16

Laparoscopic Hysterectomy

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1. Introduction

The first hysterectomy was performed by Charles Clay in November 1843. It was performed due to a large myomatosus uterus. The operation was successful, however, the patient died on the fifteenth postoperative day. The first patient who survived a hysterectomy was in 1853 and it was performed by Walter Burnham. Out of his subsequent 15 patients, three patients did not survive. These early hysterectomies were all subtotal hysterectomies.

The complete abdominal hysterectomy was recommended in 1929 by Richardson to the prevention of the cervical cancer. Supracervical hysterectomies were preferred for prevention of peritoneal contamination with vaginal bacterial flora and for prevention of peritonitis. However, in the 1950's, when penicillin and other antibiotics became available, Dr. Richardson's technique of total abdominal hysterectomy started to become popular.

Since the first in 1989 from Reich described laparoscopic hysterectomy (LH) the laparoscopic assisted vaginal hysterectomy had spread first in the medical centres (LAVH).

In 1991 Kurt Semm was first who reported about first laparoscopic subtotal hysterectomy. He called his version "CASH" (Classic Abdominal Semm Hysterectomy) and combined the Morcellement of the uterus with the coring out of the cervix. The Semm hysterectomy never became popular due to technical difficulties.

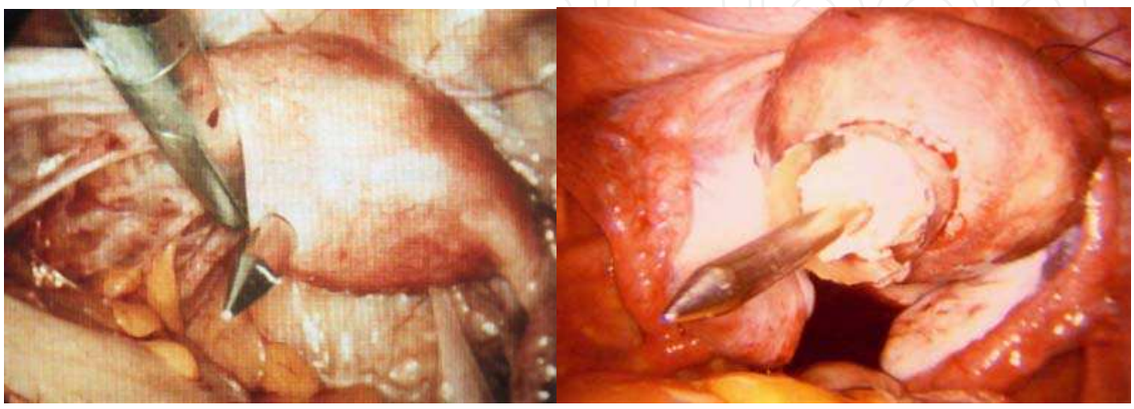


Fig. 1.

2. Indications and contraindications

The indications for laparoscopic hysterectomy are the same, as those which are count to the abdominal hysterectomy – symptomatic uterine fibroids, in the treatment of genital prolaps, endometriosis and adenomyosis, dysmenorrhoe, hypermenorrhoe or dysfunctional uterine bleeding.

After 23 years of development of laparoscopic approach for hysterectomy we haven't any major contraindications to the LH. The removal of very large uterus has become possible by technical development. With clear benefits of LH versus AH, the time-consuming morcellation isn't also a contraindication any more. Patients benefit from less complications and faster convalescence. The author takes the laparoscopic hysterectomy (TLH or LASH) routine even with large uterus (1603 G, the largest uterus until now).

Slightly different is the indication position for supracervikal hysterectomy (LASH), because of preservation of the Cervix. As main indications for the LASH are the symptomatic uterus myomatosus, the adenomyosis uteri with discomfort and dysfunctionally bleeding disturbances which are resistant to therapy. Missing premalignant or malignant changes of the cervix or the body uteri are counted as essential conditions for the realisation of a LASH. Cervixmyoma and recto-vaginal endometriosis show relative contraindications.

For women after LASH lies the risk to fall ill with an invasive cervical cancer, in countries with early diagnosis programs for the cervical cancer, between 0.1 and 0.2%. It is comparable with the risk, reported in the literature of 0.17 %, to develop a carcinoma of the vaginal butt after abdominal hysterectomy. Early lesions can be removed without problems by a specific biopsy or cervixconisation.

The LASH isn't suitable as a standard operation or as a randomly alternative to the hysterectomy in countries without existing early diagnosis programs because of the lack of guaranteed screening examinations before and after a LASH.

3. Operating room setup

The preparing for the laparoscopic case is the most important factor to get a successful laparoscopic procedure. This includes; the ergonomic position of the lights, video screens, and the power supply tower. In order to proceed with the procedure, there should be given functioning monitors/screens for the surgeon and all assistants.

The patient is placed in the dorsolithotomy position on the operating table. A nosogastric tube have to be placed to decompress the stomach. The patient should be moved downwards on the table so that the uterine manipulator can be moved in all directions. The patient`s arms must be tucked alongside the body to allow the surgeon a moving ability without restrictions. The shoulder bolster are very important. They are centred on the acromnion process, over a gel pad, and clipped to the sidebar of the table to prevent upward slippage during Trendelenburg position. A foley catheter should be placed in the bladder to allow to drainage before trocars are inserted. Both; a disposable and reusable uterine manipulator can be used.

The surgeon is positioned on the left side of the patient while the first assistant is placed at the right side and the second assistant stands between the legs. Each surgeon must have a monitor/screen in front of him which he can adjust to his needs. The power supply tower should be positioned close to the patient.

A very important aspect by the acquisition of instruments for the laparoscopic surgery is the choice of the coagulation and preparation technique. The industry courts with little smoke production and OP shortening (LigaSure, Harmonic scalpel).

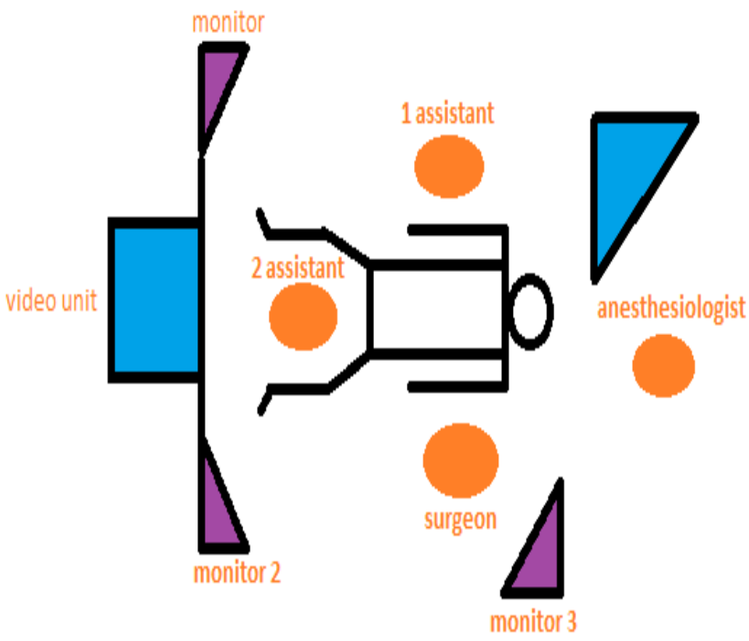


Fig. 2. Operating room setup.

The influence of different operation technologies within the long enduring operation is low. However, the operation duration is significantly influenced by the size of the uterus and not by the used instruments.
A work of the Hessler and al (13) examines and compares the application of different instruments.
172 patients obtained from the same surgeon a total laparoscopic hysterectomy. 60 patients were operated with SonoSurg™, 60 with Ultracision™, 34 with BiClamp™, 11 with BiSect™ and 7 with classical bipolar instruments. Every hysterectomy were executed with standardised Op steps. There were no determining differences between the several technologies considering of the whole operation duration and the pure hysterectomy duration.
The advantages of the classical bipolar instruments with the coagulation of bigger vessels are qualified through the obligatory instrument change to the scissors and the worse preparation qualities, in particular in the area of the cervix, bladder and bowel.
The disadvantages of the ultrasonic technology with the coagulation of the bigger vessels are compensated by the good preparations qualities in this area again. Therefore, the economic aspects, in particular the costs per operation, remain decisively for the equipment purchasing choice.

