



**For information
on 29.6.2023**

HAB-P337

Hospital Authority

Cluster Presentation Programme – New Territories East Cluster Advances in Fetal Therapy

Purpose

Members are invited to note for information the advances in fetal therapy for managing fetal abnormalities in-utero fostered by a dedicated Fetal Medicine Team (FMT) in the New Territories East Cluster (NTEC) of the Hospital Authority (HA).

Background

2. Fetal therapy aims to correct or treat unusual conditions of fetuses by means of medication or surgical intervention. While fetal medication can be administered through the mothers, there are circumstances where surgical intervention may achieve better clinical outcomes. Nevertheless, as fetuses are fragile and delicate, surgical procedures performed on a developing fetus in the womb is a highly complex and challenging operative procedure.

3. The FMT of the Department of Obstetrics and Gynaecology at the Prince of Wales Hospital (PWH), comprising multi-disciplinary team of healthcare and administrative staff, was established in 1996, and is the first team to introduce fetoscopic surgery in Hong Kong. The FMT is not only the pioneer in introducing various innovative fetal surgeries to Hong Kong, but also a team which spares no effort to acquire the highest capacity to offer the most comprehensive management options for fetal abnormalities. Since its establishment, the FMT has been at the forefront of fetal treatment and research. It has performed over 750 complex fetal surgeries since 2010 to save many fetal lives, such as fetoscopic laser photocoagulation for twin-to-twin transfusion syndrome, in-utero transfusion for fetal anaemia, insertion of pleuro-amniotic shunt for hydrothorax, fetoscopic endotracheal occlusion for severe congenital diaphragmatic hernia, and fetoscopic repair of neural tube defect. The success rates of these interventions are comparable to those of other leading fetal surgery centres around the world.

Dedicated Services by NTEC FMT

4. The FMT has demonstrated excellence in the following key areas:

Professional Service

5. With the extensive experience in fetal therapy, the FMT is trusted by many public and private obstetricians, and frequently receives referrals for many complex and rare fetal conditions. For instance, the most common and well-recognised fetal operation, fetoscopic laser photocoagulation for twin pregnancies suffering from Twin-Twin Transfusion Syndrome, was introduced in 2002. A tiny telescope is utilised to identify all the abnormally connected placental blood vessels between the two fetuses, followed by photocoagulating them by laser. Till now, the FMT has performed over 200 laser surgeries, saving over 80% of fetuses on the verge of death.

6. The FMT is also the only team in Hong Kong providing service for some complicated surgeries such as the Fetoscopic EndoTracheal Occlusion surgery for severe congenital diaphragmatic hernia (CDH), which is a defect in the diaphragm of the fetus leading to compression of the lungs by the up-going abdominal organs and thus the early death of the newborn baby due to respiratory failure. As clinical evidence showed that the survival of severe CDH fetuses is improved by placing a balloon to occlude the fetal trachea to promote lung growth, the FMT acquired this challenging skill in 2013 and performed the surgery on several fetuses. Although the initial results were not promising and the neonatal mortality remained high, the FMT continued its dedicated effort as this is the only feasible treatment for this condition. In 2019, the first survivor of this operation was born from a 40 years-old primiparous mother who previously had repeated miscarriages.

7. The FMT is also performing innovative treatments for some critical or lethal fetal conditions. In 2020, the FMT successfully treated a fetus suffering from large bronchopulmonary sequestration (BPS), which is a large abnormal lung mass that can lead to the death of the fetus in utero, through radiofrequency ablation (RFA) of the feeding vessel. As a challenging fetal therapy, RFA was reported only once in the literature but significant adverse outcomes were presented in the fetus. However, the FMT had modified the RFA technique to ablate the feeding vessel precisely. For this particular case, the lung mass diameter was reduced by 70% without any complication, and the baby was delivered at term with a good neonatal outcome.

8. Apart from surgeries, the FMT also introduced novel medical treatment for certain conditions. For example, the FMT identified a just-published paper suggesting the efficacy of an antiviral drug which had never been used in our locality for treating fetus with congenital Cytomegalovirus infection. Despite the infection was considered an untreatable condition in the past, the FMT overcame the challenges and provided timely treatment for a fetus suffered for congenital Cytomegalovirus infection, and the baby was finally born without sequelae.

People-Centred Care

9. Although the FMT strives hard to treat fetuses with congenital defects, there are situations where the problem is insurmountable and termination of pregnancy is unavoidable. While respecting the parents' decision and understanding that this is the hardest decision to be made in life, FMT endeavours to offer multidisciplinary care to the concerned parents to address their psychological needs, such as medical counseling by

doctors and bereavement counseling by midwives, aiming to support the mothers and their family to walk through the heart-breaking moments and preventing them from falling into the haze of depression. With words of comfort and warmth, the FMT has once supported a couple who decided to terminate pregnancy because their baby suffered from a serious congenital heart disease. Throughout the painful and harrowing journey, the FMT provided detailed explanation of the situation and answered questions from the couple patiently. The couple was particular grateful to the midwives for not only cleansing their baby carefully, but also dressing up her baby and preparing the baby's handprints and footprints for the parents. The people-centred support offered by the FMT gave the couple a feeling that their baby was being loved and respected, which helped them recover from the loss.

