HYSTERECTOMY

Tim Chang April 2010

Hysterectomy is the second most common major surgical procedure performed after caesarean section

approximately 20,000 Hysterectomy performed in Australia and 600,000 Hysterectomy performed in USA per annum

There is a decreasing incidence of hysterectomies in recent years, with an increasing proportion of vaginal hysterectomies, however AH is still the predominant route in approximately 50% of Australian women.

20-25% of woman have had Hysterectomy by the age of 60 (US have higher rates than Europe)

40% of Hysterectomy have no significant pathology.

Hysterectomy is mostly performed to improve quality of life, therefore the advantages, risks and alternatives should be fully discussed with the patient.

Historically first hysterectomies

VH	Langenbeck	1813
SAH	Charles Clay	1863
AH	EH Richardson	1929
LAVH	H Reich	1989
TLH	H Reich	1993

Questions to answer

- Indications
- Route
- Subtotal hysterectomy
- Role of prophylactic oophorectomy
- Complications

Indications for Hysterectomy

- Uterine fibroids } 70%
- Bleeding esp Dysfunctional uterine bleeding }
- Pelvic pain eg 20%
    - Adenomyosis
    - Endometriosis
    - PID
    - Chronic pelvic pain
- Uterine prolapse
- Neoplastic and preinvasive disease
- Others e.g Obstetric PPH, cornual ectopic pregnancy, sterilisation

Routes of hysterectomy

(benign conditions in US)

AH 65%
VH 20%
LH 15% (Jacoby et al)

Australian data
National Hospital morbidity database. (public and private)

	2004 -05
Abdominal	48%
Vaginal	39%
Laparoscopic	13%

Adapted from Hill et al. ANZJOG 2010

Medicare data for gynaecology comparing financial years

	2000-01	2008-09
Abdominal	8498 (50%)	5919 (38%)
Vaginal	6015 (35%)	5558 (36%)
Laparoscopic	2477 (15%)	3901 (26%)
Total	**16990**	**15378**

Adapted from D Molloy. O&G magazine 2010 .12;1: 30-31

TC personal figures private N=139

	2005 -2010
Abdominal	10%
Vaginal	38%
Laparoscopic	52%

Route of hysterectomy often depends on surgeon experience and biases.
Route determined by:

- Pathology present
- Patient anatomy eg unable to bend hips, narrow subpubic arch etc
- **Surgeon expertise**
- Patient ?preference?

Important to remember the outcomes of hysterectomy and any surgical procedure will depend on a) surgical experience and 2) case selection. RCT can eliminate case selection bias, but not completely surgeon experience.

Cochrane review on surgical approach to hysterectomy 2009
Prior to 1998 no RCT comparing AH to VH
Meta analysis 34 RCT involving 4495 patients comparing VH/AH and LAVH/LH/TLH for benign disease (many studies excluded prolapse and uterine size >12-14/40) conclusion:

"When technically feasible VH should be performed over AH. Where not possible, LH has some advantages over AH, but offset by longer operating times and increased risk of urinary tract injuries"

need to consider:

- Surgical experience particularly laparoscopic experience
- No Statistical Difference does not mean there is No difference

VH vs AH

- Shorter hospital stay LOS (1.1 day)
- Quicker return to normal activities
- Reduced post op pain
- Reduced febrile episodes
  (NSD blood loss or visceral injury)

LH vs AH

- Shorter hospital stay (2days)
- Quicker return to activities (with improved QoL measures upto 4 months)
- Less blood loss but NSD transfusions
- Less wound and abdominal wall infections
- Increase urinary tract injuries pooled (OR2.41) but not other visceral injuries
- Longer operating times (TLH > LAVH but few numbers)

VH vs LH

- NSD LOS
- NSD return to normal activities
- Shorter operating times (LAVH shorter than TLH)
- Less bleeding and risk of blood TF
- Less cost

eVALuate study (2004)
RCT multicentre parallel study of LHvs AH and LH vs VH 30 centres involving 43 gynaecologists with N=1380 women for benign disease from 1996-2000.
Exclusions:

- Second or third degree prolapse
- Uterus >12 weeks
- Required other pelvic floor surgery
- CI to laparoscopy

Each surgeon had performed at least 25 of each procedures

Conclusion:

- Quicker recovery with LH vs AH
- Increased major complications with LH vs AH (OR 1.91) which included unintended laparotomy as a complication.
- VH is quicker than LH with similar outcomes (underpowered)

Table 2 Primary end point of both trials: major complications. Values are numbers (percentages) of participants

