美国民间健康基金会-中国

儿科护士教学大纲

基础课程

第九单元

呼吸的处理

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PROJECT HOPE/CHINA

PEDIATRIC NURSE TEACHING PROGRAM BASIC COURSE

MODULE 9 RESPIRATORY MANAGEMENT

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中文翻译

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STUDY GUIDE: RESPIRATORY MANAGEMENT

I. Objectives

Upon completion of the module the learner will be able to:

A. List the signs and symptoms of respiratory distress in a neonate and an older child.

B. Demonstrate the ability to perform suctioning; bulb syringe, Delec, mechanical and endotracheal.

C. Identify the instances when the nasal cannula, bag and mask and face mask are required.

D. Demonstrate the ability to operate and manage a patient on the oximeter and the transcutaneous monitor.

E. List the normal values for arterial blood gases.

F. Identify the nursing responsibilities in caring for a ventilated patient.

II. Sources of Information

Required Readings

A. Procedures

1. Bulb syringe suctioning
2. Delee mucus trap suctioning
3. Mechanical suctioning
4. Endotracheal suctioning
5. Pulse Oximeter
6. Measuring oxygen concentration
7. Heating and humidifying an oxygen/air mixture
8. Mixing oxygen and compressed air
9. a. Transcutaneous monitor
   b. Hewlett Packard transcutaneous monitor
10. Chest Physiotherapy for the intubated neonate or child
11. Chest Physiotherapy for the nonintubated neonate or child

B. Lessons

1. Neonatal respiratory distress
2. Pediatric respiratory distress
3. Apnea
4. Evaluation methods and general principles of therapy for respiratory distress
5. Oxygen support devices: Oxyhood, Oxygen by mask, nasal cannula, nasal continuous positive airway pressure
6. Physiology related to oxygen management
7. Suctioning bulb syringe and Delee mucus trap

学习指引：呼吸的处理

Ⅰ．目的

修毕本单元时，学员应能：

A．列出新生儿和幼童呼吸困难时的症状及体征。

B．应用手泵式、Delee形口吸式、机械形及气管内抽吸器，进行各项抽吸程序。。

C．学会在何种情形下应用鼻管，加压皮囊与面罩共用，和单用面罩。

D．学会处理要用氧气监测仪器及经皮监测器的病人。

E．列出动脉血气体成份的正常值。

F．认识护理人工通气病人时，护士应负的责任。

Ⅱ．资料来源

必修课程

A．操作程序

1．手泵式抽吸

2．Delee形粘液隔抽吸

3．机械式抽吸

4．气管内抽吸

5．脉冲式血氧计

6．氧气浓度的测量

7．如何把氧/空气混合加温及湿化

8．混和氧气及压缩空气

9．a．经皮监测仪

b．HP惠普经皮监测仪

B．课程

1．新生儿呼吸困难

2．儿科呼吸困难

3．呼吸停止

4．评估呼吸困难的方法和治疗原理

5．氧气供应系统：头罩、经面罩给氧、鼻管、连续性经鼻气道内正压给氧

6．与给氧有关的生理学

7．手泵式和Delee形粘液隔抽吸

8. Mechanical suctioning
9. Endotracheal intubation
10. Self-inflating bag and mask ventilation
11. Extubation
12. Mechanical ventilation
13. Transcutaneous monitor
14. Chest physiotherapy and percussion
15. Arterial blood gases

Ⅱ. Clinical Activities

A. Performance Checklists
1. Oximeter
2. Bulb syringe
3. Delee mucus trap suctioning
4. Mechanical suctioning
5. Endotracheal suctioning

B. Perform Chest Physiotherapy for:
1. One child not intubated
2. One child intubated

Ⅳ. POST TEST

PROCEDURE: NELLCOR PULSE OXIMETER

Overview

A pulse oximeter is used to measure the oxygen saturations of the patient's blood. these values, if accurate, should correlate with arterial blood gases.

EQUIPMENT

·Oxisensors (appropriate size)
·Nellcor oximeter
·Instrument cable
·Clip

ACTION	RATIONALE
Preparation	
1. Plug in the oximeter.	
2. Attach the instrument cable to the oximeter by lining up the red dots on the connector and socket and pushing the connector straight in until it locks.	

