



# Fetal Surgery at Mayo Clinic





Bringing together a multispecialty team of world-renowned fetal medicine and pediatric experts and researchers, Mayo's Clinic's fetal surgery practice is one of the largest, most comprehensive prenatal diagnosis and treatment practices in the world. Housed in the Mayo Clinic Children's Center and Mayo Clinic Maternal-Fetal Medicine Center in Rochester, Minnesota, Mayo's fetal surgery practice uses advanced technology and state-of-the-art facilities to offer a wide variety of cutting-edge, minimally-invasive techniques for fetal

distress and abnormalities. Each year, Mayo's fetal surgery practice performs many fetal surgeries to improve outcomes of the unborn child.

Mayo's fetal surgery practice offers medical professionals the opportunity to refer and follow patients throughout their care. The practice understands the importance of the relationship you have already defined with your patient and their family and makes certain to work closely with you to provide individualized, leading-edge treatments and interventions to ensure the best care for your patient and unborn child.

## MAYO'S FETAL SURGERY CARE TEAM

Under the leadership of Division Chair Mauro Schenone, MD Mayo's fetal surgery integrated care team includes experts in maternal and fetal medicine, fetal surgery, pediatric surgery, pediatric cardiology, pediatric neurology, obstetrics, neonatology, genetics, radiology and anesthesiology, as well as pediatric otolaryngology, pediatric nephrology, pediatric urology, pediatric neurosurgery, clinical nurse therapy and social services, as needed.

## CUTTING-EDGE PROCEDURES

With access to state-of-the-art technology and subspecialty expertise, Mayo's fetal surgery practice is uniquely positioned to provide a multidisciplinary approach to both less invasive and open procedures performed in utero.

- Minimally invasive fetal surgery:
  - Fetoscopic laser ablation of placental anastomoses for twin-to-twin transfusion syndrome (TTTS), Twin Anemia Polycythemia Sequence (TAPS), acardiac twins
  - Vesico-amniotic shunting for lower urinary tract obstruction
  - Fetal thoraco-amniotic shunt placement for fetal hydrothorax
  - Fetal atrial septostomy for intact atrial septum



- PUBS (fetal blood transfusion for anemia)
- CHAOS (congenital high airway obstruction)
- Ultrasound –guided ablation of feeding vessels for pulmonary and large sacrococcygeal teratomas
- Serial amnioinfusions
- Open fetal surgery
  - In utero repair of myelomeningocele
  - In utero fetal tumor resection (sacrococcygeal teratomas and lung masses)
  - Ex utero intrapartum treatment (EXIT) delivery for high-airway obstructions



## CUTTING-EDGE TESTS

Patients referred to Mayo Clinic have access to unique tests and resources, including:

- 3D fetal ultrasound for detection of facial abnormalities or neural tube defects
- Fetal therapy, including intrauterine blood transfusion, laser ablation of twin-to-twin transfusion and radiofrequency ablation
- Fetal ultrasound and other sophisticated imaging technologies
- First trimester Down syndrome screening
- First trimester ultrasound screening for congenital anomalies
- Genetic amniocentesis and chronic villus sampling
- Testing related to increased maternal or paternal age
- Testing related to increased risks of genetic conditions
- Noninvasive prenatal testing
- Percutaneous umbilical blood sampling, vesicocentesis and cardocentesis
- Targeted imaging for babies at risk of birth defects and fetal anomalies
- Fetal MRI
- Fetal echocardiogram

## QUALITY AND CLINICAL OUTCOMES

In recent years there have been over 200 fetal surgeries performed at Mayo Clinic. Interventions have included fetoscopic laser ablation of placental anastomoses for twin-to-twin transfusions and complicated monochorionic twins, fetal endoscopic tracheal occlusion for severe congenital diaphragmatic hernia, in utero repair, both open and fetoscopic, of fetal spina bifida, fetal surgeries for bladder outlet obstruction, fetal tumors and in utero intervention for severe congenital heart defects. The practice continues to grow in volume, lending itself to superior quality and improved outcomes for the patient and unborn child.

