Comparison of Single-Incision Robotic Cholecystectomy, Single-Incision Laparoscopic Cholecystectomy and 3-Port Laparoscopic Cholecystectomy -Postoperative Pain, Cosmetic Outcome and Surgeon's Workload

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Since the introduction of laparoscopic cholecystectomy in 1985,¹ continuous trials for less invasive approaches by reducing the number and size of ports have been attempted by many researchers.² In this context, Navarra et al. introduced single incision laparoscopic cholecystectomy (SILC) in 1997;³ however, this technique has spread slowly until 2008 due to technical problems and the requirement for highly developed surgical skill.⁴ Although this technique has become more attractive with the improvement in skills and the development of new devices in recent years, it still has some problems, such as repeated conflict between operating instruments, lack of proprioception induced by the crossing of instruments, and reduced visualization of the key components of a cholecystectomy.⁵ These problems have led to inadequate traction of the gallbladder during a dissection of Calot's triangle and have a difficulty in obtaining the "critical view of safety". For these reasons, concerns about biliary complications have still been active subjects of debate and previous studies that reported safety and feasibility of SILC were confined mostly to selec-

tive patients with exclusion criteria, such as acute cholecystitis, obese patients, and history of previous abdominal surgery. Robotic technology has been proposed to overcome some of these limitations. Robotic single incision laparoscopic cholecystectomy appears to have similar results in terms of the incidence and grade of complications compared to standard laparoscopy. In addition, it appears to be affected by the same limitations of single-port surgery, consisting of an increased operative time and incidence of port site hernia.⁶ In terms of ergonomics, Grochola et al.⁷ reported that robotic single incision laparoscopic cholecystectomy provides significant benefits over single incision laparoscopic cholecystectomy in terms of the surgeon's stress load but increases the expense. This study has valuable implications in ergonomics and provides first domestic report of a surgeon's workload assessment in laparoscopic cholecystectomy. On the other hand, an objective assessment will be needed for a more precise workload assessment for the next large population study.

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