Appendix S1

**Surgical procedure**

The patient was positioned in the dorsal lithotomy position, with a Trendelenburg tilt, arms tucked along the body and legs supported in Allen stirrups. A 5-mm Hasson balloon trocar was inserted in the umbilicus for the camera. Once pneumoperitoneum (12 mmHg) was achieved, intra-abdominal visualization was obtained with a 0° 5mm HD telescope (ENDOEYE, Olympus Winter & Ibe, Hamburg, Germany). After that, in the PSS-H group, one standard 5-mm port was placed in suprapubic position and two PSS instruments were used as side graspers for both surgeon and first assistant. The Percuvance™ shaft was percutaneously inserted and set with proper functional tip (the gripper grasper tip or the alligator tip were installed on both percutaneous shafts) as described in previous studies 10, 11. The 5 mm port was used for suction/irrigation, monopolar hook, 5 mm endoclip, and multifunctional instrument (Thunderbeat, Olympus Winter & IBE GMBH, Hamburg, Germany). The multifunctional instrument was used in both approaches, but constitutively in PSS-H for lack of bipolar energy in percutaneous instruments. In the LPS-H group, three additional 5 mm ports were placed according to the standard LPS surgical setting (1 port in the suprapubic area, 1 in the left lower quadrant and 1 in right lower one).

Surgical steps:

1. After bilateral cauterization of the fallopian tubes in endometrial cancer cases, the intrauterine manipulator (Clermont Ferrand uterine manipulator, Karl Storz, Tuttlingen, Germany) was positioned in some patients;
2. Next, surgical steps to perform a total hysterectomy were superimposable in both approaches. Trough the coagulation and section of the round ligaments and the broad ligaments, we approached the retroperitoneal space with the visualization of the ureters and vasculo-nervous structures;
3. The uterine arteries were closed at the origin with hemostatic endoclips bilaterally;
4. When indicated, we cauterized the ovarian vessels, with ureter always under visual control;
5. Afterward ventrally, we developed the vesico-uterine septum until the pubo-cervical fascia (Halban's fascia);
6. After that, uterine vessels were recognized, cauterized, and sectioned close to the uterus walls;
7. The vagina was incised circumferentially with the monopolar hook. Uterus and adnexa were extracted through the vagina;
8. The vaginal vault was closed with a single-layer running braided and coated 0-polyglactin suture by laparoscopic or vaginal approach.

Intraoperative histological analysis was performed when requested.