

Development of a novel multichannel port (x-Gate®) for reduced port surgery and its initial clinical results

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It is important to avoid conflicts among instruments inside or among handles outside in single incision endoscopic surgery (SIES) or reduced port surgery. To minimize these conflicts we have developed a new multichannel port with wider distance between the channels. Herein we introduce this unique access port “x-Gate®” and demonstrate the initial clinical results.

The x-Gate® is dissembled into two parts: The main unit and the converter. The main unit is composed of two rings and a barrel connecting these rings. The inner ring is inserted through an incision in the abdominal wall (2–2.5 cm) into the abdominal cavity. Pulling the four belts of the outer ring evenly expand the incision and fixed to the abdominal wall. The converter has four channels, of which three have the outer diameter of 15 mm and one 22 mm. The distance between the centers of the main channels ranges from 29 to 31 mm.

We used the x-Gate® in 47 patients undergoing a variety of reduced port surgery, including cholecystectomy (22), local gastrectomy (13), intragastric surgery (4), colon resection (1), appendectomy (3), inguinal hernia repair (3), and splenectomy (1). The largest group of the current study was cholecystectomy. In this group the operation time ranged 47 to 121 minutes with an average of 68 minutes. Blood loss was almost nothing in all cases. No significant intraoperative complication was noted. We did not experience conversion to the conventional laparoscopic surgery nor laparotomy. Postoperative course in all patients was uneventful. The postoperative hospital stay ranged 3 days to 5 days with an average of 3.8. In the local gastrectomy and splenectomy cases 12 mm stapling device was used directly through the larger channel.

Overall performance of x-Gate® was sufficient in the clinical experience. There have been no complications attributed to x-Gate®. We found that with the x-Gate® the conflicts among the forceps have been drastically improved compared with other multi-channel ports. The most remarkable advantage of x-Gate® is the longer distance between the channels (2.9 to 3.1mm), which should reduce conflicts between the instruments

during the operation and possibly lessen the operation time.