

# SWESEMs utbildningsutskott

Rubrik

## Initialt omhändertagande av det nyfödda barnet

2010-09-15

### **Introduktion**

Specialister i akutsjukvård bör kunna initiera omhändertagandet av patienter i alla åldersgrupper, inklusive nyfödda. Det initiala omhändertagandet av nyfödda barn är en färdighet som även omfattar neonatal hjärt-lungräddning. Algoritmen följer i stort strukturen av Initialt omhändertagande (5) och är förenlig med riktlinjerna från European Resuscitation Council (1), American Heart Association (2), och Swedish Society for Perinatal Medicine (3).

Akutläkaren ska tidigt tillkalla relevant kompetens och arrangera transport av patienten till den relevanta vårdinrättningen.

### **I specialisttentamen**

I specialisttentamen bedöms kompetens i förlossning tillsammans med neonatal resuscitering. Förberedelse av utrustningen ingår i färdigheten Förlossning ([www.swesem.org](http://www.swesem.org)).

## Bedömningar

### **Överblick**

- Säkerhet?
- Livlös (andning, tonus, färg)?

### **Airway & C-spine**

- Skriker barnet? Om inte:

### **Breathing**

- Tillräcklig egenandning<sup>5</sup> efter 30 sekunder? Om inte:
- Fungerande maskventilation? Om inte:

### **Circulation**

- Hjärtfrekvens<sup>8</sup> < 60/min efter 30 sekunder med adekvat ventilation?
- Misstanke om blödning/sepsis hos barnet

### **Reevaluering**

- Hjärtfrekvens
- Effektiv egenandning<sup>5</sup>? Om ja:
- Central cyanos<sup>13</sup>? Om ja:

## Åtgärder

### **Överblick**

- Handskar
- Torka/stimulera barnet<sup>1</sup> och motverka hypotermi<sup>2</sup>

### **Airway & C-spine**

- Lägg på rygg med huvudet i neutralt läge<sup>3</sup>
- Inspektera munhålan. Sug om mekonium OCH livlöst<sup>4</sup>

### **Breathing**

- Ventilera 60/min med mask<sup>6</sup>
- Justera grepp, överväg intubation. **Säkerställ adekvat ventilation innan du fortsätter till Circulation<sup>7</sup>**

### **Circulation**

- Bröstkompressioner<sup>9</sup>
- 3:1 kompressioner:ventilationer, 90:30/min
- Etablera infart via navelven,<sup>10</sup> pvk eller IO nål<sup>11</sup> och ge bolus 10 ml/kg NaCl 0,9%

### **Reevaluering**

- Om HF > 60/min avbryt kompressioner  
Om HF < 60/min Adrenalin<sup>12</sup> 10 ug/kg via navelven / IO nål
- Gör uppehåll i manuell ventilation, monitorera
- Överväg extra syrgas<sup>14</sup>, ytterligare vätskebolus

### **1-Torka barnet**

”Alla nyfödda: • Torka barnet torrt” (3)

“Naked, wet, newborn babies cannot maintain their body temperature in a room that feels comfortably warm for adults. Compromised babies are particularly vulnerable. Exposure of the newborn to cold stress will lower arterial oxygen tension increase metabolic acidosis.” (1)

”Drying the baby usually produces enough stimulation to induce effective respiration. Avoid more vigorous methods of stimulation. If the baby fails to establish spontaneous and effective respirations following a brief period of stimulation, further support will be required.” (1)

### **2-Förebygga hypotermi**

“Hypothermia in the delivery room or immediate newborn period is independently associated with an increase in mortality. Thus, maintaining body heat is the initial step in neonatal resuscitation. Hypothermia in the newborn increases oxygen consumption and metabolic demands, which can impair subsequent resuscitative efforts, especially in the asphyxiated or extremely low birth weight (ELBW) infant. Low birth weight and preterm infants are particularly prone to rapid loss of body heat because of their large body surface area relative to their mass, thin skin, and decreased subcutaneous fat.” (4)

"Naked, wet, newborn babies cannot maintain their body temperature in a room that feels comfortably warm for adults. Compromised babies are particularly vulnerable. Exposure of the newborn to cold stress will lower arterial oxygen tension and increase metabolic acidosis Prevent heat loss by

