

Myths and facts about nerve-sparing radical hysterectomy

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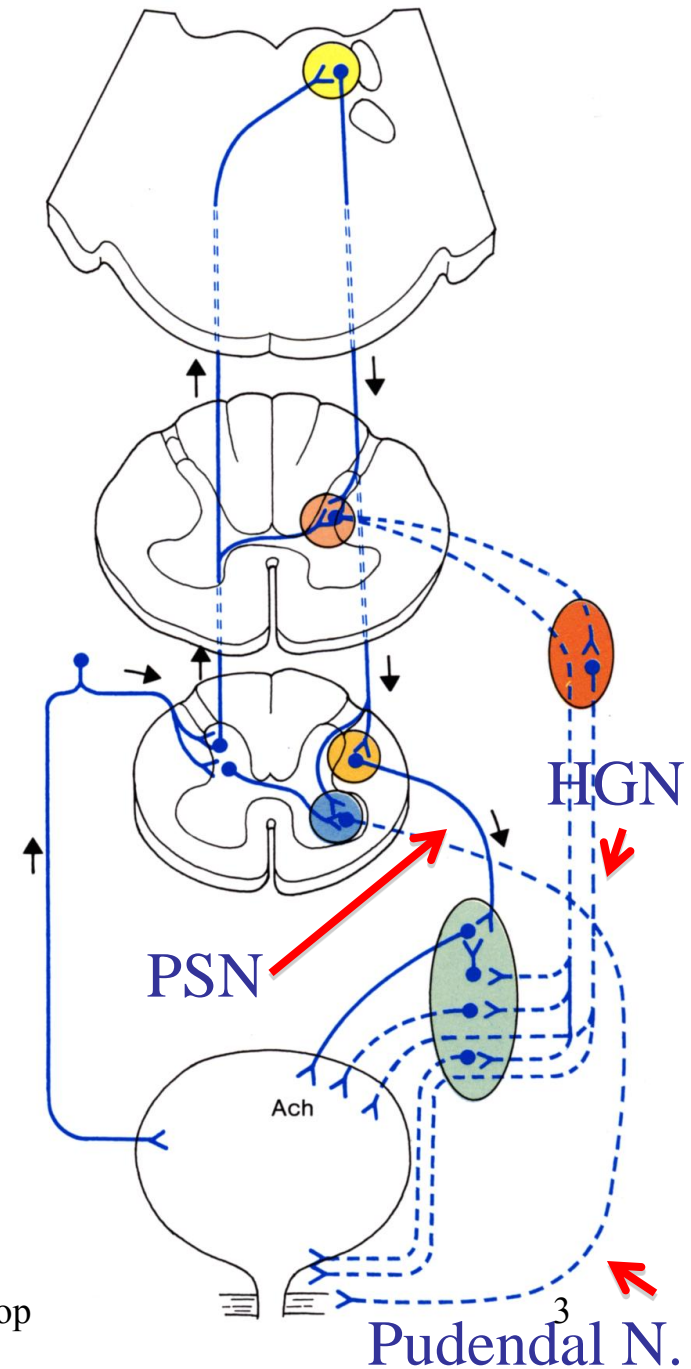
National Cancer Center Hospital, Tokyo, Japan

