Radical Surgery In Cervical Cancer
- Overview -

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Agenda

- Historical Perspectives of Radical Hysterectomy
- Recent Advances in Radical Hysterectomy
- Classifications for Radical Hysterectomy
- Advanced Cervical Cancer Surgery
- Less Radical Surgery for Early Cervical Cancer

Concept of radical hysterectomy

During the years 1880, the pathologists/anatomists had demonstrated that,

" *Cervical cancer would spread through the surrounding tissues and involve the local lymph nodes much more rapidly than had previously been assumed.*", and that

"The practiced hysterectomy could not be a curative operation and a more radical approach was called for."

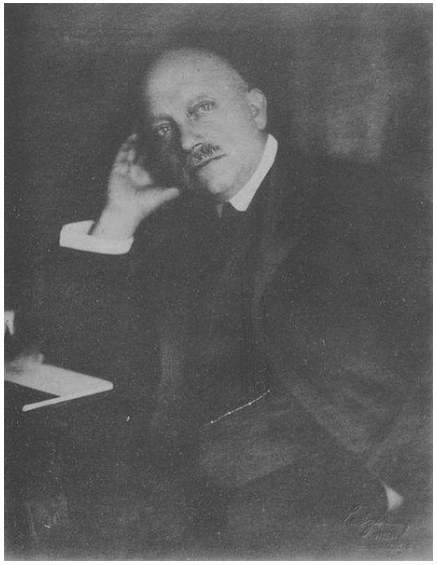
The First Radical Hysterectomy

On April 26, 1895
John T. Clark, M.D. at the Johns Hopkins Hospital

"*More radical method of performing hysterectomy surgery for uterine cancer*"

However, it appeared from his report on the operations of 12 women patients that he had not in all of these cases removed the parametrium together with the lymph nodes.

The First Radical Hysterectomy



Ernst Wertheim

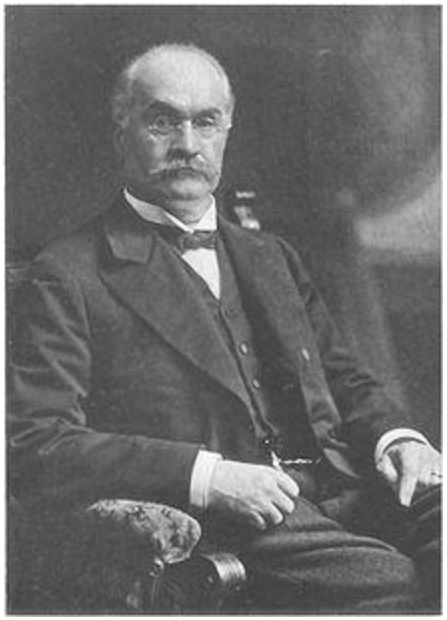
Austrian Gynecologist

1864-1920

In 1898,
Ernst Wertheim developed the abdominal radical hysterectomy with removal of the pelvic lymph nodes and the parametrium.

Wertheim E Arch Gynak 1900;61:627-668

The First Vaginal Radical Hysterectomy



Friedrich Schauta

Austrian Gynecologist

1849-1919

In 1901,
Friedrich Schauta described the radical vaginal hysterectomy and reported a lower operative mortality rate than the abdominal approach (mortality of 10 %, 5-year survival of 40%).

Schauta F. Monatsscbr Geburtsbiffe Gynaekol 1902;15:133-52

The First Radical Hysterectomy Report

"Wertheim Operation"

In 1905,
Ernst Wertheim reported the outcomes of his first 270 patients. The operative mortality rate was 18%, and the major morbidity rate was 31%.

Wertheim Operation

In 1912,
Ernst Wertheim published his results in 500 cases, which contributed so much to the development and acceptance of radical hysterectomy (mortality of 10% compared to 50% in earlier reports).

Wertheim performed more than 1300 radical hysterectomies after his first one was performed on Nov 16, 1898.