	Abdominal trial		Vaginal trial	
	Abdominal hysterectomy (n=292)	Laparoscopic hysterectomy (n=584)	Vaginal hysterectomy (n=168)	Laparoscopic hysterectomy (n=336)
Major haemorrhage	7* (2.4)	27* (4.6)	5 (2.9)	17 (5.1)
Bowel injury	3 (1)	1 (0.2)	0	0
Ureteric injury	0	5 (0.9)	0	1 (0.3)
Bladder injury	3 (1)	12* (2.1)	2 (1.2)	3 (0.9)
Pulmonary embolus	2 (0.7)	1 (0.2)	0	2 (0.6)
Anaesthesia problems	0	5* (0.9)	0	2 (0.6)
Unintended laparotomy:				
Intraoperative conversion	1† (0.3)	23 (3.9)	7 (4.2)	9 (2.7)
Return to theatre	1 (0.3)	3 (0.5)	0	1 (0.3)
Wound dehiscence	1 (0.3)	1 (0.2)	0	1 (0.3)
Haematoma	2 (0.7)	4 (0.7)	2 (1.2)	7 (2.1)
Other complications	0	0 (0)	1 (0.6)	0 (0)
At least one major complication	18 (6.2)	65 (11.1)	16 (9.5)	33 (9.8)

A patient may have had more than one complication.
*These patients converted procedure before the operation: one patient undergoing abdominal hysterectomy converted to laparoscopic hysterectomy before the operation in the abdominal trial and had a major haemorrhage. Two patients in the abdominal trial who were undergoing laparoscopic hysterectomy converted to abdominal hysterectomy before the operation and had a major haemorrhage. One patients undergoing laparoscopic hysterectomy in the abdominal trial converted to abdominal hysterectomy before the operation and had a major anaesthetic problem. One patient undergoing laparoscopic hysterectomy in the abdominal trial converted to abdominal hysterectomy before the operation and had a bladder injury.
†This patient in the abdominal trial was randomised to abdominal hysterectomy, converted to laparoscopic hysterectomy before the operation, and then converted back to abdominal hysterectomy during the operation.

criticisms:

- Including laparotomy as a complication of LH
- Experience of LH surgeons relative to the other methods? (1995 only 3% hysterectomies are performed laparoscopically in UK)
- Suturing of vascular pedicles in 7% associated with 25% of major complications

VALUE study 2004

Retrospective unselected cohort of 37,512 women undergoing hysterectomy over 12 months in 1995 in UK looking at severe complications (death, major visceral injury, DVT /PE, AMI, CVA, haemorrhage, fistula, septicaemia etc) observed:

- 3% overall incidence
- doubling risk with LH to AH 6.1% vs 3.6%
- proportion of hysterectomies: AH 67%: VH 30%: LH 3%

Table 1. Severe operative complications: events (%), adjusted odds ratios (OR), 95% confidence interval (CI).

Characteristics	Events	Total	Operative complications	
			Crude %	Adjusted OR (95% CI)
Age category				
20–29	33	869	3.8	1.07 (0.73–1.57)
30–39	339	8912	3.8	1.14 (0.98–1.31)
40–49†	615	16,427	3.7	1.00
50–59	174	5656	3.1	0.87 (0.72–1.05)
≥60	134	5309	2.5	0.78 (0.60–1.01)
One unit increase in parity		37,295		1.04 (1.01–1.08)
Indication				
Dysfunctional uterine bleeding†	568	16,179	3.6	1.00
Fibroids	291	6604	4.4	1.34 (1.14–1.56)
Endometriosis/adenomyosis	60	1937	3.1	0.83 (0.62–1.10)
Prolapse	176	6571	2.7	0.88 (0.68–1.15)
Pelvic mass	46	1224	3.7	1.24 (0.88–1.73)
Other*	90	2978	3.0	0.90 (0.71–1.14)
History of serious illness				
No†	1191	35,094	3.4	1.00
Yes	106	2201	4.8	1.47 (1.18–1.82)
Operator				
Consultant†	716	20,426	3.5	1.00
Non-consultant	508	14,772	3.4	0.93 (0.81–1.07)
Supervisor				
Not supervised†	1046	31,007	3.4	1.00
Consultant	204	4988	4.1	1.27 (1.06–1.52)
Non-consultant	34	914	3.7	1.14 (0.78–1.67)
Method				
Total abdominal hysterectomy (incl. subtotal)†	884	24,772	3.6	1.00
Vaginal	341	11,122	3.1	1.07 (0.89–1.27)
Laparoscopically assisted vaginal hysterostomy	70	1154	6.1	1.92 (1.48–2.50)

Adding subgroup totals will be affected by missing values for some variables.

* 20 other indications; cases not already coded.

† Reference category.

major criticism experience of laparoscopic surgeons as only 3% were done by this method by 152/194 consultants meaning each consultant was involved in <8 LH each compared to 127 AH over the period.

Vaginal Hysterectomy

VH when compared to AH
Reduced morbidity:

- Reduced post op pain
- Shorter LOS
- Reduced cost
- More rapid return to normal activities
- Less complications

LH when compared to VH:

- Longer operating times
- Greater hospital costs
- Greater use of analgesia
- Greater blood loss and blood TF.