Function of female autonomic nerves

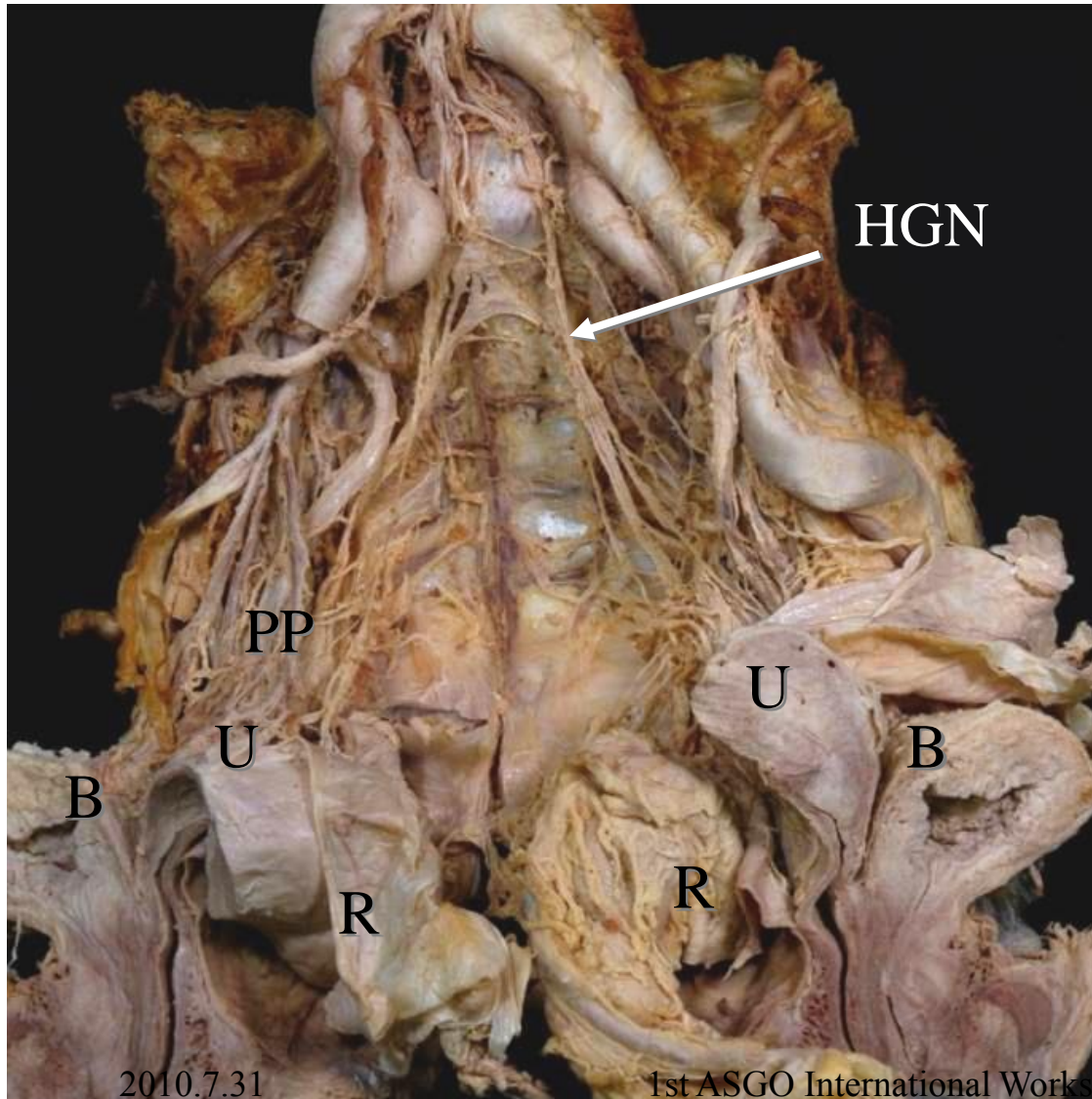
| Anatomical structure | Sympathetic | Parasympathetic |
|------------------------|--------------------------------------|------------------------------|
| Bladder | Stimulate the urethral sphincter | Relax the urethral sphincter |
| | Inhibit the detrusor | Stimulate the detrusor |
| Rectum and anus | Inhibit expulsion of feces | Expulsion of feces |
| | Stimulate internal sphincter of anus | |
| Genital tract | Inhibit uterine contraction and | Vaginal lubrication |
| | vasodilation | Genital swelling |

