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Opportunities and benefits of ultrasound technique in gynecological laparoscopic surgery (hysterectomy, myomectomy and endometriosis)

Philipp-Andreas Hessler

ISGE Congres
Bari, Italy 7 - 4 june 2008

Greetings from Frankfurt (Germany)

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2000 – 2008 statistics

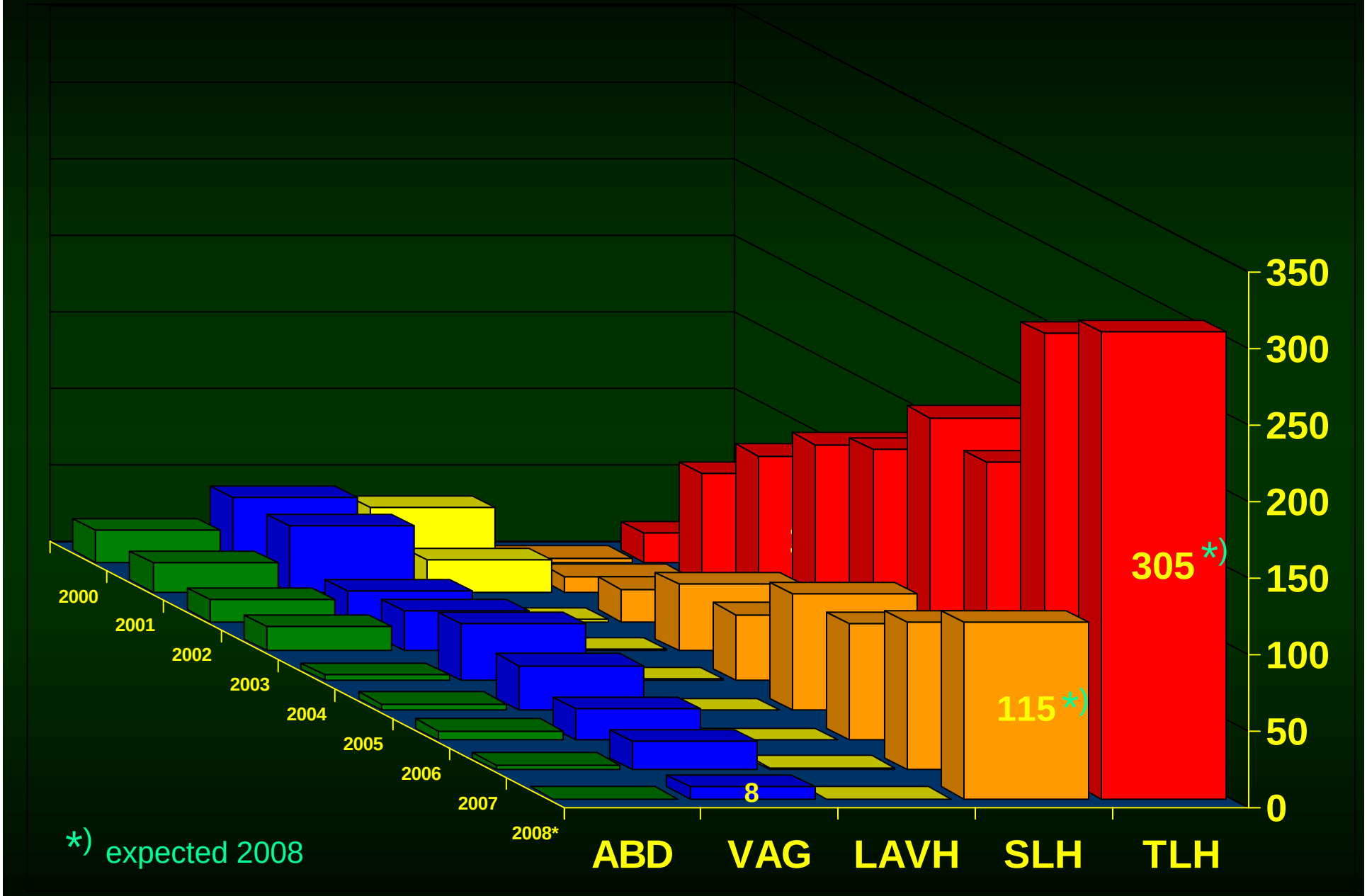
8000 interventional laparoscopies

- 1300 total laparoscopic hysterectomies (TLH)
- 400 subtotal laparoscopic hysterectomies (SLH)
- 2700 laparoscopic myomectomies
- 140 laparoscopic lymphonodectomies
- severe endometriosis, surgery of adnexa

… and all this was done with ultrasound technique !

*) we are minimal access surgery …

Surgical access for hysterectomy 2000-2008 (n=1869)



Advantages and disadvantages of ultrasound techniques

Advantages:

- Multifunktional instrument (cutting, cavitation and coagulation)
- precise dissection
- small necrosis zones
- no secondary lesions (cautery)

Disadvantages:

- high costs (single use)
- long learning curve
- relatively „slow“
- disappointing coagulation of big vessels

The 2 (3) effects of ultrasound dissection

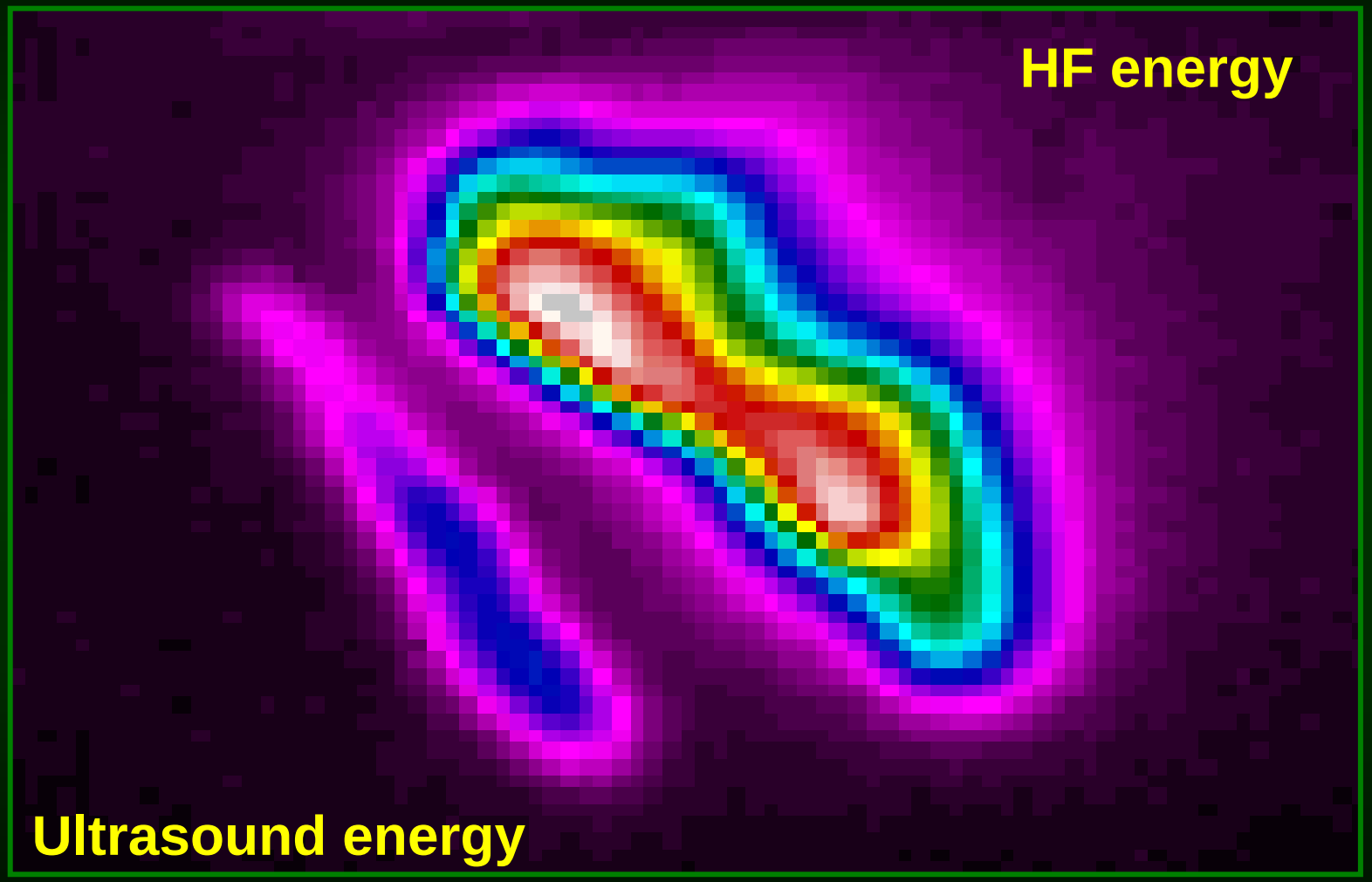
Cutting → **Coagulation**

Superficial Coagulation with the tip

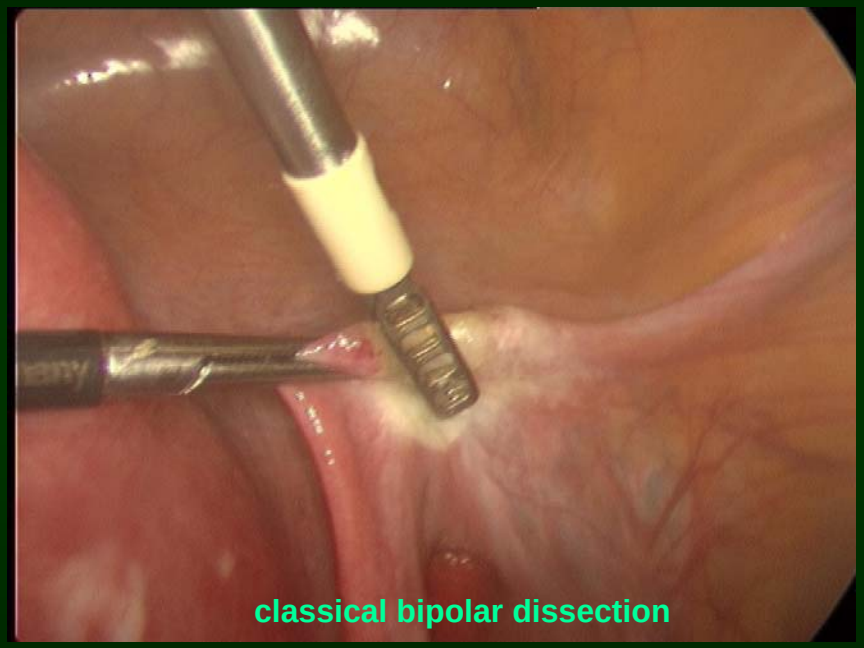
- ↑ Power (Level 5)
- ↑ Dissection speed
- ↑ Tension of tissue
- ↷ Sharp side