- protecting the baby from draughts
  - keeping the delivery room warm
  - drying the term baby immediately after delivery. Cover the head and body of the baby, apart from the face, with a warm towel to prevent further heat loss. Alternatively, place the baby skin to skin with the mother and cover both with a towel
  - placing the baby on a warm surface under a preheated radiant warmer if resuscitation is needed."
- (1)

### **3-Nyfödd på ryggen, huvudet i neutralt läge**

” The infant is positioned to open the airway by placing the infant on his/her back on a flat radiant warmer bed with the neck in a neutral to slightly extended position; the neck should not be hyperextended or flexed. The proper position aligns the posterior pharynx, larynx, and trachea, and facilitates air entry. If needed, a rolled blanket or towel may be placed under the infant's shoulder to slightly extend the neck to maintain an open airway.” (4)

"The baby should be on his or her back with the head in a neutral position. A 2-cm thickness of the blanket or towel placed under the baby's shoulder may be helpful in maintaining proper head position. In floppy babies, application of jaw thrust or the use of an appropriately sized oropharyngeal airway may be helpful in opening the airway." (1)

### **4-Sug**

“Suction is needed only if there is particulate matter or blood obstructing the airway. Aggressive pharyngeal suction can delay the onset of spontaneous breathing and cause laryngeal spasm and vagal bradycardia. The presence of thick meconium in a non-vigorous baby is the only indication for considering immediate suction. If suction is required, it is best done under direct vision.

Connect a 12–14 FG suction catheter, or a Yankauer sucker, to a suction source not exceeding –100 mmHg.” (1)

”Livlösa barn med mekonium i luftvägarna rensuges innan ventilation påbörjas. I övrigt är rensugning före ventilation kontraindicerat.” (3)

### **5-Otillräcklig andning**

"Check whether the baby is breathing. If so, evaluate the rate, depth and symmetry of respiration, together with any abnormal breathing pattern such as gasping or grunting." (1)

### **6-Ventilation med mask**

”Apné eller otillräcklig ventilering: Ventilera, 60 andetag / min” (3)

“If the infant remains apneic or gasping . . . start positive-pressure ventilation.” (2)

“In summary, assisted ventilation should be delivered at a rate of 40 to 60 breaths per minute.” (2)

"After initial steps at birth, if respiratory efforts are absent or inadequate, lung aeration is the priority . . . . For the first few breaths maintain the initial inflation pressure for 2 - 3 s. This will help lung expansion. Most babies needing resuscitation at birth will respond with a rapid increase in heart rate within 30 s of lung inflation. If the heart rate increases but the baby is not breathing adequately, continue ventilation at a rate of about 30 breaths / min, allowing approximately 1 s for each inflation, until there is adequate spontaneous breathing." (1)

"Adequate passive ventilation is usually indicated by either a rapidly increasing heart rate or a heart rate that is maintained faster than 100 beats / min. If the baby does not respond in this way, the most likely reason is inadequate airway control or ventilation. Look for passive chest movement in time with inflation efforts; if these are present, then lung aeration has been achieved. If these are absent, then airway control and lung aeration have not been confirmed. Without adequate lung aeration chest compressions will be ineffective; therefore, confirm lung aeration before progressing to circulatory support." (1)

### **7-Säkerställ ventilation innan hjärtkompressioner övervägs**

Without adequate lung aeration chest compressions will be ineffective; therefore, confirm lung aeration before progressing to circulatory support." (1)

### **8-Hjärtfrekvens**

"This is best evaluated by listening to the apex beat with a stethoscope. Feeling the pulse in the base of the umbilical cord is often effective but can be misleading; cord pulsation is only reliable if found to be more than 100 beats min." (1)

### **9-Bröstkompressioner**

”Hjärtfrekvens < 60 trots > 30s adekvat ventilation: fortsatt ventilation, thoraxkompressioner (3:1) 90/min + 30 inblåsningar/min” (3)

“Compressions should be delivered on the lower third of the sternum to a depth of approximately one third of the anterior-posterior diameter of the chest. Two techniques have been described: compression with 2 thumbs with fingers encircling the chest and supporting the back (the 2 thumb-encircling hands technique) or compression with 2 fingers with a second hand supporting the back.