8．机械式抽吸
9．气管内抽吸
10．自动充气皮囊及面罩通气
11．除去插管
12．机械通气
13．经皮监测
14．胸部物理治疗及叩诊
15．动脉血气体状态
16．胸部物理治疗

Ⅱ．临床步骤

A．操作一览
1．血氧计
2．手泵式抽吸器
3．Delec形粘液隔抽吸
4．机械抽吸
5.气管内抽吸

B．为下列病人进行物理治疗：
1．无插管小童一名
2．有插管小童一名

Ⅳ．测验

操作程序：Nellcor 脉冲式血氧计

概　论

脉冲式血氧计可测出病人血中的氧饱和度。如数值准确，可直接反映出动脉血气体状态。

Nellcor 血氧计

器材

- 氧传感器（大小要适中）
- 血氧计
- 导线
- 夹子

步骤	原因
准备	
1．替血氧计插上导线。	
2．把导线接在血氧计时，先将连接器和插套上的红点互相对准，然后把连接器推入套中，至感觉锁上为止。	

3. Place the appropriate oxisensor on the neonate. The foot is the preferred location, but if unaccessible, the palm of the hand or the area across the Achilles tendon may be used.

Placing the Oxisensor N-25:

a. Locate alignment mark "A" on the sole of the foot.

b. Wrap the oxisensor around the foot, placing alignment mark "B" on the top of the foot.

c. Completely wrap.

d. The oxisensor should not be placed so tight as to disturb blood flow to the distal extremity.

Placing the Oxisensor I-20:

It is intended for larger neonates and is designed to function best on the great toe.

1) Center alignment mark "A" on the bottom of the toe.

2) Wrap the oxisensor around the toe, placing alignment mark "B" on the toenail opposite "A".

4. Turn the instrument on.

5. a. Setting the alarms.

b. There are alarm settings for high and low saturation and for high and low heart rates. Each of these alarms can be set by pressing the appropriate switch on the front of the oximeter and then using the dial to set the desired value.

3. Two oxisensors, the N-25 and the I-20 are designed for use with neonates. The smaller is for neonates up to 3kg. The sensor is designed to wrap around the patient's foot so that the light diode and photodiode oppose one another.

d. Circulation distal to the sensor location should be checked frequently.

4. The instrument will emit a beep, all the displays will light momentarily, the pulse search light will begin to flash and the O_2 saturation and pulse rate displays will show zero.

5. a. It is important to always have the alarms set as a warning that physiologic changes may be occurring with the patient.

b. When the oximeter is used with neonates, the alarms are usually set as follows:

-High Saturation…95—96%

-Low Saturation…84%

-High Heart Rate…160—180bpm

-Low Heart Rate…80—100 bpm

3．替婴儿接上适当的氧传感器。足部是最理想的接合位置，如情况不许可，可试接在手掌或跟腱处。放置氧传感器N-25：

a）把有“A”字一面贴在足底。

b）用氧传感器缠绕足部，使有“B”字一面贴在足面。

c）完成缠绕。

d）氧传感器不应缠得太紧，以免足部血流受阻。

放置血氧计I—20

为较大新生儿面设计，最适合缠于拇趾上。

a）把A字面贴在趾底。

b）用传感器缠绕拇趾，使B字面贴在趾甲上，对准A面。

4．把仪器开关打开。

5．a．调警报系统。

b．警报系统可监测高或低饱和度和高或低心率。每项警报以血氧计标板上的按钮作开关，再用转钮来调校理想值。

3．有两型氧传感器，即N-25和I-20型，专供新生儿所用。

较小的一型供轻于3Kg的新生儿应用，传感器要缠绕足部，使两枚光敏二极管互相对准。

d）要加紧观察传感器远端足部的血流状况。

4．仪器会发出一声讯号，所有指示灯会亮起，脉冲追踪指示灯会闪亮，氧饱和度和脉搏显示出0读数。

5．a．要注意经常接上警报，以期及早发现病人生理上的变化。

b．应用于新生儿时，警报通常调至下列数值：

高饱和度—95—96%

低饱和度—84%

高心率—160—180 b.p.a.

低心率—80—100 b.p.a.

6. Check the perfusion indicator.

6. When the sensor is correctly placed, the perfusion indicator (vertical bar of lights) will begin to follow the pulse. A low display level may indicate incorrect sensor placement or poor patient perfusion.