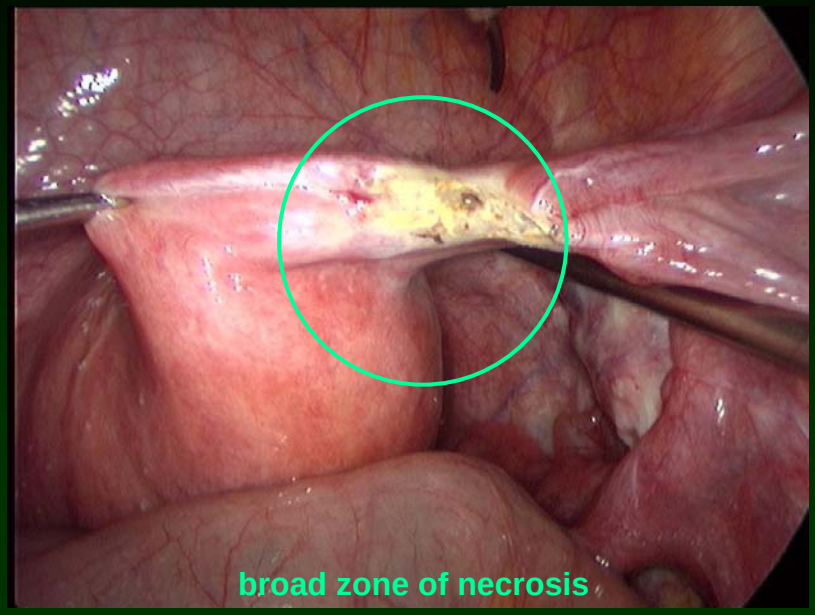
- ↓ Power (Level 3)
- ↓ Dissection speed
- ↓ Tension of tissue
- ↶ Flat side

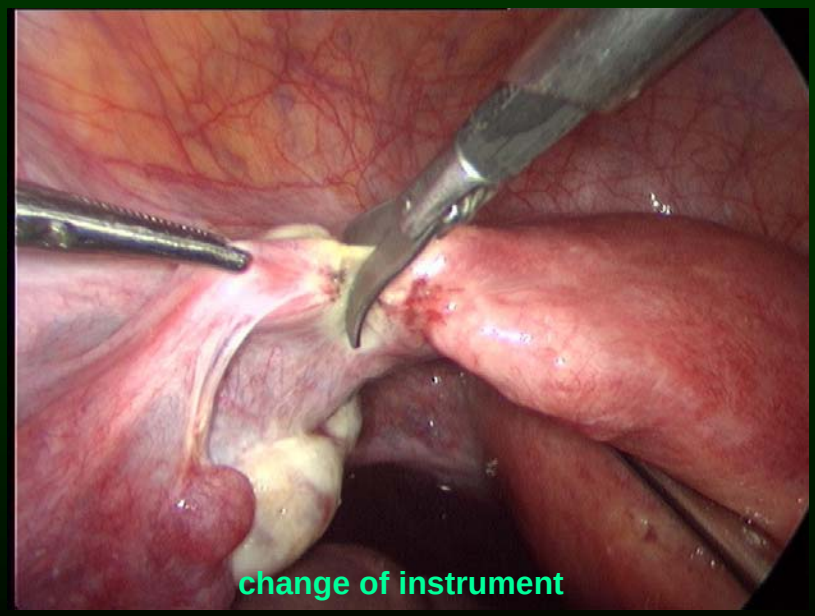
Ultrasound vs. HF



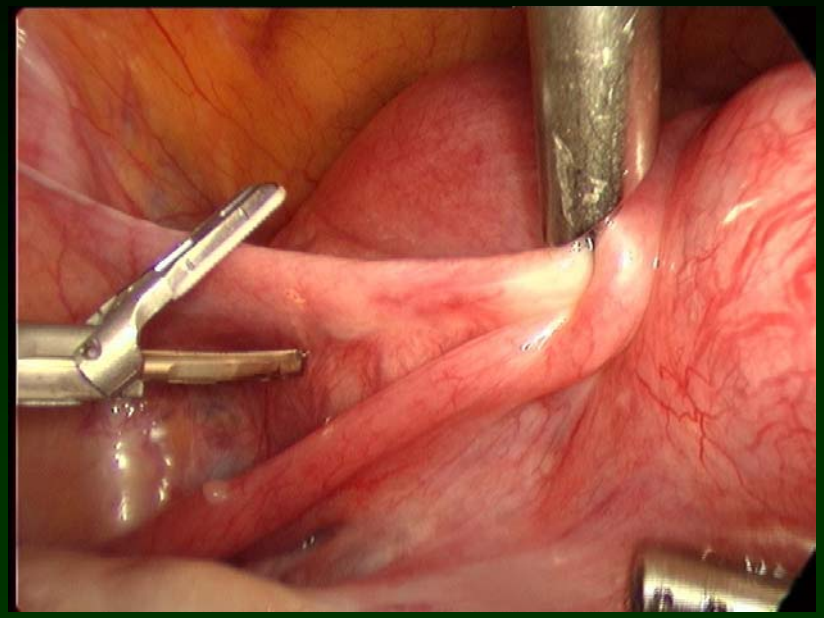
Bipolar, BiClamp + Ultracision (1)

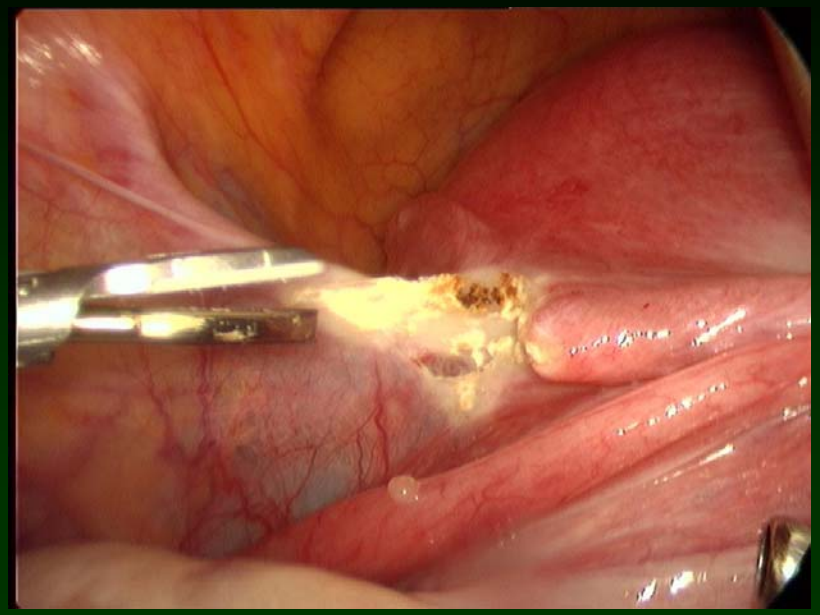

classical bipolar dissection

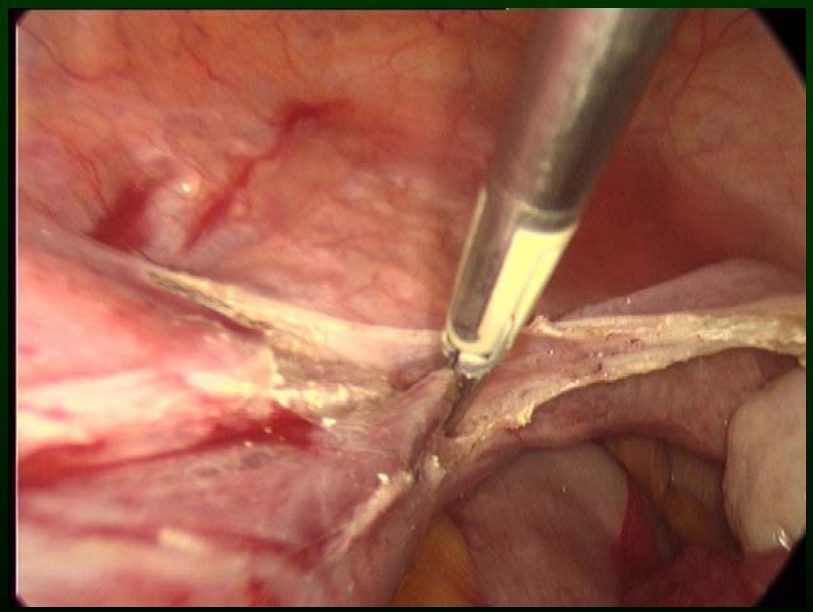

broad zone of necrosis


change of instrument

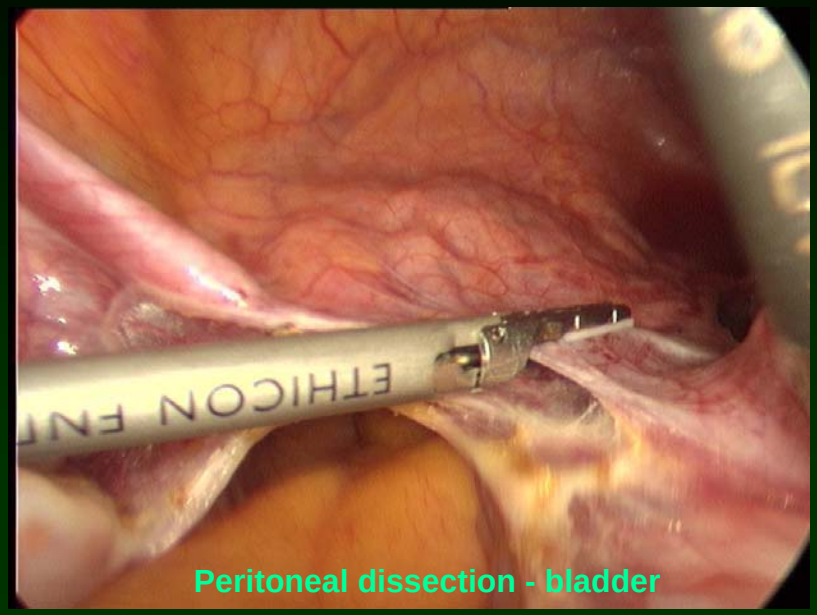
Bipolar, BiClamp + Ultracision (2)



