Simulation-based teaching of prostate biopsies: Predictive validity of a prostate biopsy simulator

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Introduction & Objectives: The limitations of current teaching methods for prostate biopsies, based on apprenticeship, are in part responsible for the low sensitivity of systematic prostate biopsies performed for the initial diagnosis of prostate cancer. The Biopsym simulator, simulator for prostate biopsies, provides a complete learning environment dedicated to the initial teaching of the gesture.

The face, content and construct of the simulator have already been validated. The objectives of this study were to evaluate the predictive validity of the simulator, ie. the ability of students to reproduce the skills acquired on the simulator in real-life situation.

Materials & Methods: A prospective randomized study was conducted between February and July, 2018, in an academic urology department. Medical students who had no experience of prostate biopsy were randomized between arm A « conventional training » and arm B « simulator training ». All students performed 5 series of systematic prostate biopsies on the simulator, under supervision and guidance of a urologist. The students in arm B had a visual and numerical feedback on their performances and were allowed to use all the functionalities of the simulator. The transfer of skills was assessed by recording the position of the 12 biopsies performed by each student on a human cadaver using a 3D ultrasound mapping device (Koelis, France). Evaluation was performed by 3 senior urologists experts in prostate biopsy who rated the performance of each student and attributed a score in %.
**Results:** Twenty four students participated in the study. Two students were excluded because of a refusal to perform biopsies on a cadaver (n=1) and the performance of biopsies on a patient during the study (n=1). The median score obtained on the simulator at the end of the training was 57% (53-61) for arm A and 66% (59-71) for arm B. The median score obtained on the cadaver by students trained with the simulator was 75% (60-80), statistically superior to the score obtained by students trained conventionally of 45% (30-60), p<0.0001. The median score obtained by all students when performing biopsies in real-life situation was 63% (50-80) versus 60% (56-70) for their last training on the simulator.

**Conclusions:** These results allow for the validation of the transfer of skills acquired on the simulation, and show the superiority of a training curriculum integrating simulation and performance feedback.