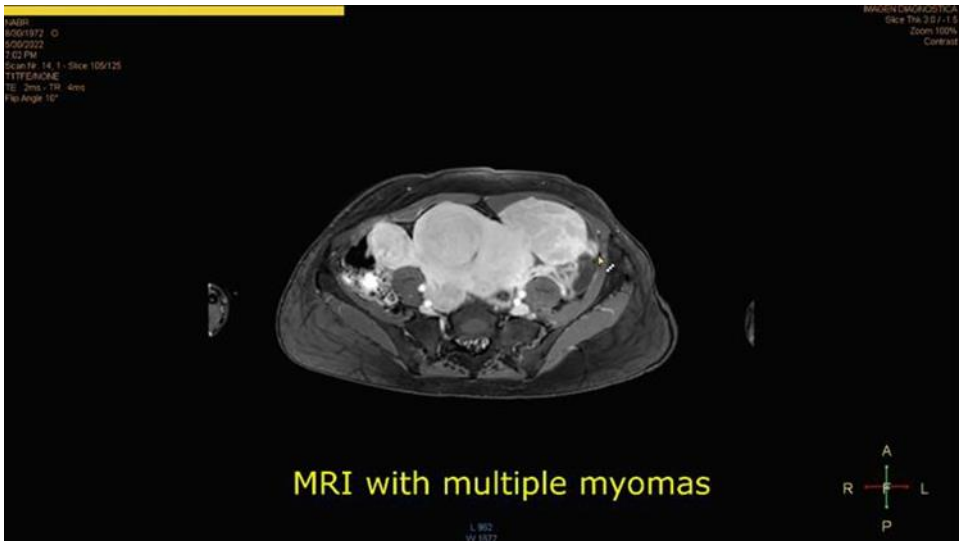

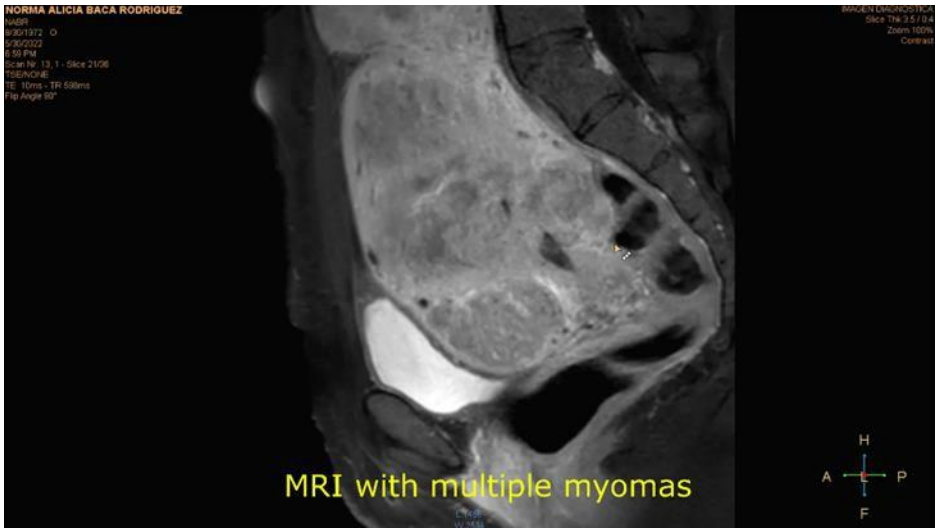

Fig 2 fibroids on MRI

The Body Mass Index is (BMI) 19.05 kg/m2 decimal precision two within the average weight.

The clinical picture was discussed with the patient, and the decision was to have a Total hysterectomy + bilateral salpingectomy with ovarian preservation. The patient was informed of Hybrid v-NOTES, and signed the consent. The LAv-NOTES technique was planned due to the expected complexity of the procedure. The day before surgery, a myoma mapping was done with U/S [Supp. Fig 10].

