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RUNNING TITLE: Precipitous birth not occurring on a labor and delivery unit

ABSTRACT

Each year, hundreds of deliveries all over Europe occur precipitously outside of the hospital setting. We report our experience concerning two labors and deliveries resulted in good outcomes in an helicopter. Between February and November 2020, two infants were born during helicopters flights with the assistance of physician and nurse.

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Background

The term precipitate or precipitous labor has been defined as a labor that lasts no more than three hours from onset of regular contractions to delivery [1]. Precipitous delivery is generally thought to result from abnormally low resistance of the birth canal, abnormally strong uterine contractions, lack of awareness of painful contractions, or some combination of these [2]. The major risk factors for precipitous birth appear to be placental abruption, multiparity and very small infant size. Assisting women during an imminent delivery of a fetus for health care providers who don't perform obstetric deliveries as part of their usual practice (eg. Anesthesiologist) in an unusual delivery could be well done even on helicopter.

HEMS (Helicopter Emergency Medical Service) has become an important mode of modern transport for ill patients. Sicily has a population of 5.100.904 inhabitants. In addition to regular ambulance service, our isle is covered by six physician staffed HEMS [3]. Every year in Western Sicily more than 200 critically ill patients are transferred by our three helicopters. This number usually includes patients with respiratory distress, heart or brain diseases, traumatic illness et cetera. Over the past 10 year we reported an high incidence of migrants arrived in Lampedusa; some of them are patients requiring hospitalization who are transported exclusively by the 118 Helicopter Emergency Medical Service in 6 Sicilian hospitals.The mean age is 25 years; more frequent areas of provenance are Horn of Africa, North Africa, Syria, and Nigeria. Women are hospitalised almost exclusively for obstetric-gynaecological problems, with a high prevalence of abortions secondary to the long journey; men are hospitalised especially for bone fractures, burns, dehydration, infectious diseases, suicide attempts, and, recently, for CO poisoning of people locked in the holds of boats [4].

Air travel is currently considered safe up to 36 weeks of gestation for singleton pregnancies and up to 32 weeks of gestation for multiple pregnancies. The risk of delivery complications for the mother and infant is almost double when infants are born out of hospital [5].

Case Reports

We report the cases of two young migrant women (25 and 27 years old), who were transported by HEMS from Lampedusa to Palermo because pregnant. Their gestational age at delivery was 37 and 38 weeks. A delivery before 37 weeks of gestation is considered preterm; these newborns are at increased risk of morbidity, particularly respiratory problems and difficulty maintaining their temperature. Before the helicopter take-off they looked like to be quite fine. Blood pressure, heart rate and oxygen saturation were checked and normal. During the flight both women went into labor and assisted to rupture of amniotic membranes. A large intravenous catheter (14 gauge) into an arm vein of both patients was inserted.

This picture was taken after the landing of the helicopter in the Palermo HEMS Base

A pelvic examination was performed to determine the presenting part and whether delivery was imminent (cervix dilatation: 4 and 5 cm) in both cases. Both women were voluntarily pushing with their contractions and the fetus were beginning to emerge from the vagina. So it was clear that they were more likely to be in the second stage of labor and about to deliver. The median second stage of labor (time from full cervical dilation to delivery) is approximately 30 minutes in nulliparous women (no previous birth) and 12 minutes in multiparous women (one or more previous births). Contractions were more than two minutes apart for both women. The mothers were placed for delivery: in a semi-sitting position, with hips flexed and abducted, and knees flexed. Clean absorbent materials were placed under the mothers to collect blood and body fluids eliminated during the birth process. To make easier the delivery of the baby, pillows were placed under the mother's hips and back to raise the perineum above the surface of the stretcher. This provides additional room to maneuver when guiding the infant posteriorly to ease his/her shoulder under the symphysis pubis. We tried to give instructions to the mothers: before the fetus was visible at the "introitus", the mother wanted to bear down and push according to her own reflex needs in response to the pain of contractions and the pressure felt from descent of the fetal head. We asked her to pant through the peak of contractions and try to rest and breathe normally between them. This helped to keep them from bearing down and delivering before additional help was available [6]. The goal was to control fetal expulsion. We asked them to make only modest expulsive efforts in an attempt to achieve a controlled delivery (ie, gradual expulsion of the fetus). Delivery were complete in a few minutes, without maternal or fetal trauma. As soon as possible we placed the babies on the mother's chest (skin to skin) where they could cradle them and keep them warm. Maintaining body heat is an important initial step in caring for the newborn because hypothermia in the immediate newborn period increases oxygen consumption and metabolic demands and is independently associated with increased mortality.