Because the 2 thumb– encircling hands technique may generate higher peak systolic and coronary perfusion pressure than the 2-finger technique, the 2 thumb–encircling hands technique is recommended for performing chest compressions in newly born infants. However, the 2-finger technique may be preferable when access to the umbilicus is required during insertion of an umbilical catheter.” (2)

“There should be a 3:1 ratio of compressions to ventilations with 90 compressions and 30 breaths to achieve approximately 120 events per minute to maximize ventilation at an achievable rate (Class Indeterminate). Thus, each event will be allotted approximately 1/2 second, with exhalation occurring during the first compression after each ventilation.” (2)

"Circulatory support with chest compressions is effective only if the lungs have first been successfully inflated. Give chest compressions if the heart rate is less than 60 beats / min despite adequate ventilation. The optimal technique is to place the two thumbs side by side over the lower third of the sternum, with the fingers encircling the torso and supporting the back. The lower third of the sternum is compressed to a depth of approximately one third of the anteriorposterior diameter of the chest. A compression to relaxation ratio with a slightly shorter compression than relaxation phase offers theoretical advantages for blood flow in the very young infant. Do not lift the thumbs off the sternum during the relaxation phase, but allow the chest wall to return to its relaxed position between compressions. Use a 3:1 ratio of compressions to ventilations, aiming to achieve approximately 120 events / min, i.e. approximately 90 compressions and 30 breaths. However, the quality of the compressions and breaths are more important than the rate.” (1)

### **10-Navelven**

De flesta medtagna/asfyktiska barnen hämtar sig fort med övertrycksventilation och behöver ingen infart. Om det finns risk för sepsis (t ex GBS eller feber hos mamman) eller blödning (t ex vid abruptio placenta) hos ett barn som behöver resusciteras bör infart etableras och vätskebolus NaCl 0,9 mg/ml 10 ml/kg ges. Om bröstkompressioner behövs göras bör också infart etableras.

”Medications need to be given intravenously. The quickest means of obtaining intravenous access in the newborn is cannulation of the umbilical vein. This is accomplished by aseptically inserting a catheter into the umbilical vein to a depth of 2 to 4 cm until there is free flow of blood.” (4)

“Drugs are rarely indicated in resuscitation of the newborn infant. Bradycardia in the newborn infant is usually caused by inadequate lung inflation or profound hypoxia, and establishing adequate ventilation is the most important step to correct it. However, if the heart rate remains less than 60 beats min<sup>-1</sup> despite adequate ventilation and chest compressions, drugs may be needed. These drugs are presumed to exert their effect by their action on the heart and are being given because cardiac function is inadequate. It is therefore necessary to give them as close to the heart as possible, ideally via a rapidly inserted umbilical venous catheter” (1)

### **11-Intraosseös nål**

Se punkt 10 angående behov av infart. En studie talar för att intraosseös nål är ett alternativ till navelvenkateter (7)

### **12-Adrenaline**

"Despite the lack of human data, it is reasonable to continue to use adrenaline when adequate ventilation and chest compressions have failed to increase the heart rate above 60 beats / min. Use

the IV route as soon as venous access is established. The recommended IV dose is 10 - 30 mcg/kg." (1)

"The recommended IV dose is 0.01 to 0.03 mg/kg per dose. Higher IV doses are not recommended (Class III) because animal (LOE 6) and pediatric (LOE 7) studies show exaggerated hypertension, decreased myocardial function, and worse neurologic function after administration of IV doses in the range of 0.1 mg/kg." (2)

Samma dos rekommenderas enligt Swedish Society of Perinatal Medicine, nämligen 10 – 30 ug/kg (för ett 3 kg barn: 0,3 – 0,9 ml av 0,1 mg/ml IV) (3)

I denna algoritm rekommenderas 10 ug/kg, dvs samma dos som vid barn A-HLR. Adrenalinet kan ges koncentrerat 0,1 mg/ml med efterföljande NaCl-flush (2-3 ml), eller spädas 1:10 till 0,01 mg/ml. Korrekt dos och att det når in i blodbanan är det avgörande.

### **13-Central cyanos**

"A healthy baby is born blue but becomes pink within 30 s of the onset of effective breathing. Observe whether the baby is centrally pink, cyanosed or pale. Peripheral cyanosis is common and does not, by itself, indicate hypoxaemia." (1)

"Central cyanosis is determined by examining the face, trunk, and mucous membranes. Acrocyanosis (blue color of hands and feet alone) is usually a normal finding at birth and is not a reliable indicator of hypoxemia but may indicate other conditions, such as cold stress." (2)

