



Original Article

A major trauma course based on posters, audio-guides and simulation improves the management skills of medical students: Evaluation via medical simulator



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ABSTRACT

Background: Medical competence requires the acquisition of theoretical knowledge and technical skills. Severe trauma management teaching is poorly developed during internship. Nevertheless, the basics of major trauma management should be acquired by every future physician. For this reason, the major trauma course (MTC), an educational course in major traumatology, has been developed for medical students. Our objective was to evaluate, via a high fidelity medical simulator, the impact of the MTC on medical student skills concerning major trauma management.

Methods: The MTC contains 3 teaching modalities: posters with associated audio-guides, a procedural workshop on airway management and a teaching session using a medical simulator. Skills evaluation was performed 1 month before (step 1) and 1 month after (step 3) the MTC (step 2). Nineteen students were individually evaluated on 2 different major trauma scenarios. The primary endpoint was the difference between steps 1 and 3, in a combined score evaluating: admission, equipment, monitoring and safety (skill set 1) and systematic clinical examinations (skill set 2).

Results: After the course, the combined primary outcome score improved by 47% ($P < 0.01$). Scenario choice or the order of use had no significant influence on the skill set evaluations.

Conclusion: This study shows improvement in student skills for major trauma management, which we attribute mainly to the major trauma course developed in our institution.

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1. Background

During medical school in France, theoretical knowledge is acquired through conventional lectures, reading and web-based learning. Medical students are assessed through multiple choice questionnaires on theory and clinical cases. During internships, practical skills are taught by the attending physician or resident and acquired at the bedside by managing real medical cases. Before the 5th year, only 2 out of 345 items of required knowledge deal with major trauma. Training courses in anaesthesiology, intensive care and emergency care are optional. Although most students will not become specialists in emergency medicine, intensive care or

anaesthesiology, they will need elementary knowledge and skills to manage the initial in-hospital care of major trauma patients.

Since clinical situations are highly unpredictable, competence in combining theoretical knowledge, technical skills and appropriate behaviour when dealing with major trauma is difficult to assess in real patients. A specific educational course, the major trauma course (MTC), has been developed at the Grenoble University Hospital as a broad based-teaching tool to improve theoretical knowledge, technical skills and behavioural abilities for major trauma management. A high fidelity medical simulator can be a powerful tool for knowledge evaluation and skills perfection [1], especially regarding low-incidence clinical situations [2]. Since 2008, more than 1000 medical students have taken part in the MTC at the Grenoble University Hospital with a very high level of satisfaction (exceeding 90%; level 1 on the Kirkpatrick scale) [3]. The Kirkpatrick scale is a tool and model for evaluating whether or not a training program is useful/efficient. Four levels exist, ranging

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from level one, participant satisfaction, to level four, improvement in patient safety during clinical practice, for example.

The aim of this study was to evaluate the impact of the MTC on medical students' abilities to handle first line care for major trauma (level 2b of the Kirkpatrick scale). The assessment was performed on a high fidelity medical simulator.

2. Students and methods

2.1. Study design

We conducted a before/after interventional prospective study of a simulation based-teaching tool: the MTC. Students recruited

among the trainees of the Intensive Care Unit (ICU) signed a written informed consent form. The study was organized in 3 steps (Fig. 1). Step 1 consisted of an initial evaluation of the student's ability to manage a first simulated trauma patient; one month later, students attended the MTC (step 2); one month after step 2, a second evaluation of their ability to manage a different simulated trauma patient was performed (step 3).

2.2. Major trauma course

The educational objectives of the MTC include the first in-hospital care for major trauma patients, patient evaluation, diagnosis of frequent severe injuries, and initial medical care.

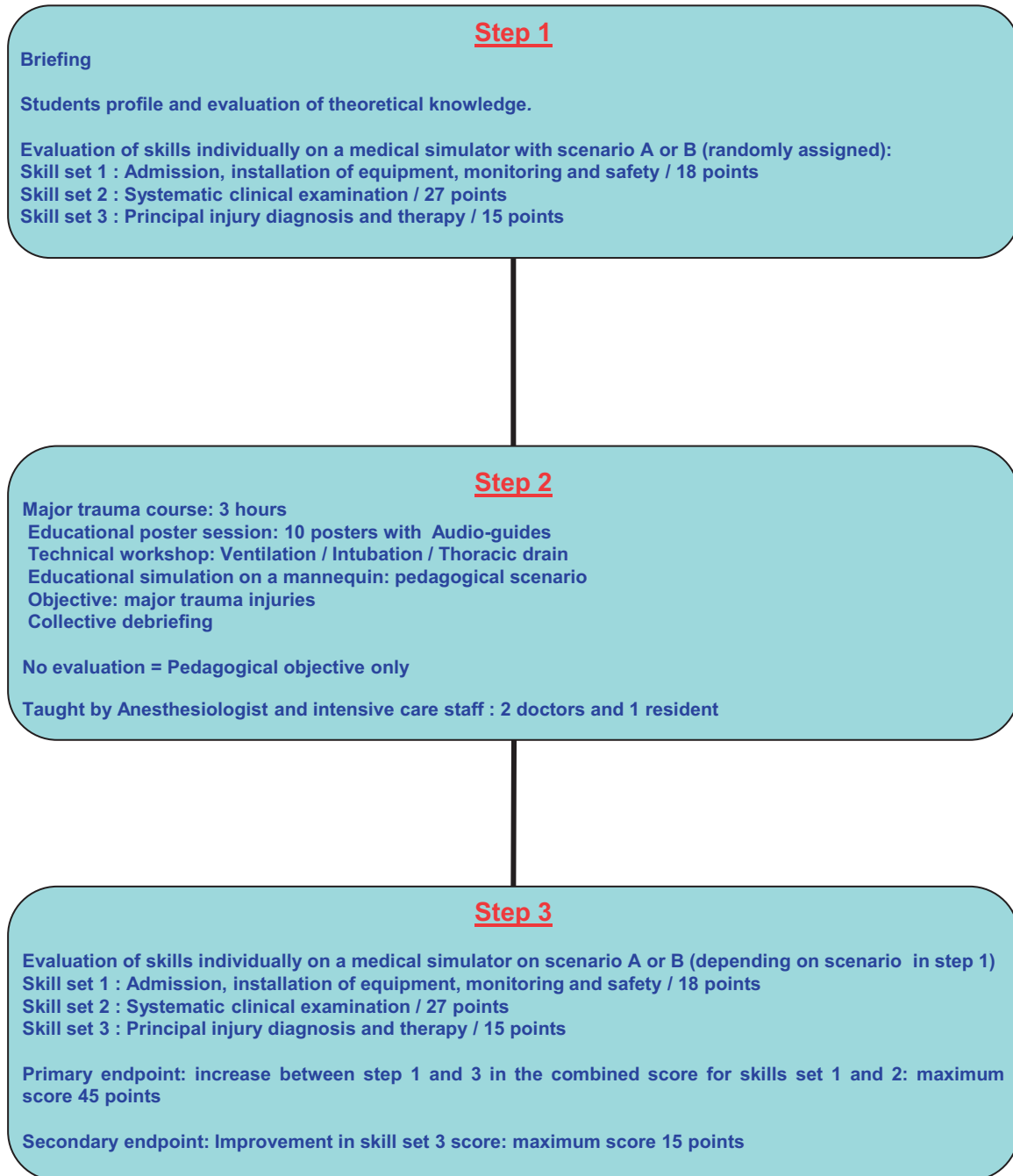


Fig. 1. The 3 steps of the study.

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