There was two surgical teams a gynecology oncologist MIGS (minimally invasive gynecological surgeon) specialist; described as surgeon one and his assistant, fellow (FMIGS 2nd year) MIGS with one assistant (FMIGD 2nd year), one anesthesiologist, and one surgical Nurse [Supp. Fig 12]. During the intervention, the first step was the

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abdominal approach here the operation field was prepared and draped. The Verres needle was placed in Palmer point and the CO2 distention was initiated [Supp. Fig 2], then the first port was inserted 20 cm above the umbilicus [Supp. Fig 3], we used a telescope of 11mm with a 0° fore oblique lens, and four 5mm accessory ports were used on each side of the abdomen, with as energy source the LigaSure™ Retractable L-Hook laparoscopic sealer/divider (Medtronic™, Minneapolis, MN, USA). The bilateral salpingectomy thereafter a myomectomy of the pedunculated myomas was performed [Supp. Fig 4]. During the vaginal time, a Foley catheter was placed, the Gel Port® (Applied Medical™, Rancho Santa Margarita, CA, USA) was inserted, and CO2 was insufflated up to 12 mm Hg to maintain an adequate pneumovagina with the use of a 30°mm scope and Enseal® G2 (Ethicon®Endo-Surgery, Cincinnati, OH, USA). The cervix was pulled with Pozzi forceps and then circumcised with a sharp knife.; previously hydrosulfate with 10cm of lidocaine + epinephrine at the anterior fornix, the vaginal mucosa, and the bladder were pushed up along the uterine-cervical fascia whilst traction on the cervix was maintained.

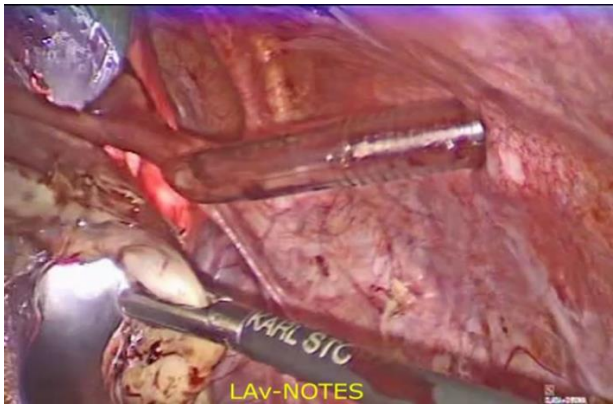

Fig 3 LAv-NOTES

Once the peritoneum between the bladder and the uterus was identified, it was opened using cold scissors. The same technique was used in the posterior fornix until the peritoneum of the pouch of Douglas was visualized and opened. Once the anterior and posterior peritoneum was opened, both sacro-uterine ligaments were identified, clamped, and cut using cold scissors then ligated with Vycril- 1® (Ethicon®, Piscataway, NJ). The following step was to put the Alexis retractor and the Gel port ® [Supp. Fig 6, Fig 8] (Applied Medical™, Rancho Santa Margarita, CA, USA.) An Alexis O Wound Protector/Retractor (Applied Medical™, Rancho Santa Margarita, CA, USA.) was placed in the pouch of Douglas then, the hysterectomy was performed, caudally to cranially, the remainder of the parametrium, the uterine arteries, and the ovarian ligament were cut and coagulated with advanced Bipolar energy, Enseal® G2 (Ethicon®Endo-Surgery, Cincinnati, OH, USA). [Supp. Fig 5 and 9]. The laparoscopic time was 124 minutes, and for vaginal time, 34 minutes [Supp. Fig 7 and 11], considering that both procedures were done at the same time. After hemostasis, the pneumoperitoneum was deflated, and the port device was removed. The uterus with the myomas was morcellated with a knife and extracted per vagina, and the colpotomy was vaginaly sutured using a Vicryl-1 ® (Ethicon®, Piscataway, NJ) suture. The abdominal 11mm port was closed with 2 Vicryl-2 ®, and all 5 mm ports were closed with Monocryl 4-0 (Ethicon®). The patient's recovery was unremarkable, and she was discharged 32 hours after the surgery. The total weight of the uterus and myomas were 2285 grams. The pathology report came back as benign myomas.

