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Part 7: Neonatal resuscitation 2015 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science with Treatment Recommendations☆,☆☆

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Introduction

Newborn transition

The transition from intrauterine to extrauterine life that occurs at the time of birth requires timely anatomic and physiologic adjustments to achieve the conversion from placental gas exchange to pulmonary respiration. This transition is brought about by initiation of air breathing and cessation of the placental circulation. Air breathing initiates marked relaxation of pulmonary vascular resistance, with considerable increase in pulmonary blood flow and increased return of now-well-oxygenated blood to the left atrium and left ventricle, as well as increased left ventricular output. Removal of the low-resistance placental circuit will increase systemic vascular resistance and blood pressure and reduce right-to-left shunting across the ductus arteriosus. The systemic organs must equally and quickly adjust to the dramatic increase in blood pressure and oxygen exposure. Similarly, intrauterine thermostability must be replaced by neonatal thermoregulation with its inherent increase in oxygen consumption.

Approximately 85% of babies born at term will initiate spontaneous respirations within 10–30 s of birth, an additional 10% will respond during drying and stimulation, approximately 3% will initiate respirations after positive-pressure ventilation (PPV), 2% will be intubated to support respiratory function, and 0.1% will require chest compressions and/or epinephrine to achieve this transition.[1–3] Although the vast majority of newborn infants do not require intervention to make these transitional changes, the large number of births worldwide means that many infants require some assistance to achieve cardiorespiratory stability each year.

Newly born infants who are breathing or crying and have good tone immediately after birth must be dried and kept warm so as to avoid hypothermia. These actions can be provided with the baby lying on the mother's chest and should not require separation of mother and baby. This does not preclude the need for clinical assessment of the baby. For the approximately 5% of newly born infants who do not initiate respiratory effort after stimulation by drying, and providing warmth to avoid hypothermia, 1 or more of the following actions should be undertaken: providing effective ventilation with a face mask or endotracheal intubation, and administration of chest compressions with or without intravenous medications or volume expansion for those with a persistent heart

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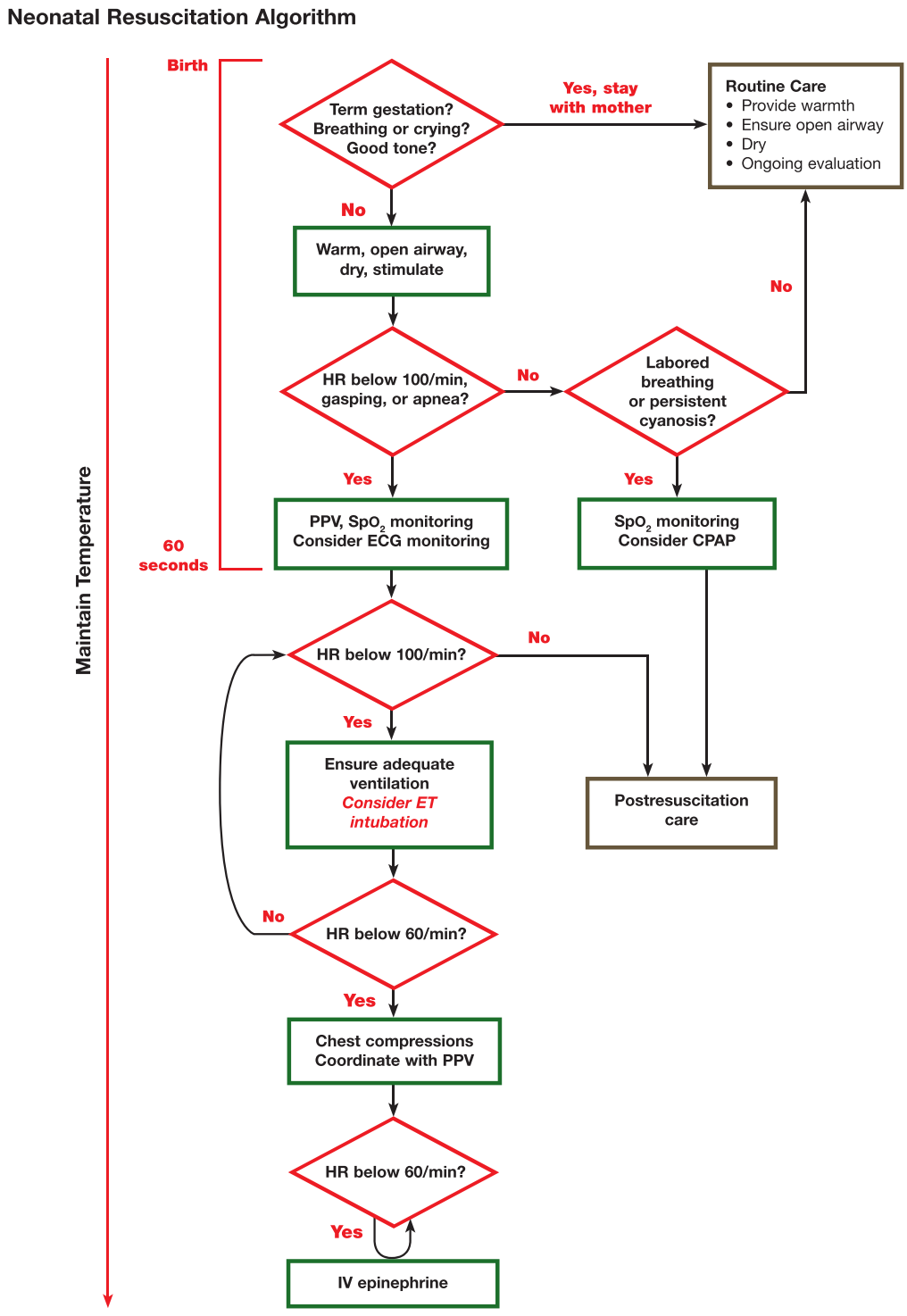

Fig. 1.

rate less than 60/min or asystole, despite strategies to achieve effective ventilation (Fig. 1).

The 2 vital signs that are used to identify the need for an intervention as well as to assess the response to interventions are heart rate and respirations. Progression down the algorithm should proceed only after successful completion of each step, the most critical being effective ventilation. A period of only approximately 60 s after birth is allotted to complete each of the first 2 steps, i.e., determination of heart rate and institution of effective ventilation. Subsequent progression to the next step will depend on the heart rate and respiratory response.

Evidence evaluation

GRADE

The task force performed a detailed systematic review based on the recommendations of the Institute of Medicine of the National Academies[4] and using the methodological approach proposed by the Grading of Recommendations, Assessment, Development and Evaluation (GRADE) Working Group.[5] After identification and prioritization of the questions to be addressed (using the PICO [population, intervention, comparator, outcomes] format),[6] with the assistance of information specialists, a detailed search for relevant