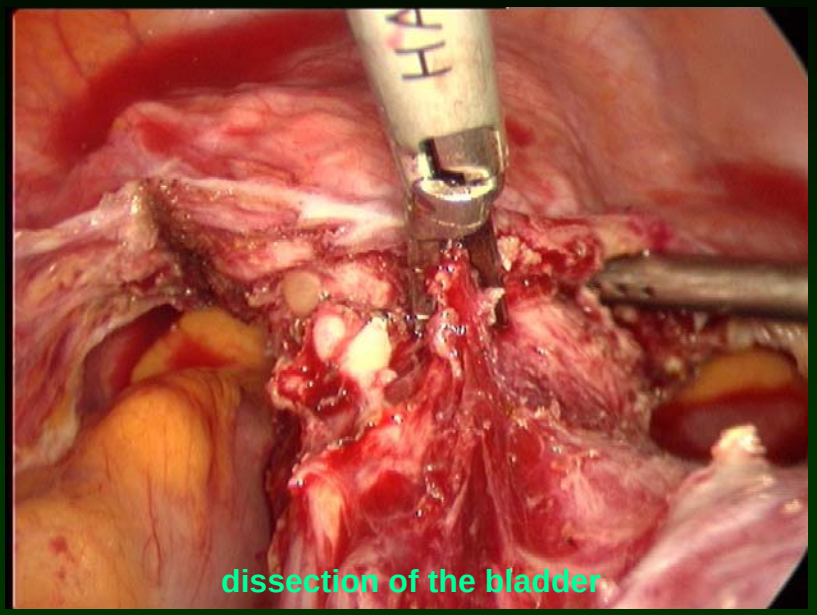


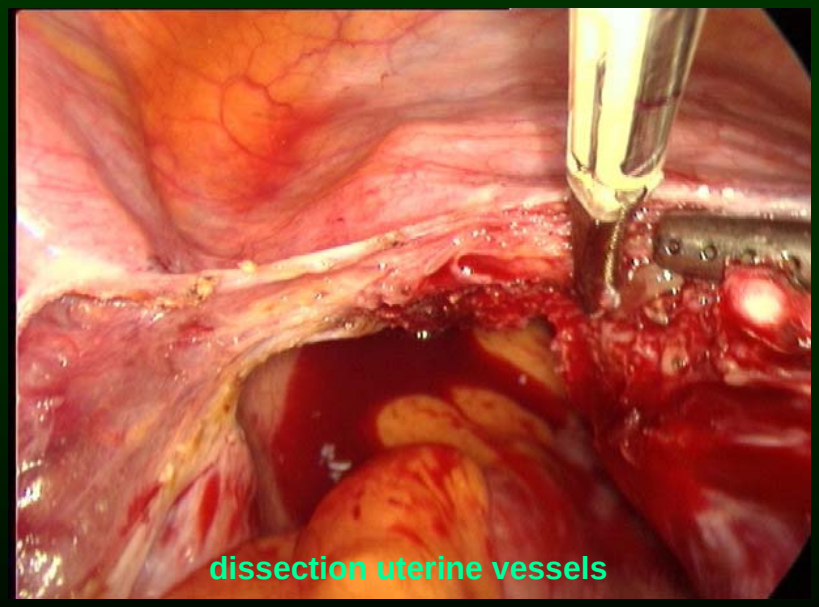


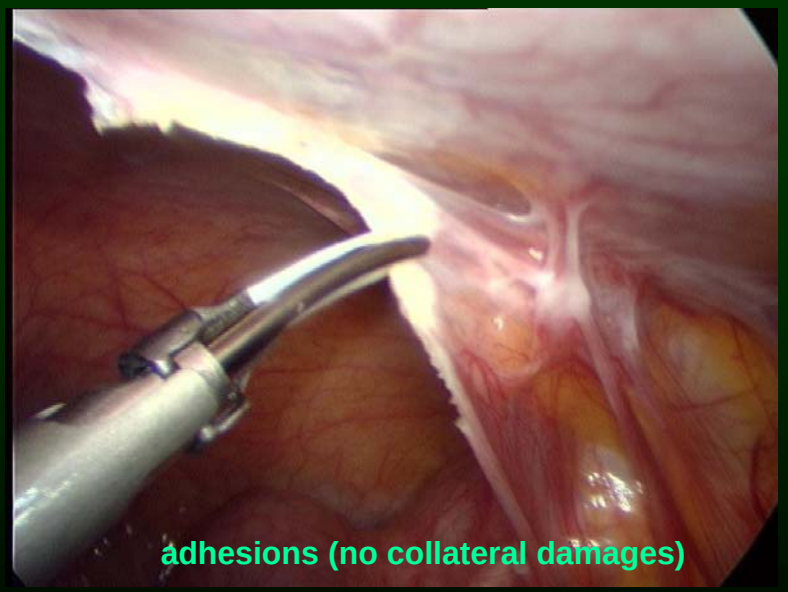
Bipolar, BiClamp + Ultracision (3)