Statistical analysis of the results proved the effectiveness of Wertheim Operation and the Operation *served as a persistent model for all later modifications to the methodology.*

Introduction of Radiation

However,

with the introduction of radiation as a therapeutic modality for cervical cancer, surgical treatment of this disease declined due to high mortality rate (up to 40%) of abdominal procedures.

In the early 1900, it was found that patients had lower mortality rates and improved survival when treated with radiation compared to surgery.

For several decades radiation was the standard of care for cervical cancer, with lower mortality than surgery.

Reintroduction of Wertheim Operation

Antibiotics and improvements in operating techniques reduced the previously described morbidity and mortality of Wertheim operation to acceptable levels.

***Wertheim operation was reintroduced and has been modified many times to improve both anatomic detail and radicality by several surgeons*.**

Reintroduction of Wertheim Operation

Victor Bonney

British Gynecologist

1872-1953

"*Wertheim's Operation In Retrospect*"

500 cases of Wertheim Operation for Cervical Cancer (mortality of 14%, 5-year survival rate of 42%)

Surgical success was comparable to radiation.

Bonney V. Lancet 1949;1;637-9

Reintroduction of Wertheim Operation

Hidekazu Okabayashi

Japanese Gynecologist

1884-1953

"Wider extirpation of parametrial tissue than Wertheim 's Op. "

"A novel separation of the posterior leaf of the vesicouterine ligament"

Reintroduction of Wertheim Operation

Joe Vincent Meigs

American Gynecologist

1892-1963

In the 1940s,

1) *Combining Wertheim operation with a complete pelvic lymph node dissection to increase its therapeutic efficacy*
2) *Safe way to perform Wertheim operation*

(1% Op Mortality, 75% Survival)

Meigs J. Am J Obstet Gynecol 1945;40:542-3

Incorporation of Lymphadenectomy

Wilhelm Latzko

1863-1945

Anatomic studies in the 1800s found positive nodes in patietns who died of cervical cancer and that the parametria contained abnormal lymph nodes before they were palpably abnormal.

Cruveilhier J. Bechet Jeune; 1834 / Wagner N. Eine pathologisch-anatomische Monographie; 1858

Wilhelm Latzko pioneered lymphadenectomy at the early part of the twentieth century.

Latzko W et al. Zbl Gynakol 1919;34:689-705

Meigs reintroduced lymphadenectomy in the USA in the 1940s as part of radical hysterectomy.

In 1967, FIGO declared the standard for radical lymphadenectomy would encompass the removal of at least 20 lymph nodes.

Incorporation of Lymphadenectomy

In the 1950s,
Mitra used an ***extraperitoneal pelvic lymphadenectomy*** technique in combination with radical vaginal hysterectomy.

Mitra S. Am J Obstet Gynecol 1959;78:191-196

Dargent et al. introduced ***laparoscopic pelvic lymphadenectomy*** in radical vaginal hysterectomy.
And thus, radical vaginal hysterectomy was looked at with renewed interest.
Dargent et al. delineated the benefits of the vaginal approach including ***fewer intraoperative complications, shorter operative times, and a more rapid postoperative recovery***.

Marchiole P et al. Gynecol Oncol 2007;106:132-141

Laparoscopic Radical Hysterectomy

Advances in laparoscopic instruments have made it possible to safely perform radical hysterectomy laparoscopically.

Since the original reports of the early 1990s, there have been over 1000 laparoscopic radical hyterectomies reported in the literature.

The safety and feasibility of this operation have clearly been established.

Advantages consistently reported: ***Lower blood loss, shorter hospital stays, quicker return of work, and fewer complications without compromising the survival outcomes***

Robotic Radical Hysterectomy

In the last few years, robotic surgery has been introduced into gynecologic surgery practice.

Since the first robotic assisted radical hysterectomy was described in 2006, a number of reports have been published and the use of this surgical technique is increasing.

Sert BM et al. Eur J Gynaecol Oncol 2006;27:531-533

The advantages offered by this new technology include ***a 3-dimensional magnified field, tremor filtration, and 5 or 6 degrees of instrument mobility inside the body, thus significantly reducing the ergonomic problems*** associated with the conventional laparoscopic approach.