PROBLEM SOLVING

Problem	Solution/Remarks
1. No indication of pulse, no saturation or rate display(pulse search indicator on).	1. a. Check patient's condition. b. Sensor is unplugged from the instrument or placed on the patient incorrectly. Check and correct as required. c. Defective oxisensor. Replace with a new one. d. Patient perfusion is too poor to allow the instrument to pick up an acceptable pulse. Test the instrument on yourself or another patient.
2. Perfusion indicator tracks pulse but there is no oxygen saturation or pulse rate display.	2. a. Defective sensor. Try another sensor. b. Patient's perfusion is too low to allow the instrument to measure saturation and pulse rate. (fewer than three or four bars on perfusion display.
3. Saturation and a pulse rate display is changing rapidly and perfusion indicator is erratic.	3. Excessive patient motion. Check to see that the sensor is securely applied. Replace it if necessary.
4. Pulse rate does not correlate with other monitors.	4. a. Excessive patient motion. The determination of pulse rate is more sensitive to motion than measurement of oxygen saturation. Check to see that the sensor is securely applied. b. Artifact on the ECG monitor.

6．查看血流指示仪

6．若传感器安装正确，血流指示仪（垂直光标）会开始显示脉搏，如指示仪显示微弱，可能传感器安装不妥，或病人血流不足。

解决问题

问题	解决方法/附注
1．无脉搏指示，无氧饱和或心率读数（脉搏追踪指示灯亮起）	1．a．检查病人状况。 b．感受器没套入测量仪或没正确接在病人上。仔细检查并纠正错误。 c．氧传感器损坏，换上新的。 d．病人血运太差，仪器测不出脉搏。试用仪器测自己或另一病人。
2．血流指示器有脉搏显示，但无氧饱和度或脉搏读数。	2．a．传感器损坏，试用另一部。 b．病人血运太差，仪器测不出氧饱和度和脉搏（垂直光标不及3至4度）。
3．饱和度和脉搏读数不停转变，血流指示仪出现荒谬指示。	3．病人移动太多，查看传感器是否接得牢固。如有需要，换上另一个传感器。
4．脉搏与其它监测不符。	4．a．病人移动太多。脉搏测试仪较血氧计对移动敏感，查看传感器是否接得牢固。 b．心电图监测器显示假象。

LESSON. TRANSCUTANEOUS MONITOR

Transcutaneous oxygen monitoring means that the oxygen concentration of a neonate's blood is measured by a device placed on the neonate's skin. Because of the thin skin of a neonate it is possible to do this with neonates but less reliable with adults.

A small sensor, about the size of a dime, is placed on the neonate's skin. The sensor heats the underlying skin to a specific temperature. The capillary bed in the skin beneath the sensor is arterialized by the heat, which means the circulation to the area is increased and it is mainly arterial rather than venous blood. Oxygen carried in the blood to these capillaries diffuses across the skin surface and through the sensor membrane, where it is measured. There is a delay of 15 to 30 seconds between a change in arterial oxygen concentration and the time the corresponding change in transcutaneous oxygen occurs.

Transcutaneous monitoring is unreliable in neonates with decreased peripheral perfusion including neonates with:

Hypotension
Hypovolemia
Hypothermia
Generalized Edema
Severe anemia

Transcutaneous monitoring only gives information regarding oxygenation. The neonate's pH, serum bicarbonate and carbon dioxide concentration must also be assessed in order to provide appropriate therapy.

Transcutaneous monitoring should never be used as a complete replacement for arterial blood oxygen determinations. It is important to obtain a correlating arterial blood gas. As a general rule transcutaneous monitors are used to monitor pO_2 trends and not necessarily actual pO_2 values.

Normal transcutaneous oxygen concentrations is the same as normal arterial oxygen concentration. Therefore, the transcutaneous oxygen values should be between 50-80 mmHg.

MONITORING SITES

A suitable site for transcutaneous monitoring is essential and should have the following features:

1. Good capillary circulation.
2. Location away from large surface blood vessels.
3. Absence of hair and fatty deposits.
4. Absence of bony prominences.
5. Flat surface for a tight seal.

The chest and abdomen are usually the preferred sites but the back, buttocks and thigh may also be used.