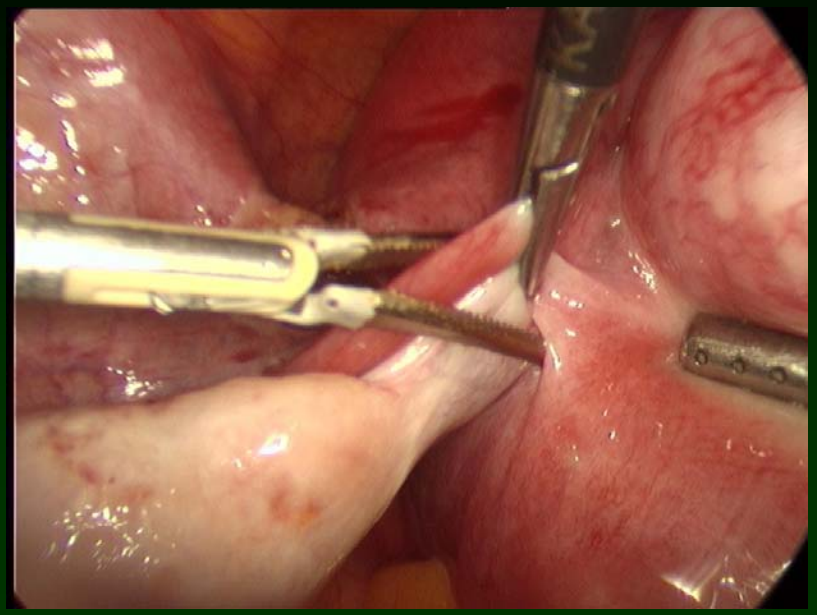
Peritoneal dissection - bladder

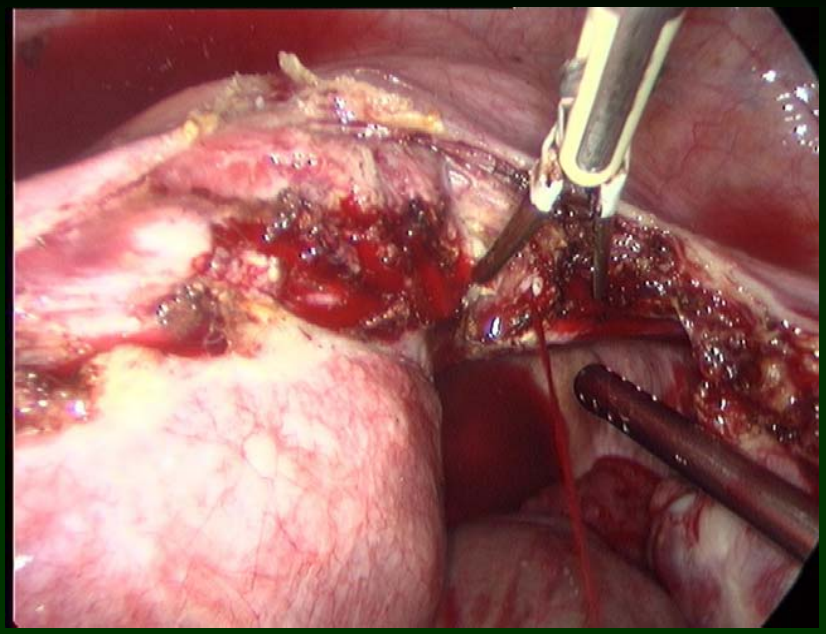

dissection of the bladder

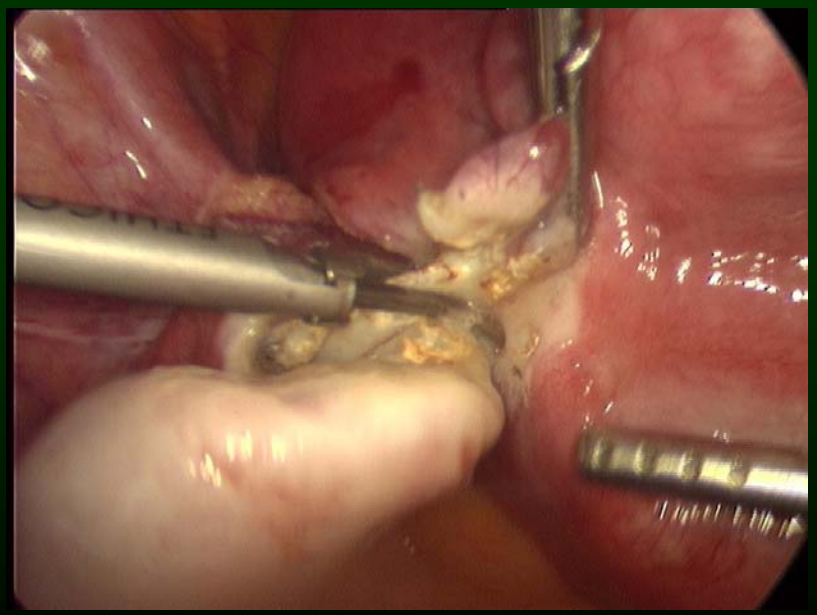

dissection uterine vessels

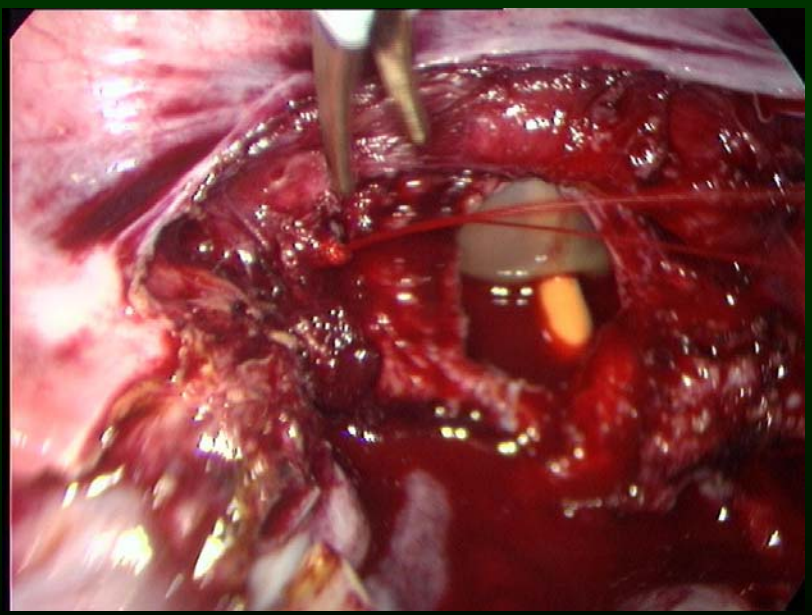

adhesions (no collateral damages)

Bipolar, BiClamp + Ultracision (4)

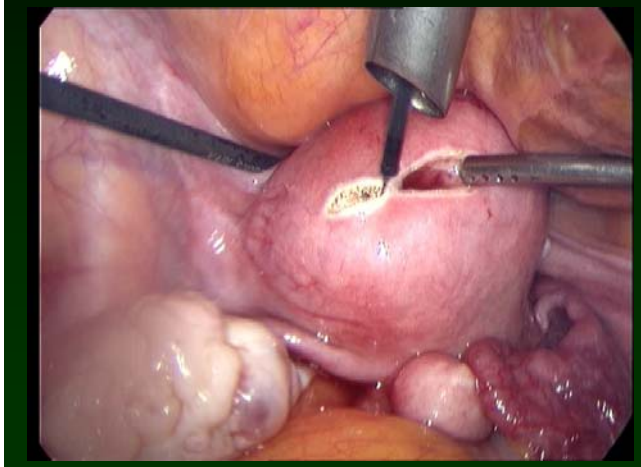


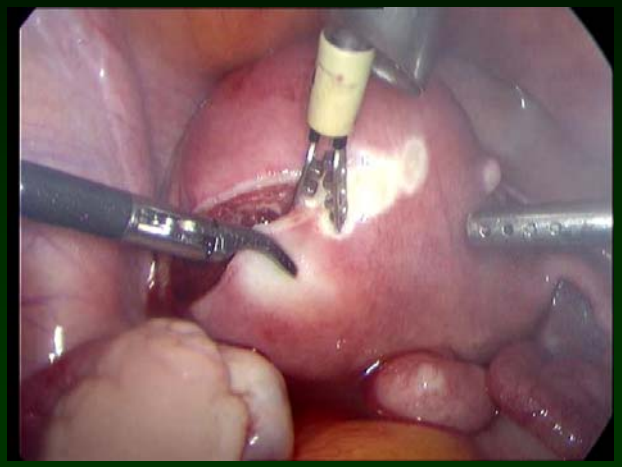


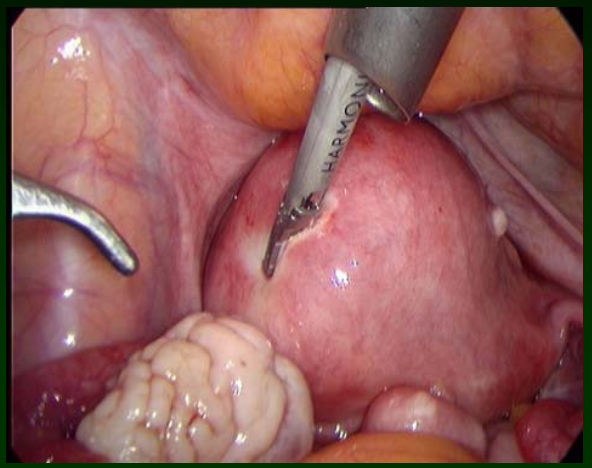


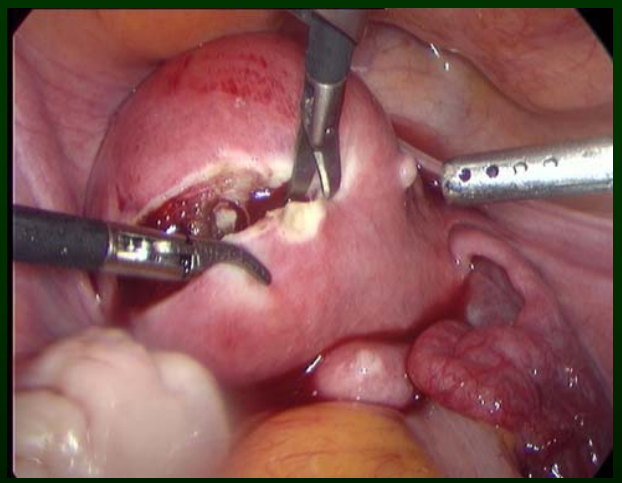


Ultrasound tecnique for laparoscopic myomectomy (1)







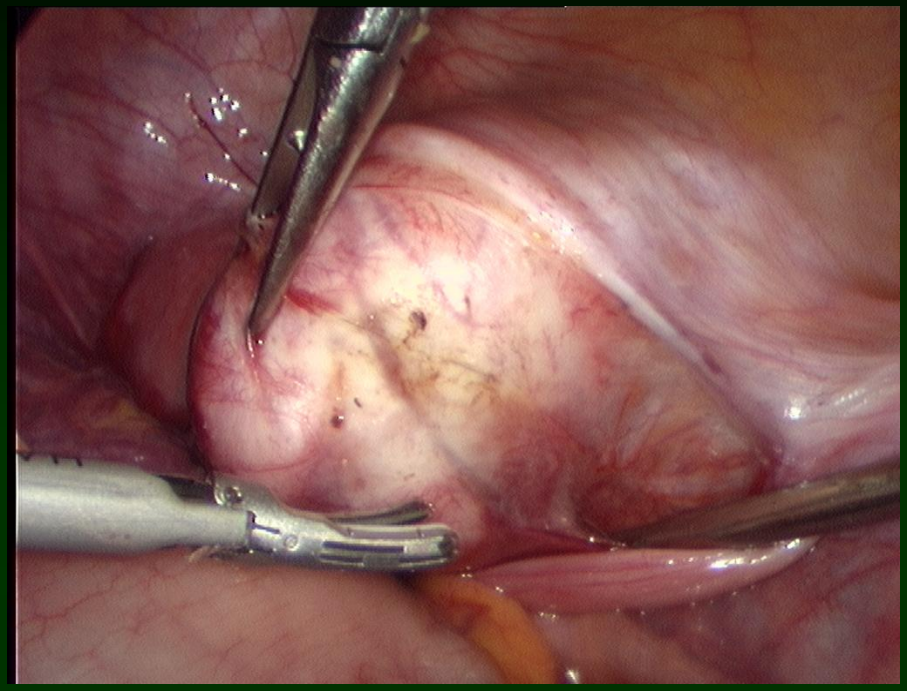


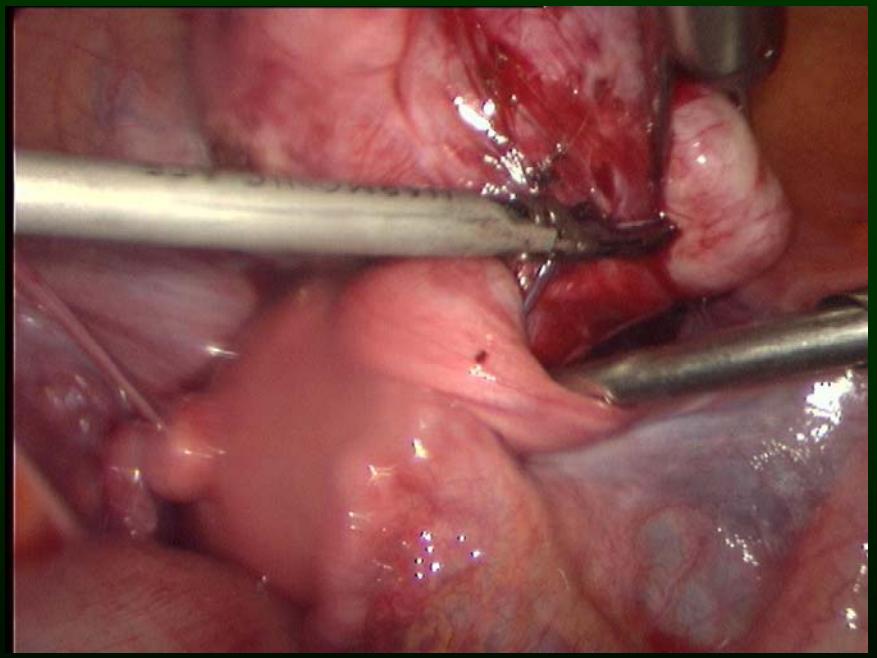
monopolar dissection

bipolar dissection

ultrasound dissection

Ultrasound tecnique for laparoscopic myomectomy (2)