Teamwork, Knowledge Transfer and Research

10. Intrauterine surgery is a major operation and a life-and-death issue for a tiny fetus. As the procedure is technically demanding and requires close cooperation within the team, the operating team would discuss the operative plan in great details before each surgery. Intraoperatively, every member, be it the chief surgeon or the supporting colleagues, has a specific role to ensure the whole operation runs smoothly. Given that emergency often occurs at unpredictable hours, the FMT is committed to supporting the urgent needs of patients, even during non-standard hours. There were episodes whereby the FMT had to carry out an emergency intrauterine blood transfusion to save a dying fetus at late night and insert a pleuro-amniotic shunt for a fetus with hydrothorax during Lunar New Year. Members of the team are always willing to make an all-out effort in fighting for the life of the unborn fetuses.

11. To formulate the best treatment for every case and provide a platform for passing on knowledge to young doctors, weekly team meetings are held for discussions of cases in detail and exchange of views between clinical professionals. Furthermore, doctors of FMT spent extra efforts to perform clinical research and published their work, and obtained outstanding academic achievements. Local and international conferences and workshops conveyed by the FMT (e.g. Asia Pacific Congress in Maternal Fetal Medicine, Asia Pacific Conference on Fetal Therapy, Chinese University of Hong Kong – Hong Kong Hub of Paediatric Excellence Seminar series, Baylor College of Medicine – Chinese University of Hong Kong – National University of Singapore Joint Symposium in Clinical Genetics etc) gathered international renowned experts in fetal medicine and fetal therapy every year for knowledge exchange and experience sharing. All these have contributed greatly to the development of the field locally and internationally. Even during the time of the COVID-19 pandemic, the FMT persistently held a wide range of local and international webinars, which benefited a lot of midwives, obstetric trainees, specialists, and fetal medicine subspecialists.

12. The FMT also tried its best to overcome obstacles in developing new fetal therapies through collaboration with different medical teams, and has recently performed an investigational in-utero blood and stem-cell transfusion for treating fetuses with hemoglobin Barts disease, which is formerly labeled as a lethal condition. So far, two babies who received the prenatal treatment were delivered with good neonatal outcome and the FMT is continuing to recruit cases in Hong Kong to prove its effectiveness.

13. The FMT demonstrates that trust and tacit understanding are the fundamental factors for every successful surgery, and has been awarded the Outstanding Team Award of HA in 2020. Despite the heavy workload, the team spirit is always high and team members enjoy mutual respect and trust, cultivating a great sense of belonging.

Key Success Factors

14. Advanced fetal therapy involves the use of specialised techniques to diagnose and treat fetal abnormalities in utero, which is a rapidly evolving field with a growing body of research and clinical experience. It is essential for healthcare providers to keep abreast of the latest guidelines and advancements in the field so that the highest level of care could be provided and the best possible outcomes for both the mothers and the fetuses could be achieved. In addition, based on the vast experience of FMT, other key factors leading to the successful fetal therapy in NTEC are highlighted below:

- (a) A multidisciplinary approach through which experts including paediatric surgeons, anesthesiologists, and neonatologists collaborate to provide the best possible care for patients in need of fetal surgery and ensure that all aspects of the mother and fetus's care are adequately addressed;
- (b) Careful selection of patients and comprehensive prenatal diagnosis, including advanced imaging techniques to determine the severity of the fetal condition and the potential benefits of intervention, as well as the provision of counseling to expectant parents regarding the risks and benefits of the procedure and the potential long-term outcomes for the fetus;
- (c) Informed consent from parents and compliance to ethical guidelines to ensure that decisions are made in the best interests of both the mothers and the fetuses;
- (d) Apart from staying up-to-date with the latest advancements in the field to enhance the safety and efficacy of fetal interventions, adequate training and education are equally important to strengthen the technical skills of healthcare providers and their ability to provide comprehensive counseling and support to expectant parents; and
- (e) High-quality research to establish the long-term safety and efficacy of fetal interventions. The data collection process and collaboration among medical centers can help improve the understanding of the best practices for advanced fetal therapies.

Way Forward

15. Looking forward, the FMT is determined to meet and overcome every challenge ahead, bringing hope and comfort to the parents and their fetuses. The FMT will continue to embrace successes with a humble heart, face failures with courage, and persevere in times of difficulty. In view of the anticipated increase in service demand and the potential

healthcare collaboration with cities in other Guangdong-Hong Kong-Macao Greater Bay Area, the FMT at PWH, serving as the pioneer and major unit in providing fetal therapies for patients in Hong Kong, would render support to the development of a specialised Fetal Medicine Centre in NTEC to provide timely and advanced fetal therapies to our patients.

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