### **14-Överväg tillägg av extra syrgas**

Tillförsel av extra syrgas är kontroversiellt. "There are concerns about the potential adverse effects of 100% oxygen on respiratory physiology and cerebral circulation and the potential tissue damage from oxygen free radicals. Conversely there are also concerns about tissue damage from oxygen deprivation during and after asphyxia. . . . Meta-analysis of 4 human studies (LOE 1) showed a reduction in mortality rate and no evidence of harm in infants resuscitated with room air versus those resuscitated with 100% oxygen, although these results should be viewed with caution because of significant methodological concerns." (2)

### **Barn med spontanandning**

Hos barn med central cyanos som andas själv rekommenderas tillförsel av extra syrgas: "If central cyanosis (lips, tongue, and central trunk) is present in a newborn with adequate respiration and a heart rate above 100 beats per min, free-flowing oxygen should be administered. When the infant turns pink, oxygen can be gradually withdrawn while ensuring that the newborn can still maintain a pink color." (4)

"Supplemental oxygen is recommended for babies who are breathing but have central cyanosis." (1) "free-flow oxygen should be administered to babies who are breathing but have central cyanosis (Class Indeterminate)." (2)

### **Barn som ventileras**

Hos barn som behöver konstgjord andning (och där central cyanos antagligen föreligger) rekommenderas antingen tillförsel av extra syrgas direkt eller efter 90 sekunder om det inte har skett någon förbättring:

“At present, the standard approach to resuscitation is to use 100% oxygen. Some clinicians may elect to start resuscitation with an oxygen concentration less than 100%, including some who may start with air. Evidence suggests that this approach may be reasonable. However, where possible, ensure supplemental oxygen is available for use if there is no rapid improvement following successful lung aeration. If supplemental oxygen is not readily available, ventilate the lungs with air.” (1)

“Supplementary oxygen is recommended whenever positive-pressure ventilation is indicated for resuscitation. . . . The standard approach to resuscitation is to use 100% oxygen. Some clinicians may begin resuscitation with an oxygen concentration of less than 100%, and some may start with no supplementary oxygen (ie, room air). There is evidence that employing either of these practices during resuscitation of neonates is reasonable. If the clinician begins resuscitation with room air, it is recommended that supplementary oxygen be available to use if there is no appreciable improvement within 90 seconds after birth. In situations where supplementary oxygen is not readily available, positive-pressure ventilation should be administered with room air (Class Indeterminate).” (2)

“Central cyanos trots adekvat ventilation eller egen andning → överväg tillförsel av extra O2.” (3)

Med hänsyn till risken för skada från extra syrgas finns en särskild reevaluering av närvaro / frånvaro av central cyanos. Om central cyanos inte längre föreligger kan man motivera seponering av extra syrgas. “Oxygen is a drug, and oxidant injury is theoretically more likely in preterm infants.” (1)

### **Muskeltonus?**

Enligt Swedish Society of Perinatal Medicine rekommenderas att tonus bedöms hos alla nyfödda: “Alla nyfödda: • Kontrollera andning, tonus och färg” (3)

Frånvaro av muskeltonus talar för att den nyfödda är medvetlös och kommer att behöva ventileras: "A very floppy baby is likely to be unconscious and is likely to need respiratory support." (1)

Däremot är inte klart att bedömningen av muskeltonus leder till någon åtgärd som inte redan har införts vid bedömningen av färg, andning och hjärtfrekvens. I Swedish Society of Perinatal Medicines algoritm finns ingen åtgärd kopplad till bedömningen av muskeltonus.

### **Referenser**

- 1-ERC-European Resuscitation Council Guidelines for Resuscitation 2005 Section 6. Paediatric life support. Resuscitation 2005;67S1:S97-S133 (p. 19)
- 2-AHA-American Heart Association. Part 13: Neonatal Resuscitation Guidelines. Circulation 2005;112;188-95
- 3-NHLR-Neonatal HLR, ABCD Swedish Society of Perinatal Medicine
- 4-UTD-Fernandes CJ. Neonatal resuscitation in the delivery room. In: UpToDate, Rose BD (Ed), UpToDate, Wellesley (MA), 2010
- 5-www.swesem.org Initialt omhändertagande
- 6-Funai EF, Norwitz ER. Management of normal labor and delivery. In: UpToDate, Rose BD (Ed), UpToDate, Wellesley (MA), 2010
- 7-Abe KK, Blum GT, Yamamoto LG. Intraosseous is faster and easier than umbilical venous catheterization in new-born emergency vascular access models. Am J Emerg Med 2000;18:126—9