Complications of ET tube placement include mucosal trauma causing bleeding, oropharyngeal or tracheal perforation, esophageal intubation with subsequent persistent hypoxia, and right mainstem intubation that can lead to atelectasis, persistent hypoxia, and pneumothorax. You can minimize these risks by ensuring optimal placement of the laryngoscope blade and carefully noting how far the ET tube is advanced.

Once positive-pressure ventilation or supplemental oxygen administration begins, the paramedic should reassess the patient by evaluating heart rate, respiratory rate, and oxygenation. Oxygenation is best determined by a pulse oximeter rather than simple assessment of colour, because colour is too subjective.

Gastric Decompression

Gastric decompression using an orogastric tube is indicated for prolonged bag-valve-mask ventilation (more than 5 to 10 minutes), if abdominal distension is impeding ventilation, or in the presence of diaphragmatic hernia. Many diaphragmatic hernias are diagnosed prenatally by routine ultrasound; they are suspected clinically if there are decreased breath sounds (90% of diaphragmatic hernias are on the left), a scaphoid or concave abdomen (many of the abdominal contents are in the chest), and increased work of breathing. Skill Drill 40-2 shows gastric decompression in a neonate.

1. To determine the length of tube to insert, use an 8F feeding tube and measure the length from the bottom of the earlobe to the tip of the nose to halfway between the xiphoid process (lower tip of sternum) and the umbilicus (Step 1).
2. Insert the tube through the mouth (Step 2).
3. Attach a 20-gauge syringe and suction the stomach contents (Step 3). Tape the tube to the baby's cheek. Remove the syringe from the feeding tube, leave open to free drainage, to allow venting of air from the stomach, and intermittently suction the feeding tube.

Chest Compressions

Chest compressions are indicated if the pulse rate remains less than 60 beats/min despite positioning, clearing the airway, drying and stimulation, and 30 seconds of effective PPV. Two techniques are used, depending on the number of rescuers available Figure 40-9. With the thumb (two-rescuer) technique, two thumbs are placed side by side over the sternum just below the nipples, and the hands encircle the torso. With the two-finger (one-rescuer) technique, the tips of the index and middle fingers are placed over the sternum just below the nipples and the sternum is compressed between the fingers.

The depth of compression is one third of the anteroposterior diameter of the chest. Your fingers should remain in contact with the chest at all times. In neonates, the chest compressions occur in synchrony with artificial ventilation, which you continue during chest compressions. The person delivering the chest compression counts out loud, "One and two and three and breath and. . . ." Downward strokes of chest compressions should be delivered while saying, "One and two and three." Release of the strokes should occur while saying "and." The person ventilating delivers a breath during the sequence "breath and." This results in 90 compressions and 30 breaths/min. Pulse rate is assessed at 30-second intervals, and chest compressions stop when the pulse rate is greater than 60 beats/min. Liver laceration and rib fractures are possible risks of delivering chest compressions. Refer to Appendix A for coverage of infant CPR.

Venous Access

Emergent access becomes necessary when fluid administration is needed to support circulation, when resuscitation medications (eg, epinephrine) must be administered IV, and when therapeutic drugs (eg, IV dextrose, antibiotics) must be given IV. Establishing peripheral access in an infant can prove difficult, however.

The umbilical vein can be cannulated using an umbilical vein line in a newborn using the following steps:

1. Clean the cord with alcohol or another antiseptic. Place a sterile tie firmly, but not too tightly, around the base of the cord to control bleeding. Place a sterile drape over the site. Although the line must be placed quickly in a code situation, maintain sterile technique as much as possible.
2. Prefill a sterile 3.5F or 5F umbilical vein line cannula (a comparable-size sterile feeding tube can be used in an emergency) with normal saline using a 3-ml syringe, and three-way stopcock.
3. Cut the cord with a scalpel below the clamp placed on the cord at birth about 1 to 2 cm from the skin (between the clamp and the cord tie).
4. The umbilical vein is a large, thin-walled vessel usually found at the 12 o'clock position, as compared to the two thick-walled umbilical arteries usually found at 4 and 8 o'clock Figure 40-10. Insert the cannula into this vein for a distance of 2 to 4 cm (less in preterm infants) until blood can be aspirated. If the cannula is advanced into the liver, the infusion of hypertonic solutions may lead to irreversible damage Figure 40-11. If the cannula is advanced into the heart, arrhythmias may develop.
5. Flush the cannula with 2.0 ml of normal saline and tape it in place.

Pharmacologic Interventions

Medications are rarely needed in neonatal resuscitation, as most infants can be resuscitated with ventilatory support. Medications in neonates are based on weight, so you may need to estimate the infant's weight for dosing. A full-term infant usually weighs 3 to 4 kg; an infant born at 28 weeks of gestation, on average, weighs 1 kg.

Epinephrine

Administration of epinephrine is indicated when the infant has a pulse rate of less than 60 beats/min after 30 seconds of effective ventilation and 30 seconds of chest compressions. The recommended concentration for newborns is 1:10,000. The recommended dose is 0.1 to 0.3 ml/kg of 1:10,000 epinephrine IV, equal to 0.01 to 0.03 mg/kg, administered rapidly, followed by a 0.5- to 1-ml normal saline flush to clear the line. If IV access is not yet established, use the higher dose of 0.3 up to 1 ml/kg of 1:10,000 epinephrine given via the ET tube. Dosing may be repeated every 3 to 5 minutes in case of persistent bradycardia.