4. Positioning the trocars

The typical placement of the laparoscope is umbilical (Figure 3). Most surgeons use 10mm instruments with 0 degree. At a large uterus (16 weeks and exceeding) a 30 degree optic is often helpful to present uterine vessels and ureters. If the the uterine fundus reached the umbilicus or beyond, the umbilical optic insertion is impossible. In such cases we used the left subcostal access. We place the trocar on the left below the ribs with two fingers-width and medially 1-2 cm to the epigastric line. The preparation is carried out openly.

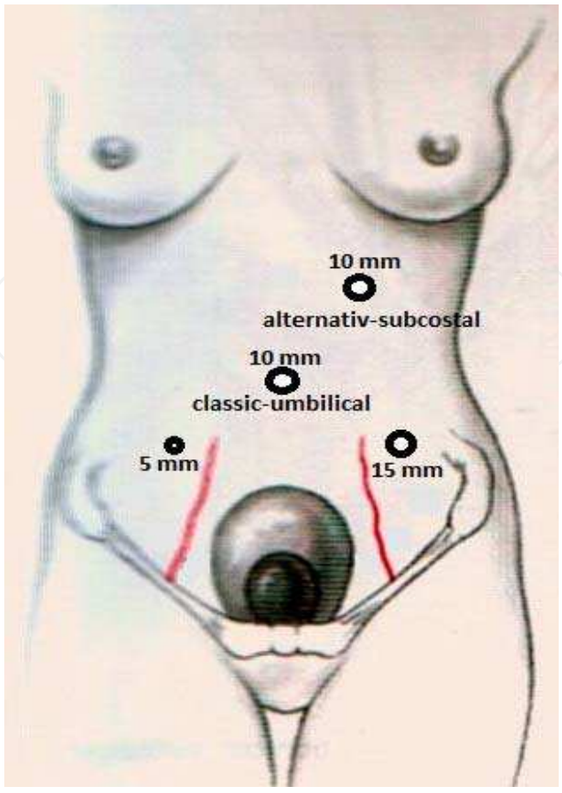


Fig. 3.

We perform all hysterectomies with two ports. On the right lower abdomen is always a 5 mm port placed and on the left lower abdomen, a 12 mm port. The left access will be extended to 15 mm for the morcellation. When peritoneal Adhesions is suspected primary, we choose a left subcostal access also.

Fig. 4. Very large uterus makes the use of navel trokar-optics impossible.

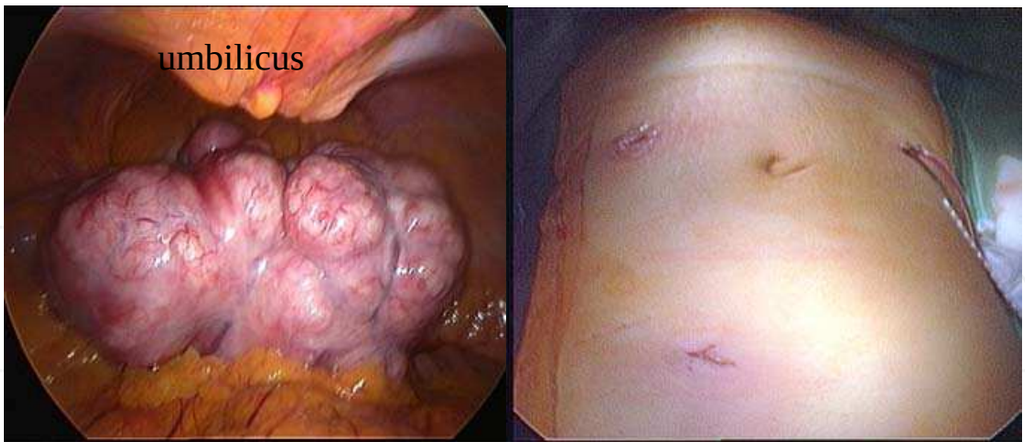


Fig. 5. The same patient. Subcostal access on the left for the optic and very big uterus.

5. Classic laparoscopic hysterectomy (LH)

- LAVH - laparoscopic-assisted vaginal hysterectomy
- LASH - laparoscopic supracervical hysterectomy
- TLH - total laparoscopic hysterectomy
- TLIH - total laparoscopic intrafascial hysterectomy

All hysterectomies made by us are proceeded with standardised methods. Depending on the chosen technique, the operations conduct to a certain point always same.

We always use a uterine manipulator. We are convinced that this is a very important component of surgical technique. By the manipulator, the uterus is pushed anteriorly and laterally. This saves us one laparoscopic port. Additionally, the distance between the uterine vessels and the ureter is amplified. The distance to the ureter allows low-risk vessel coagulation.

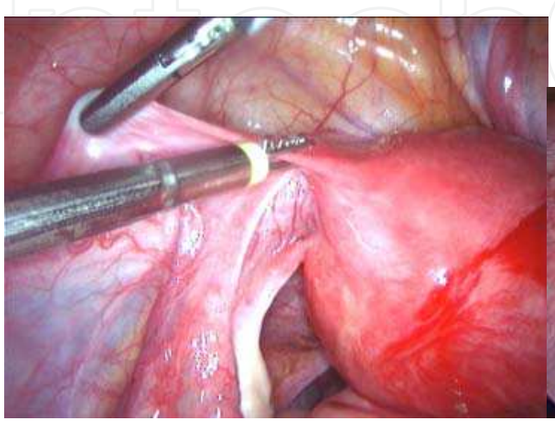
Fig. 5. Uterine Cohen manipulator which we use for LASH, LAVH, TLIH.

Fig. 6. Uterine Hohl manipulator for TLH, TLIH.

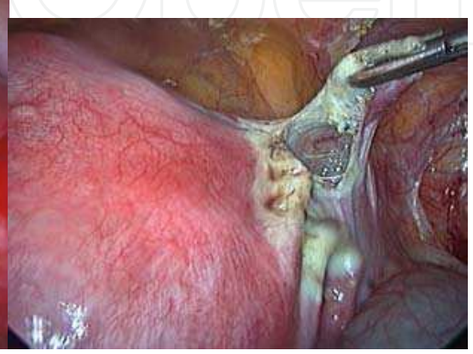
Single standardised surgical technique steps of the LH in our clinic are:

1. Cauterization and transection of the round ligament ("liga sure" or bipolar).

After cutting the round ligament the retroperitoneal space is opened. Now the ovarian ligament can be presented with ovarian vessels and it can be better targeted to achieve a coagulation. At large uterus, depending on the situation, we cut sometimes the fallopian tube or ovarian ligament first.

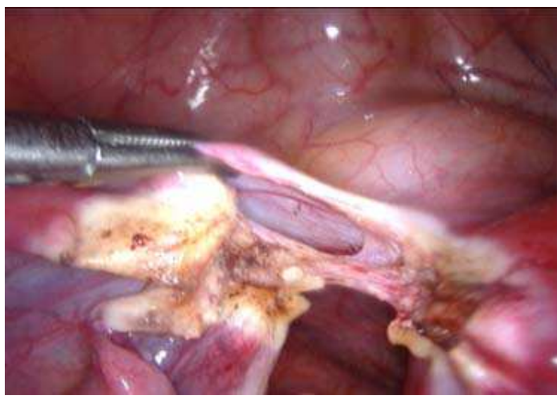


1.a. Small uterus.

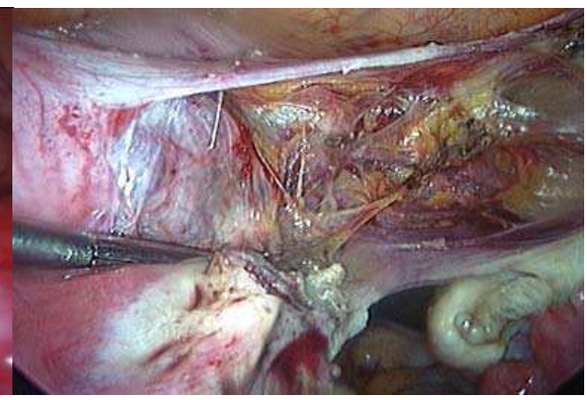


1.b. Big uterus.