Piver-Rutledge-Smith Classification

Five Classes of Extended Hysterectomy for CX CA

- Class I hysterectomy (*TeLinde Modification*)
  - In situ and microinvasive carcinoma
  - After RT in barrel-shaped EndoCx Ca (extrafascial hyst.)
- Class II extended hysterectomy (Wertheim')
  - Microinvasive carcinoma, in unusual situation
  - Small postirradiation recurrences limited to the cervix
- Class III extended hysterecotmy (Meigs')
  - Stage I to IIA
  - Centeral recurrence after RT (rectum, bladder not invaded)
- Class IV extended hysterecotmy
  - More extensive anteriorly occurring central recurrences
  - Metastases occupy the parametrium
- Class V extedned hysterectomy
  - Central recurrent cancer involving portions of the distal ureter and bladder

Piver MS, Rutledge F, Smith JP. Obstet Gynecol 1974;44(2):265-72.

EORTC-GCG Classification

Classification of Radical Hysterectomy (Modification from Piver classification)

- Type I Hysterectomy (*Simple hysterectomy*)
  - IA1 cervical cancer without LVSI
- Type II Hysterectomy (*modified radical hsyterectomy)*
  - IA1 cervical cancer with extensive LVSI
  - IA2 cervical caner, IB1 cervical cancer (<1cm stromal invasion)
- Type III Hysterectomy (*Radical hysterctomy*)
  - IB1-IIA cervical cancer
- Type IV Hysterectomy (*Extended radical hysterectomy*)
  - Large IIA cervical cancer
- Type V Hysterectomy (*Partial exenteration*)
  - Central or isolated pelvic recurrences
  - Persistent disease after (CC)RT

Mota F. Int J Gynecol Cancer 2008;18:1136-8.

New Classification

- Type A Hysterectomy
  - Minimum resection of paracervix
- Type B Hysterectomy
  - B1: Transection of paracervix at the ureter
  - B2: Additional removal of lateral paracervical lymph node (medial to Obturator nerve)
- Type C Hysterectomy
  - Transetion of paracervix at the junction with internal iliac vascular system
  - C1: Nerve preservation of autonomic nerves
  - C2: Without preservation of autonomic nerves
- Type D Hysterectomy
  - Laterally extended resection
  - D1: Resection of total paracervix at pelvic side wall and vessels of paracervix
  - D2: D1+hypogastric vessel and adjacent fascial or muscular structure
- Lymph node dissection
  - Level 1: Inter and exernal iliac lymph node
  - Level 2: Common iliac lymph node
  - Level 3: Inframesenteric aortic
  - Level 4: Infrarenal aortic

Advanced Cervical Cancer Surgery

Ryukichi Mibayashi

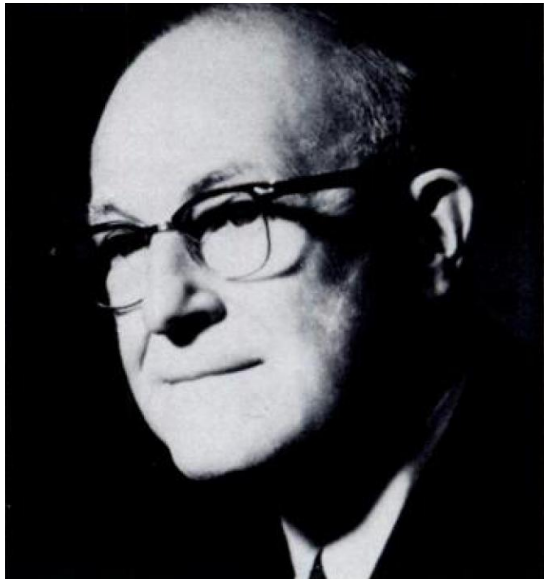
Japanese Gynecologist

1898-1977

On March, 1941, Ryukichi Mibayashi urged the necessity of ultraradical operation by his own method in instances of advanced cancer, ***"Hypogastric System Removal"***

