

Clinical Simulation of a Pace Maker Surgery for Medical Imaging Professionals Training

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Abstract

The learning simulation context envisages the students to integrate a realistic situation probable in their professional future. Its great advantage relies on the promotion of deep knowledge, since the student effectively participates in the scenario, instead of only being a passive element in the learning process. During the simulation, the student can feel the difficulties, try to overcome them and acquire a real perception of the working environment [1]. In this work we present a simulation context that took place at the clinical simulation centre of the University of Aveiro, “Simula”. It was simulated the implantation of a pace maker in a surgical procedure with fluoroscopic imaging support, being the environment similar, as much as possible, to an operating room. The target was a group of medical imaging and radiotherapy students. The main objectives were to enhance and develop technical, problem-solving and interpersonal skills as well as to implant teamwork values [1].

Introduction

In the presented work we describe the simulation scenario and the four phases of the learning process: introduction to the context, briefing, simulation in the prepared scenario and debriefing [2-3].

The “Simula” centre, is equipped with a video system, which allow to record all the simulation procedures, and with high fidelity full-body mannequin simulators mimicking the production of vital signs and allowing their manipulation through a control station hidden from the scenario (figure 1). The control of the vital signs was performed by a member of the teaching team. The students signed an informed consent for video recording.

Scenario Description

The scenario environment was the operating room of the “Simula” centre (figure 2).



Fig.1 Room with the control station to handle the vital signs of the mannequin.