Every Hysterectomy should be done by the vaginal route when "technically" feasible. The traditional contra- indications(few are absolute):

1. Patient factors eg Uterus too high / immobile or Vagina too narrow
   Commonly quoted nulliparity is C/I to VH
2. Uterine factors
   Uterus too big quoted C/I VH.
   Commonly uterus >12 weeks size require more skill to remove
   Often preop assessment of size is inaccurate
3. Extra uterine factors
   Concomitant extrauterine pathology eg. severe endometriosis, PID, etc. leading to restricted mobility of the uterus or limited vaginal space or Previous surgery e.g. ventro-suspension or Manchester . Need for objective assessment rather than subjective suspicion: role is laparoscopy fills this criteria
4. Others eg
   Adnexal pathology requiring removal ovaries
   Oophorectomy can be accomplished by the vaginal route with experience
   Invasive cancer especially of the cervix/uterus/ovaries

With surgical experience most of these contra-indications can be overcome.

Technical considerations:
Perioperative antibiotics, decreases febrile morbidity especially in pre menopausal woman

Use of vasoconstrictors especially with the local anesthetic facilitates dissection and reduces bleeding and post operative pain, but tissue ischemia and reducing antibiotic distributon may led to increase risk of infection.

Traditionally sutures used for all pedicles. More recently development of electrosurgical sealing devices (e.g. ligasure can seal vessels upto 7mm within 2-7sec and is operator independent) presents some advantages:

- Shorter operating time
- Reduced blood loss and perioperative haemorrhage complications
- Facilitates increase use of vaginal approach with reduced conversions (relevant for trainee surgeons)
- Reduced post operative pain (personal opinion)

Table 3. Procedure Parameters (Mean ± Standard Deviation, Median, Range)

	EBVS (n = 30)	Suture (n = 30)	Statistical significance (P)
Vaginal hysterectomy procedure time (min)	39.1 ± 17.7 36 (22–93)	53.6 ± 26.7 47 (37–160)	.003
Total procedure time* (min)	48.0 ± 26.8 42.0 (22–93)	60.3 ± 27.9 55.5 (37–160)	.014
Estimated blood loss (mL)	68.9 ± 51.6 50.0 (20–200)	126.7 ± 113.3 100 (25–600)	.005

EBVS = electrosurgical bipolar vessel sealer.

from Levy et al AMJOG 2003

Need to be careful to Burns to skin and viscera
Descriptions of outpatient VH reported (>90% VH in B Levy's series):

- Thorough patient preparation
- Comprehensive management of pain and perioperative nausea
- Need good patient support network post op

Standard technique:

- Circumcision of the cervix border smooth meets rough
- Sharp dissection of the tissue between cervix and bladder (the correct plane)
- Opening POD and uterovesicle peritoneum
- Right angle retractor lift the bladder and ureters away
- Tie uterosacral ligament
- Uterine vessels
- Utero-ovarian pedicles
- Close vault with peritoneum left open and uterosacral ligaments ties to vault.

Techniques of debulking an enlarged uterus at vaginal Hysterectomy

1. Splitting the uterus (hemisection) useful for size up to 14 weeks

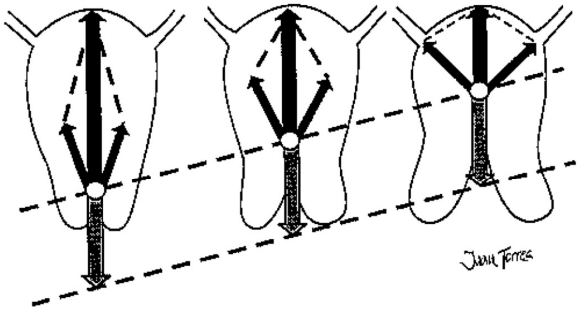
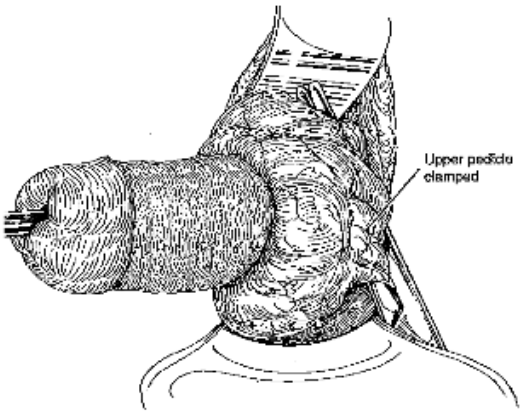


Figure 10.3 Mechanical effect of hemisection.

2. Coring: to convert circular structure to an elongated structure without



3. Wedge resection (aim is to reduce the central volume of the uterus/fundus allowing access laterally)
4. Myomectomy
5. Cervical amputation and myomectomy

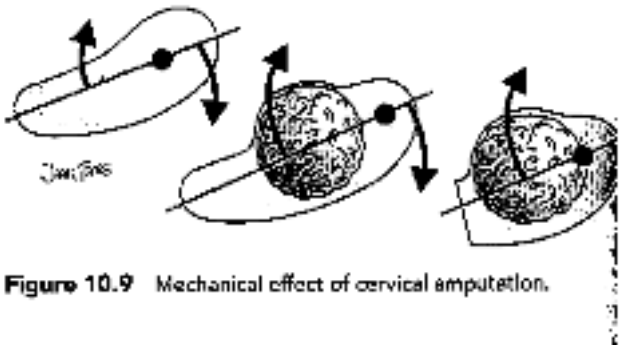


Figure 10.9 Mechanical effect of cervical amputation.

