




3 mm Senhance robotic hysterectomy: a step towards future perspectives

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Received: 4 October 2017 / Accepted: 12 January 2018 / Published online: 23 January 2018
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Dear Editor,

In the last two decades, surgical approach for hysterectomy has evolved significantly [1]. On the one hand single-site surgery, minilaparoscopy and the more recent percutaneous approach have led to an increasing search of minimal invasiveness [2]; on the other hand, technology reached the highest expression in robotics [3, 4].

Whereas minimizing laparoscopic access permitted to achieve a further and significant reduction of invasiveness while maintaining surgical adequacy, robotic technology allowed the possibility to overcome common limits of laparoscopic approach extending the advantages of endoscopic surgery to “difficult cases” for whom the only surgical way would have been an extensive laparotomy.

Apparently, these two trends deeply diverge from each other.

However, technological improvement is constantly redefining the concept of the “minimal” surgical approach. In 2013 the introduction of Telelap ALF-X robotic system (now called Senhance™—Transenterix USA) represented a unique innovation in this panorama: robotic technology applied to a pure laparoscopic setting with reusable instruments and 5 mm ancillary trocar [5].

System description

Senhance surgical platform is based on three independent robotic arms that are remotely controlled by the Surgeon. From the control unit, named “cockpit”, the surgeon drives the robotic arms by utilizing robotic controls that replicate

the laparoscopic manipulators. Immediately below the 3D-HD screen, an infrared sensor, the “eye tracking system”, constantly tracks the surgeon’s eye movement and drives the camera according to the specific point the surgeon is looking at. On each robotic arm, 5 or 3 mm strength and reusable instruments can be hooked and inserted in the peritoneal cavity through standard trocars. A 10-mm balloon trocar is inserted in the umbilicus for the 10-mm 3D-HD camera (Viking System). Once the operative procedure has started, each robotic arm detects the force applied on tissues: these data are processed by the system and translated in “haptic feedback” on the control manipulator.

Main characteristics of this innovative technology have been widely investigated in terms of safety and efficacy in gynecological procedures in our Division of Gynecologic Oncology of the Policlinico Agostino Gemelli in Rome [6].

Basing on this premises, looking back to published data in terms of ultra-minimally invasive instrumentation and considering the high versatility of the system, Transenterix recently introduced a totally new CE-marked robotic instrumentation: driven by utilizing surgeons’ requests, a set of 3-mm monopolar reusable robotic instruments was developed to cross the line of both minimally invasive and robotic surgery.

Representing an absolute innovation, for the first time in the robotic era, 3 mm instruments are hooked on a robotic platform.

From July to September 2017, four patients with indication of hysterectomy with bilateral salpingo-oophorectomy for risk-reducing purpose or premalignant endometrial disease were considered eligible for 3 mm Senhance surgery. IRB approval was obtained and the patients were enrolled after the signing of informed consent. The same surgeon with an experience of more than 100 Senhance procedures performed all surgeries.

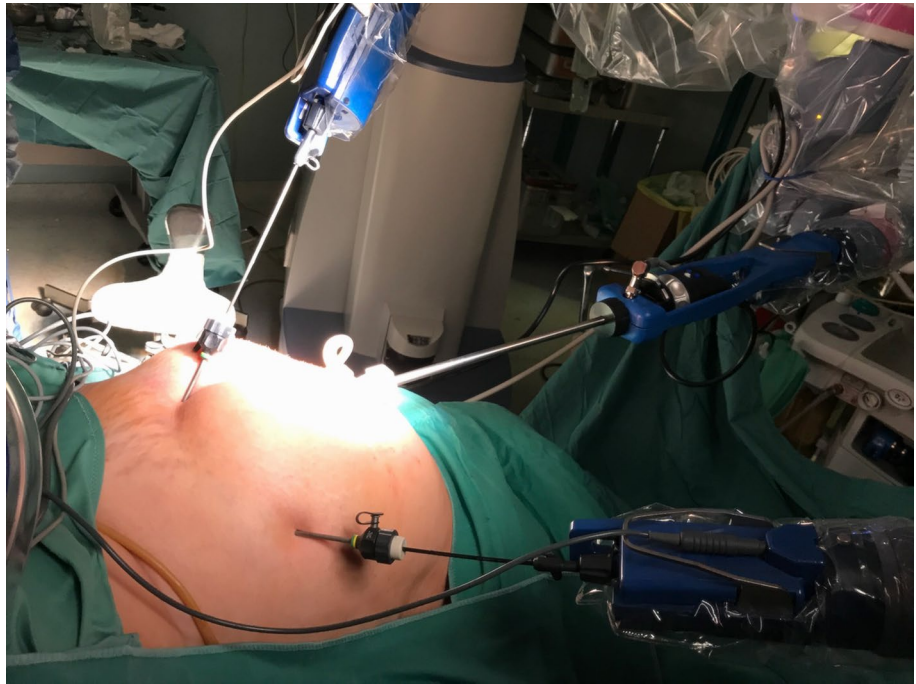
A standard laparoscopic port placement was adopted for the surgical procedures.

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Fig. 1 Operative setting and port placement



In addition to two 3 mm trocars, respectively, placed on the left side and suprapubic position, a 5-mm standard trocar was placed on the right side to overcome the lack of bipolar energy. A 5-mm multifunctional instrument (Thunderbeat by Olympus) was used by the first assistant to ensure appropriate coagulation. The team maintained the standard surgical technique for hysterectomy (Fig. 1).

Median operative time was 97.5 min (120–80), EBL was less than 50 ml in all cases and no conversions to standard robotic approach were registered. All patients were discharged on day 1. No postoperative complications occurred (within 30 days).

The present small series cannot be considered more than a pioneer experience in a new dimension of the robotic era: the possibility to obtain an extreme reduction of instruments' size together with the advantages provided by robotic technology represents an amazing goal achieved in the modern surgical panorama. Maintaining the same surgical setting used in standard mini-laparoscopy represents an added value for the surgeon: 3 mm instruments do not require specific learning curve when hooked on a robot, but a surgical skill in minilaparoscopy is important to make proper use of the instruments. Whereas the haptic feedback function allows the surgeon to feel flexibility of 3 mm thinner instrument, the 3 mm operative tip requires caution in making traction and dissection in the same way minilaparoscopy does.

Actually, the absence of bipolar grasper represents the most important limitation of this surgical solution. However, even if its availability is mandatory to start a prospective assessment of safety and feasibility of this new set of

instruments, the role of Senhance platform is growing rapidly and it is going to define the new concept of “minimally invasive robotic surgery”.

Compliance with ethical standards

Ethical standards All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Conflict of interest S. Gueli Alletti was a consultant for Transenterix Company at the time of writing the present paper. Doctors Perrone, Cianci, Rossitto, Bernardini and Scambia have no conflict of interest to declare.

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