Endoscopic Fetoscopy [1]

By: Mandile, Olivia

Endoscopic fetoscopy is a minimally invasive surgical procedure performed during pregnancy [2] that allows physicians to view the fetus [3] in-utero. Physicians use endoscopic fetoscopy to evaluate, diagnose, and treat fetal abnormalities. Physicians use an endoscope, or a thin, flexible surgical device with a light attached to its end, to perform endoscopic fetoscopy procedures. In 1954, Björn Westin performed the first endoscopic fetoscopy in Sweden. Since Westin’s initial development of the procedure, interest in endoscopic fetoscopy has grown throughout the early part of the twenty-first century. In addition, the use of endoscopy [4] has expanded beyond fetal medicine and has been introduced to other fields of medicine such as general surgery. Endoscopic fetoscopy allows surgeons to diagnose and correct fetal abnormalities that would otherwise result in fetal death before delivery or in lifelong impairment if treatment were delayed until after delivery.

In 1954 Björn Westin, an obstetrician from Sweden, performed the first endoscopic fetoscopy. Westin first attempted fetoscopy on pregnant women who were going to have medically necessary abortions. He inserted a scope through the woman’s cervix [5] and was able to view the fetus [3] in the uterus [6]. In 1967, Bernard Mandelbaum, an obstetrician based in Michigan, was the first to introduce the fetoscope through a small incision in the abdomen of a pregnant woman. Physicians’ use of fetoscopy as a diagnostic technique peaked in the 1970s. Following the 1970s, the technique declined in popularity as physicians began using ultrasound [7], a less invasive method, to diagnose fetal abnormalities. In the 1980s, endoscopy [4] quickly became popular in other fields of medicine, such as general medicine. The increasing use and perfection of endoscopy [4] in general medicine brought the technique back to gynecology, resulting in a renewal of fetoscopic procedures. Interest in treating fetal abnormalities using fetoscopy rather than open fetal surgery, or surgery where the uterus [6] is opened, has grown in the twenty-first century because minimally invasive procedures such as fetoscopy cause less trauma to both the pregnant woman and her fetus [3].

Fetoscopy uses an instrument called a fetoscope to view the fetus [3] while inside the uterus [6]. There are two types of fetoscopes, one that is used externally on the pregnant woman’s abdomen to listen to the fetal heartbeat, and an endoscope that is used internally in the pregnant woman’s uterus [6] to view the fetus [3]. Endoscopic fetoscopy uses an endoscope. An endoscope is a long, thin, flexible tube with a fiber-optic camera on its tip. It contains a working channel, meaning the tube is hollow and enables physicians to insert surgical instruments through the endoscope. Surgeons have used surgical instruments such as cutters, forceps, probes, and lasers with fetoscopes to treat fetal conditions. The use of such tools allow surgeons to treat and correct fetal abnormalities after diagnosis.

Endoscopic fetoscopies are typically conducted when an ultrasound [7] shows fetal abnormalities that cannot be diagnosed using a less invasive, external approach. Physicians usually conduct endoscopic fetoscopies after the eighteenth week of pregnancy [2], when the fetus [3] is developed enough to clearly show existing abnormalities. During an endoscopic fetoscopy, the physician gives the pregnant woman a sedative and local anesthetic to prevent pain and movement of both the pregnant woman and the fetus [3]. Physicians can insert the endoscope transabdominally, or through the abdomen of the pregnant woman, or transcervically, or through the cervix [5] of the pregnant woman. To place the fetoscope transabdominally, a surgeon makes a small incision in the skin of the abdomen. The scope is inserted through that incision into the amniotic sac [8], which surrounds the developing fetus [3]. Then, the image from the endoscope is projected on a monitor, where the surgeon can view it. Because endoscopes are inserted into the pregnant woman’s uterus [6], risks associated with endoscopic fetoscopy include infection, rupture of amniotic sac [8], premature labor [9], and fetal death. Therefore, endoscopic fetoscopies are only conducted in cases where fetal treatment is necessary or when diagnosis through external means is not possible.

The first purpose of endoscopic fetoscopy is to diagnose fetal abnormalities. During a fetoscopy, physicians can take fetal blood and tissue samples. Fetal blood samples can be used to diagnose conditions such as hemophilia [10], a condition in which blood does not clot normally, sickle-cell anemia [11], in which red blood cells are abnormally rigid, or Tay Sachs disease, a genetic disorder affecting nerve cells [12]. Fetal tissue samples are used to diagnose Duchenne muscular dystrophy [13], a disorder of progressively weakening muscles, and Weber-Cockayne syndrome, a condition in which skin is fragile and blisters easily. The images taken during a fetoscopy are used to diagnose neural tube [14] defects such as spina bifida [15], an opening of the membranes around the spinal cord.

Using the working channel of a fetoscope, physicians can also use endoscopic fetoscopy to treat the fetal abnormalities that they diagnose. Fetoscopy is routinely used to treat three conditions: twin-to-twin transfusion syndrome [16], amniotic band syndrome,
Sources


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