Mayo's fetal surgery practice, in many cases, produces significantly better outcomes and chances of survival than traditional postnatal repair. 2021 outcomes data include:

- More than 87% of fetoscopic laser ablation cases of placental anastomoses for twin-to-twin transfusion syndrome achieved a viable gestational age and delivered at least one viable fetus
- There were no maternal complications
- Latency period between ablation and delivery was >10 weeks
- Reported a novel intervention of Radio Frequency Ablation for treatment of fetal thoracic mass
- A 100% success rate for myelomeningocele cases with more than 70% of cases delivered beyond 34 weeks of gestation, no preterm labor, and no deliveries before 30 weeks of gestation
- Mayo Clinic Children's Center in Rochester, Minnesota is a top choice for referring providers in the U.S. for pediatric care



## FETAL SURGERY RESEARCH

Mayo's fetal surgery experts have advanced their field through ongoing research studies including those targeted at outcomes registries and practice advancement:

- Renal Anhydramnios Fetal Therapy (RAFT) Study
- Maternal-fetal Immune Responses to Fetal Surgery
- North American Fetal Therapy Network Fetal Myelomeningocele Repair Registry
- Observed to Expected Lung to Head Ratio and Liver Herniation in the Prediction of Diaphragmatic Hernia Outcome in a Contemporaneous Multi-Center Cohort
- Treatment of Severe Twin to Twin Transfusion Syndrome using Fetoscopic Laser Photocoagulation of Communicating Placental Vessels
- Radiomic Techniques for Evaluating Placental Abnormalities, including Placenta Accreta Spectrum

## WHY CHOOSE MAYO CLINIC

- Mayo Clinic tailors treatments using advanced technology and techniques, many of which may not be available outside of Mayo, including new cutting-edge, in utero therapies
- Mayo Clinic surgeons include internationally-renowned, highly-specialized experts with extensive experience in fetal surgery

- Mayo Clinic provides comprehensive care for pregnant women with complex maternal and fetal conditions
- Mayo Clinic offers teleneonatology, a live audio-video telemedicine connection, for patients who deliver with their referring physician in a hometown, community hospital
- Mayo Clinic offers maternal and fetal medicine telemedicine, a live audio-video telemedicine connection, for patients with complex maternal and fetal conditions
- Mayo Clinic uses state-of-the-art imaging techniques, including 7-Tesla and MRI scanner, to accurately diagnose birth defects prenatally
- Mayo Clinic's outpatient setting allows for access to the fetal surgery multidisciplinary team including Mayo Children's Center NICU Follow-up Clinic and the spina bifida clinic
- Mayo Clinic coordinates with the patient's referring physician to provide education and a follow-up care plan after all treatment is completed
- Mayo Clinic offers a dedicated multidisciplinary team of experts in different aspects of fetal and maternal conditions

## REFER A PATIENT

Use our referring provider portal to submit referral requests and view your patients' Mayo Clinic medical records at the same time we do. Contact Mayo Clinic in Rochester, Minnesota at 800-533-1564 or [mayoclinic.org/medical-professionals](https://www.mayoclinic.org/medical-professionals) or call the fetal nurse coordinator line at 507-422-6703, 8 a.m. to 5 p.m. Central time, Monday through Friday.

## APPOINTMENT SCHEDULING AND FOLLOW-UP COMMUNICATION

We work directly with patients to schedule their appointments, and then coordinate with their referring physician for follow-up regarding outcomes of their visit.

## INSURANCE

Mayo Clinic has agreements with many insurance carriers, third-party administrators and employers. Patients should check with their insurance plan for specific coverage details before confirming an appointment with our scheduling office.

[mayoclinic.org/insurance](https://www.mayoclinic.org/insurance)

## CONTINUOUS PROFESSIONAL DEVELOPMENT

Mayo Clinic School of Continuous Professional Development offers a unique learning experience for today's health care professional. Educational activities enhance and enrich your medical knowledge and improve your service to the patient. [ce.mayo.edu](https://ce.mayo.edu)

## CLINICAL TRIALS

Research is an integral part of Mayo Clinic. Mayo Clinic physicians are actively engaged in a wide range of novel clinical research, offering patients promising experimental agents and devices. Mayo Clinic investigators work together with you to optimize patient care. [www.mayo.edu/research/clinical-trials](https://www.mayo.edu/research/clinical-trials)

## MAYO CLINIC LABORATORIES

Mayo Clinic Laboratories (MCL) is the global reference laboratory of Mayo Clinic.

MCL provides highly specialized testing and pathology consultation across all medical sub-specialties for patients around the world. [mayocliniclabs.com](https://www.mayocliniclabs.com)



## REFER A PATIENT

### **Rochester, Minnesota**

Fetal Nurse Coordinator  
507-422-6703

8 a.m.-5 p.m Central time  
Monday through Friday

For other specialty referrals:  
800-533-1564

Use our referring provider portal to submit referral requests and view your patients' Mayo Clinic medical records at the same time we do.

In addition, access to resources including clinical trials, CME, Grand Rounds, and scientific articles and videos are available.



Learn more online at [mayoclinic.org/medical-professionals](https://www.mayoclinic.org/medical-professionals)

[mayoclinic.org](https://www.mayoclinic.org)

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