2. Ligation of the tube and of the ovarian ligament with the vessels.



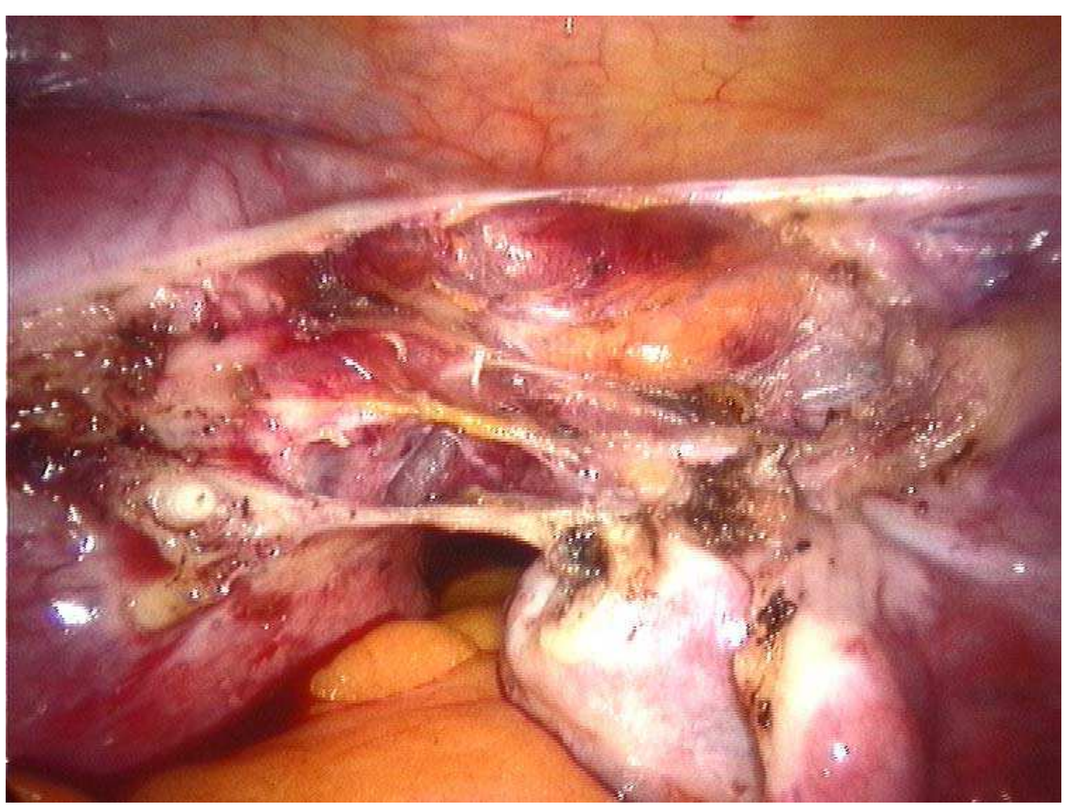
2.a. Small uterus.



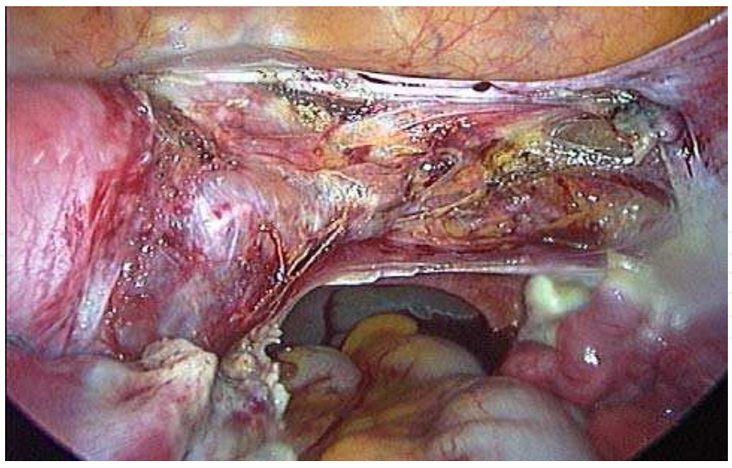
2.b. Big uterus

The retroperitoneal space is wide open by the blunt preparation. All anatomical structures are clearly visible. If necessary, the ureter can already be now grounded and identified on the back page of the broad ligament.

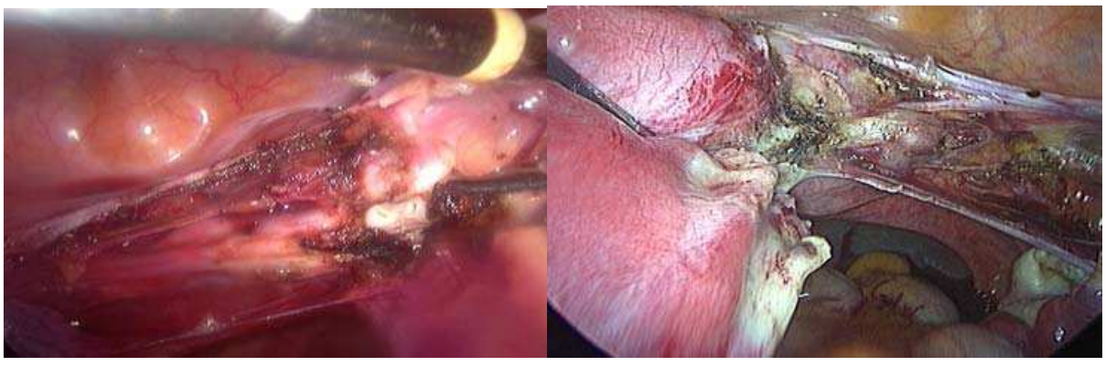
3. Dissection of the anterior broad ligament peritoneum to cervix level.



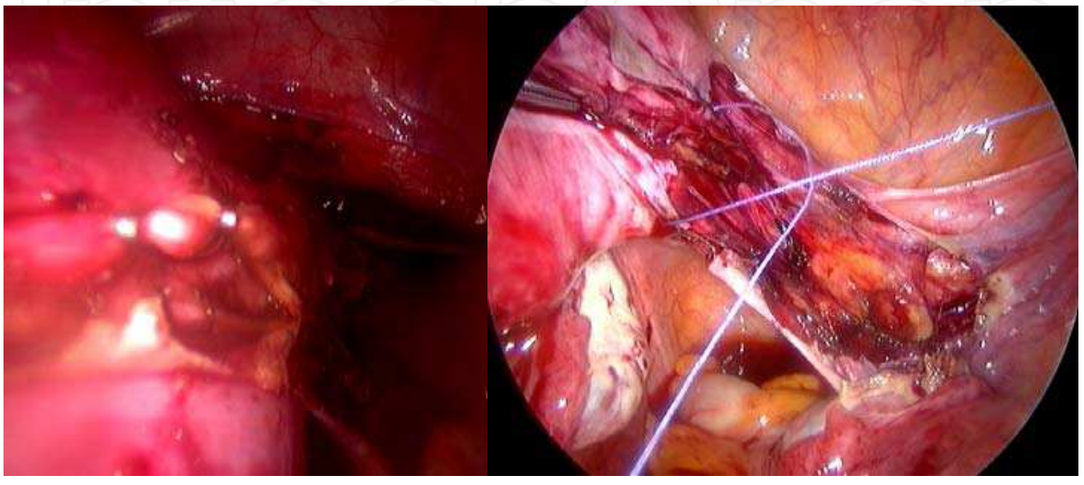
4. Search and localisation of the ureters.
5. Dissection of the posterior broad ligament peritoneum to uterosacral ligament. The broad ligament peritoneum is skeletonized to expose the uterine vessels.



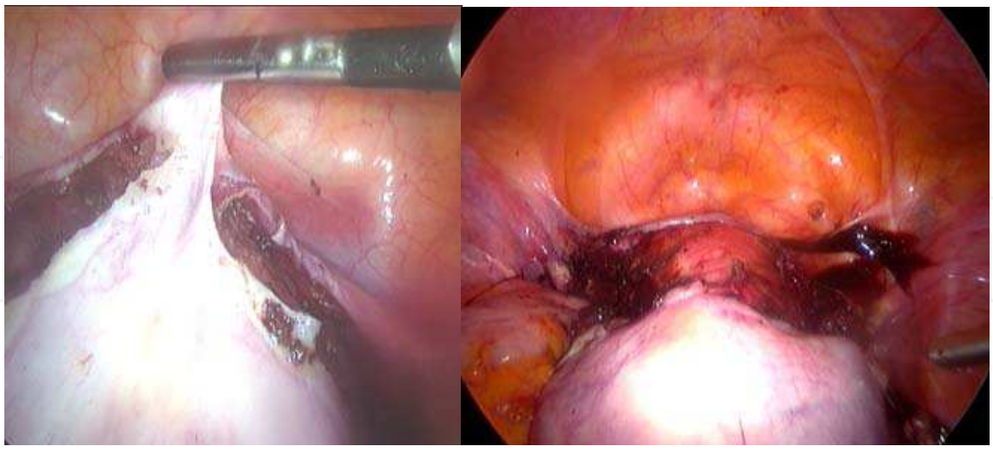
6. Ligation and incision of the uterine vessels with „bi-clamp“ or bipolar coagulation.



