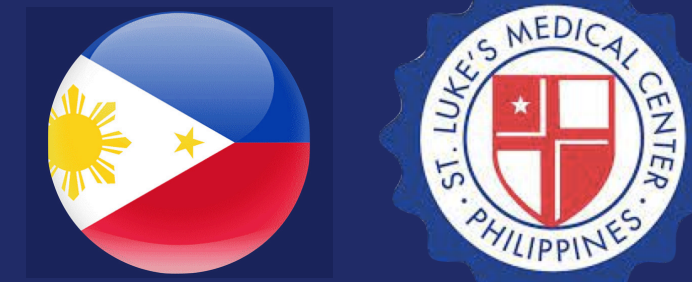




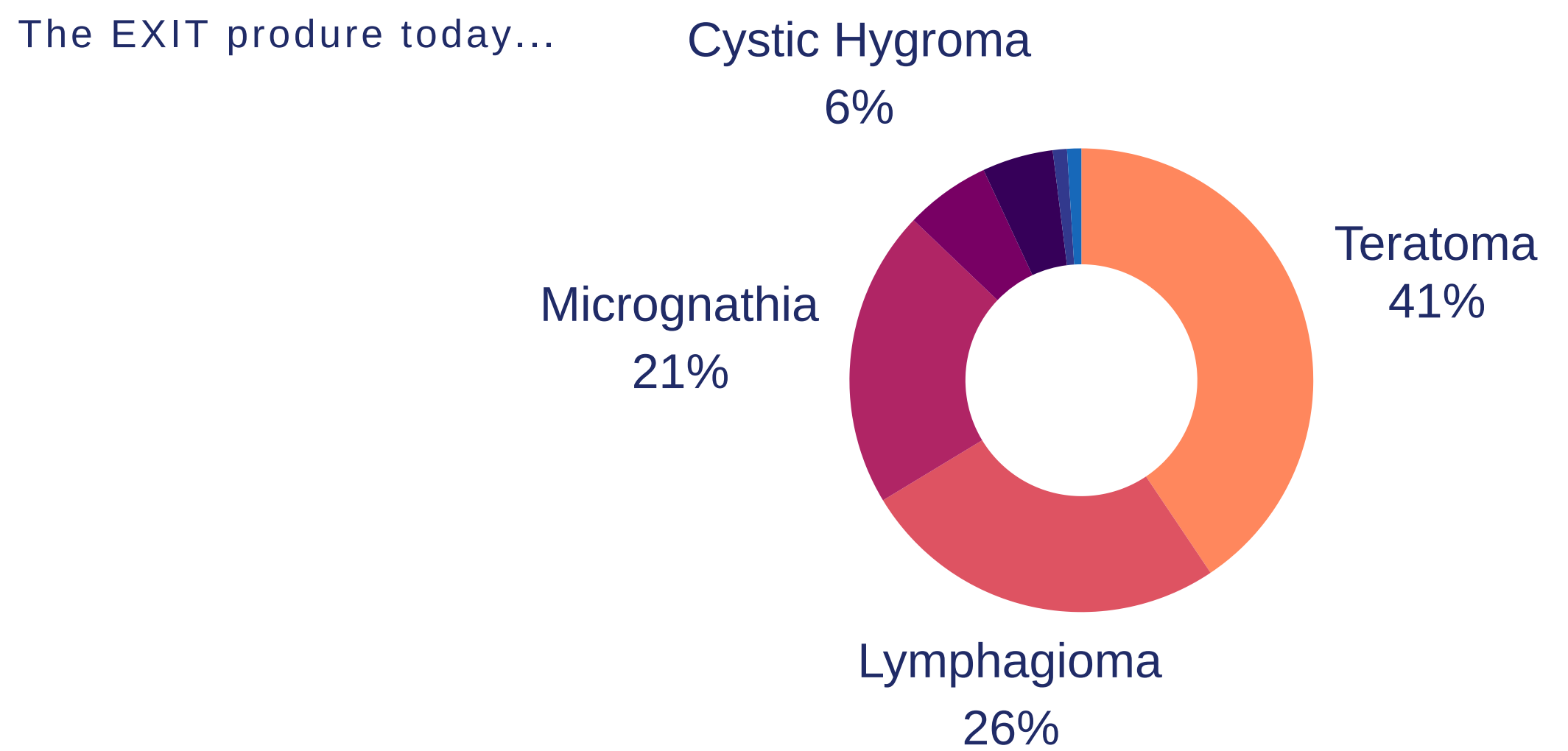
A BALANCING ACT OF SURVIVAL

A Case Report on the Anesthetic Management of an Ex Utero Intrapartum Procedure

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The Ex Utero Intrapartum Treatment (EXIT) procedure's inception was in 1989 when it was first performed in a case of cervical teratoma. Since then, this special procedure has evolved into what it is today.



The EXIT procedure is implemented to increase the rate of fetal survival while stabilizing cardiopulmonary function.

Overall **fetal survival rate** of **83%**
Overall rate of **adverse maternal events** is only **9.4%**

This case report describes the anesthetic management of an EXIT procedure conducted in a patient with threatened preterm labor of a fetus with a cervical teratoma.