Meigs J. Am J Obstet Gynecol 1945;40:542-3

Advanced Cervical Cancer Surgery



Alexander Brunschwig

American Gynecologist

1901-1969

In 1947,

"*The First Pelvic Exenteration*" by Alexander Brunschwig

Mortality rate: 2-13.5%, 5-year survival rate: 25-61%

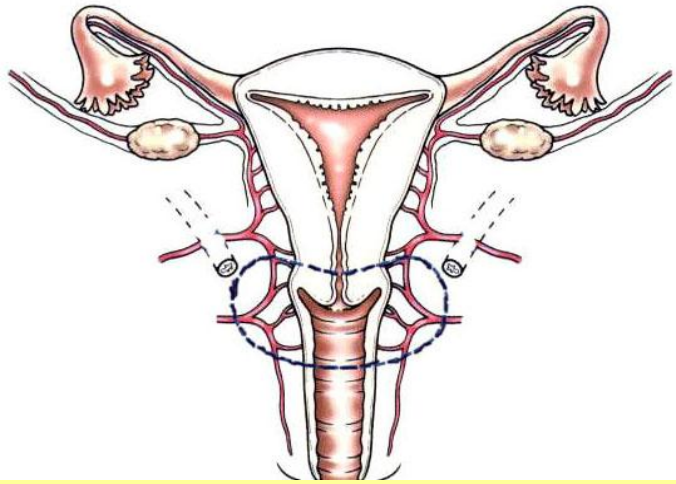
Brunschwig A. Cancer 1948;1:177

Laparoscopy Assisted Vaginal Radical Trachelectomy

Pf. D. Dargent

- First performed in 1986
- First reported in 1994, 28 cases

  Gynecol Oncol 1994;52:105(Abstract 14)
- Dargent's Operation



- *Laparoscopic PLND &/or PALND*
- *Vaginal Radical Trachelectomy*

Published Data on LAVRT

Author	Year	N	FIGO Stage	Histology		Size		OP time (min)	EBL (mL)	F/U (month)	Preg/ Live Birth	Recur	Death
				SCC	Other	< 2cm	> 2cm						
Burnett	2002	21	IA2-IIA	12	9	1.1 (0.3-3.0)		318	293	32	3/3	0	0
Schlearth	2003	12	IA2-IB	4	6	10	2	NR	203	47	4/2	0	0
Covens	2003	93	IA1-IB2	42	44	85	8	180	300	30	4	0	0
Plante	2004	82	IA1-IIA	42	30	64	4	252	254	60	50/36	3	2
Hertel	2006	108	IA1-IB1	75	33	108	0	253	NR	29	18/12	4	2
Shepherd	2006	123	IA2-IB1	83	40	NR		NR	NR	45	55/28	3	2
Marchiole	2007	135	IA1-IIA	90	28	1.66±0.91		179	NR	95	56/29	7	5
Total		574	IA1-IIA								190/114	17	11

❑ *Shortcomings of LAVRT*

1. Difficulty of learning radical vaginal surgery
2. Concern about incomplete parametrial resection

Published Data on Abdominal RT

Author	Year	N	FIGO Stage	Histology		Size		OP time (min)	EBL (mL)	F/U (month)	Preg	Recur	Death
				SCC	Other	< 2cm	> 2cm						
Smith	1997	1	IB	NR	NR	NR		NR	NR	NR	NR	NR	NR
Rodriguez	2001	3	IA2-IA2	2	1	NR		260-270	200-700	9-31	2	1	0
Palfalvi	2003	21	NR	NR	NR	NR	NR	NR	NR	NR	2	0	0
Del Priore	2004	1	IB1	1	0	NR	NR	NR	NR	6	NR	1	0
Ungar	2005	33	IA2-IB2	26	4	< 6		NR	NR	47	3	0	0
Abu-Rustum	2005	2	IB1	00	2	1.4 / 2		NR	NR	NR	NR	0	0
Cibula	2005	3	IA2-IB1	NR	NR	NR		NR	350-3500	NR	NR	NR	NR
Bader	2005	1	IB1	1	0	1		NR	NR	6	NR	1	0
Abu-Rustum	2007	5	IB1	3	2	0.7-1.3		248	280	NR	NR	NR	NR
Total		**70**	**IA2-IB2**								**7**	**3**	**0**