It is extremely important that the uterus will be strongly positioned anteriorly and laterally to the opposite direction with the uterine manipulator.
Alternatively, the uterine vessels can be torn down after a titan clip supply or a suturing. The Bi-clamp or bipolar coagulation is the safest and fastest option.



7. Dissection of the bladder.

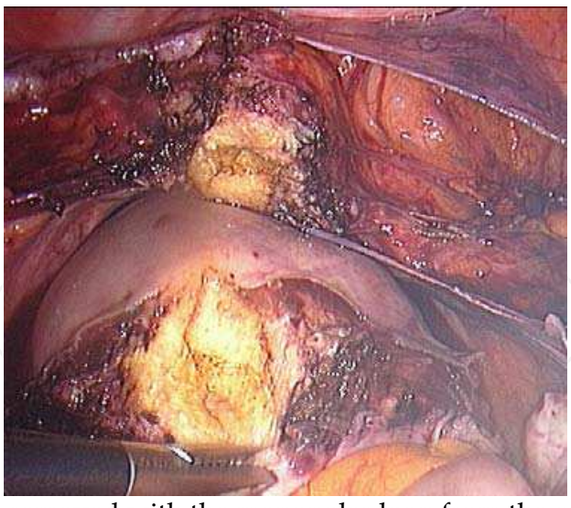


First the vesicouterine fold must be identified, afterwards elevated prior to incise it. This space must be dissected carefully, especially in the case at surgery, in particular previous caeserean section.

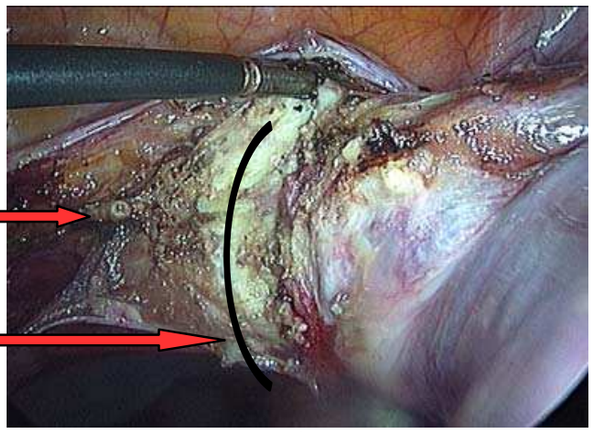
8. The skeletonized uterus.

All surgical steps of these hysterectomy techniques (LAVH, LASH, TLH, TLIH) were until now identical.
If the LAVH technique is chosen, you have to start the vaginal part of the operation. The uterus body will be removed from the cervix within the LASH operation.
Further preparations shall be conducted within the TLH and TLIH (total laparoscopic intrafascial hysterectomy) technique (14).

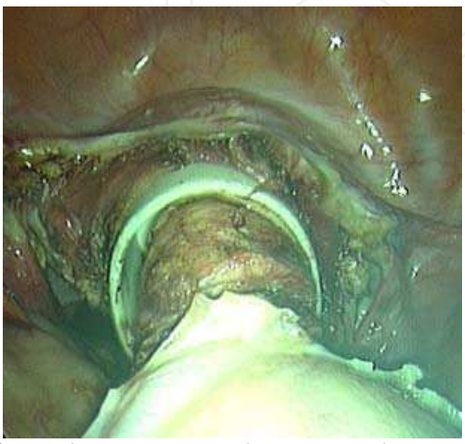
9. The excision of the cervix (LASH) or the uterus from the vagina can be made laparoscopically (TLH) , as well as the dissection of the vagina through a vaginal route (LAVH).



9.a. The uterine body is removed with the monopolar loop from the cervix.
The cervix stump and the cervical canal are now bipolar coagulated. This is made to avoid the cyclical residual bleeding after surgery.

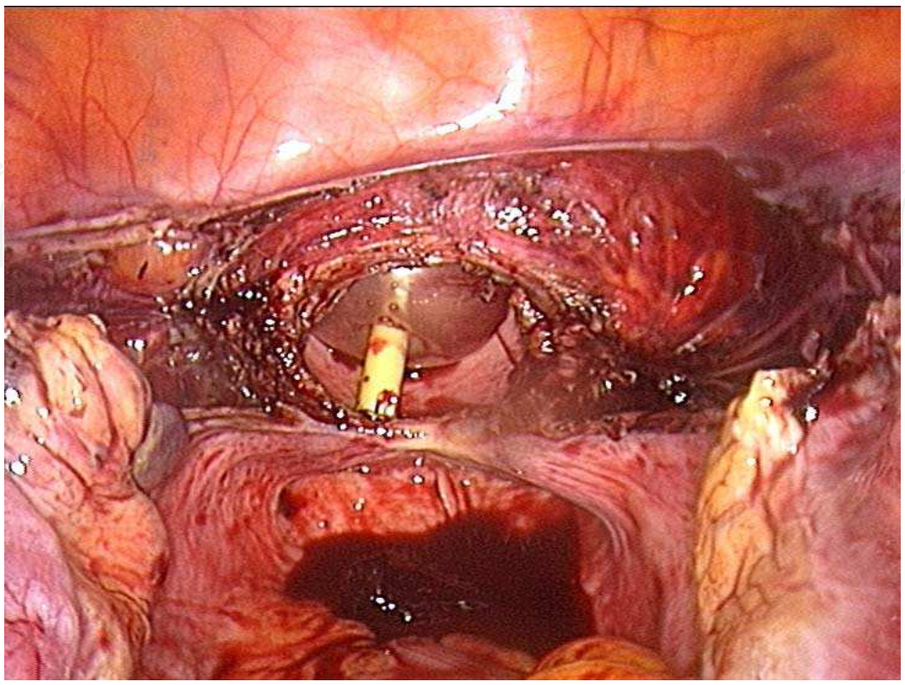


9.b. The uterine vessels are divided. The cap of uterine manipulator shows the edge where the cut must be made. We use for this mono-polar power.

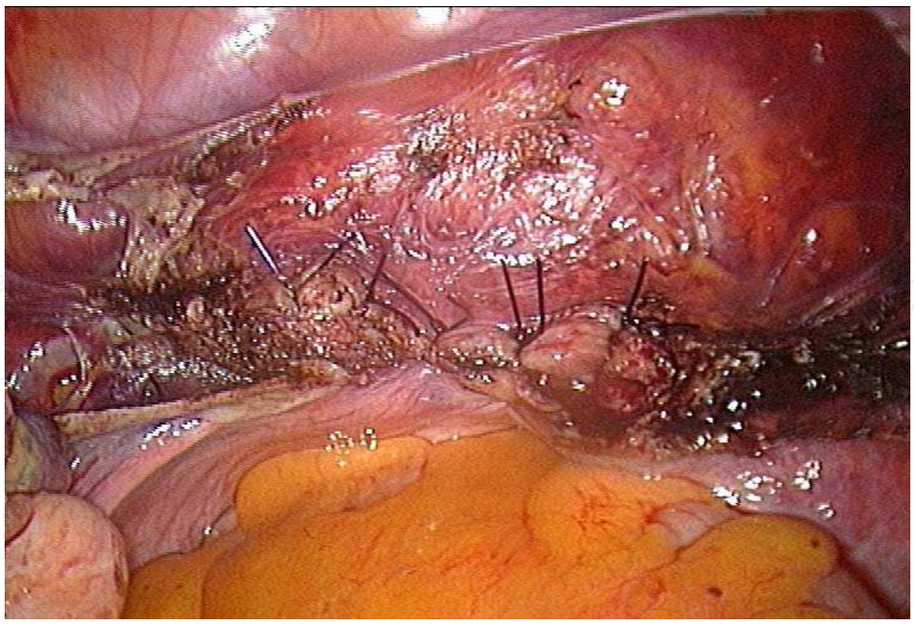


9.c. The uterus is removed from the vagina. In the vagina the cap from the manipulator is visible.