We must be aware of the fact that:

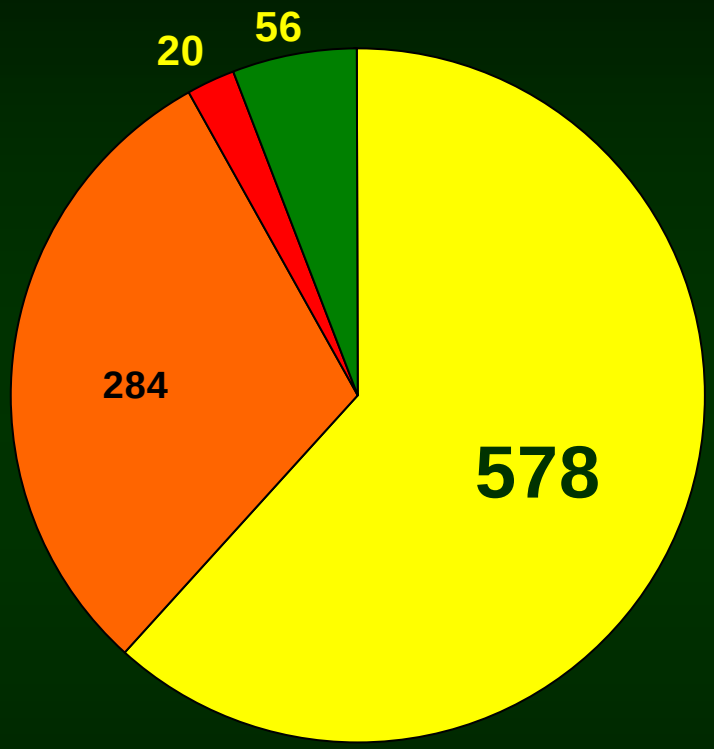
Total laproscopic hysterectomy is impossible to perform without modern dissection techniques (i.e. preparation and coagulation)!

So what is the best operating technique ?

bipolar, ultrasound ?

Laparoscopic total hysterectomy

study design (1)



December 2005 to May 2008

944 hysterectomies

- TLH (Total Laparoscopic Hysterectomy)
- SLH (Subtotal Laparoscopic Hystrectomy)
- ABD (Abdominal Hysterectomy)
- VAG (Vaginal Hysterectomy)

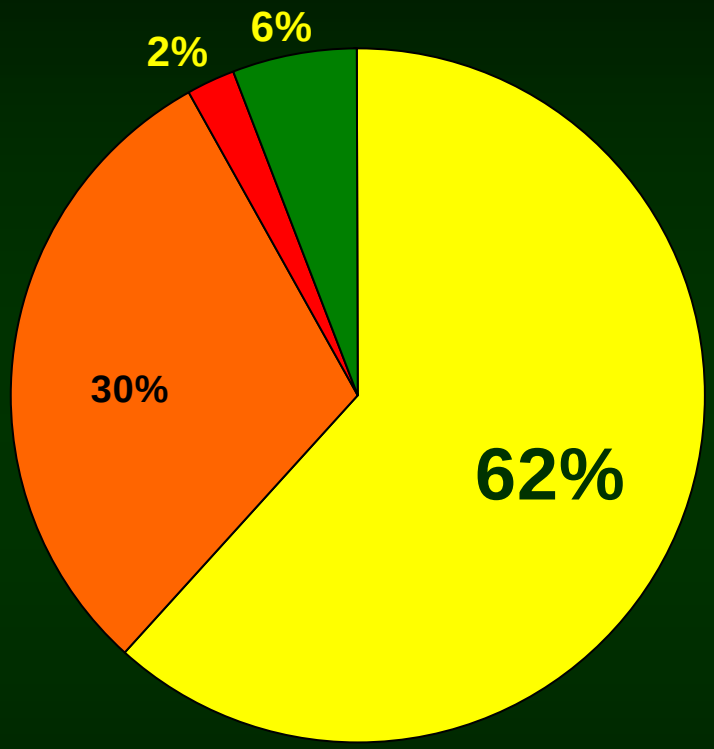
Laparoscopic Hysterectomies

n = 862 (578 TLH and 284 SLH)

(excluding cancer or prolaps surgery)

Laparoscopic total hysterectomy

study design (2)



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944 hysterectomies

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- SLH (Subtotal Laparoscopic Hystrectomy)
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- VAG (Vaginal Hysterectomy)

Laparoscopic Hysterectomies

92% (TLH and SLH)

(excluding cancer or prolaps surgery)

Laparoscopic total hysterectomy — study design (3)

- only simple hysterectomies (if appropriate with monolateral or bilateral surgery on adnexa e.g. ovarian cyst or adnectomy), but independent of uterus size
- preoperative, but if appropriate also initially intraoperative exclusion of hysterectomies with complicating subsidiary interventions (adhesion site, severe endometriosis, large tumours of adnexa etc.)
- following a study-independent acclimatization period, all operations were performed with one set of instruments by one and the same surgeon in as uninterrupted a sequence as possible
- if it became apparent in the course of a test series that a procedure or instrument was disadvantageous to the course of the operation, the series was discontinued on ethical grounds

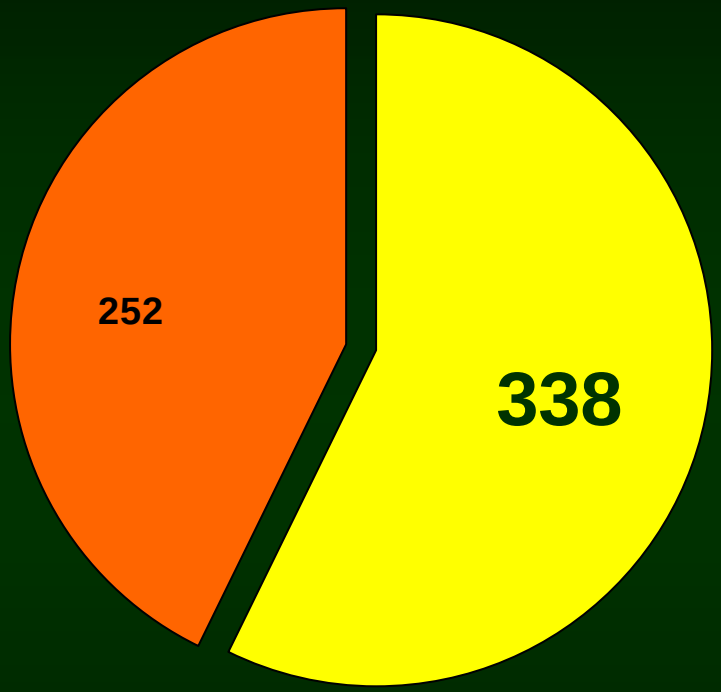
Laparoscopic total hysterectomy study design (5)

1. **Preparation:** following preoperative diagnostic hysteroscopy (obligatory at our hospital) and once positioning, disinfecting and sterile draping are complete, this phase comprises:*ingress with the Veress needle, safety checks, positioning of the 4 trocars (10 mm subumbilical, 5 mm suprasymphysial, median and bilateral), visualization of the site possibly with smaller adhesiolyses around the caeca or adnexa and preparation of the instruments for the hysterectomy itself.*
2. **Hysterectomy:** period between detaching the adnexa from the uterus or from the infundibulum pelvicum and detaching the portio from the vagina.
3. **Extraction:** the following procedures were used depending on uterus size: *simple vaginal extraction (102/172=58.2 %), hemisection, morcellation or myoma nucleation (33/172=19.2 %) or the use of 15 mm or 20 mm morcellators (37/172 = 21.6 %)*
4. **Suturing of the vaginal fundus:** provide the stump of the vagina with a continuous suture using PDS 0 and subsequent central peritonealization of the central wound area above the vaginal fundus.
5. **Finishing up:** irrigate the abdominal cavity, check that intestine and ureters are undamaged, position a 15 Robinson drain in the pouch of Douglas, retract the instruments under observation and drain the pneumoperitoneum, intracutaneous skin closure and dressings.

= **Total operating time:** made up of all the above-mentioned individual steps together.