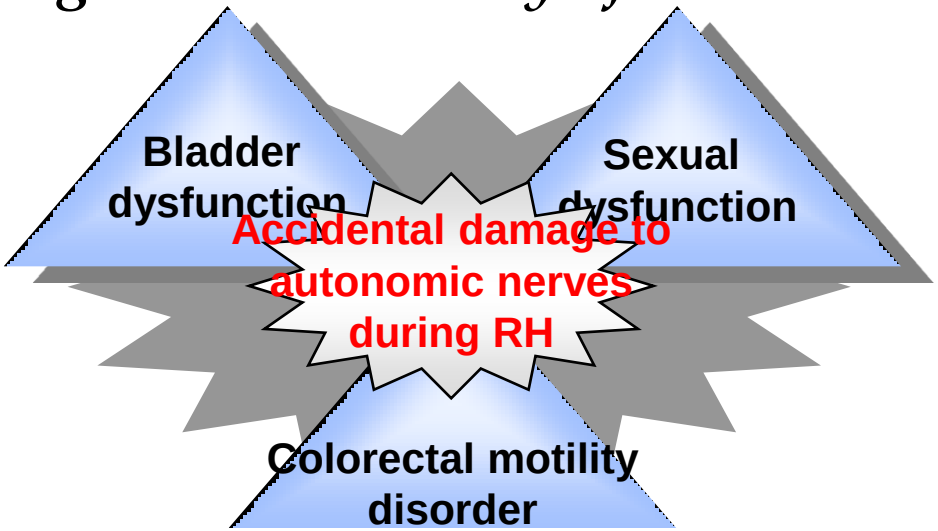
- ***Shortcomings of ART***
  1. Large abdominal incision
  2. Significant blood loss, and high rate of blood transfusion
  3. Longer postoperative hospital stay

Laparoscoic Radical Trachelectomy

Author	Year	N	FIGO Stage	Histology		Size		OP time (min)	EBL (mL)	F/U (month)	Preg	Recur	Death
				SCC	Other	< 2cm	> 2cm						
Pomel	2002	7	NR	NR	NR	NR		180-220	NR	NR	NR	NR	NR
Lee	2003	2	IB1	2	0	2.5 / NR		365/340	900/400	12/9	NR	0	0
Cibula	2005	1	IB1	1	0	0.8		250	250	4	NR	0	0
Bafghi	2006	6	IA2-IB1	NR	NR	NR		NR	NR	25	2	1	1
Kim	2010	27	IA2-IIA	20	7	19 / 8		290	332	31	3	1	1
Total		**16**	**IA2-IB1**								**5**	**2**	**2**