LAPAROSCOPIC HYSTERECTOMY

The role of Hysterectomy is to replaced abdominal Hysterectomy and not vaginal Hysterectomy.

Increase use of laparoscopic Hysterectomy eg in Australia medicare data shows increase from 15% to 26% from 2001 FY to 2009FY (private hysterectomies).

Advantages of the laparoscopic approach:

- Magnification and improved visualization of pelvic anatomy
- Precise haemostasis leading to less blood loss
- Allows treatment of pelvic disease eg endometriosis
- Reduced morbidity compared to laparotomy

Most hysterectomies are performed by the abdominal route, however recent American MA survey reported >90% would prefer themselves or their spouse to undergo VH/LH. It has been suggested that performing <2 hysterectomies per month it would be difficult to obtain the skills for LH.

Reasons for limited up take of laparoscopic hysterectomy:

- Inadequate training and the learning curve
- Increased capital and disposable costs (lack of administration support)
- Inadequate caseload
- Lack of support from colleagues (anaesthetists and nursing staff)
- Increased time taken to perform LH.

Indications for LH (TC personal opinion)

- Significant pelvic pathology requiring visualization of the pelvis e.g endometriosis, significant pelvic adhesions or ventrosuspension etc
- When oophorectomy required
- Difficult VH because poor descent or patient anatomy

Contraindications LH

- Insufficient knowledge, training and experience with the planned procedure
- Inadequate instrumentation esp camera systems
- Medical conditions contraindicating laparoscopy

Types of laparoscopic hysterectomies

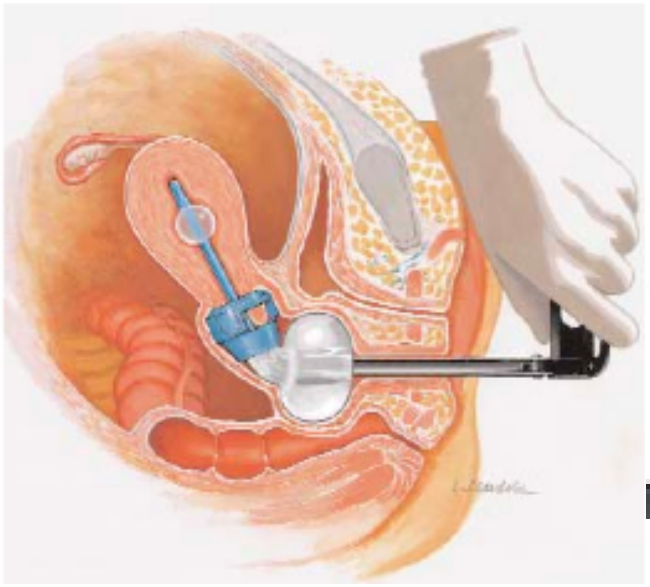
- LAVH
- LH
- TLH

Success and efficiency in endoscopic surgery requires:

- A team approach, each familiar with their roles in the Surgery, including anaesthetist.
- Surgeon having a thorough understanding of the equipment used and alternatives
- Calm environment with no time pressures etc.

Technique of TLH by TC

- Three 5mm ports with 1x12mm suprapubic port. Patient in lithotomy with trendelenberg after initial post is inserted.
- Rumi manipulator with Koh cup placed in uterus/ vagina gives good manipulation and delineated the vaginal fornices very well.



- Identify the ureter and make a window in the peritoneum above this and/or ureterolysis.
- Incise the round ligament to gain entry into the retroperitoneal space
- Develop the utero-ovarian pedicle by incising the anterior leaf of the broad ligament, then stapling these pedicles with stapler (LCS 45x2.5mm)
- Incise the utero-vesicle peritoneum and pubocervical fascia to release the bladder and indirectly the ureters.
- Developing the uterine vessels by skeletonizing the vessels, pushing the vaginal cup up to displace the ureters.

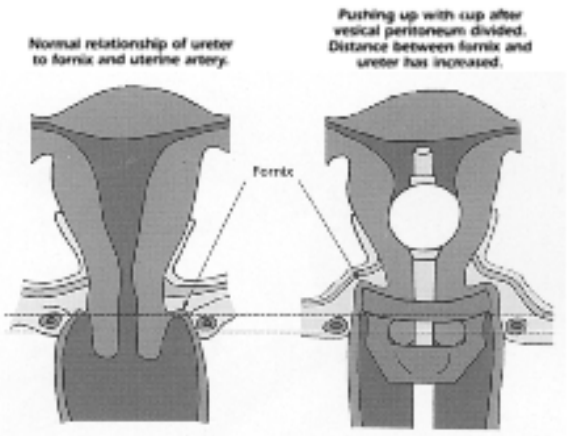


FIGURE 10. Relationship of ureter to fornix and uterine artery (A) before and (B) after insertion of the RUMI system.