Laparoscopic total hysterectomy

study design (6)



December 2005 to May 2008

578 total laparoscopic hysterectomies

■ included in study

Study
n = 338 (58%)

Laparoscopic total hysterectomy

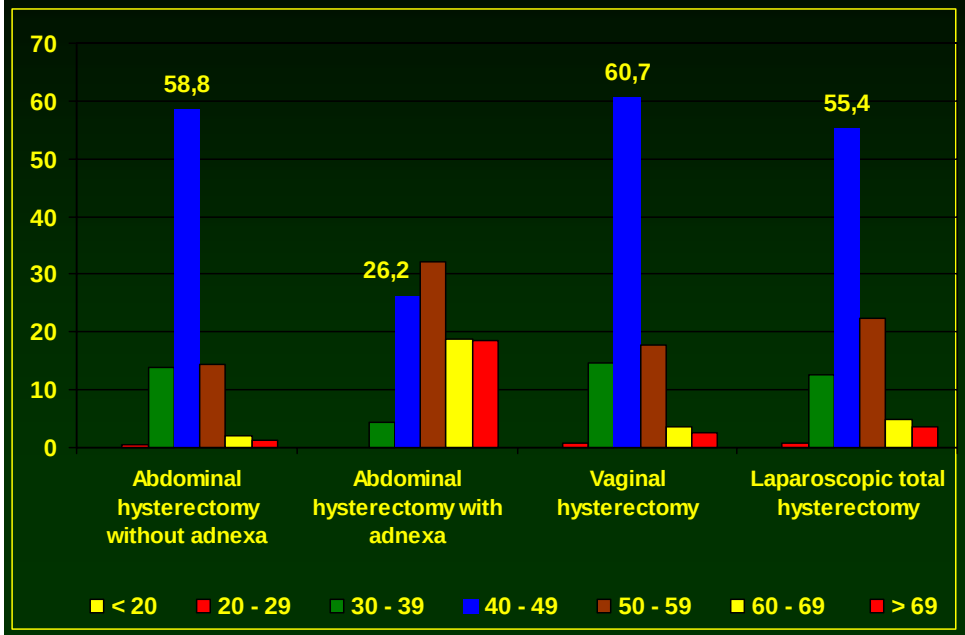
Results

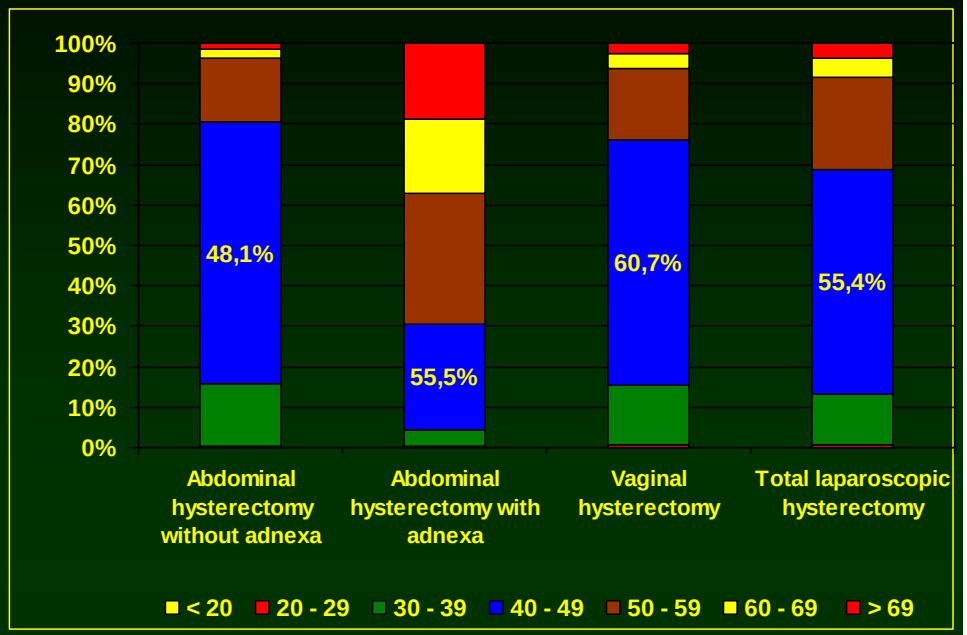
No significant differences:

Age (years):	**47,4**	29 – 90
Hospitalisation (days):	4,6	2 – 20
Uterus weight (g)	290	34 – 2450
Hemoglobine loss	**- 0,7**	-5,6 - +2,7

Laparoscopic total hysterectomy

Patients age





Hessen 2006 (QS OP Gyn)

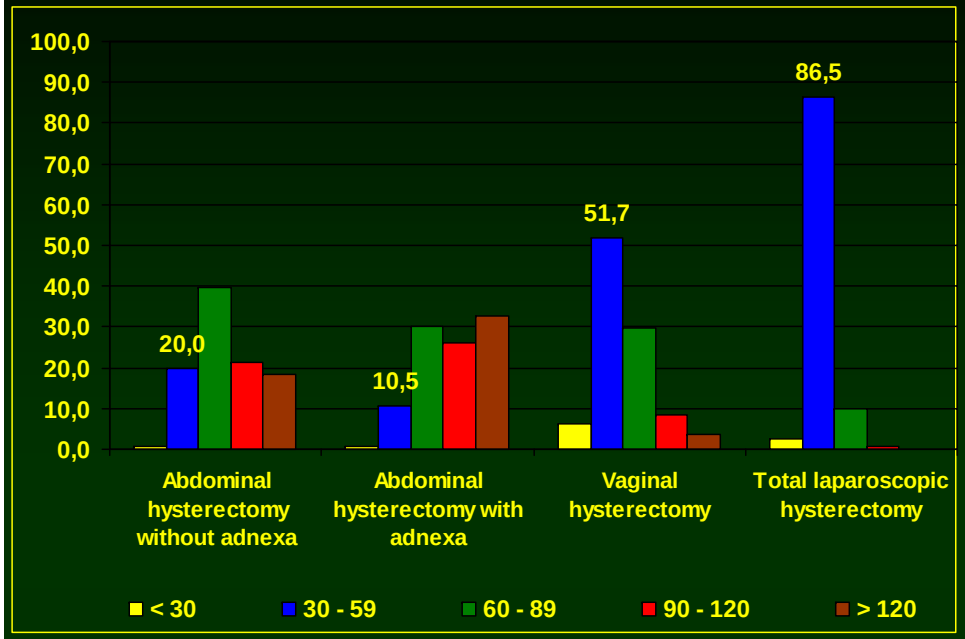
- Abdominal hysterectomy without adnexa — n = 2010
- Abdominal hysterectomy with adnexa — n = 1121
- Vaginal hysterectomy — n = 2730

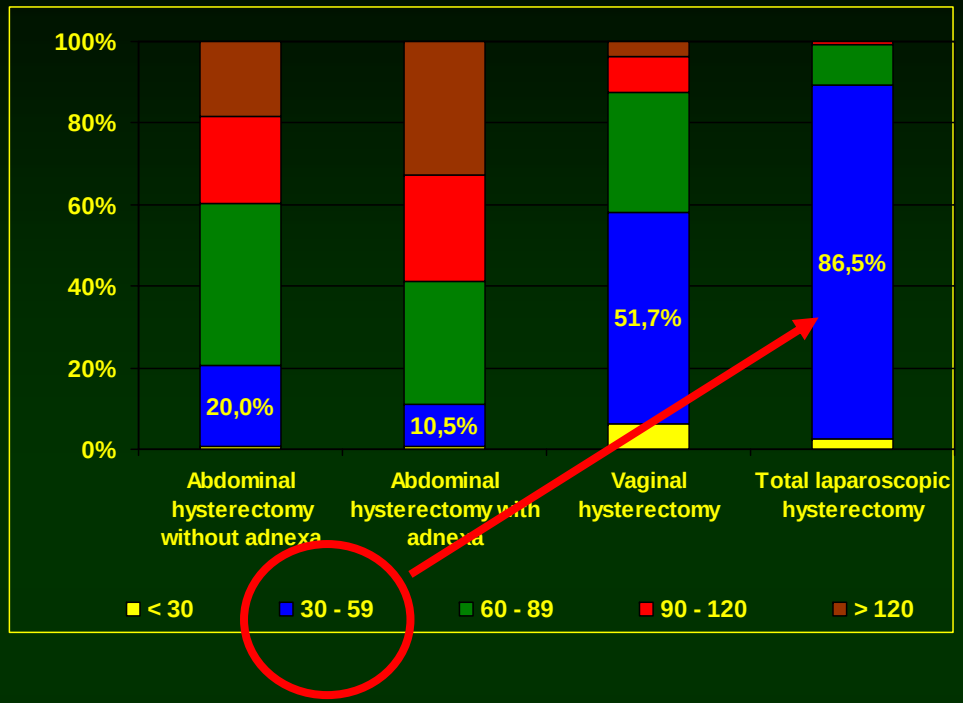
KH Sachsenhausen TLH study 11/2005 bis 5/2008