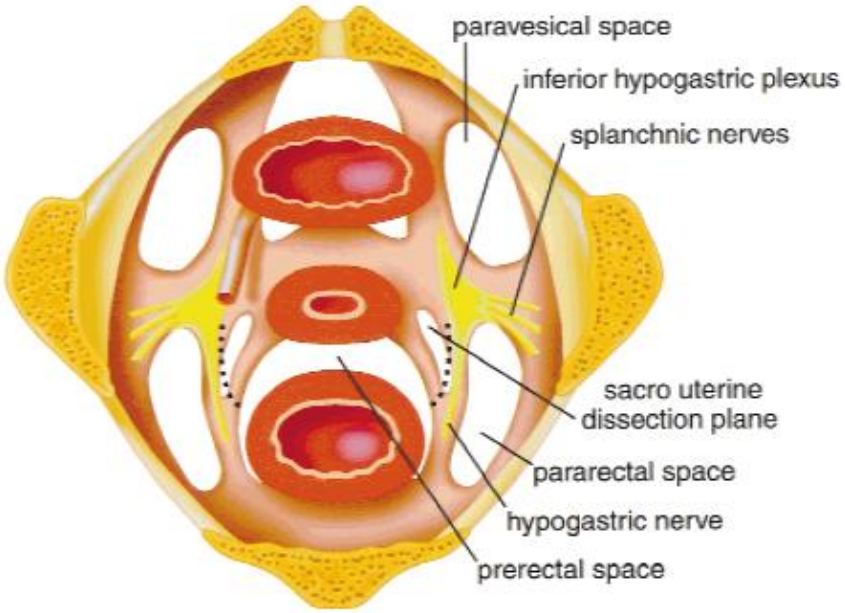
Needs for Nerve-sparing Procedures

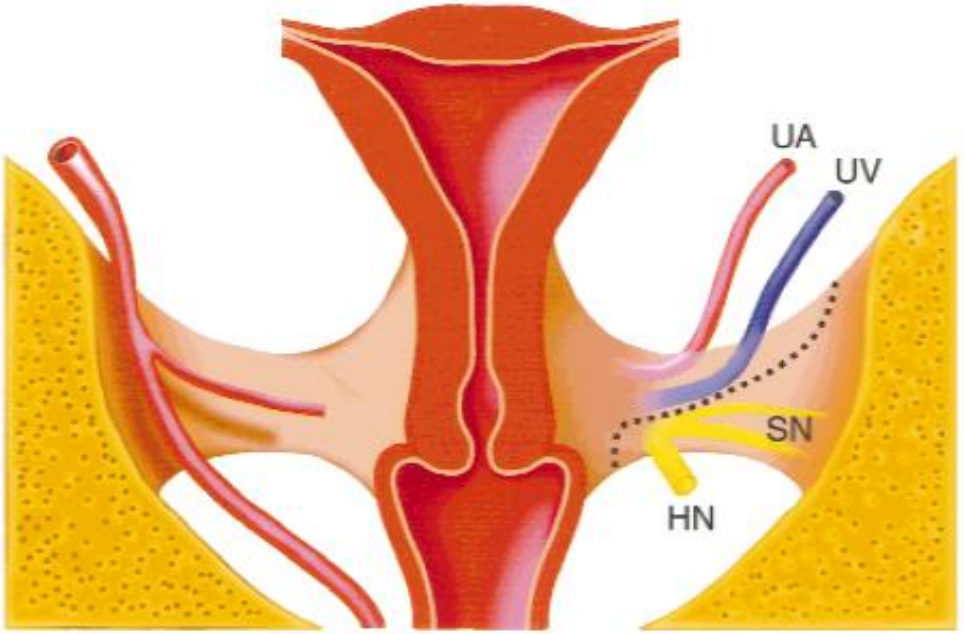
- *Typical Long-term Morbidity of Radical Hysterectomy*