10. Vaginal closure with PDS suture (ethicon). When possible remove the uterus through the vagina.

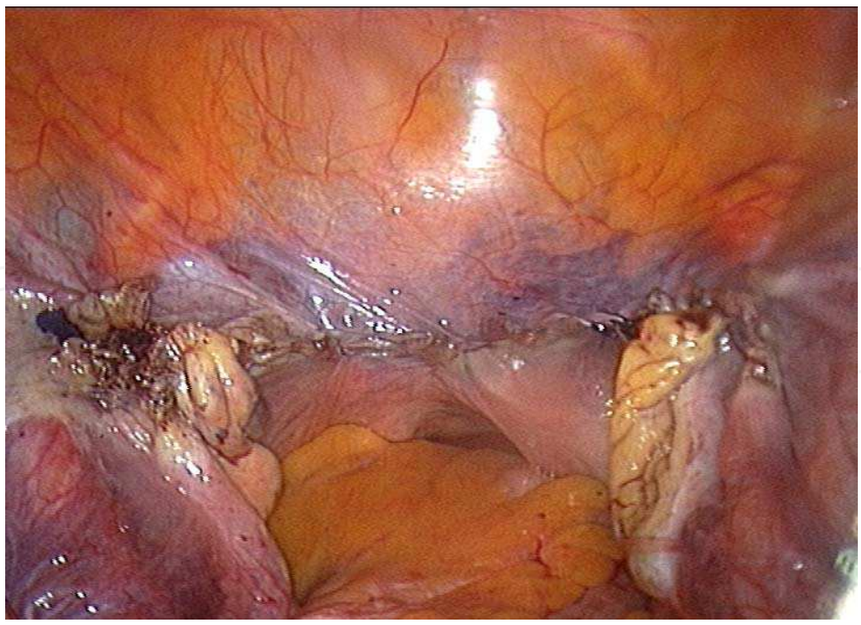


10.a. In the vagina a thick Foley catheter is placed for CO2 sealing.

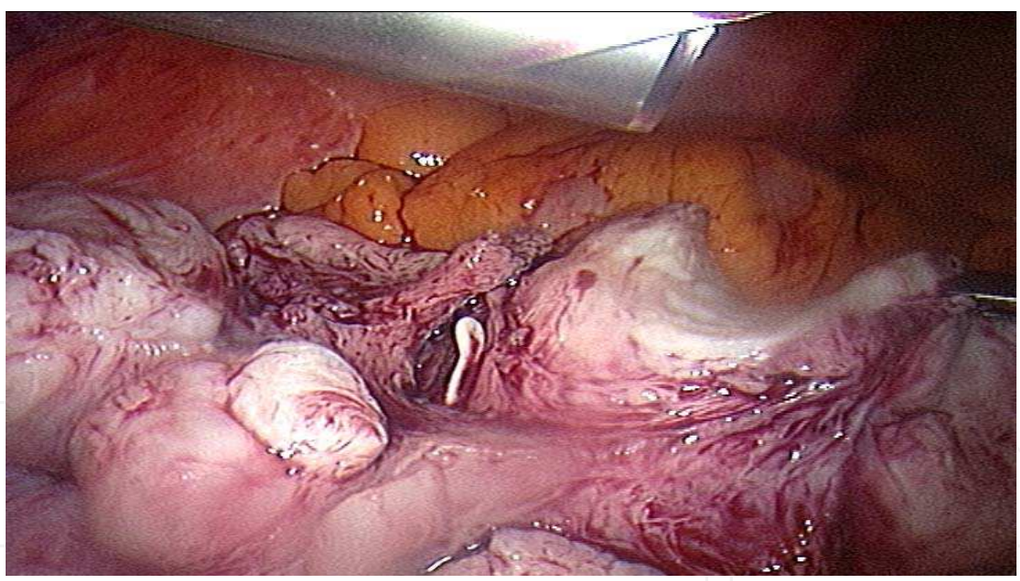


10.b. The vaginal stump is closed with sutures.

11. Closure of the peritoneum over cervix or over vaginal cuff with PDS – "Lahodny – Clip" suture or PDS – "Endosuture" (both-Ethicon).



12. Morcellation of uterus.



6. Comparison of abdominal, vaginal and laparoscopic hysterectomies

There are not so many prospective, randomized studies to compare the different technique of hysterectomy. A recent meta-analysis of 27 randomized trials showed that patients after laparoscopic hysterectomy (LH) compared to the abdominal (AH) has less blood loss, had suffered less perioperative infections and had a significantly shorter recovery time (15). In contrast, was the AH operation duration shorter and the injuries to the urinary tract (bladder and ureter) significantly higher after LH. The LH has comparing to the VH

significantly longer operating durations. It is noted that most studies compare various modifications of LAVH to the VH. The operating endurances depend in the LH significantly more from the operational skills of the surgeon-dependent than in the VH. In english-speaking countries, the vaginal surgery is less operated, and the percentage of vaginal hysterectomies in all uteri removed due to benign indications is accordingly lower. In the USA amounts the percentage 25% (16) and in UK one-third (17).
A major advantage of the VH over the LH is its feasibility in the spinal anaesthesia and the lower costs.
The LH implicates perfect anatomical overview and the image magnification of the video camera. This is for example in the diagnosis and treatment of endometriosis of prime importance. It delivers also enormously further development of nerve-sparing surgical techniques.
After the LH the hospitalization was at the shortest. In Germany, the TLH and LASH is an outpatient procedure. Outpatient means that the patients are able to leave the clinic after approximately 6 hours. All patients were cared for at the operating evening by telephone. The results are similar to the process in the hospital (6).
Meta analyse: vaginal hysterectomy (VH) vs. abdominal hysterectomy, (AH), vs. laparoscopic hysterectomy (LH/LAVH) delivered in 2009 in a Cochrane overview Nieboer et al (18).

Hospitalisation:

VH vs. **AH**	-1,1 Days [0,92-1,92]
LH vs. **AH**	-2,0 Days [1,86-2,17]
VH vs. **LH**	No difference

Febrile episodes or unclear infections:

VH vs. **AH**	OR :0,42
LH vs. **AH**	OR: 0,65
VH vs. **LH**	No difference

Operative middle blood loss:

LH vs. **AH**	MD: -45 ml
LH vs. **VH**	OR: 2,76 (significant blood loos)

Resumption of normal activities:

VH vs. **AH**	9,5 Tage (95% CI: 6,4-12,6)
LH vs. **AH**	13,6 Tage (95% CI: 11,8-15,4)

Wound infections:

LH vs. **AH**	OR: 0,31

Injury of the urinary ways:

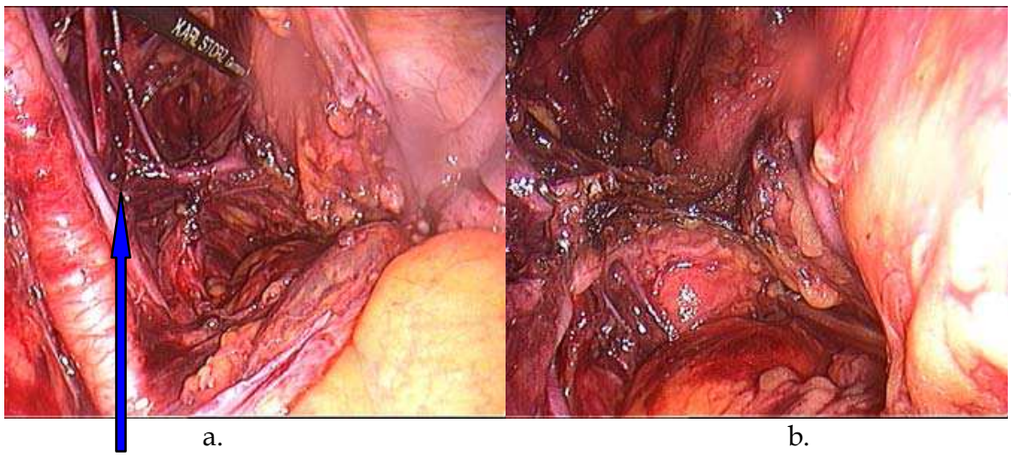
LH vs. **AH**	OR: 2,41
LH vs. **VH**	No difference

Operating time:

LH vs. **AH**	20,3 minutes
LH vs. **VH**	39,3 minutes

7. Laparoscopic radical hysterectomy

A pioneer of laparoscopic oncologic gynaecology was Daniel Dargent. Laparoscopic lymphadenectomy was described by him in 1989. His greatest achievement however, was the involvement of Schauta radical vaginal hysterectomy according to laparoscopy. Developed by Dargent laparoscopically assisted radical hysterectomy (LAVRH) was successfully used in the treatment of cervical cancer. The work of Querleu on pelvic lymph node dissection were very important as well (22).
The LAVH was more frequently performed with lymph node dissection in the endometrial carcinoma. Thanks to technological developments, the TLH displaced the LAVH not only as hysterectomy management, but also as part of the surgical treatment of endometrial cancer. Today it is a standard therapy of endometrial carcinoma and not too large uterus. Afterwards the laparoscopic way was performed entirely by the radical hysterectomies - the laparoscopic Wertheim operations (TLRH - total laparoscopic radical hysterectomy)(23,24).



a. b.