- Total laparoscopic hysterectomy (with or without adnexa) — n = 330

Laparoscopic total hysterectomy

Duration of surgery





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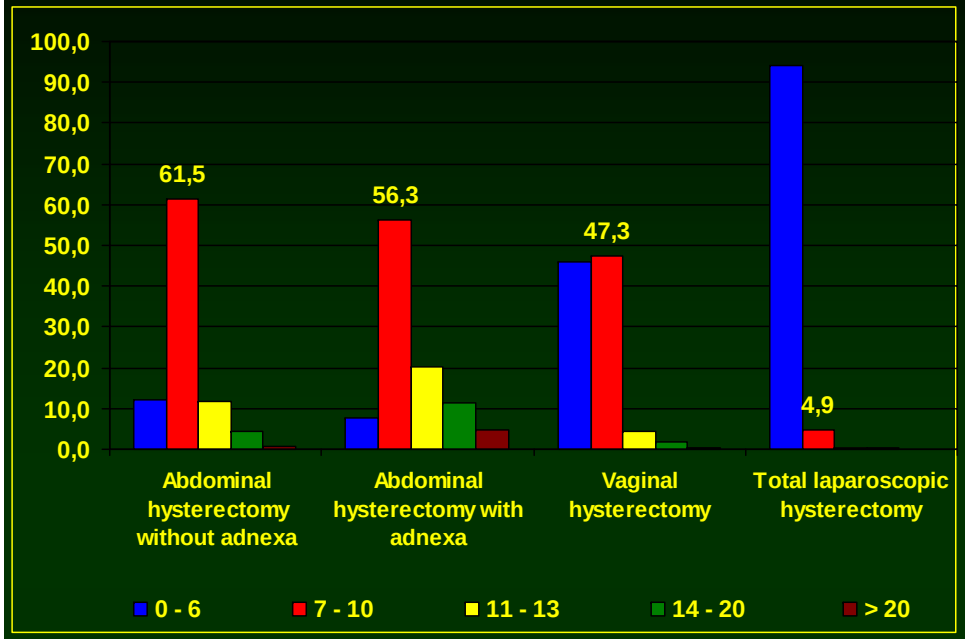
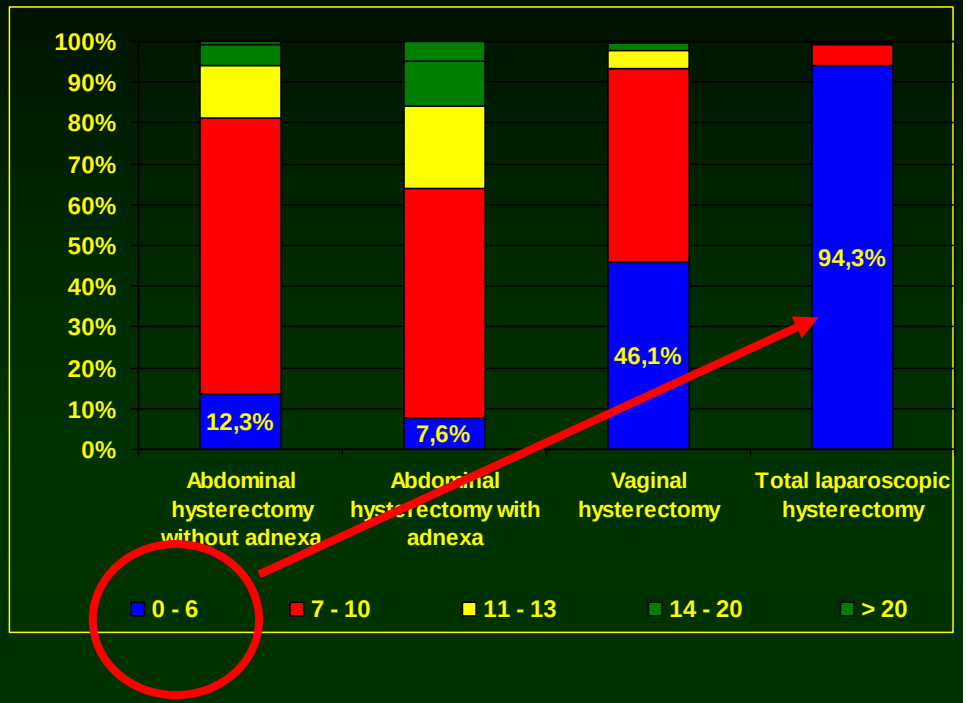
TLH study
11/2005 bis 5/2008

Total laparoscopic hysterectomy (with or without adnexa) **n = 330**

Laparoscopic total hysterectomy

days of hospitalisation





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KH Sachsenhausen
TLH study
11/2005 bis 5/2008

Total laparoscopic hysterectomy **n = 330**
(with or without adnexa)

Laparoscopic total hysterectomy n = 330

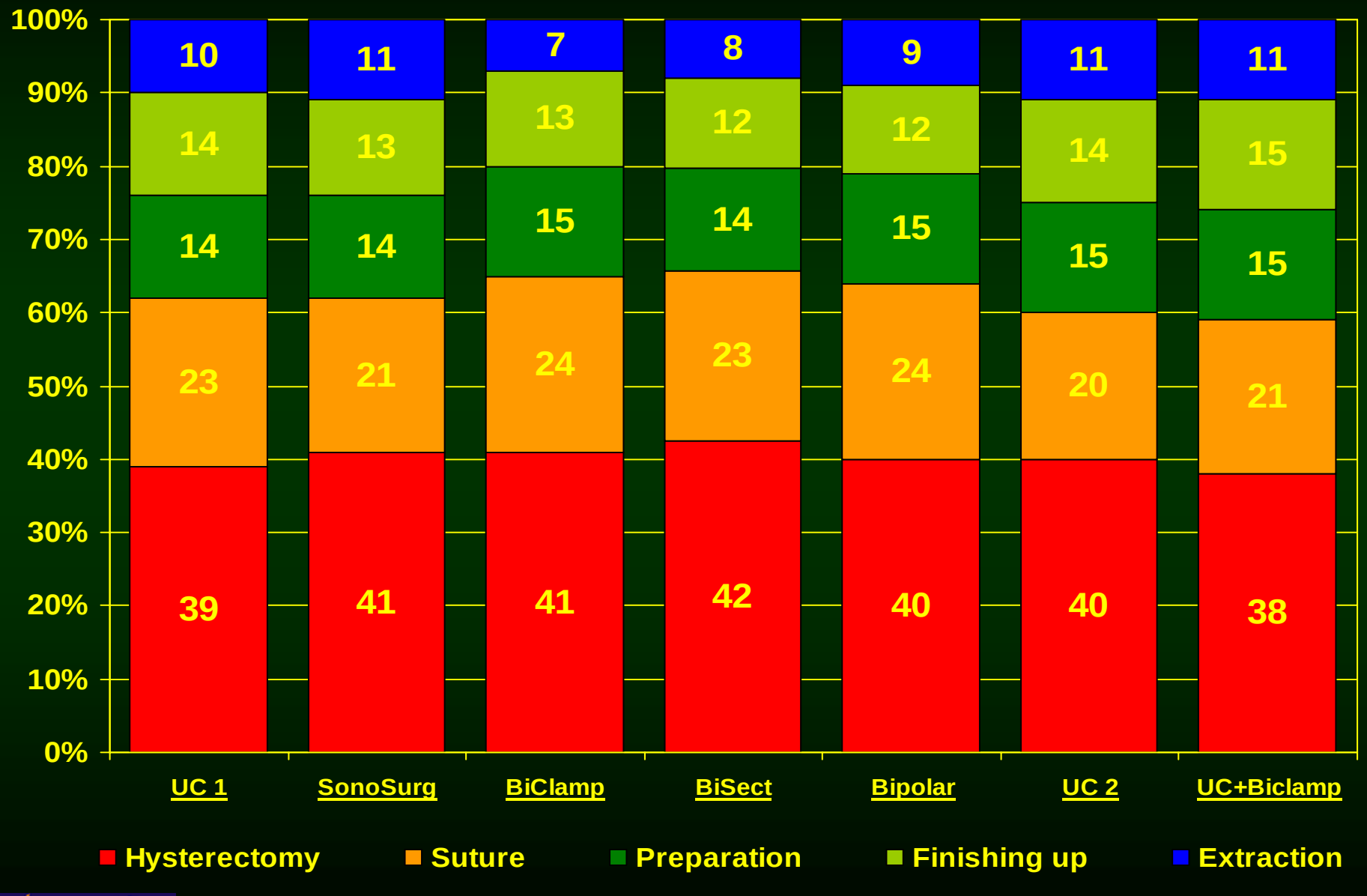
techniques

	UC 1	SonoSurg	BiClamp	BiSect	Bipolar	UC 2	UC + BiClamp
n =	60	60	34	11	7	60	98
Overall surgery time (min)	45 25-105	45 28-72	47 30-75	45 35-80	45 37-66	38 25-116	36 22-72
- Preparation	6	6	7	6	7	6	5
- Hysterectomy	18	18	19	19	18	15	14
- Extraction	5	5	3	4	4	4	4
- Suture	10	10	11	10	10	8	8
- Finishing up	6	6	6	6	5	5	5
- Preparation	14%	14%	15%	14%	15%	15%	15%
- Hysterectomy	39%	41%	41%	42%	40%	40%	38%
- Extraction	10%	11%	7%	8%	9%	11%	11%
- Suture	23%	21%	24%	23%	24%	20%	21%
- Finishing up	14%	13%	13%	12%	12%	14%	15 %