- Bipolar or suture the uterine vessels, keeping on to of the rim of the cup. Once the vascular supply of the uterus is stopped, the uterus turns cyanotic.

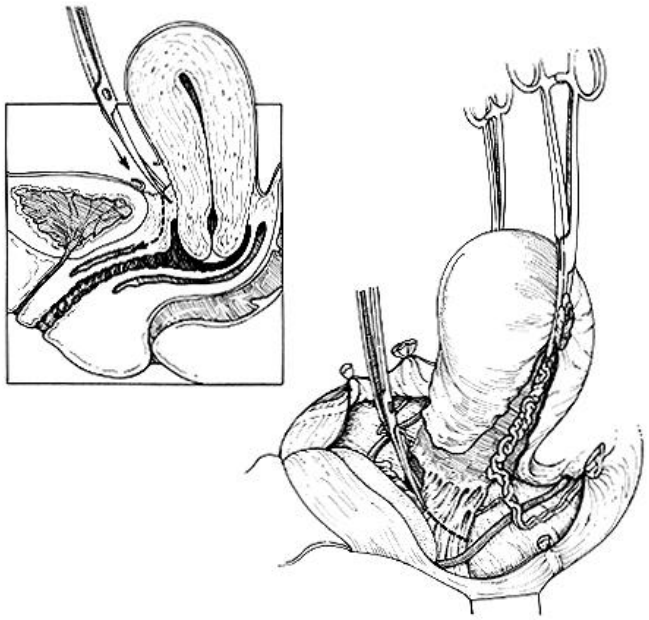
- Using high power monopolar diathermy or harmonic scalpel perform colpotomy, keeping on top of the rim of the cup and ensuring the cup is pushed up taut to the vagina.
- The uterus is pulled into the vagina, but kept in the vagina to maintain pneumoperitoneum.
- The vaginal vault is sutured laparoscopically, incorporating the uterosacral and cardinal ligaments reconstituting the pericervical ring using 0-PDS.
- Pedicles and ureters checked and haemostasis secured.

Unique complications of LH
- Laparoscopy entry complications
- Epigastric vessel injury 0.4%
- Incisional hernia 0.3%
  reduced with closure of all incision >7mm
- CO2 gas embolus
- conversion to Laparotomy ? is this a real complication ?

ABDOMINAL HYSTERECTOMY
AH should only be performed when VH and LH is not possible.

AH is still the most common route of hysterectomy in most countries with a ratio of 3:1 AH:VH, despite the literature showing this route has the highest morbidity.
Major reason for predominance of AH is surgical training.

Technique of abdominal hysterectomy:
- Patient placed in dorsal lithotomy to allow vagina access
- Incision dependent on anticipated pathology and size of the uterus
- Good exposure is the key with packing; self retaining retractor; mobilizing adhesions/bowel etc.
- Round ligament cut and tied 1/3 to1/2 from the uterus to avoid retroperitoneal vessels and gain entry into the retroperitoneal space.
- Utero-ovarian ligament isolated clamped, cut and tied.
- Uterovesicle peritoneum incised and bladder sharply dissected off the uterus (may include incising the pubocervical fascia).



- Posterior broad ligament peritoneum incised to skeletonize the uterine vessels.
- The ureter can be identified attached to the pelvic peritoneum of the side wall.
- Uterine clamp placed at the level of the internal os, whilst putting traction on the uterus to distance the vessels from the ureter. The pedicle is then cut and tied.
- The cardinal ligaments are then clamped, hugging the cervix and pulling the cervix on tension.
- Vagina entered with clamps placed on cardinal uterosacral ligament complex and vaginal angles sutured incorporating the uterosacral/cardinal ligaments.
- The vaginal vault closed.

Sub total hysterectomy (SAH or LSH)

More than 95% of Hysterectomy (AH) are total <5% sub total (SAH)
Purported advantages of sub total Hysterectomy
Short term:

- Reduced risk of injury to ureters and bladders
- Reduced Hemorrhage and pelvic haematoma

Long term (via less damage to the neuroanatomical structures)

1. Bowel function less impaired
2. Bladder function less impaired
3. Improved Sexual function:
    - Cervix important for orgasm
    - Improved lubrication
    - Preserves vagina length

Risk of cervical cancer of the stump = 0.3%, although treatment of cervical stump cancer more difficult

Cochrane 2006
Meta analysis 3 RCT N= 733 concluded:
Short term outcomes

- SAH less operating time vs AH (-12 minutes)
- SAH less blood loss (-85mls) but NSD Blood TF
- SAH reduced febrile morbidity (OR 0.43)
- SAH less pelvic haematoma and pelvic abscess but NSD
- NSD in :
    - Urinary tract injury (metanalysis was underpowered to detect this)
    - Bowel complications
    - Pain scores post op
    - Wound infection
    - LOS (SAH <AH just outside SD)

Longterm

- SAH increased cyclical bleeding at 1 year (OR 11.3) with 12% having bleeding. Studies have rates up to 20%, but with reverse cone or diathermy to cervical canal may reduce this (significant data lacking). 1-2% require reoperation.
- NSD in
    - Bladder function
    - Bowel function
    - Sexual function
    - Prolapse vault

Most data from open hysterectomy.
Retrospective cohort studies on LSH vs LH:

- Reduced operating time
- Decreased blood loss
- Shorter LOS
- Reduced urinary tract injuries

Modern indications for subtotal hysterectomy:
Only when the dangers of removal of the cervix exceed retaining it should sub total Hysterectomy(SAH) should be done e.g.