CASE DESCRIPTION

29 year old **primigravid** in threatened **preterm labor**
30 week old **fetus** with a **cervical teratoma**
(12.1 x 9.5 x 7.3 cm)



At 30 5/7 weeks age of gestation, the patient went into preterm labor thus requiring emergency cesarean section delivery.

At 31 weeks, a multidisciplinary team which included an obstetrician, a neonatologist, a pediatric otorhinolaryngologist, a pediatric surgeon, two anesthesiologists, and two pediatric anesthesiologists performed the EXIT procedure.

A double set-up was prepared at the OR. At induction, rapid tracheal intubation was done.



Maintenance of anesthesia was done with sevoflurane. Adequate uterine relaxation was achieved with sevoflurane and an isoxsuprine infusion. Maternal hemodynamics were maintained with phenylephrine, norepinephrine and fluid resuscitation.

Skin incision to partial delivery of the fetus required 15 minutes. The fetal head and upper torso up to the clavicle were partially delivered. A sterile pulse oximeter was applied to the fetus' exposed hand. Intubation was attempted on the infant multiple times by the pediatric neonatologist and the pediatric otolaryngologist via a direct laryngoscopy and video laryngoscopy, respectively. Fetal intubation attempts were unsuccessful in the first attempts due to the large size and anterior location of the teratoma, as well as significant tracheal obstruction. Tracheostomy was attempted, but was unsuccessful; this was attributed to the large mass size.

Due to concerns regarding maternal blood loss and hemodynamic stability, the umbilical cord was clamped and the neonate was fully delivered. The time between uterotomy and cord clamp was about 36 minutes.

The neonate was brought to the prepared radiant warmer and intravenous access was obtained. Manual bag-mask ventilation was done. Neonatal resuscitation was done with high quality CPR and epinephrine administration.

Endotracheal intubation (2.5 uncuffed) was successfully attempted by the pediatric anesthesiologist using direct laryngoscopy. Chest rise was present. Bilateral breath sounds heard upon auscultation. However, no pulse was appreciated. The neonate was pronounced expired after 15 attempts at resuscitation.



DISCUSSION

Maternal Considerations



- Anesthetic drugs and techniques selected must have a good record of safety.
- GETA was chosen to lessen maternal anxiety and for better hemodynamic control
 - All drugs used have dose dependent fetal effects. Therefore timely administration is key.

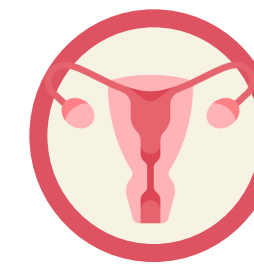


Maternal blood pressure is a primary determinant of uterine blood flow and should be meticulously preserved.

- Tocolytics, pressors and anesthetic drugs with rapid titratability were utilized.
- An arterial was inserted for close monitoring

Profound uterine relaxation

is mandatory to prevent uterine contractions and placental separation.



- Finally, uterine atony and bleeding must be prevented.
- Shifting from the use of sevoflurane to TIVA with propofol was done

The ***EXIT Procedure*** is distinct in its anesthetic management as it must involve careful planning not only from the maternal but the fetal perspective.

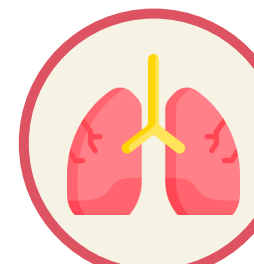
Pediatric Considerations



- Adequate analgesia and anesthesia should be provided to the fetus.
- Anesthesia is required to blunt the stress response in the fetus.
 - In this case, as in most EXIT procedures, maternal general anesthesia ensured placental passage of inhalant anesthetics.



- Fetal hemodynamics were meticulously maintained.
- During the EXIT procedure, the fetus depends wholly on uteroplacental support.
 - Therefore, ensuring full uterine relaxation is essential because changes in placental vascular tone significantly affect fetal cardiac output.
 - The goal of the team was to avoid fetal hypotension by avoiding maternal hypotension, which was the reason for the strict blood pressure control.



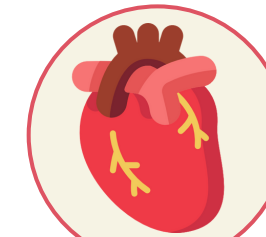
- Fetal airway management should be properly prepared for and discussed in advance by the team.
- Prior to the EXIT procedure, the team held a pre-operative family conference where the airway management plan was ironed out.

The **challenge** was the balancing act of quickly carrying out fetal intervention while maintaining stable maternal hemodynamics.

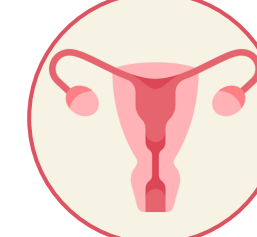
CONCLUSION



Maintaining adequate uteroplacental circulation is a vital cornerstone of management for both mother and fetus.



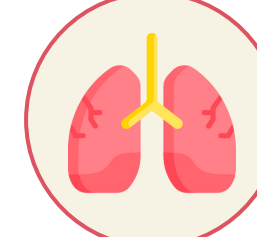
Maintenance of hemodynamics



Timely uterine relaxation



Safety of Anesthetics



Preparation for Fetal Airway Management

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