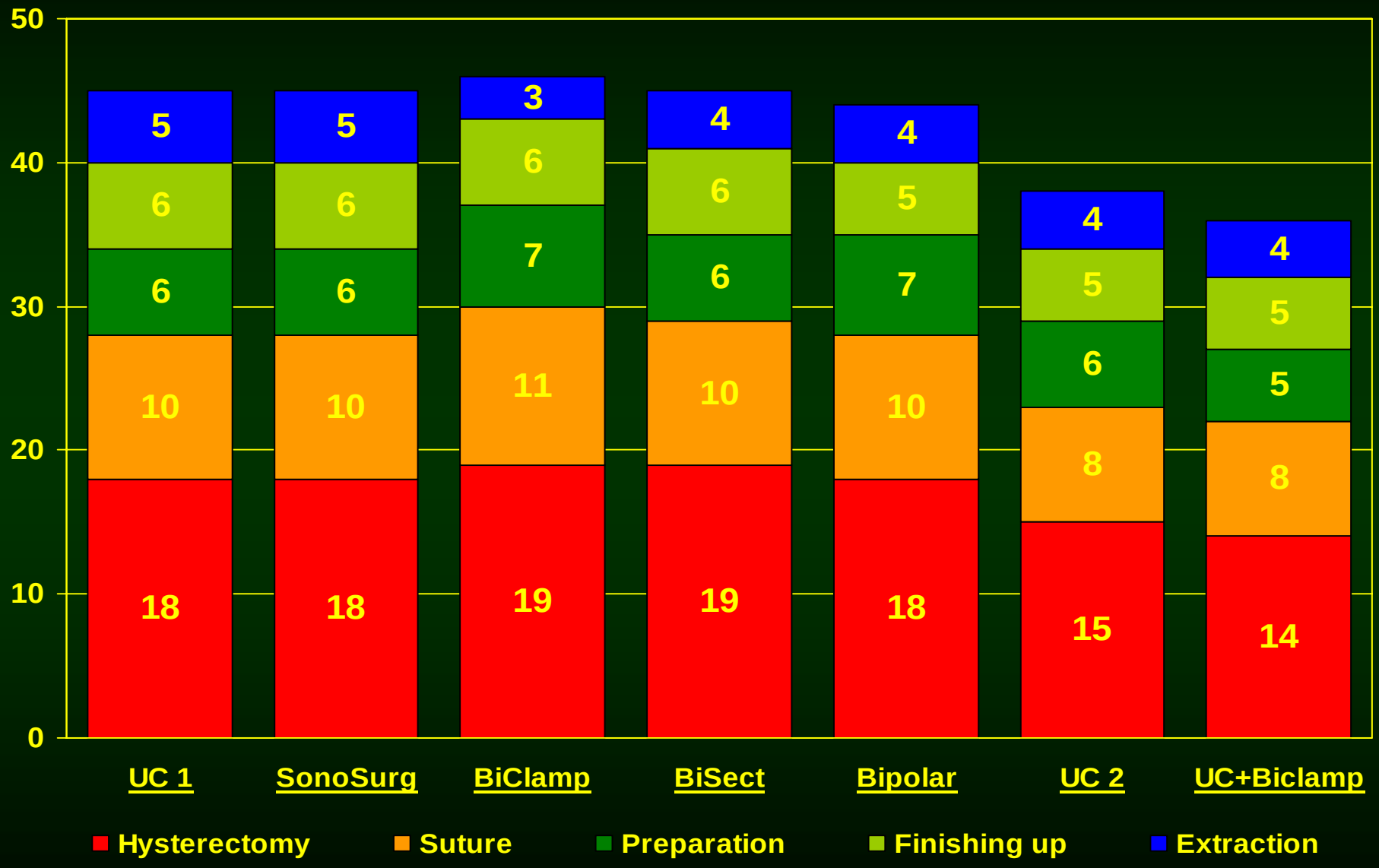
UC = Ultracision

Laparoscopic total hysterectomy

duration surgery %

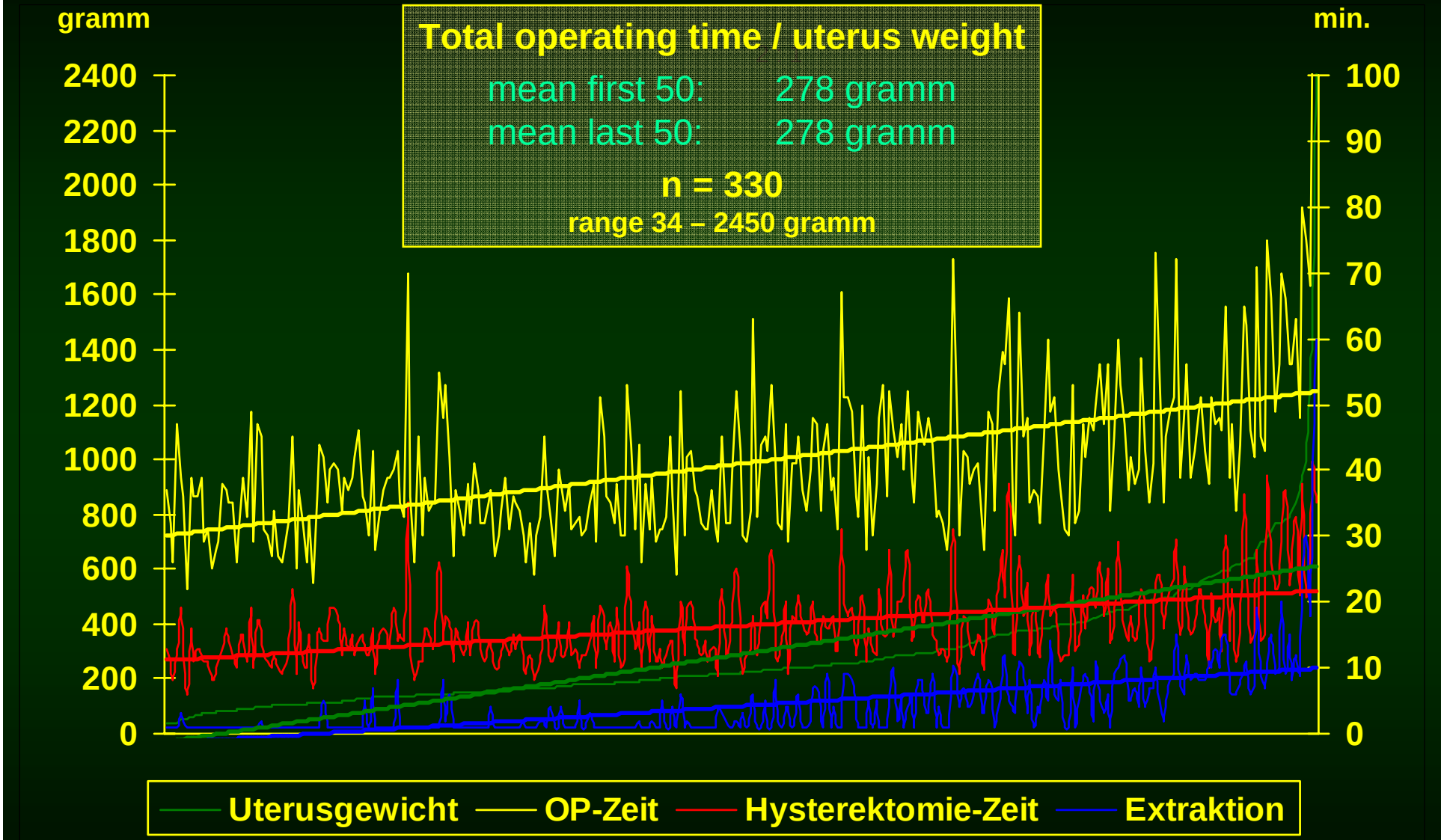


Laparoscopic total hysterectomy duration surgery (min)



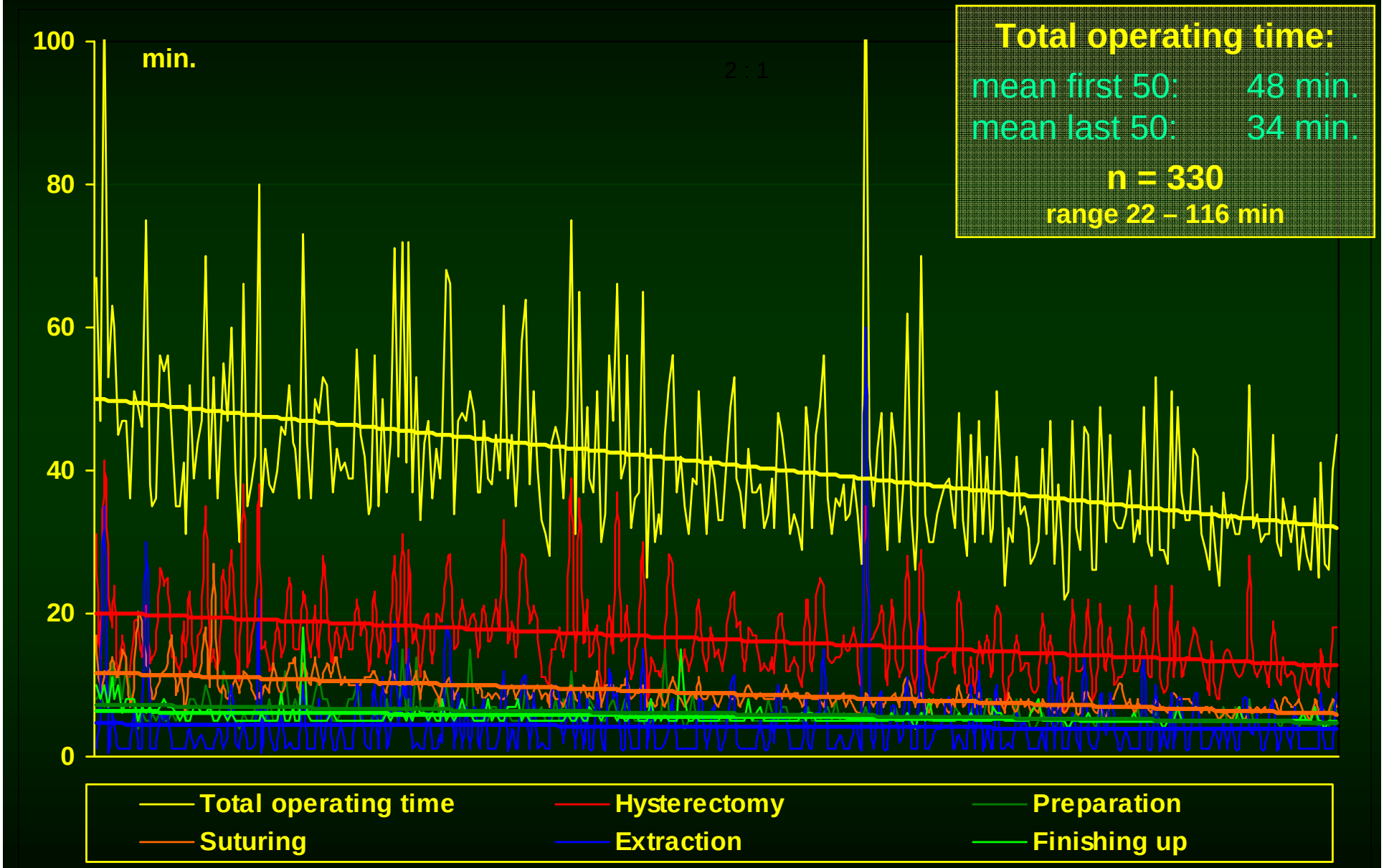
Laparoscopic total hysterectomy

uterus weight



Laparoscopic total hysterectomy

learning curve



Advantages and disadvantages of ultrasound techniques

Advantages:

- Cutting + coagulation with a single instrument
- precise dissection
- small necrosis zones
- no secondary lesions (cautery)

Disadvantages:

- high costs (single use)
- long learning curve
- „slow“ handling
- disappointing coagulation of big vessels

Thank you for your attention !