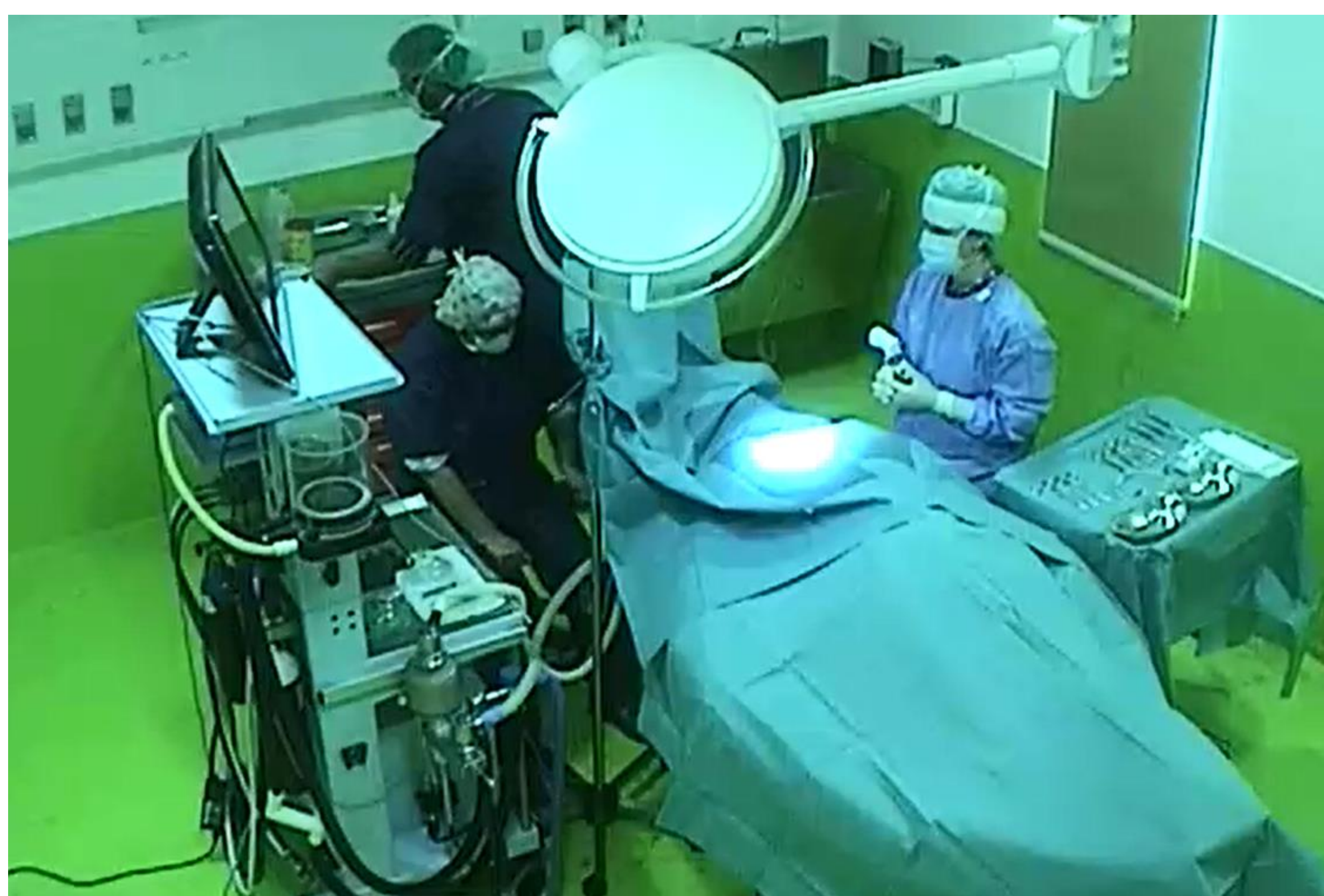


Fig.2 Operating room scenario with the patient prepared and hidden by the sterile drapes.

The 65 years old male patient (mannequin) was anesthetized and his vital signs were monitored. The anaesthesia machine and the monitoring system were connected to the patient.

The operating field was set up by placing the sterile drapes and all the characters were properly dressed with appropriate clothes (coat, gloves, masks, cap...). Also, the surgical instruments were prepared and ready to be used.

The characters in the scenario were performed by the teachers who played the roles of anaesthetist, surgeon, nurse and radiology technician. These characters were responsible to establish the procedure dynamics.

The scenario was idealized in such a way that during the surgery the medical imaging services would be requested. This means that at the arrival time of the medical imaging team, the surgical procedure was already ongoing.

The imaging equipment (C-arm fluoroscopic imaging system) was stored in the service room in the vicinity of the operating room.

Introduction to the Context

The group of students were introduced to the context at arrival. It was explained that it would be performed a surgical procedure requiring imaging support. Two students volunteer themselves to participate actively in the procedure while the remaining students were allowed to attend remotely through the internal video system. None of the students had previous contact with such scenario in clinical environment nor in the practical classes.

move rapidly the C-arm. Another difficulty was the variation of the patient vital signs to critical values.

Debriefing

The last and essential step of the simulation is the debriefing, in which all the group make a reflection summary. It was asked to the students to describe the scenario and to think about their behaviour referring how good the trainees performance was, positive references and points to improve. The discussion was mediated by the teachers, which complemented the important aspects and suggest key ideas to the students.

Students considered the simulation teaching valuable and it opened pathways to effectively discuss and reflect about their performance, analysing the difficulties and improvements to be done.

Conclusões / Conclusions

The presented work effectively allowed to engage the students in their learning process. They were more receptive to the explanations, discussions and knowledge transmissions. Besides, they made a critical analysis of their performance and aroused curiosity and interest concerning experiences that would not be lived in the classroom.

References

- [1] F. Lateef; J Emerg Trauma Shock. 2010 Oct-Dec; 3(4): 348–352
- [2] R. M. Fanning et al; Simulation in Healthcare; 2007; 2(2): 115-125
- [3] J. W. Rudolph et al; Simulation in Healthcare; 2014; 9(6): 339-349

Briefing

The two volunteer students were introduced to the scenario. The students were informed that they would be trainees of medical imaging technicians in a curricular internship.

It was explained the clinical information of the patient, the type of surgery and the imaging support requirement.