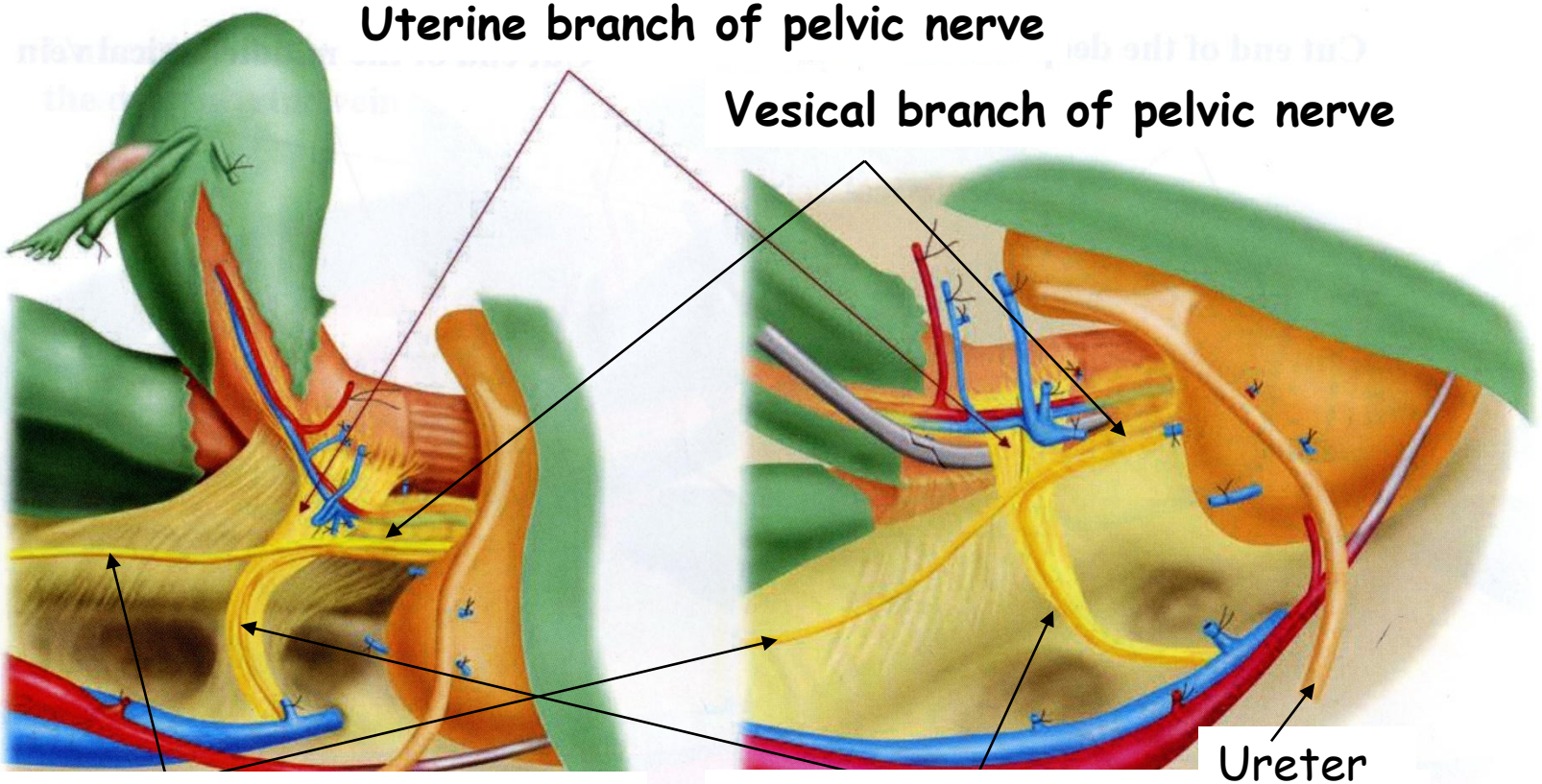
- *Bladder Dysfunction*
  - Severe dysfunction ; 10-32 %
  - Parasympathetic denervation (PSN); Hypocontractile bladder / Decreased sensation
  - Sympathetic denervation (HN); Storage disorder / Incontinence