Fig. 7. a. Dissected cardinal ligament left after pelvic lymph node dissection - laparoscopic Wertheim operation. b. Cardinal ligament left after the division of the pars vaskularis. The pars nervosa of the ligament is spared.

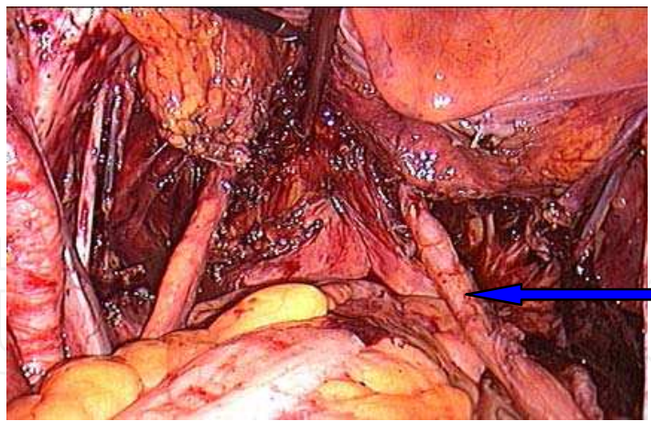
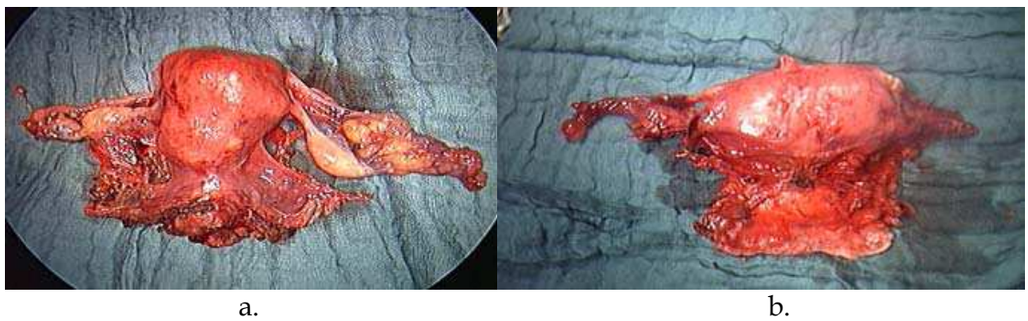


Fig. 8. Situs after TLRH (laparoscopic Wertheim operation).



a. b.

Fig. 9. a. Wertheim preparation (Piver III radicalness). b. Schauta preparation.

1992 Netzhat refereed to the para-aortic lymphadenectomy (23). The feasibility of lymphadenectomy by laparoscope were combined with the trachelectomy when the wish to conceive existed beside an early cervical cancer. The process can be carried out vaginal, abdominal or laparoscopically assisted. Between 40% and 70% patients after trachelectomy were pregnant (26).

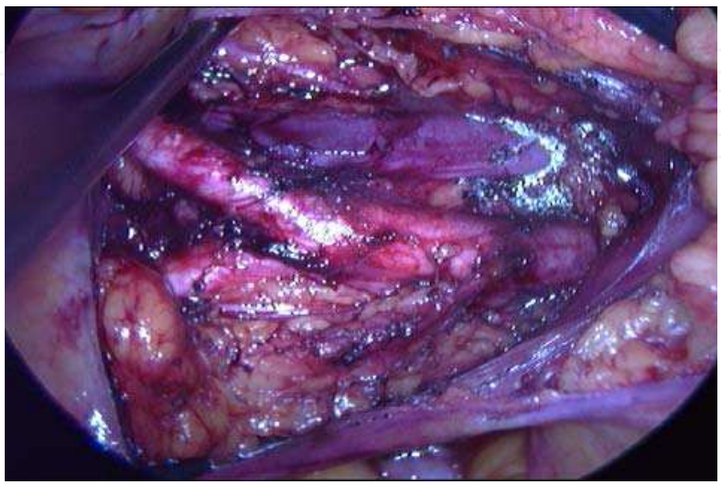


Fig. 10. Para aortic lymph nodes dissection.

Laparoscopy in comparison to open surgery:
- Perfect anatomical overview. Magnifying glass enlargement permits nerves-spare surgery.
- Patients with high BMI and endometrium carcinoma profited from the laparoscopy by the reduction of perioperativ complications like incisional hernia, ileus and due to quicker mobilisation - thrombosis and embolism.

Early endometrial cancer: the comparison of laparotomy and laparoscopy (27):

Procedure	Patient (n)	Middle Op-duration (min)	Middle blood loss (ml)	Removed lymph nodes (n)	Hospitalisation (Days)	Complications all together (%)
Laparotomy	1458	123	402	17,7	7,5	31,3
Laparoscopy	1023	176	236	18,3	4,1	14,9

Result:
- Laparoscopic onkosurgery offers the same oncological security like the open surgery.
- Laparoscopy is associated with less blood loss and less complications. There was less need of blood transfusions.
- The post surgical morbidity can be reduced.
- High-price equipment and a long training curve are facing reduced hospitalization costs and a lower morbidity.

Similar results were shown by other studies (28). Laparoscopic therapy for early cervical and endometrial cancer is the open approach in oncological point of view equivalent. There are nearly identical numbers of lymph nodes obtained via laparotomy (pelvic 18, 7 paraaortal inframesenterial) or laparoscopy (pelvic 17, 7 paraaortal inframesenterial) (27).

8. New laparoscopic device – transumbilical endoscopy (TUE)

In 2004 is the origin year of the N.O.T.E.S. - Treatment (Natural Orifice Transluminal Endoscopic Surgery) of the study group around Anthony Kallo. The technology uses as access roads the so-called natural body openings like stomach, large intestine, bladder or the vagina. From that movement also comes the surgery through the navel – e . N.O.T.E.S. (Embryonic Natural Orifice Transluminal Endoskopic Surgery). All ports required by the surgeon are positioned in the navel pit. In addition are mostly used so-called "single ports". The best well known technologies are the SILS - technology (single Incision Laparoscopic Surgery) of the company Covidien and the LESS – technology (Laparo-Endoscopic single site Surgery) from the company Olympus as disposable ports.
Endoscopic umbilical techniques (Embryonic – N.O.T.E.S.) get in the gynaecology more common. The LAVH, LTH, LASH and the colposacropexie are among, beside the adnexal surgery, this treatment. Some years previously a rapid development could have been followed in the visceral surgery which came along with a wide range of operations opportunities within this technique. In 1995 the first cholecystectomy were accomplished in Ferrara. Today nephrectomy, gastric sleeve – resections, inguinal hernia operations, sigmaresection, colectomy, fundoplication, RY – gastric bypass and pancreas head resections are carried out.

The first e.N.O.T.E.S. Hysterectomy was reported in Juli 2007, in the USA by Dr. Kate O'Hanlan (20). In Europe the first TLH, with SILS - port on 08.05.2009 and the first SILS – LASH on 30.06.2009 by Dr. Cezary Dejewski in Bremerhaven, Germany (19).
Synonyms of the transumbilical laparoscopic surgery:

- Transumbilical single port surgery – TUSPS
- Transumbilical multi port surgery – TUMPS
- Embryonic NOTES – e.N.O.T.E.S.
- Transumbilical Endoscopic Surgery - TUES
- One Port Umbilical Surgery – OPUS
- Natural orifice trans-umbilical surgery - NOTUS
- Single Port Access (SPA) surgery
- Single-Access-Site (SAS) laparoscopic surgery
- Single-Site-Access (SSA) laparoscopic surgery
- Trans-Umbilical Laparoscopic Assisted (TULA) surgery
- Single Incision Laparoscopic Surgery - SILS™
- Laparo-Endoscopic Single-site Surgery – LESS™

The minimization of the access trauma results in less postoperative pain, reduced postoperative intestinal atony, less strain on the lung function and provides a better cosmetic scar results. Patients benefit from quicker recovery and improved quality of life. All the benefits of laparoscopy compared with conventional open surgery are embraced by the e.N.O.T.E.S. technology.
The less postoperative wound pain results from that navel access in which no abdominal muscle were injured. The reduction of two or three trokars on the lower abdomen reduces the intraoperative risk of injury to epigastric vessels (Figur 6).