Neural Control of the Lower Urinary Tract

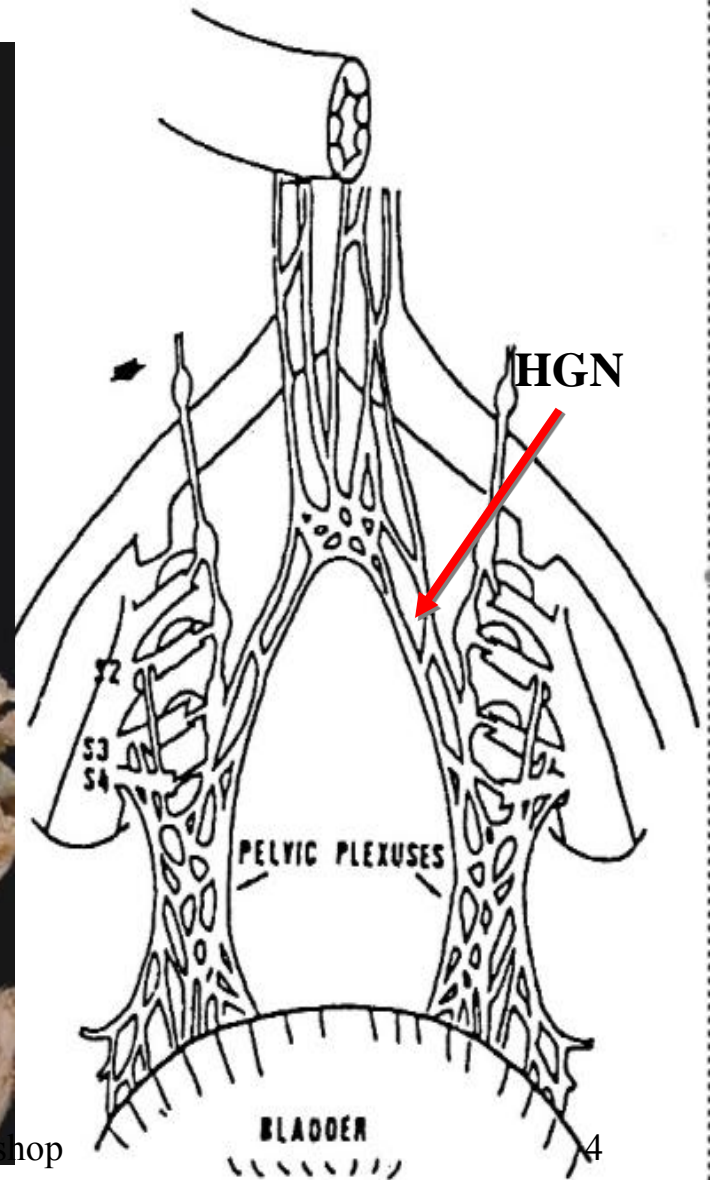
- The lower urinary tract is innervated by 3 sets of peripheral nerves involving the parasympathetic, sympathetic, and somatic nervous systems:
- **Pelvic parasympathetic nerves** arise at the sacral level of the spinal cord, excite the bladder, and relax the urethra.
- **Lumbar sympathetic nerves** inhibit the bladder body and excite the bladder base and urethra.
- **Pudendal nerves** excite the external urethral sphincter.
- These nerves contain afferent sensory as well as efferent motor axons.