Nerve-Sparing RH



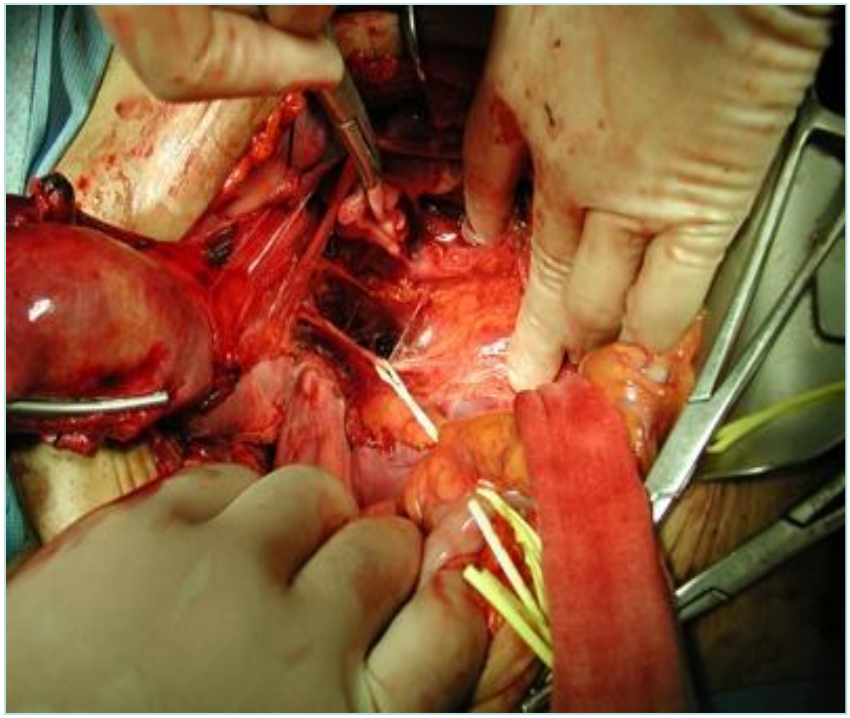


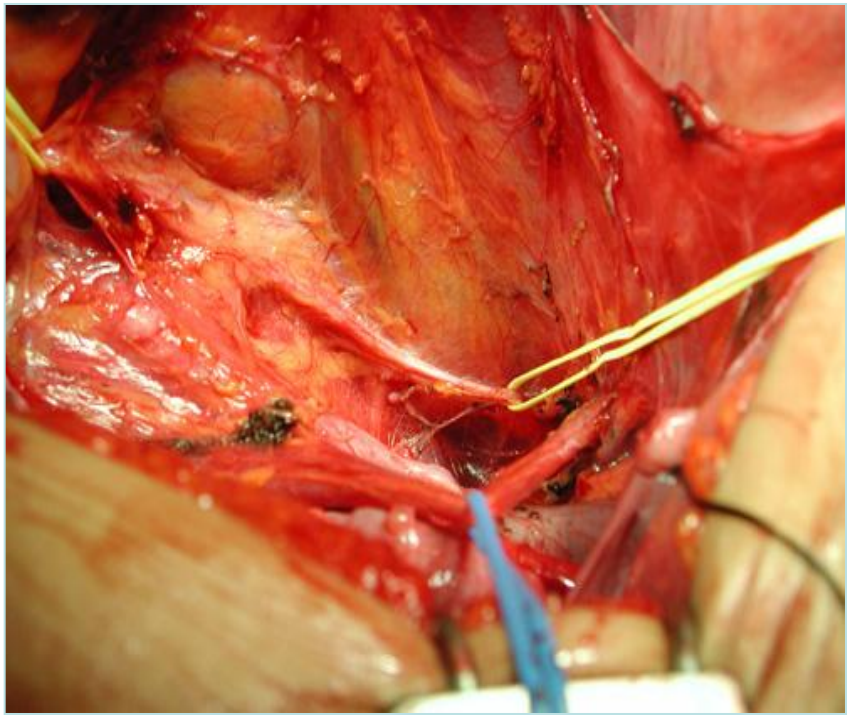
Nerve-Sparing RH



Sakuragi et al. IJGC 2005 / Fujii S et al. IJGC 2007

Nerve Sparing ARH





In Conclusion,

Abdominal radical hysterectomy at the moment remains the gold standard for the treatment of early cervical cancer.

Further advances in laparoscopic and robotic technologies have allowed all of the advantages associated with a minimally invasive approach in radical hysterectomy.

Accumulating experience on radical trachelectomy and nerve-sparing radical hysterectomy led to the significant improvement in the quality of life and significant reduction in the morbidity associated radical hysterectomy.

Recently, these new surgical techniques become accepted as a new standard of care.


Thank you for your attention !!
Asan Medical Center, Seoul, Korea