Laparoscopic Surgery in Gynaecological Oncology
Anatomical Considerations

Dr Rajendra A Kerkar MD MRCOG
Whipps Cross Hospital, London, UK
The Anterior Pelvis
Anatomical Landmarks

• The transverse vesical fold
  – Overlies the bladder dome running horizontally between the superior pubic rami
  – Crosses the obliterated hypogastric arteries 2.5cms above the round ligaments

• The obliterated hypogastric arteries
  – Continuation of the internal iliac arteries
  – Run beneath the parietal peritoneum towards the umbilicus
The Anterior Pelvis
Anatomical Landmarks

• The inferior epigastric arteries
  – Terminal branches of the external iliac arteries
  – Wind round the medial edge of the internal inguinal ring
  – Run upwards and medially above the parietal peritoneum along the lateral margins of the rectus muscles
The Anterior Pelvis
Anatomical Landmarks

• Inferior epigastric arteries
  – Lie just lateral to the obliterated hypogastric arteries
  – Enter the rectus sheath at the arcuate line.
  – Generally do not cross the rectus muscles towards the midline
Laparoscopic Surgery In Gynaecological Oncology
The Pelvic Sidewall Triangle
Gateway to the Retroperitoneum

• Boundaries
  – Base : Round ligament
  – Lateral : External iliac artery
  – Medial : Infundibulopelvic (IP) ligament
  – Apex : Where the IP ligament crosses the common iliac artery
The Pelvic Sidewall Triangle
Gateway to the Retroperitoneum

• Access
  – Deviate the uterus to the contralateral side and put the round and IP ligaments on stretch
  – Incise the pelvic peritoneum parallel to the external iliac vessels upto the apex
  – Bluntly dissect the retroperitoneal areolar tissue
  – Meticulous haemostasis of peritoneal and retroperitoneal vessels is essential
The Retroperitoneum
Anatomical Considerations

• The retroperitoneal spaces
• The pelvic ureter
• The pelvic blood vessels
• The low paraaortic region
• The pelvic and paraaortic lymph nodes
The Retroperitoneal Spaces

- Central spaces
  - Retropubic space: Cave of Retzius
  - Vesicovaginal pace
  - Rectovaginal space
  - Retrorectal/Presacral space

- Lateral spaces
  - Paravesical spaces
  - Pararectal spaces
Lateral Retroperitoneal Spaces
The Paravesical Space

• Boundaries
  – Distal : Pubic bone
  – Proximal : Cardinal ligament
  – Medially : Obliterated hypogastric artery
  – Laterally : External iliac vessels and obturator fossa
  – Inferiorly : Pelvic floor (Levator ani)

• Medial paravesical space : between the obliterated hypogastric artery and bladder
Lateral Retroperitoneal Spaces
The Pararectal Space

• Boundaries
  – Lateral : Internal iliac artery
  – Medial : Ureter, uterosacral ligament and rectal pillar
  – Distal : Cardinal ligament and uterine artery

• Medial pararectal space : between the broad ligament peritoneum and the ureters and uterosacral ligaments
Surgical Approach to the Lateral Retroperitoneal Spaces

- Access through the pelvic sidewall triangle
- Bluntly develop the retroperitoneal space
- Identify the ureter at the apex of the pelvic sidewall triangle
- Extend peritoneal incision up to the caecum on the right and descending colon on the left
- “Congenital” adhesions may have to be divided on the left and sigmoid mobilised
Surgical Approach to the Lateral Retroperitoneal Spaces

• Identify the obliterated hypogastric artery retroperitoneally

• Develop the paravesical space by blunt dissection of areolar tissue on either side of the artery - remember the immediate lateral relation of the external iliac vein

• Trace the obliterated hypogastric artery retrograde to define the origin of the uterine artery
**Surgical Approach to the Lateral Retroperitoneal Spaces**

- Delineate the anterior limit of the cardinal ligament
- Develop the pararectal space by blunt dissection proximal and medial to the cardinal ligament OR
- Identify the ureter at the pelvic brim and bluntly dissect lateral to it while pushing it gently medially with the tip of the suction probe
Obliterated Hypogastric Arteries

**Keys to Retroperitoneal Dissection**

- Constant landmarks, even in obese patients
- Facilitate dissection of the paravesical spaces
- Help to delineate the uterine arteries and cardinal ligaments
- Completion of the anterior dissection allows precise dissection of the pararectal spaces
The Ureters
Surgical Anatomy

• 25 - 30 cms in length
• Right and left ureters lie 4-5 cms lateral to the IVC and aorta respectively
• Crossed by the ovarian vessels midway between the renal pelvis and the pelvis brim, the left at a higher level than the right
• Ovarian vessels are lateral to the ureters at the pelvic brim
The Pelvic Ureters
Surgical Anatomy

- Crossed by the ovarian vessels from lateral to medial side as the vessels enter the IP ligament at the pelvic brim
- Right ureter usually crosses the external iliac while the left is closer to the midline and crosses the common iliac artery
- Run along the pelvic sidewall just above the internal iliac arteries
The Pelvic Ureters
Surgical Anatomy

