NOVEL SINGLE-PORT ROBOTIC RIGHT HEMICOLECTOMY SURGICAL ROBOTICS PLATFORM: ACCESS AND REACH



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PURPOSE:

Single-port laparoscopy for abdominal surgery is technically challenging due to surgical technique and technology limitations, specifically in right hemicolectomy, which has traditionally shown high herniation rates due to the number of abdominal ports. In comparison with the standard laparoscopic procedure, single port-access, as well as NOTES, may provide improved aesthetic benefit, decreased postoperative pain and a shorter duration of hospitalization[1].

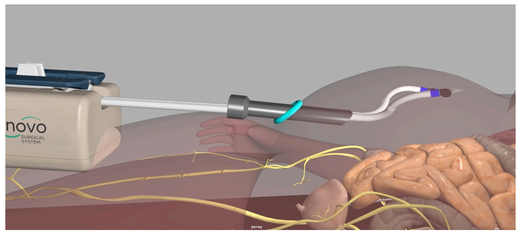
The functionality of a novel single port robotics platform may enable the benefits of the single port-access and NOTES, while alleviating the latter challenges. Initial pre-clinical results show positive impact on the surgical workflow and access, including limiting initial and post incision to 2.1cm

MATERIALS AND METHODS:

A transformative robotics platform has been developed that allows the articulation to occur inside the abdomen by 2 arms inserted through a single incision or natural orifice. An accessory port for advanced energy and stapling were added.

- System features miniature humanoid-shaped robotic arms that provide human level dexterity, multi-planar flexibility and 360 degrees of articulation for various access configurations.
- Robotic arms are introduced into the workspace extended and then retroflexed or anteflexed towards the anatomy to reach and manipulate tissue of the right colon, transverse colon, control and dissect the mesentery and proximal margin

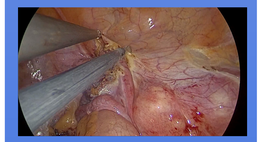
This study measured the manipulability of this new robotic platform throughout its entire reachable workspace in the abdomen[2], including traction, counter traction and anatomy maneuverability.







Various arm configurations



Standard laparoscopic instrument triangulation



Flexible robot triangulation and improved visualization

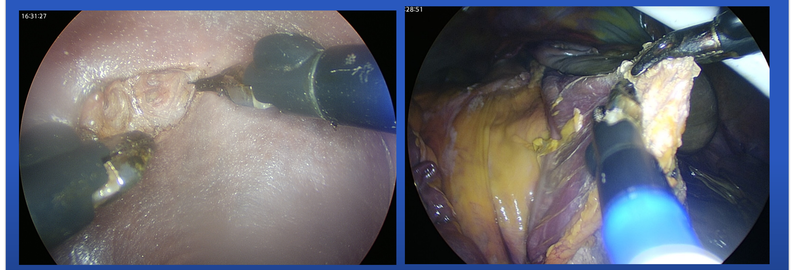
RESULTS:

The results show that the reachable workspace encompasses the entirety of the average male and female abdomen from the para-aortic nodes to the pelvic floor, across from abdominal sidewall to sidewall and from the abdominal wall to vertebrae.

- The transformative and innovative design of the shoulder, elbow and wrist joints of the instrument arms allow for their articulation to occur after entry into the abdomen, enabling a feasible and effective approach to single port right colectomy.

Because the wrist joints have unlimited rotation and the shoulder and elbow joints allow the arms to function as they cross over each either, the manipulability index remains high (high usability) within the abdominal cavity and particularly around anatomy of interest such as the distal ileum, cecum, ascending colon and proximal to mid-transverse colon.

The system enables clear and concise movements to mobilize the right colon, perform transverse mesenteric dissection and free the specimen.



Colectomy via a novel single abdominal access point



ANOVO SURGICAL SYSTEM

CONCLUSIONS:

The design of this new robotic technology has the potential to provide surgical treatment during a single port right hemicolectomy including improved triangulation, reduced instrument clashing and optimized visualization[3]. The use of a single port access through a transumbilical or transpfannestiel incision and avoiding additional trocars and drains could increase patient satisfaction, based on reduced pain and increased cosmetic results[4]. Nevertheless, further prospective studies are needed.

Currently FDA authorized for benign hysterectomy, with salpingo-oophorectomy, with salpingectomy, salpingectomy, oophorectomy, adnexectomy, ovarian cyst removal.

EPD is a consultant of Momentis
CL and HY are consultants of Momentis
MC and MM are employees and shareholders of Momentis

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