If skin-to skin contact with the mother is not possible, additional ways to keep the infant warm after drying include swaddling in warm towels/blankets, performing skin-to-skin contact with a support person, placing in a warm (36.5ºC) isolette, raising the environmental (room) temperature, and providing clothing. Apgar scores were recorded at one and five minutes after birth. The Apgar score assesses neonatal heart rate, respiratory effort, muscle tone, reflex irritability, and color. Up to two points are assigned for each variable. Our neonates had both Apgar scores of 10 and consequently didn't require any special intervention. We doubly clamped the cord a couple of minutes after delivery, approximately four inches from the baby, and cut the cord between the clamps with scissors. There is no urgency to clamping the umbilical cord and it should not be clamped for a minimum of 30 to 60 seconds after birth to facilitate the fetal to neonatal transition

and increase infant iron stores. Placental separation occurred naturally, within five minutes of the expulsion of the infants. After placental expulsion, oxytocin was administered to stimulate the uterus to contract and remain contracted in one of the patients. Oxytocin was infused (eg, 20 units in 500 mL crystalloid over one hour) into a maternal vein. Episiotomy was not necessary. The delivery assistance was provided during in-flight births by a physician and a nurse. The following supplies made up our delivery kit:

1. Antibacterial cleansers to wash your hands and the mother’s perineum
2. Gauze sponges
3. Sterile gloves and gowns
4. Clean cloth or gauze sponges to wipe infant’s nose and mouth
5. Two sterile clamps to clamp the umbilical cord
6. Sterile scissors or knife to cut the umbilical cord between the clamps
7. A red-top tube to collect fetal blood from the placental end of the cut umbilical cord
8. Clean towels, sheets, and/or blankets to dry and swaddle the infant
9. Blankets to keep the mother warm
10. Suitable containers for the placenta and wet, bloody clothing and sheets
11. A diaper

In addition, appropriate equipment for neonatal resuscitation (eg, suction device, newborn-sized endotracheal tubes, and intubation blades) was available.

Technical features

Classification:UNCLASSIFIED

AW139 – Emergency Medical Services (EMS)

For Emergency Medical Services (EMS) operations, speed of response is paramount! The ability to react, locate and respond to an emergency with the right resources can be the difference between life and death. Today's missions require the helicopter to be more than a means of transporting patients from the incident site to the hospital. Indeed, they must act as 'flying hospitals', equipped to deliver life-saving care by bringing the doctor to the patient.

Our Leonardo's helicopters AW139, are ideally suited to the demands of primary and secondary missions, with a spacious and versatile cabin essential to allow efficient patient care.

They're designed around patient needs and equipped with spacious cabins. AW139 can carry up to 3 medical passengers and 2 patients in a spacious cabin, all with the best power reserve of any helicopter in its class.

The AW 139 flies at an altitude up to 10.000 feet (3000 m), cruising at a speed close to 145 kts (270 km/hr) with a maximum range of 3 hours (5:13 min with auxiliary tank), makes it possible to depart from Lampedusa and land at the Civico Hospital in Palermo (163 nm/302 km) in one hour and 15 minutes.

Conclusions

Very few researches exist investigating in-flight emergencies births. We report our experience concerning two labors and deliveries resulted in good outcomes in an unusual delivery site like helicopter. In-flight emergency births are infrequent but not trivial. Helicopter medical staff includes a physician and a nurse who are trained to help with in-flight deliveries and have on-board medical and first aid kits adequate for in-flight deliveries.

The Commander Maurizio Lebet might be acknowledged, because of his technical help.

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