A touch of added realism: Preparation of your patient simulator for CVP monitoring

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Introduction

It is widely accepted that experience is the best acquired "on the job", we all "learn by doing", and that "practice makes perfect". Making simulation training scenarios as realistic as possible is an important issue that has a direct effect on the teaching effectiveness of such a training method. The aim of this abstract is to present how we recreated a setup to simulate a patient subjected to Central Venous Pressure (CVP) monitoring (Picture 1). This is a continuation of the tricks that apply to patient simulators and that have already been presented at another conference in order to enhance simulation training such as urinary catheterisation[1] and internal haemorrhage with a wound drain[2]. Work serving a related purpose was also recently presented by Wade et al[3].

Method

The essential components required to perform this modification are: a syringe, a long tube with an internal diameter corresponding to the external diameter of the CV catheter, a CVP manometer scale, and a complete CVP line (Picture 2). In order to directly control the CVP measurement the CV catheter needs to be pushed inside the long tube until it properly covers the lumens. Some silicon or glue is required to prevent any leak while the tube is in place inside the patient simulator. Once secured the modified CVP line needs to be adjusted under the mannequin's skin in the appropriate position[4,5] (Picture 3). The tube needs to be hidden and run as far as the control room where it can be primed with water and needs to be connected to a half filled syringe. The reading on the CVP manometer needs to be adjusted to the required level just before the scenario. Ideally a small syringe should be used by the operator during the scenarios to obtain a better control of the CVP reading. It is important to note that this setup works correctly only when using the port connected to the lumen at the tip of the catheter. The other lumens are blocked by the long tube and require high pressures to operate, which may cause leaks.

Picture 1: In the present case, SimMan setup with CVP line connected to a manometer.

Conclusion

It is hoped that this abstract will be particularly useful to people starting in the field of medical simulation. We strongly believe that sharing our experiences and practices is the best way to improve healthcare trainees' experience, and ultimately provide better patient care. Although it has been noticed that physicians often underestimate CVP measurement[6] and that the use of CVP manometers is slowly being replaced by more advanced technology, it still is a very valid technique to which trainees should be exposed. This CVP line setup is inexpensive, very realistic, and can be adapted to any patient simulator with a removable chest or neck skin. Students who participated in scenarios making use of this setup found it very realistic.

Picture 2: Equipment required to setup a patient simulator for CVP monitoring.

Picture 3: Line to control the CVP manometer passing under the chest plate of the mannequin.

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