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Ergonomics in Laparoscopic Surgery

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Abstract

Despite the many advantages for patients, laparoscopic surgery entails certain ergonomic inconveniences for surgeons, which may result in decreasing the surgeons’ performance and musculoskeletal disorders. In this chapter, the current status of ergonomics in laparoscopy, laparoendoscopic single-site surgery (LESS), and robot-assisted surgery will be reviewed. Ergonomic guidelines for laparoscopic surgical practice and methods for ergonomic assessment in surgery will be described. Results will be based on the scientific literature and our experience. Results showed that the surgeon’s posture during laparoscopic surgery is mainly affected by the static body postures, the height of the operating table, the design of the surgical instruments, the position of the main screen, and the use of foot pedals. Ergonomics during the laparoscopic surgical practice is related to the level of experience. Better ergonomic conditions entail an improvement in task performance. Laparoscopic instruments with axial handle lead to a more ergonomic posture for the wrist compared to a ring handle. LESS is physically more demanding than conventional and hybrid approaches, requiring greater level of muscular activity in the back and arm muscles, but better wrist position compared with traditional laparoscopy. Physical and cognitive ergonomics with robotic assistance were significantly less challenging when compared to conventional laparoscopic surgery.

Keywords: Ergonomics, laparoscopic surgery, laparoendoscopic single-site surgery, robotic instrument, electromyography, motion capture
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