- Obliteration of the pouch of Douglas from endometriosis or PID in an inexperienced pelvic surgeon although this is does not treat the pathology
- Excessive hemorrhage e.g at obstetric AH
- Patient preference after counseling

Contraindications:

- Cervical dysplasia
- Uterine hyperplasia or cancer
- Patient unwilling to continue with cervical surveillance
- Severe rectovaginal endometriosis

Role of prophylactic oophorectomy at hysterectomy

55% women in US have oophorectomy at time hysterectomy with 78% women aged between 45-64 undergo BSO.
Australian data show approximately 35% of women undergo oophorectomy at hysterectomy.

Factors to consider:

- The ovary continues to function after menopause
- Oestrogen replacement therapy poses risks eg. breast cancer, thromboembolism etc
- Low Compliance with HRT

Traditional indications for Oophorectomy at the time hysterectomy

- Risk residual ovary syndrome esp pathology affecting the ovaries eg. Tumours, cysts ,endometriosis, Chronic PID
- To reduce the risk of subsequent ovarian cancer
- When the blood supply is compromised
- Severe PMS after trial of confirmed ovarian suppression improved symptoms
- approaching menopause (?>45-50 years)

For prophylactic surgery need to consider:

- benefits of Surgery
- risks (short and long term) remember DO NO HARM
- patient choice

Benefits of Bilateral salpingo oophorectomy (BSO)

- Cancer risk
  lifetime risk ovarian cancer 1.4%
  risk is reduced with hysterectomy with ovarian conservation by 50%
  incidence ovarian cancer after hysterectomy with conservation of ovaries is 0.1%-0.3%.
  Prophylactic oophorectomy reduces the risk of ovarian cancer in future but
  does not eliminate this altogether. (primary peritoneal cancer still develops)
  Need to perform 350 BSO to prevent 1 case ovarian cancer
  BSO reduces risk of breast cancer 35%-50% esp younger women <45 years
  Increase risk lung cancer (RR 1.26-2.09) uncertain to the mechanism
- Residual adnexal syndrome
  2-3% women require further surgery ovaries after hysterectomy mainly for pelvic pain and ovarian pathology. Risk may be higher in women with endometriosis affecting ovaries, previous ovarian pathology.
  Need to perform 30 extra BSO to prevent 1 case ROS.

Risks of prophylactic BSO

(most studies are retrospective observational studies, with bias recruitments)

- Increase all cause mortality in BSO patients vs control esp women under 45: (RR 1.3) and worse for those not taking HRT (RR 1.7). retrospective observational studies.
- Increase risk of Myocardial Infarction (MI) and mortality from MI in women with BSO, even if BSO performed after 50years and worse for those never taken HRT (RR 1.2-2). (studies heterogenous)
- Increase incidence of osteoporosis and hip fractures related to decrease oestrogen and androgens.

- Association between BSO and Parkinsonism, dementia anxiety and depression, but was negated by HRT.
- Hot flushes >90% after BSO often more severe compared with natural menopause, with more severe urogenital and loss of libido symptoms.

Modern indications for prophylactic oophorectomy
prophylactic surgery should only be performed if the benefits significantly outweigh the risks. The current evidence (none are RCTs) does not support BSO for many of the traditional indications

Decision needs to be individualised after thorough conselling

Menopause or perimenopause is not an absolute indication

- At high risk of ovarian or breast cancer e.g. BRCA1 gene or history of breast colon cancer etc
- Significant ovarian pathology leading to high risk of residual adnexal syndrome e.g severe endometriosis involving endometriomas in a woman in her late fourties.

Immediate complications of hysterectomy

- Haemorrhage (1-3%)
  Defintion varies. Commonly quoted definitions:
    - Blood loss >1000ml
    - Requiring blood transfusion
    - Requires additional intervention eg return to OT
    - Drop in HB >3-5

  Types of haemorrhage:
    - Intraop
    - Early post op
    - Late post op (30-50% of haemorrhage)

  Surprisingly early studies report incidence haemorrhage greater with VH (2.5-3%) than AH (1-1.5%) but reduced blood TF rates CREST (8% vs 15%); more recent studies TF rates 1-5%