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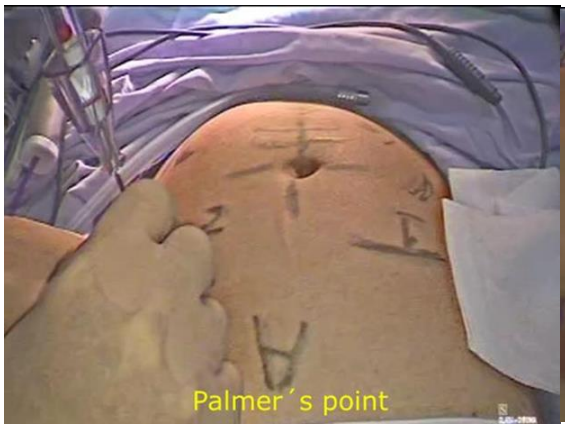
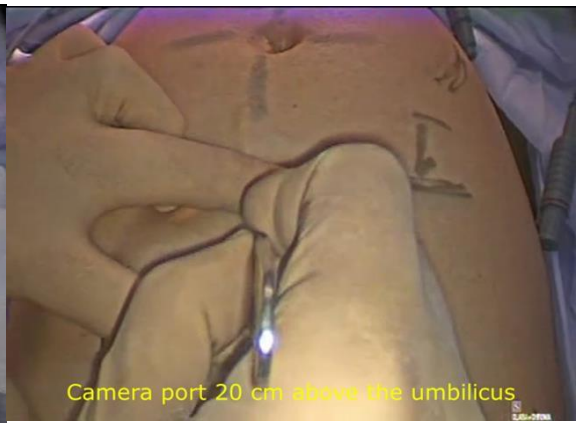
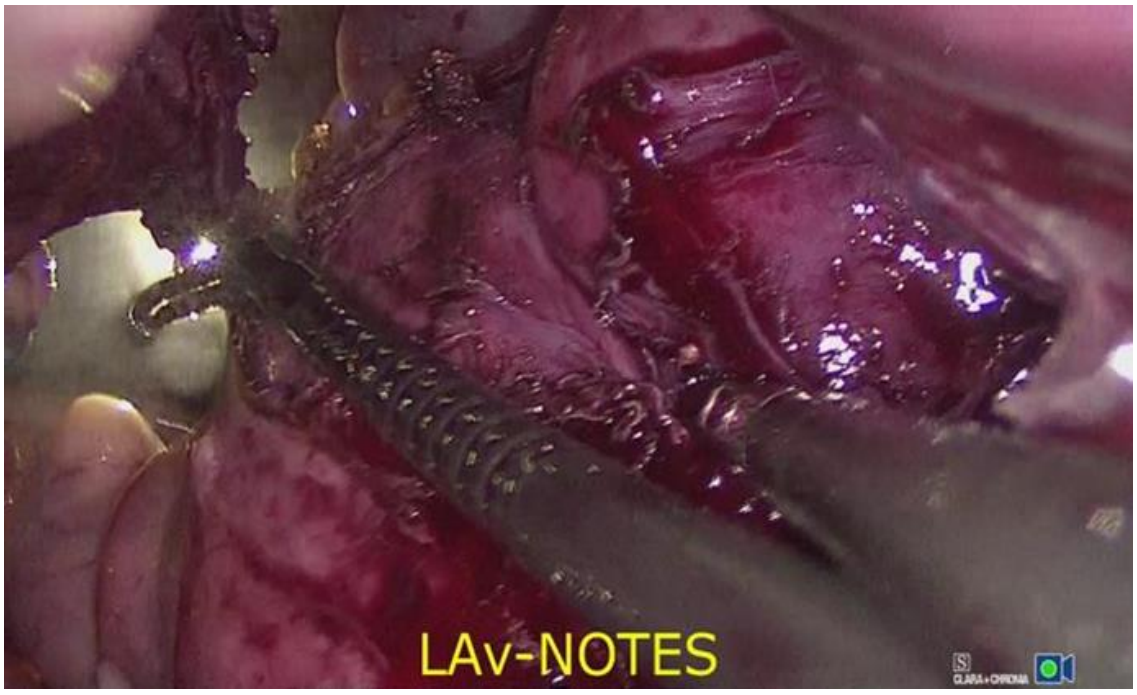




