

# Learning how to use transcutaneous monitors

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The use of transcutaneous equipment is an essential element in the daily monitoring of neonates. To ensure reliable results and as little discomfort to neonates as possible, new staff members must be trained thoroughly. Nurse Åse Hansen, from the Copenhagen County Hospital, runs through the basic elements of staff training.

## Introduction

The use of transcutaneous (tc) equipment is an essential element in the daily monitoring of neonates. To ensure reliable results and as little discomfort to the neonates as possible, new staff members must be trained thoroughly.

Because staff are often rotated between departments we have found it impractical to organize classroom-type formalized training. Instead, we use a tutor system: the newcomer is assigned to an experienced staff member who is then responsible for the training.

The training is designed to provide both the theoretical background of the tc equipment and the information and practice required for its safe use. The elements in

the training are explained below.

## Transcutaneous monitoring - the theory

In this part the purpose of using tc equipment is explained: to get continuous information on  $pO_2$  and  $pCO_2$  for the assessment of the respiratory condition of the patient, for comparison with the clinical observations. We consider tc measurements of  $pO_2$  and  $pCO_2$  to be more reliable than blood gas measurements based on capillary samples.

With proper use of tc monitors, values can be obtained which are almost identical to the arterial values. By using tc monitoring, blood sampling can be reduced to a few a day, and changes in the patient's condition will be registered and treated immediately.

## Transcutaneous monitoring - the practice

The details of the analyzer are explained, including power supply, gas supply for calibration, and the function and initial settings of the various controls. The calibration procedure is explained.

The proper handling of parts that come in contact with the neonate, such as the patient cable, fixation rings and contact liquid, is discussed. A special point is made of discussing the criteria for when calibrations and membrane replacements are needed.

It is emphasized that careful cleaning of the skin before mounting the fixation ring is important to obtain reliable values. The most suitable places for attaching the fixation rings are pointed out.

After this the attachment procedure is shown in practice.

Then the trainee tries the various steps in practice while he or she explains the function of the device to the tutor. The trainee mounts the patient cable and starts a measurement. The tutor points out that there are certain sources of errors, and that it is always important to observe the patient and to relate the tc values to the clinical observations. The trainee is instructed in how to deal with some common errors.

The first couple of times that the trainee has to mount the equipment, there is always a tutor present until the trainee feels totally familiar with the procedure.

### Some easy-to-deal-with errors

1. A membrane with rough edges or frayed ends - remembrane the electrode.
2. "Old" fixation rings with bad adhesion, leaking contact liquid from the place of measuring - replace the fixation ring.
3. A newborn overdue child with a thick layer of partly rejected corium - clean thoroughly and wash with alcohol.
4. Pulled or twisted patient cable - place the cable in a free path.
5. Too low electrode temperature causing too low  $pO_2$  and too high  $pCO_2$  - adjust the electrode temperature to 44 °C.
6. Insufficient blood flow through the capillary bed causing inaccurate values - increase blood volume according to the standard procedure using a volume expander.