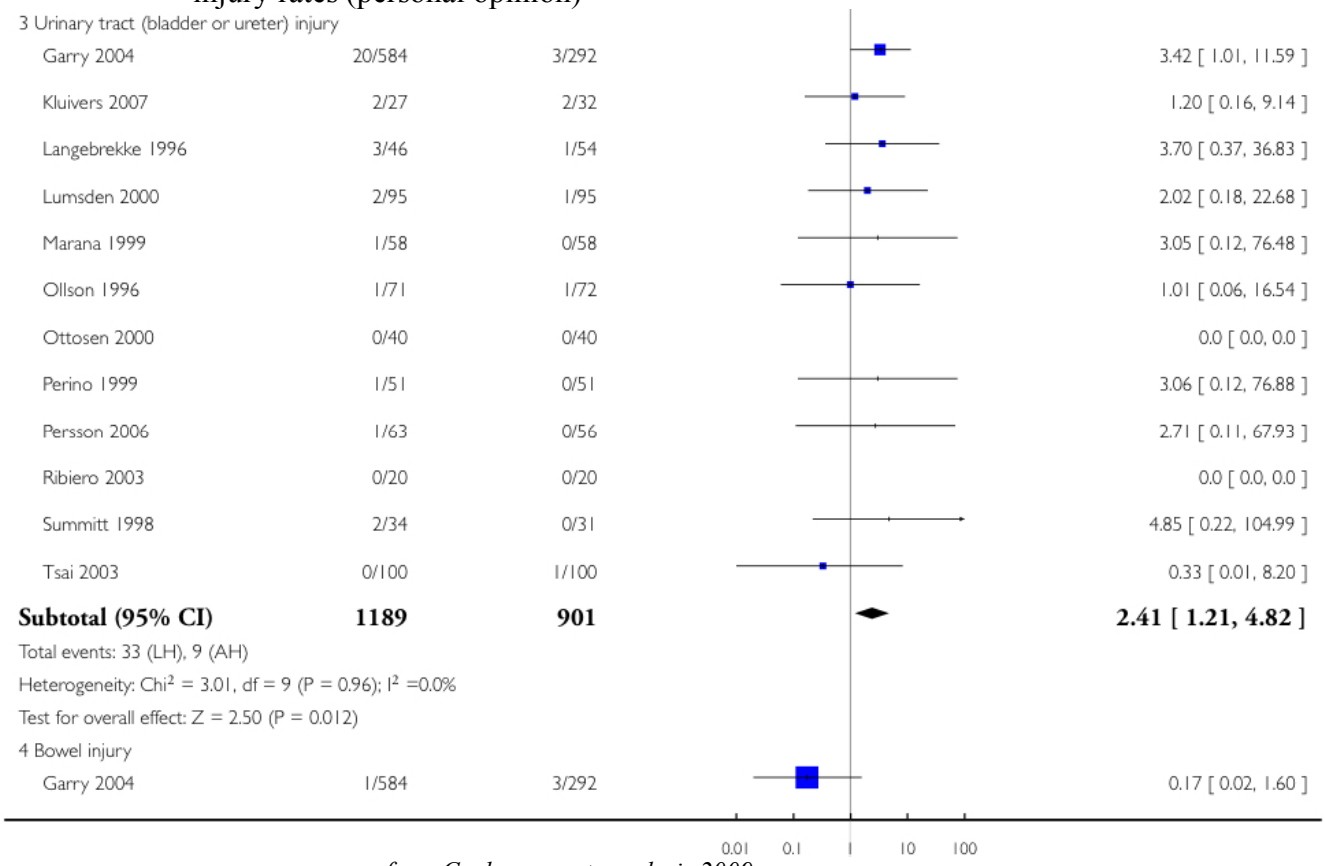
	Abdominal hysterectomy			Vaginal hysterectomy		
	All reported rates (%)	Most commonly reported rates (%)	CREST (%)	All reported rates (%)	Most commonly reported rates (%)	CREST (%)
Intraoperative	0.2–3.7	1–2	0.2	0.5–3.5	0.7–2.5	0.7
Postoperative	0.24–2.3	1–2	1.6	0.4–5.7	1.0–5.0	1.9
Transfusion	2.2–75	2–12	15	0.7–13	2.0–8.3	8.3

from Harris W. Early complications of hysterectomy O&G Survey1995

earlier cases series for LH reported reduced operative haemorrhage rates of 1-2% with TF rates 1.6%.
Cochrane NSD blood loss between VH and AH, but less blood loss (-45mls) and less drop in Hb between LH and AH but NSD TF rates.