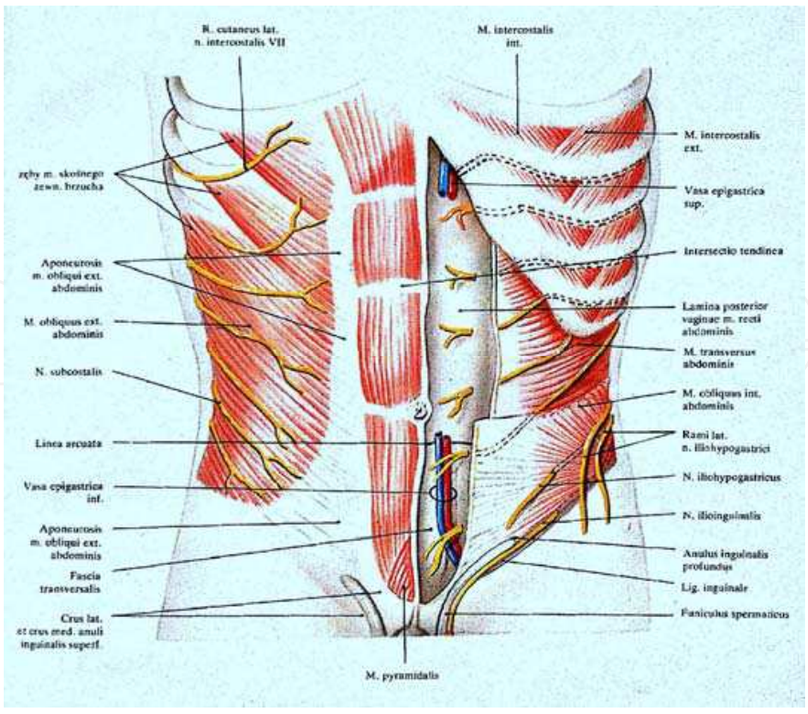


Fig. 6. Abdomen anatomy.

The size of the umbilical scar after the "single port" is from 2 to 3.5 cm.

Fig. 7. Various disposable ports (Ethicon, Covidien, Olympus).

Fig. 8. Single ports from Storz (reusable).

The author had performed about 60 e.N.O.T.E.S. operations between the 1st june 2008 and the 30th april 2010. Including 18 total and 22 supracervical hysterectomies, 1 appendectomy, 11 ovarial surgery, 5 adnexectomy and 6 laparoscopic sacrocolpopexy.
The technique has significant advantages over N.O.T.E.S. surgery. First it is clinically proven and allow on any time to switch to conventional laparoscopy, and many procedures can be performed without quality loss.
Our position is that the ovarial surgery (cystenenukleation with suture ovarian reconstruction) cannot be regarded as an entry in the transumbilical endoscopy because present technology doesn`t allow us a non tissue sparing surgery as a result of confined space conditions and optic collisions. Loss of substance on the ovary at awkward surgery exercises are the result. The transumbilical surgical technique inflicts the surgeon a greater challenge than the conventional technique. The prerequisite for the application of the TUE presume the training and experience in traditional endoscopy. Everything else would discredit the entire development.

Fig. 9. Several curved endoscopic instruments for transumbilical endoscopy.

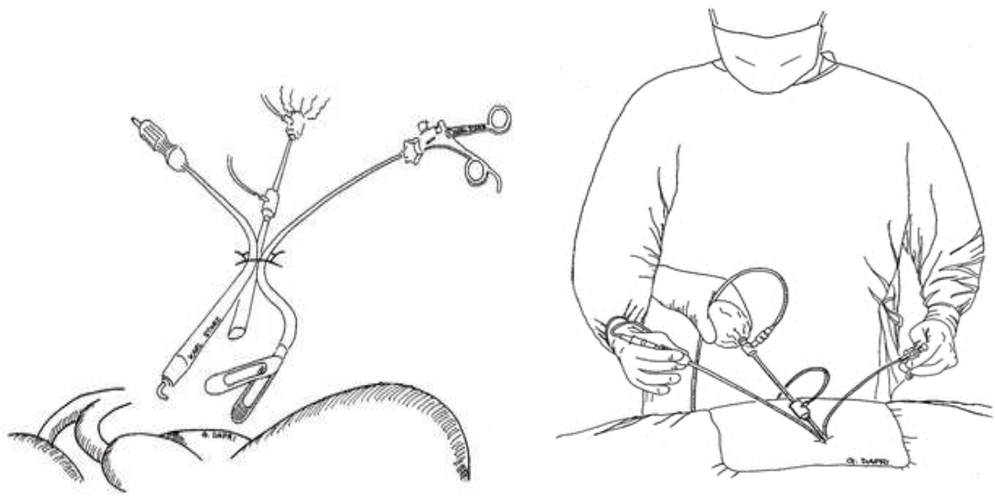


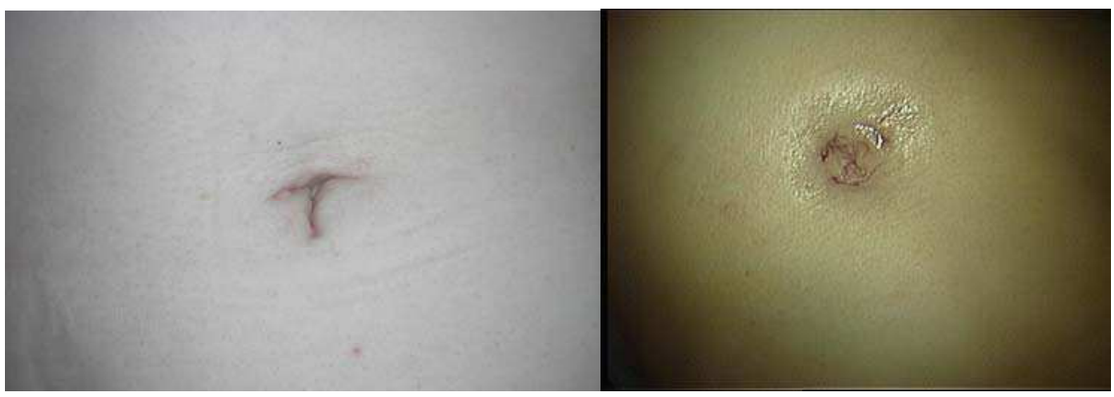
Fig. 10. Problem of limited space and instruments collision.

A further development of instruments and optics for establishing the transumbilical endoscopy are urgently needed. The industry attract currently their biggest attention on the "single port" technology (SPA - single port access). The previously developed SILS (single incision laparoscopic surgery – Covidien) and LESS (Laparo Endoscopic Single Site Surgery – Olympus) are followed by reusable items such as "Endocone" and "X-Cone" ports from Storz. The Wolf and the Esculap company announced now their own ports.
The scar after the cut for the insertion of singel-ports is 2.5 to 3 cm.

Fig. 11. SILS Single-Port (Covidien) and the umbilical scar 8 weeks after.

We have next to the TUSPS also the "multi-port" technology (TUMPS – transumbilical multi port surgery) applied. We place in the navel instead of a single port three 5 mm trocars (flexible, reusable - from Wolf).

Fig. 12. Transumbilical multi-port endoscopic surgery (TUMPS) – three 5,5 mm ports umbilical.



a. 4 weeks after b. 4 days after (another patient)

Fig. 13. Umbilical scars after TUMPS.

Our operating experience has not shown any advantage of "Single Port" (TUSPS – transumbilical single port surgery) technique against the "multi-port" method (TUMPS – transumbilical multi port surgery). Because of placing more ports through the navel, you achieve a wider operating radius so that optic and instruments collisions are much rarer in contrary to the single port technique. In addition with curved instruments it is easily to use the the conventional laparoscopic instruments. The operation is not as cost intensive, and leaves only three 5.5 mm wide scars. The grooves are with the "skin bridge" separated, so a lower risk of hernia can be expected. The pain is being investigated by us, but appears to be lower.

It is possible for the morcellator to expand a 5,5 mm tip to 15 mm and to morcellate it parallel to the camera. The transvaginal morcellation must be used with "single-port", but working with a mirror inverted camera, operations appear much more difficult and assume a longer training curve.

The tumoraseptic extraction of ovarian masses by the rear colpotomy is more convenient for large-adnexal findings, so we use this management in TUSPS and TUMPS technique.

