Editorial

Fetoscopic Surgery: The Frontier of Maternal–Fetal Medicine in Indonesia

Muhammad Alamsyah Aziz

Fetoscopic surgery represents one of the most transformative developments in modern maternal–fetal medicine. By allowing direct visualization and minimally invasive access to the intrauterine environment, fetoscopy bridges diagnostic precision with therapeutic intervention. Since its early applications in the 1990s, fetoscopic techniques have advanced significantly, improving both perinatal survival and long-term neurodevelopmental outcomes in fetuses affected by otherwise lethal conditions.[1,2] In Indonesia, the expansion of fetoscopic procedures marks a turning point in high-risk obstetric care, aligning with the global movement toward fetal precision medicine.[3,4]

Fetoscopy utilizes a minimally invasive endoscopic approach to access the amniotic cavity, enabling direct visualization of the fetus, umbilical cord, and placental surface. Depending on the indication, fetoscopic procedures can be classified as diagnostic or therapeutic, including fetoscopic laser photocoagulation for Twin-to-Twin Transfusion Syndrome (TTTS), fetoscopic tracheal occlusion for congenital diaphragmatic hernia (CDH), and fetoscopic repair of spina bifida.[5]

Fetoscopic surgery is performed under regional or general anesthesia, guided by ultrasound to identify placental location, cord insertion, and optimal entry points. A small trocar (2–4 mm) is inserted percutaneously into the recipient twin's amniotic sac, allowing introduction of a fetoscope equipped with fiber-optic illumination. The surgeon maps the vascular equator of the placenta and identifies arterio-venous, veno-venous, and arterio-arterial anastomoses. Laser photocoagulation is performed using selective or Solomon techniques to ablate abnormal vessels[6], followed by amniotic decompression to restore uterine tone. Postoperatively, patients are monitored for contractions, bleeding, or membrane rupture.

Fetoscopic laser therapy has revolutionized TTTS management. The randomized trial demonstrated improved survival and reduced neurological morbidity compared to amnioreduction. [2] Meta-analyses confirm survival of at least one twin in 80–90% of cases and dual survival rates of 60–70%.[6,7] Emerging fetoscopic techniques such as tracheal occlusion for CDH and neural tube repair continue to expand the field.[5]

Fetoscopic interventions require multidisciplinary expertise and careful ethical deliberation. They balance maternal safety against fetal benefit under the principles of autonomy, beneficence, non-maleficence, and justice.[8,9] Challenges include informed consent, equitable access, training, and cost. A structured national fellowship and standardized credentialing for fetal therapy are essential.[3,4]

Indonesia stands at the threshold of developing national fetal surgery capability. Centers such as RSUP Dr. Hasan Sadikin Bandung, Dr. Cipto Mangukusumo General Hospital Jakarta, RSAB Harapan Kita Jakarta, Dr. Soetomo General Hospital Surabaya, Dr. H. Adam Malik General Hospital, Medan, Dr. Sardjito General Hospital, Yogyakarta, Dr. M. Djamil General Hospital, Padang, Dr. M. Hoesin Genera; Hospital, Palembang, and Prof. dr. I.G.N.G. Ngoerah General Hospital, Bali are ready to pioneer this field. A National Fetoscopy Network could harmonize protocols, data registries, and referral systems, while partnerships with international centers will accelerate expertise development.

Fetoscopic surgery embodies the fusion of technology, ethics, and compassion. By treating the fetus as a patient within the womb, it redefines obstetric care and symbolizes Indonesia's commitment to advancing maternal–fetal health.

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