will find it increasingly difficult to say no. They also worry that a judge might order a woman to have fetal surgery against her will. Legal precedent already exists for this kind of dispute between mother and fetus. Pregnant women have been ordered to have unwanted cesarean sections after medical authorities testified that the operation was in the best interest of the unborn baby [7].

A major risk of prenatal surgery is nicking the placenta, causing blood hemorrhaging, uterine contractions, and birth of a premature infant who may not survive. Preterm labor is the most common complication of prenatal surgery. Fetoscopic surgeries are less dangerous and traumatic than open fetal surgery and reduce the risk of premature labor. Subsequent children of a mother who has undergone fetal surgery usually are delivered by cesarean section because of scarring of the uterus. Moreover, all fetuses that undergo surgery are born prematurely. Infants born even six weeks early are at the risk of delays in walking and talking and of learning problems. Infants born at 30 weeks of gestation or less are at the risk of blindness, cerebral palsy, and brain hemorrhages [4].

It was considered that fetal surgery requires the most sophisticated technologies. Unfortunately, clinics in our country have no opportunity to perform such operations.

Today phetoscopy operations are carried out in a number of Russian clinics. Unfortunately, despite the progress of recent years, the Russian advances in fetal surgery on the background of the developed European countries and the USA still look modest.

### References

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