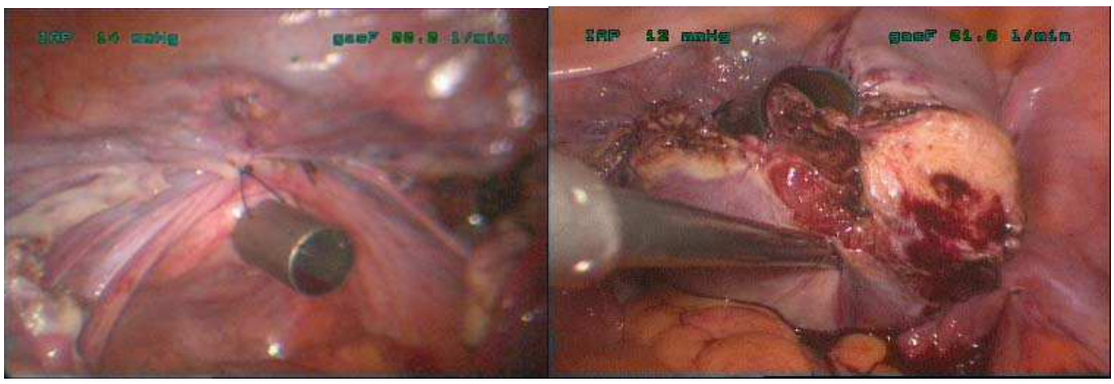


Fig. 14. Morcelation with the rear colpotomy.

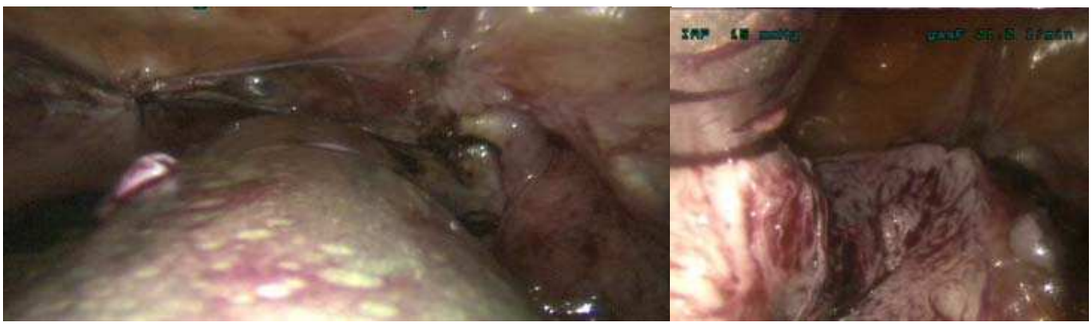


Fig. 15. The umbilical morcelation, multi-port umbilical surgery.

Fig. 16. Recovery of 16 cm big cystoma through the vagina with endo bag.

The total or supracervical hysterectomy by transumbilical access was made, according to the standards of the laparoscopic hysterectomy (LH), with conventional technique. All the individual steps of those procedures remained identical.

9. Complications

In review of Hurd (15), which includes over 1.5 million gynaecological patients, is reported that complications in 0.1 to 10 percent of procedures and 20 to 25 percent of complications were not recognized until the postoperative period.

Between 1980 and 1999 the incidence of entry access injury was 5 to 30 per 10,000 procedures. Bowel and retroperitoneal vascular injuries comprised 76 percent of all injuries and almost 50 percent of small and large bowel injuries were unrecognised for at least 24 hours. The type and proportion of organ injury during entry was: small bowel (25 percent), iliac artery (19 percent), colon (12 percent), iliac or other retroperitoneal vein (9 percent), secondary branches of a mesenteric vessel (7 percent), aorta (6 percent), inferior vena cava (4 percent), abdominal wall vessels (4 percent), bladder (3 percent), liver (2 percent), other (less than 2 percent).

A literature review of procedures performed from 1975 to 2002 reported entry-related visceral lesions occurred in 0.3 to 1.3 per 1000 procedures and entry-related vascular lesions occurred in 0.07 to 4.7 per 1000 procedures. The open technique was not associated with fewer complications than the closed technique; however, this result likely reflects the high risk status of patients undergoing the open procedure.

9.1 Patient risk factors

A very important patient risk factors displays obesity. Increased weight takes on a special significance for laparoscopy. Placement of laparoscopic instruments becomes much more difficult. Bleeding from abdominal wall vessels may be more common because these vessels become difficult to locate. Many intra-abdominal procedures become increasingly difficult because of a restricted operative field secondary to retroperitoneal fat deposits in the pelvic side walls and increased bowel excursion into the operative field. This second problem is probably related to increased volume of bowel, decreased elevation of a heavier anterior abdominal wall by the pneumoperitoneum, and the inability to place many patients who are obese in steep Trendelenburg position because of ventilation considerations.

Another well-described surgical risk factor is age. As the population ages, more women of increased age will have indications for laparoscopy. Older patients are at increased risk of having concomitant disease processes that affect their perioperative morbidity and mortality. Probably the single most important consideration is age-associated increase in cardiovascular disease. Of special importance is the increased susceptibility of elderly persons to hypothermia. In older patients, even mild degrees of hypothermia may increase the risk of cardiac arrhythmia.

As far as laparoscopic complications are concerned, one of the most important risk factors is a history of previous abdominal surgery. The risk of adhesions of omentum and/or bowel to the anterior abdominal wall after previous abdominal surgery is greater than 20%. The most common of these strategies is the use of an open technique for laparoscopic trocar placement, as first advocated by Hasson.

In patients with previous laparotomy in which the scar is located at the umbilicus, use of an alternative location for trocar insertion is usually located in the left subcostal quadrant. The closest organ to the left upper quadrant is the stomach. Therefore, an oral gastric tube is recommended before.

9.2 Anaesthetic risk factors

One of the most critical time-dependent aspects of preparation is the degree to which the patient's stomach is empty because both general anaesthesia and increased intra-abdominal pressure may increase the risk of regurgitation and resultant aspiration.

Preoperative evaluation should include a search for evidence of underlying cardiac disease. With a positive history or physical examination findings suggestive of cardiac disease, preoperative evaluation by both a cardiologist and an anaesthesiologist is extremely important.

Finally, patients at risk for congestive heart failure should be evaluated carefully prior to laparoscopy because a decrease in cardiac output may be related to decreased venous return and increased peripheral vascular resistance.
Any patient with a significant history of pulmonary problems should be evaluated by both a pulmonologist and an anaesthesiologist prior to laparoscopy. Hypercarbia and decreased ventilation associated with laparoscopy may be especially deleterious in pulmonary patients with chronic respiratory acidosis.

By example of bladder and ureter injuries by l total aparoscopic hysterectomy (TLH):

Number:	830 (1)	512 (2)	567 (3)
Uterus weight:	239 g	241 g	242 g
OP time:	132 min	133 min	104 min
Blood loss:	130 ml	309 ml	1,45 g/dl
Hospitalisation:	1,4 Tage	2,7 Tage	5,6 Tage
Conversion to LAP:	0,60%	1,80%	0,20%
Complications rate:	4,70%	4,80%	1,40%
Bladder injury:	12 (1,4%)	2 (0,4%)	4 (0,7%)
Ureter injury:	10 (1,3%)	1 (0,2%)	1 (0,2%)
Bowel injury:	3 (0,4%)	5 (0,97%)	1 (0,2%)

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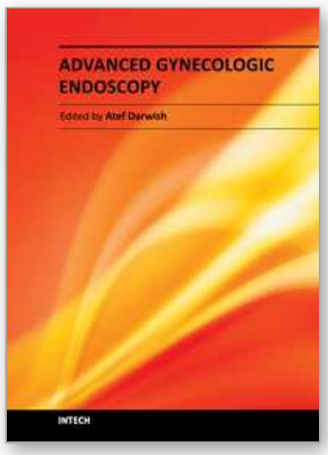

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The main purpose of this book is to address some important issues related to gynecologic laparoscopy. Since the early breakthroughs by its pioneers, laparoscopic gynecologic surgery has gained popularity due to developments in illumination and instrumentation that led to the emergence of laparoscopy in the late 1980's as a credible diagnostic as well as therapeutic intervention. This book is unique in that it will review common, useful information about certain laparoscopic procedures, including technique and instruments, and then discuss common difficulties faced during each operation. We also discuss the uncommon and occasionally even anecdotal cases and the safest ways to deal with them. We are honored to have had a group of world experts in laparoscopic gynecologic surgery valuably contribute to our book.

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