Simulation

In the scenario, the trainees needed to manipulate the C-arm in order to provide usable clinical images requested by the surgeon, interacting with the remaining team and respecting radiologic protection and the aseptic norms (figure 3). To approximate the simulation to a real scenario, some planned difficulties were implemented: it was asked to the trainees to accelerate the procedure and to provide images of several anatomic structures, which required to

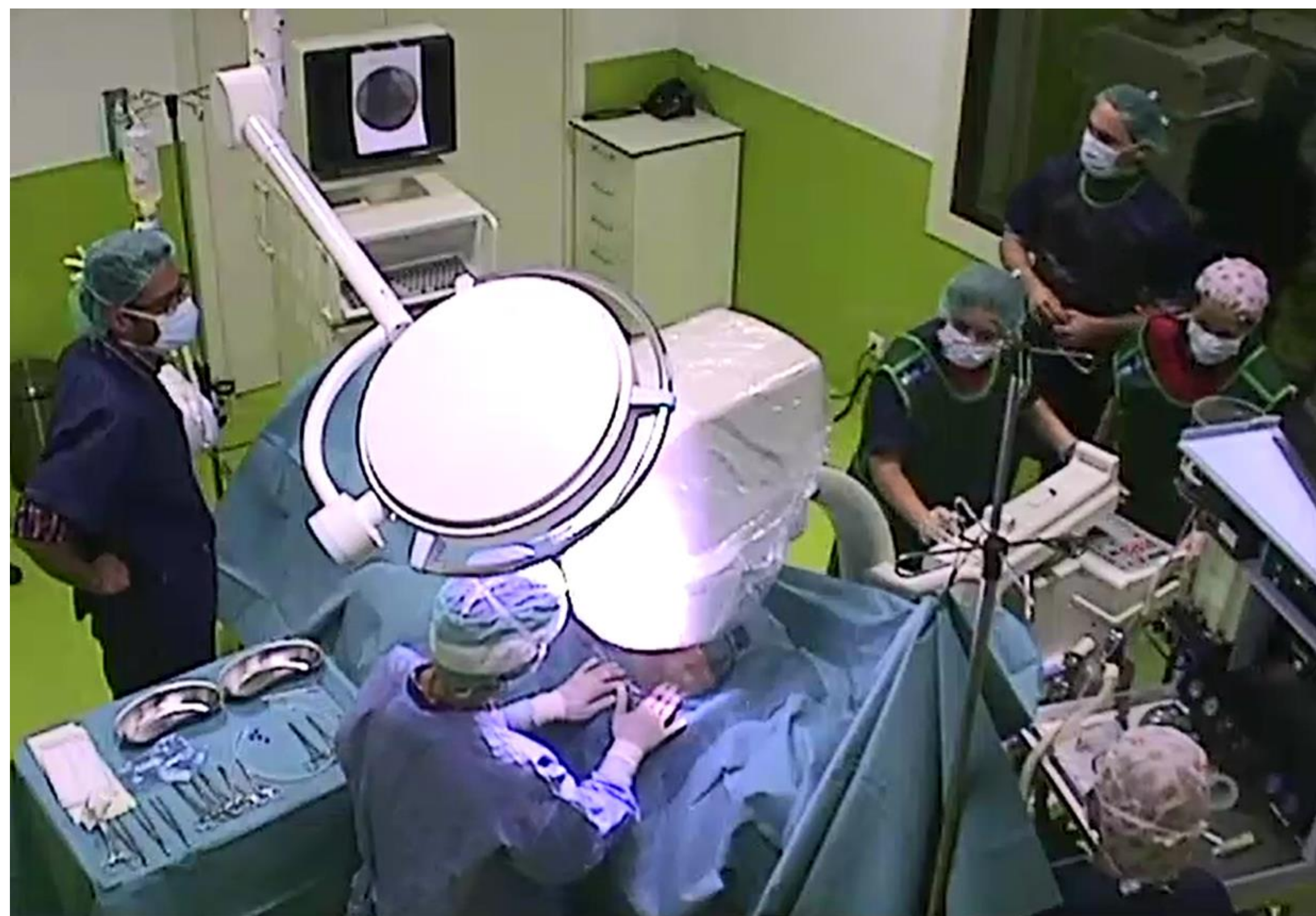


Fig.3 Simulation scene, showing the students managing the C-arm to provide fluoroscopic images.