autonomic nerves in Pelvis

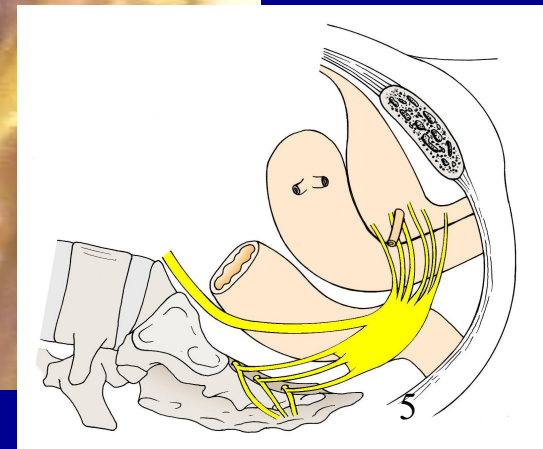
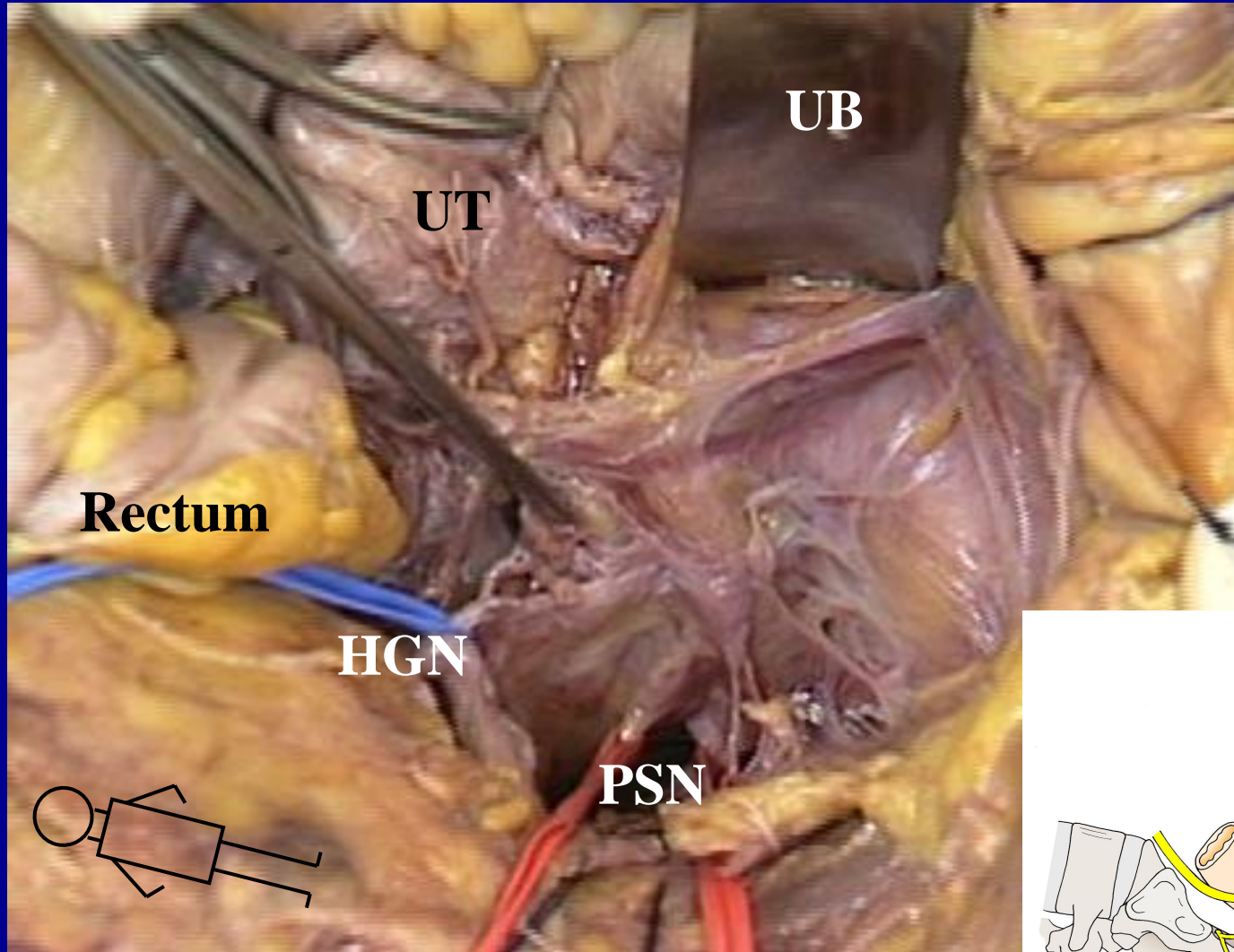