Entry abdominal



Laparoscopic view of the pediculated abdominal pedunculated myomas Ovarian ligament was cut and coagulated with advanced bipolar energy, Enseal ® using LAv-NOTES.

Results:

We report a case of a hysterectomy and salpingectomy with ovarian preservation using LAv-NOTES being successfully performed on a patient with a very large poly-myomatous complicated uterus.

Discussion:

A thorough literature search has suggested that this is the first reported case doing a hysterectomy and salpingectomy with ovarian preservation using LAv-NOTES being successfully performed on a patient with a very large poly-myomatous uterus. The advantages were a double vision in the surgical field, the advantage being that anatomical

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structures were well visible and perfectly identifiable, minimizing the possibility of complications [Fig 3]. The LAv-NOTES technique is a way to invert the limitations of VH whilst maintaining its benefits, with the additional benefit of laparoscopic surgery. The significant differences between v-NOTES and LAv-NOTES are that in both situations it is possible to perform vaginal hysterectomy with the advantages described above but with LAv-NOTES additional information on the status of the abdominal cavity is provided, in addition to direct visualization of the ureters, the pelvic vessels, and important anatomical structures and complications are prevented in difficult cases. With this new technique, we are proving the facility to perform safe surgery in very complex cases like a large uterine size, stretched vagina, no uterine descent, or recently the number of cesareans sections, adhesions, and multiple surgeries are known to restrain vaginal accessibility.

A 2010 survey reported that residents and their program directors believed that graduating residents were not prepared to perform most types of hysterectomies. Only 38% of program directors and 28% of residents believed that residents were prepared entirely to perform TVH. Those numbers dropped to 29% and 22% for TLH [9].

We believe that young gynecologists or residents will be more confident with this surgical approach to performing hysterectomies. Then, the learning curve will be shorter for hybrid LAv-NOTES because the surgeon can see the anatomy from two points of view, abdominal and vaginal, therefore, LAv-NOTES can extend the scope and capability of conventional v-NOTES. The concept of minimally invasive surgery offers the advantage of minor trauma to the abdominal wall, shorter hospital stays, less pain, and fast recovery can be duplicated in hybrid LAv-NOTES. We believe that this new technique will change the surgical approach for very complex cases with a large uterus, keeping in mind that the cost will be higher, but the recovery, the safety, and the less invasive surgery will compensate.

Katrien Nulens, MD et al. published a Retrospective Cohort Study of 114 Patients on their data. The v-NOTES technique seems to be a safe, effective, and less invasive alternative to performing a hysterectomy in cases with a large uterus. Following the ISGE guidelines (that recommend AH in cases with an expected large uterus >280 g, especially when vaginal accessibility is limited), a laparotomy would have been proposed to most of the women in this study, whereas a v-NOTES hysterectomy was performed without needing conversion in 99% of the patients. [10].

Conclusion:

The most performed procedure at present time is the hysterectomy, with the new hybrid surgical technique called, LAv-NOTES we can bring the procedure directly into the field of minimally invasive surgery with the advantages that vaginal hysterectomy offers, but without the disadvantages it, since this technique allows for a direct vision into the abdominal cavity, , and copes with the challenges in complex surgeries such as the very large uterus or poly-myomatous uterus.

More publications about v-NOTES are emerging in the gynecological surgical field, we need more evidence to prove the feasibility of this procedure. In the meantime, we started to apply the LAv-NOTES as the best choice for complex gynecological cases. Comparative studies to evaluate perioperatively outcomes of the patients are needed.