课程：经皮监测

经皮氧监测意指用一仪器接在婴儿皮肤上进行氧测量程序。新生儿皮肤较成人皮肤薄，所以这方法有可能在新生儿身上得出较可靠的结果，在成人身上用此法得出的结果可靠性比较低。

主要器材是一个细小的传感器，如铜钱段大小，贴在皮肤上。它产生的热力可把皮肤温度升至一特异点，令传感器下面的微血管扩张，局部循环增加，微循环内血液变成以动脉血为主，产生了所谓动脉化的现象。局部血液的氧，经扩散而到达皮肤表面，传感器就可在皮肤表面测量氧浓度。当动脉氧浓度改变，要等15到20秒，传感器才可以从皮肤表面测到该转变。

经皮监测应用在周边血运不足的新生儿时，结果不可靠，特别是下列各具体病例：

血压低　　血容量过少
体温低　　全身性水肿
严重贫血

经皮监测只能提供氧状况的资料，新生儿的pH、血清碳酸氢盐、二氧化碳浓度等应该要同时测量，以帮助决定治疗方案。

经皮监测绝不可以作为一种取代动脉血氧测量的手段，一定要取得动脉血氧浓度与经皮监测的结果作联系分析。一般来说，经皮监测的结果可以用来监测血氧的趋势，但不直接反映PO_2值。

经皮监测的正常值与正常血氧浓度一样，范围是50—80mmHg之间。

监测部位

进行经皮监测的最理想部位应有下列特点：

1. 微循环良好。
2. 远离较大的周边血管。
3. 无毛及油脂沉积。
4. 无骨突。
5. 表面平滑，可供传感器紧贴。

胸和腹是常用的部位，但背、臀或大腿也可供监测用。

Length of Monitoring

The sensor heats the skin beneath it 43.5-44.0℃. This can cause first or second degree skin burns unless the site is changed on a regular basis.

1. The location of the sensor should be changed at least every three hours.

2. The nurse should observe for redness or blistering. If present, the site must be changed more frequently, such as every two hours.

Refer to the transcutaneous monitoring procedure which outlines calibrating the monitor.

LESSON: HEWLETT PACKARD 78850A TRANSCUTANEOUS MONITOR

Ⅰ. Directions for Machine Function

A. Connect to power source and turn on

B. Connect sensor to machine

C. Machine will do self check and print out data

D. Calibrate sensor - O_2 sensor

1. Press O_2 calibrate
2. Put sensor in room air
3. Bell rings when calibration finished

E. Calibrate PO_2

1. Press PO_2 Calibrate
2. Machine will read: Air Zero
3. Press Zero; Apply one drop of zero solution onto sensor then wait
4. Bell rings when finished, display says: Remove zero solution. At this time the number should read "0".
5. Wipe solution from sensor
6. Press Air button
7. Hold sensor in room air
8. Bell rings when calibration complete. At this time the number should read "157".
9. Place a tiny drop of electrolyte solution on the center of the sensor.
10. Attach an adhesive circle to the sensor and adhere to the skin.

Ⅱ. Changing Sensor Placement

1. Sensor placement should be changed every 3-4 hours.
2. To calibrate the machine when changing the skin sensor position, begin at E. 5. Wipe the solution from the sensor.
3. Attach to skin.

Ⅲ. Review of Alarm System

监测时限

传感器产生的热力可使皮肤温度达43.5－44.0℃，热力足以引起一至二度烧伤，所以传感器应定时换位。

1．至少应该每三小时转换传感器位置一次。

2．护士要观察皮肤有无变红和起泡。如有上述情况，监测部位要增加转换次数，例如每二小时一次。

欲知如何正确校准监测仪，可参考经皮监测操作程序。

课程：HP 惠普78850A经皮监测仪

Ⅰ．仪器功能指南

A．接上电源，打开开关掣

B．把传感器与测量仪接上

C．仪器会作自我检查，并印出各项数据

D．校准传感器－O_2传感器

1．按下 O_2 调校掣

2．把传感器放在空气中

3．电铃响起，表示调校完毕

E．调校氧分压（PO_2）

1．按 PO_2 调校掣

2．标板显示：Air zero

3．按 zero 掣，用一滴 zero 溶液，滴在传感器上，稍作等候。

4．等到电铃响起，标板显示：Remove zero solution（清除 zero 溶液），此时 PO_2 读数应是“0”。

5．抹干传感器

6．按 Air 掣

7．持传感器，曝露在空气中。

8．自动调校完毕后，电铃自动响起。此时显示大气 PO_2 读数应为“157”。

9．在探头上滴一滴接触液。

10．将双面环状粘胶纸贴于探头上，另一面贴于皮肤。

Ⅱ．改变传感器位置

1．传感器应每 3 — 4 小时换位一次。

2．换位时要把仪器重新调校，从上述E．5 处起。抹干探头。

3．贴在皮肤上。

Ⅲ．检查警报系统