

Impact of Metacognition in Urological Surgeons on the Process of Gaining Proficiency in Robot-Assisted Surgery Evaluated Using a Mimic dV-Trainer

Introduction and Objective: Metacognition is “knowing about knowing”, a process by which individuals are aware of their own brainwork during learning. Metacognition has been a focus of particular attention as one of the most important factors involved in learning, and as a strong predictor of academic success. The aim of the present study was to assess the impact of metacognitive ability in urological surgeons on the process of gaining proficiency in robot-assisted surgery using the Mimic dV-trainer.

Materials and Methods: Nineteen urological surgeons performed a suturing task 4 times. Their performances were recorded using a built-in scoring algorithm. They also answered a questionnaire consisting of 52 items designed to evaluate metacognition, the Metacognitive Awareness Inventory (MAI; Schraw and Dennison, 1994). Their metacognition was evaluated in terms of 3 components related to knowledge, “Declarative knowledge”, “Procedural knowledge” and “Conditional knowledge”, and 5 components related to regulation, “Planning”, “Information management strategies”, “Comprehension monitoring”, “Debugging strategies”, and “Evaluation”.

Results: There were positive correlations between the scores for overall metacognition and those for the suturing task in all 4 trials (correlation coefficient, $R=0.695$ at the 1st trial, $R=0.802$ at the 2nd trial, $R=0.743$ at the 3rd trial, and $R=0.626$ at the 4th trial). Among the components of metacognition, “Comprehension monitoring” and “Evaluation” at the 1st trial ($R=0.965$ and $R=0.979$, respectively) and “Debugging strategies” at the 4th trial ($R=0.907$) showed a strong correlation with the suture task, but the remainder did not.

Conclusions: Our data indicate that components of metacognition related to regulation are associated with an advantage in assimilating the most fundamental suturing technique in robot-assisted surgery.