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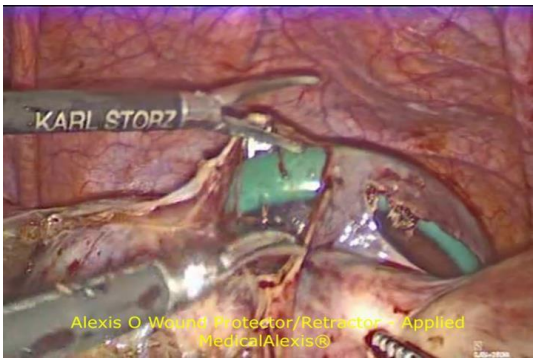
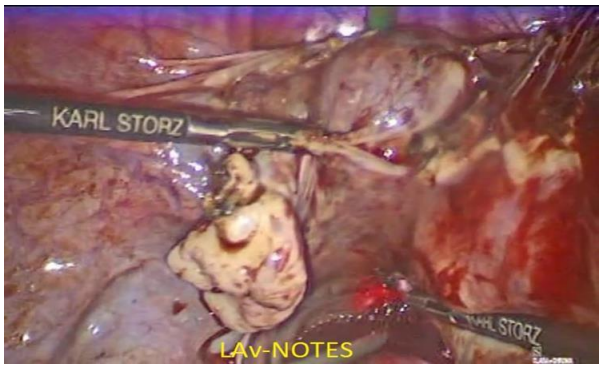
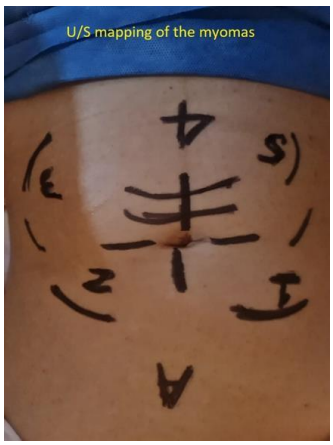
OR Setting:

Alexis O Wound Protector/Retractor - Applied Medical®





LAv-NOTES U/S Mapping the day before surgery



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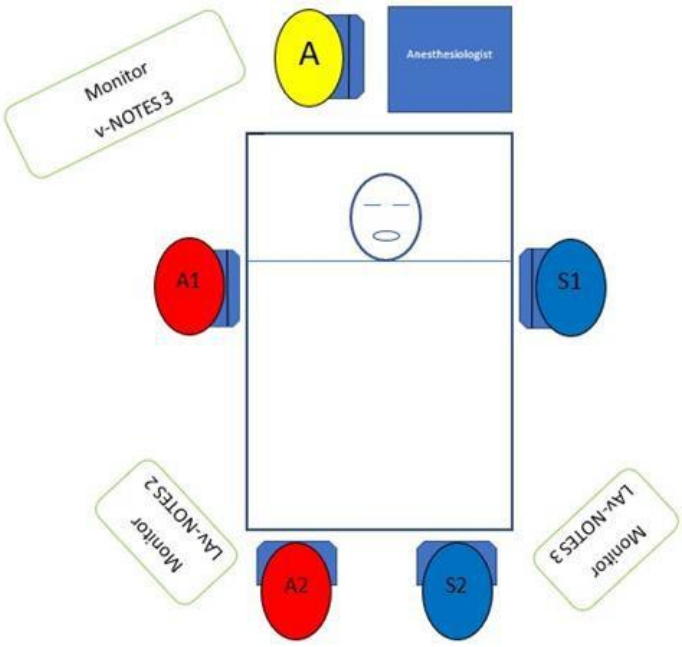
This diagram shows the surgical team positions and the monitors. Surgeon 1(S1) is the Gynecology Oncology Surgeon, a specialist in MIGS; (A 1) was his assistant; Surgeon 2 (S2) was a MIGS Gynecologist, and (A 2) was his assistant (the assistants were FMIGS 2nd year).



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