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Gasless Robotic Single-port Cholecystectomy Using The DaVinci SP System: A Feasible Way Minimizing Surgical Dearrangement While Obtaining The Critical View Of Safety

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Background : Gasless minimally invasive surgery has been proposed as an alternative method to reduce associated problems with carbon dioxide inflated pneumoperitoneum, which recently incorporates robotic surgical systems to ensure the surgical field of view. This study aims to present the initial experience and feasibility of the gasless robotic single-port cholecystectomy (RSPC).

Methods : We reviewed 35 consecutive patients who underwent gasless RSPC with the da Vinci SP Robotic Surgical System (Intuitive Surgical) from October 2021 to March 2022. Carefully selected patients were enrolled in the study among patients diagnosed with symptomatic gallstone or gallbladder polyp. Patients should have no acute inflammatory changes in the gallbladder, severe gallbladder dilatation, or edematous gallbladder wall and not expect excessive visceral fat on preoperative imaging. In addition, Considering the distance that the robotic arm joints can move sufficiently, RSPC was performed when the distance from the navel to the gallbladder was at least 8 cm. All operations were performed by a surgeon with extensive robotic single-site cholecystectomy experience. We prospectively evaluated the patient's demographic data, intra-operative results, and postoperative outcomes.

Results : Gasless RSPC was successfully performed in 30 out of 35 patients. In the case of 5 patients with conversion to the standard pressure pneumoperitoneum, there was insufficient surgical space (n=3), the GB perforation (n=1), and bleeding during surgery (n=1). The mean whole operation time was 53.6 ± 17.2 minutes. No patients complained of postoperative shoulder pain or had postoperative complications, and the average hospital stay was 2.1 ± 0.3 days.

Conclusions : Gasless RSPC is feasible and safe for some patients who need cholecystectomy. The unique features of the SP robotic platform allow the surgeon to perform safely in an incapacious surgical space. However, this procedure is possible only for highly selected patients yet.

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