• Turn forwards and medially in the base of the broad ligament at the level of the ischial spines
• Pass into the ureteric canal under the uterine arteries, 1.5 cms lateral to the internal cervical os, the left ureter being closer to the cervix
• Turn abruptly medially (genu) over the anterior vaginal fornices to enter the bladder
The Pelvic Ureters
Risk of Surgical Injury

• At the pelvic brim, during division of the IP ligament

• At the ovarian fossa, especially during ovarian resection or in the presence of adhesions

• Lateral to the cervix, while controlling the uterine arteries
The Medial Laparoscopic Approach To The Pelvic Ureters

• Simple : create a “window” in the medial leaf of the broad ligament just above the ureter

• Limitations
  – Works only if anatomy is normal
  – Distal ureter may be difficult to visualise
  – Fails totally in the presence of cul-de-sac pathology
The Superior Laparoscopic Approach To The Pelvic Ureters

• Identify the ureter at the pelvic brim and bluntly dissect it off the medial leaf of the broad ligament

• Limitations
  – Laborious and time consuming
  – Does not facilitate dissection of the distal ureter or uterine arteries
The Lateral Laparoscopic Approach To The Pelvic Ureters

- Open the pelvic sidewall triangle
- Identify the ureter at the apex of the triangle
- Identify the obliterated hypogastric artery and develop the paravesical space
- Identify the uterine artery and delineate the cardinal ligament
- Develop the pararectal space
The Pelvic Blood Vessels

• The common iliac artery
  – Divides into the external and internal iliac arteries in front of the sacroiliac joint
  – The common iliac venous confluence lies just below this bifurcation

• The common iliac artery
  – Runs along the medial edge of the psoas muscle and exits the pelvis below the inguinal ligament
The Pelvic Blood Vessels

- The external iliac artery
- Inferior epigastric and the deep circumflex iliac are the only two branches
  - The external iliac vein is initially directly posterior to the artery but is posteromedial to it in its distal third
- The external iliac artery
  - Runs just lateral to the ureter and uterosacral ligaments
The Pelvic Blood Vessels

• The internal iliac artery
  – The uterine artery arises from its medial aspect and curves on to the cardinal ligament, crossing the ureter 1.5 cm lateral to the supravaginal Cx
  – The superior vesical artery arises from its posterolateral aspect and is usually not seen unless the paravesical space is opened
The Low Paraaortic Region

• Aortic bifurcation
  – Overlies the L4 vertebral body in 75% of cases
  – Lies above L4 in 9% of cases
  – Lies below the L4-L5 disc in 11% of cases
  – Lies within 1.25 cms above or below a line drawn between the iliac crests in 80% of cases
The Low Paraaortic Region

• The inferior Vena Cava
  – Lies posterolateral and to the right of the aorta
  – The lumbar veins join it along its posteroinferior edge
  – The right ovarian vein joins it at the origin of the ovarian arteries from the aorta

• The inferior mesentric artery
  – Arises from the front of the aorta, just below the origin of the ovarian arteries and 4 cms above the aortic bifurcation
The Pelvic Lymph Nodes

- External iliac nodes
  - 8-10 nodes located along the anterolateral and posteromedial aspects of the external iliac vessels
  - The anterolateral chain lies between the psoas muscle and the external iliac artery
  - The posteromedial chain lies between the external and internal iliac vessels and are continuous distally with the deep femoral nodes
  : Interiliac nodes are the main drainage sites for the uterus, Cx, vagina and bladder.
The Pelvic Lymph Nodes

• External iliac nodes
  – The interiliac chain constitutes the primary drainage site for the uterus, Cx, vagina, bladder and urethra

• Parametrial nodes
  – 4-8 nodes located in the lateral parametrium i.e, distal third of the cardinal ligament
  – Directly drain the uterine cervix and isthmus
The Pelvic Lymph Nodes

• Obturator nodes
  – 12-15 nodes located along the obturator nerve in the obturator fossa
  – Majority lie superficial to the obturator nerve
  – Parametrial nodes drain directly into the obturator nodes

• Presacral nodes
  – 2-3 nodes located along the lateral sacral arteries
The Paraaortic Lymph Nodes

• App 45-50 small nodes located along the course of the aorta and IVC

• Classified as:
  – Right paracaval, left paraaortic and aortocaval in uro-oncology literature

• Primary drainage sites for the ovaries and kidneys
Pelvic Lymph Nodes: Surgical Significance

- Interiliac nodes are primarily involved in small volume Stage IB1 Ca, Cx and Ca. Endometrium
- Anterolateral external iliac nodes are not involved if the interiliac nodes are negative for tumour. Involvement is more likely with bulky tumours.
- “Skip” lesions are rare per se but are more likely to occur with cervical adenocarcinomas or in the presence of significant LVS involvement.
**Paraaortic Lymph Nodes: Surgical Significance**

- Secondary drainage sites for cervical and endometrial cancers and paraaortic node involvement does not occur unless the pelvic nodes are involved.
- Paracaval, paraaortic and aortocaval groups are most likely to be involved in patients with advanced Ca, Cx.
- Retrocaval and retroaortic nodes are usually not involved.