- Urinary tract injury
  Bladder injury 1-2% with increasing incidence due to increase CS
  VH>AH with comparable rates at LH from earlier case series.
  NSD in Cochrane

  Ureteral injury 0.1-0.5% in uncomplicated cases and rises to 1-2% for complicated cases.
  VH <AH in case series but NSD Cochrane
  LH>AH in Cochrane pooled bladder and ureter (OR=2.41) with NSD VH vs LH, but TLH>VH (OR= 3.69)
  Using colpotomy cup and not using staplers on the uterine vessels may reduce ureteric injury rates (personal opinion)



from Cochrane metaanalysis 2009

routine cystoscopy can detect >90% urinary tract injuries and should be used liberally. Ureteric catheters do not decrease injuries in routine cases, but can be useful in complicated cases and can improve the ease of the surgery (personal opinion)

- Bowel injury
  1/250-300 cases
  AH>VH in older studies but NSD in Cochrane
  Paralytic ileus AH 1-4%
  VH 0.2%

- Thromboembolism
  Incidence DVT after major abdominal pelvic surgery without prophylaxis up to 30%
  Not much data on benign hysterectomy per se, but indirect evidence shows prophylaxis does decrease incidence of DVT/PE
  Cochrane 2009 review concluded reduction in DVT in prolonged prophylaxis for 4 weeks after major abdominal pelvic surgery (benign and malignant) with no increase in bleeding complications compared with in hospital only prophylaxis. Applicability to laparoscopic and vaginal surgery not known

Comparison 1. LMWH versus placebo

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 All VTE	4	901	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.41 [0.26, 0.63]
2 All DVT	4	901	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.43 [0.27, 0.66]
3 Proximal DVT	4	901	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.27 [0.13, 0.57]
4 Symptomatic VTE	4	901	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.22 [0.06, 0.80]
5 All VTE (Sensitivity analysis)	3	793	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.42 [0.27, 0.68]
6 Symptomatic VTE (Sensitivity analysis)	3	793	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.14 [0.02, 0.82]
7 Bleeding complications	4	1242	Peto Odds Ratio (Peto, Fixed, 95% CI)	1.11 [0.62, 1.97]
8 Mortality	4	1021	Peto Odds Ratio (Peto, Fixed, 95% CI)	1.12 [0.65, 1.93]

from Rasmusssen et al. Cochrane 2009

- Febrile morbidity
  Large variation incidence commonly quoted 10-20% with 50% unexplained
  Prophylactic AB reduces infectious morbidity from 10-15% without AB to 2-4% with AB
  Classification:
  - Operative site
  - Distant site
  - Unexplained

	Abdominal hysterectomy			Vaginal hysterectomy		
	All reported rates (%)	Most commonly reported rates (%)	CREST (%)	All reported rates (%)	Most commonly reported rates (%)	CREST (%)
Unexplained fever	1.9–38	10–20	16.8	1.8–10	5.0–8.0	7.2
Operative site infection	6.6–24.7	6.6–24.7	9.4	3.9–21	3.9–10	3.9
Wound infection	1.6–11	4–8	5.0	N/A	N/A	N/A
Pelvic infection	3.2–21	3.2–10	4.4	3.9–21	3.9–10	3.9
Urinary tract	1.1–11	1.1–5	7.0	1.7–45	1.7–5.0	3.4
Pneumonia	0.12–2.6	0.4–2.6	0.4	0.29–2.0	0.29–2.0	0.4

N/A, not applicable.

from Harris W. Early complications of hysterectomy O&G Survey1995

LH case series reported unexplained fever rates of 2% with most infection rates of <1%
Cochrane VH vs AH showed less febrile episodes (OR 0.42) and LH vs AH showed less febrile episodes (OR 0.67) and abdominal & wound infections (OR 0.31)

- Other Complications
    - Femoral neuropathy and other neropraxia
      Mainly after AH deep blades retractors, but can occur after long VH
    - Fallopian tube prolapse
      Almost after VH, esp if vault left open
    - Wound dehiscence
      After AH, esp midline incision, obesity, other medical problems
    - Conversion to laparotomy
      Rate depends on what cases are initially undertaken vaginally or laparoscopically, but in experienced hands, rates are low .

Long term complications of hysterectomy

- Residual adnexal syndrome <5%
- Premature ovarian failure.
  Hysterectomy leads to earlier menopause average 4 years and 25% become menopausal within 2 years
  Mechanism:
    - compromised blood supply
    - Removal hormonal factors of the uterus which control ovarian function
- Urinary sequelae
  Particularly after radical Hysterectomy often bladder dysfunction :
    - reduced compliance
    - Increased reflex contractions
    - Reduced urethral pressure profiles.

  This is due to interruptions of the sympathetic nerve supply.
  There is no significant effects with simple hysterectomy

- Vaginal cuff dehiscence
  Reported incidence av 0.2% AH and VH to av 1% TLH
  May present from 1 month (1st intercourse) to up to 5 years post op
  Risk factors:
    - Raised intra-abdominal pressure
    - Weakened cuff e.g infection, TLH with excessive diathermy
    - Early coitus: avoid intercourse 6 weeks

  Techniques to reduce dehiscence at TLH:
    - Minimize use of monopolar/ use high power density monopolar
    - Full thickness closure of the vault
    - Delayed absorbable PDS suture
- Mental health disorders
  Couselling preparation of the patients before surgery is important
- Sexual dysfunction
  In general improved or no decrease in sexual function after hysterectomy. In a small proportion of women (<10%)
    - Direct eg. vaginal shortening, oestrogen deficiency etc
    - Indirect eg. change in body shape

New approaches to hysterectomy

- robotic assisted hysterectomy
- Hand assisted laparoscopic hysterectomy

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