Is visuospatial ability of importance for patient safety?

Research project

Center for Advanced Medical Simulation, Karolinska University Hospital[a] and
Department of clinical science, intervention and technology (CLINTEC), Karolinska Institutet at
Karolinska University Hospital, Stockholm, Sweden[b]. Departments of Obstetrics and Gynecology[c] and
Department of Surgery[d], Södertälje Hospital, Södertälje, Sweden.
Department of Psychology, Umeå University[e], Umeå, Sweden. Divisions of Surgery[f] and
Orthopaedics[g] at Karolinska University Hospital, Stockholm, Sweden.

Liv Ahlborg, MD[a,c]; Leif Hedman, PhD[e]; Daniel Murkes, MD[a,c]; Bo Westman, PhD, MD[a,b,d]; Ann Kjellin,
PhD, MD[a,b,f]; Li Felländer-Tsai, PhD, MD[a,b,g]; Lars Enochsson, PhD, MD[a,b,f]

Abstract
Background: Clinical surgical training is, not only time consuming and expensive, but also potentially hazardous for the patient. As new and more advanced surgical techniques are introduced and as medical treatment increasingly replaces surgical intervention, the number of operations available for doctors under training is limited. Previous studies have suggested that laparoscopic simulator training improve the surgical result and thereby patient safety. Consultants in obstetrics and gynecology often share their time between both specialties and therefore spend less time in the operating theatre compared to other operating specialists and could therefore particularly benefit from simulator training. Previous studies also indicate that simulator performance is correlated to the innate visuospatial ability of the operator, at least among students or novices.
Purpose: To investigate if consultants in obstetrics and gynecology improve their result when training in a laparoscopic simulator and if their performance is correlated to their visuospatial ability.
Method: Participants were tested for visuspatial ability by the Mental Rotation Test A (MRT-A). After a familiarization session and standardized instruction, all participants conducted three consecutive virtual tubal occlusions followed by three virtual salpingectomies. Linear regression was used to analyze the relationship between visuospatial ability and simulated laparoscopic performance. Performance in the simulator was measured by Total time, Score and Ovarian diathermia damage.
Results: The MRT-A score correlated with both Total time and Score in the medium level virtual tubal occlusion. In the technically more difficult virtual salpingectomy the MRT-A score correlated with Total time (r= -0.64; P= 0.02), Ovarian diathermia damage (r= -0.65; P=0.02) and with overall Score (r=0.64; P=0.02).
Learning curves were obtained with significant improvements in both Total time and Score.
Discussions/conclusions: During training in a gynecological laparoscopic simulator, consultants in obstetrics and gynecology appear to improve their performance. Performance was however influenced by the visuospatial ability of these consultants. Thus, simulator training can be important to improve surgical skills and thereby patient safety. Moreover testing the visuospatial ability of consultants in obstetrics and gynecology can be helpful for developing individual training programs and thereby improve surgical results and patient safety.

Key words: Visuospatial ability, simulator training, laparoscopy, gynecology,
                consultants, patient safety