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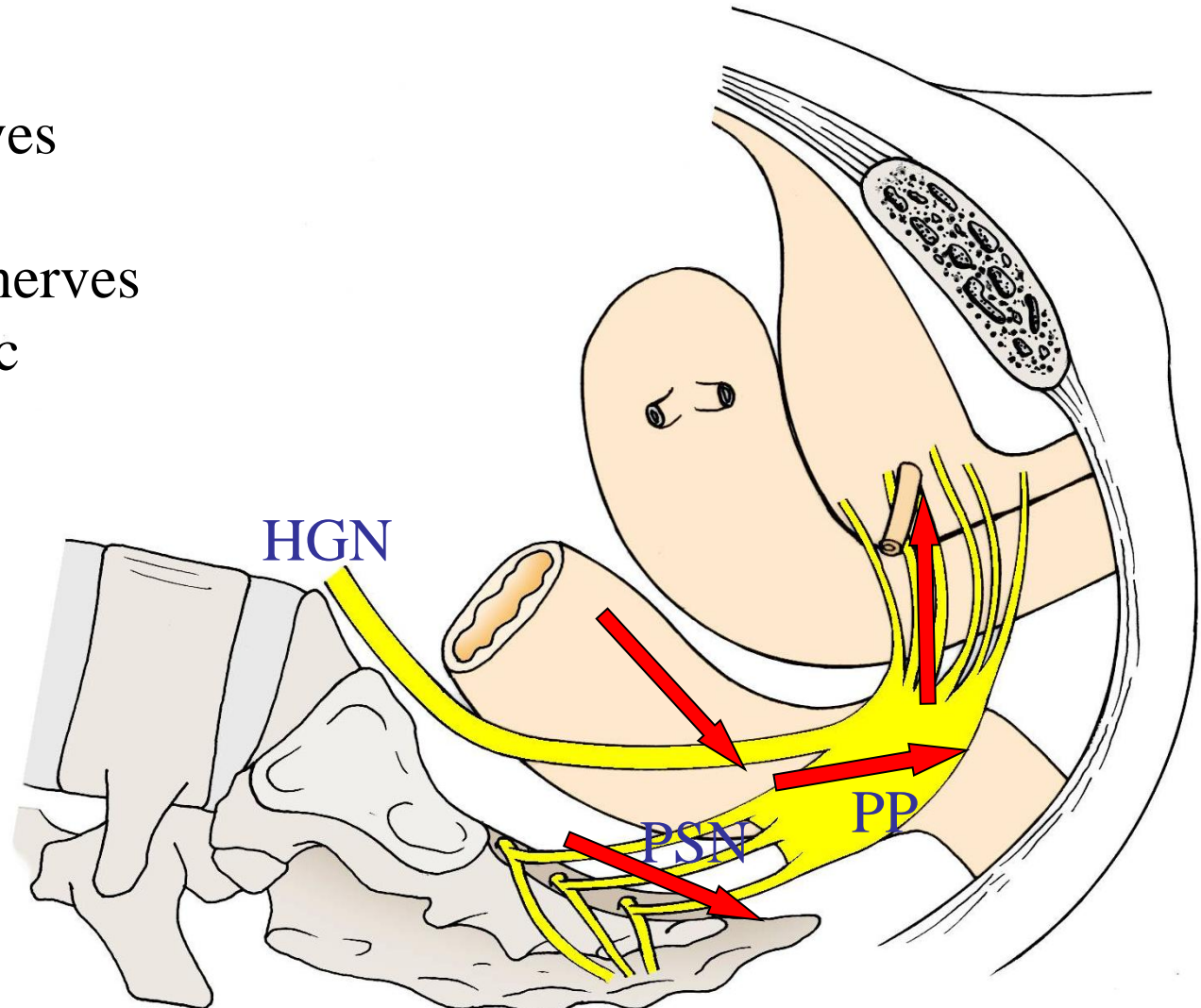
Autonomic nerves related to voiding function

right pelvis by fresh cadaver study



Autonomic nerves related to voiding function

- Hypogastric nerves
 - sympathetic
- Pelvic splanchnic nerves
 - parasympathetic
- Pelvic plexus
- bladder branches



Level of nerve preservation

1. Non-touch preservation
2. Exposure preservation
3. Partial preservation
4. Dissection



Bladder function recovery

| Method | HGN | PSN | P Plexus | bladder braches | PVR<50m L |
|---------------------------|-----|----------------|----------|-----------------|-----------|
| Simple Hx | ⊙ | ⊙ | ⊙ | ⊙ | <5POD |
| class II RH | ⊙ | ⊙ | ⊙ | ○ | 7-16POD |
| class III RH | × | ⊙(S2,3,4) | △ | △ | CIC: 10% |
| Nerve-sparing ARH (Tokyo) | ○ | ⊙(S2,3,4) | ○ | △ | 18POD |
| Extended NS ARH (total) | ○ | × (S2) ○(S3,4) | ○ | △ | 18POD |
| NS ARH (partial) | × | × (S2) ○(S3,4) | △ | △ | 24POD |

⊙ non-touch preservation

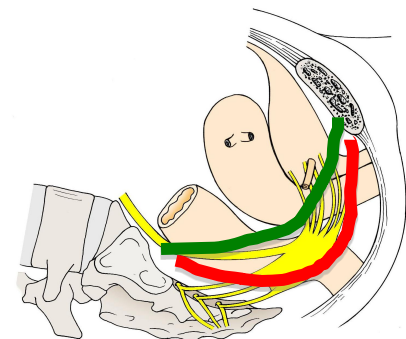
○ exposure preservation

△ partial preservation
dissectio

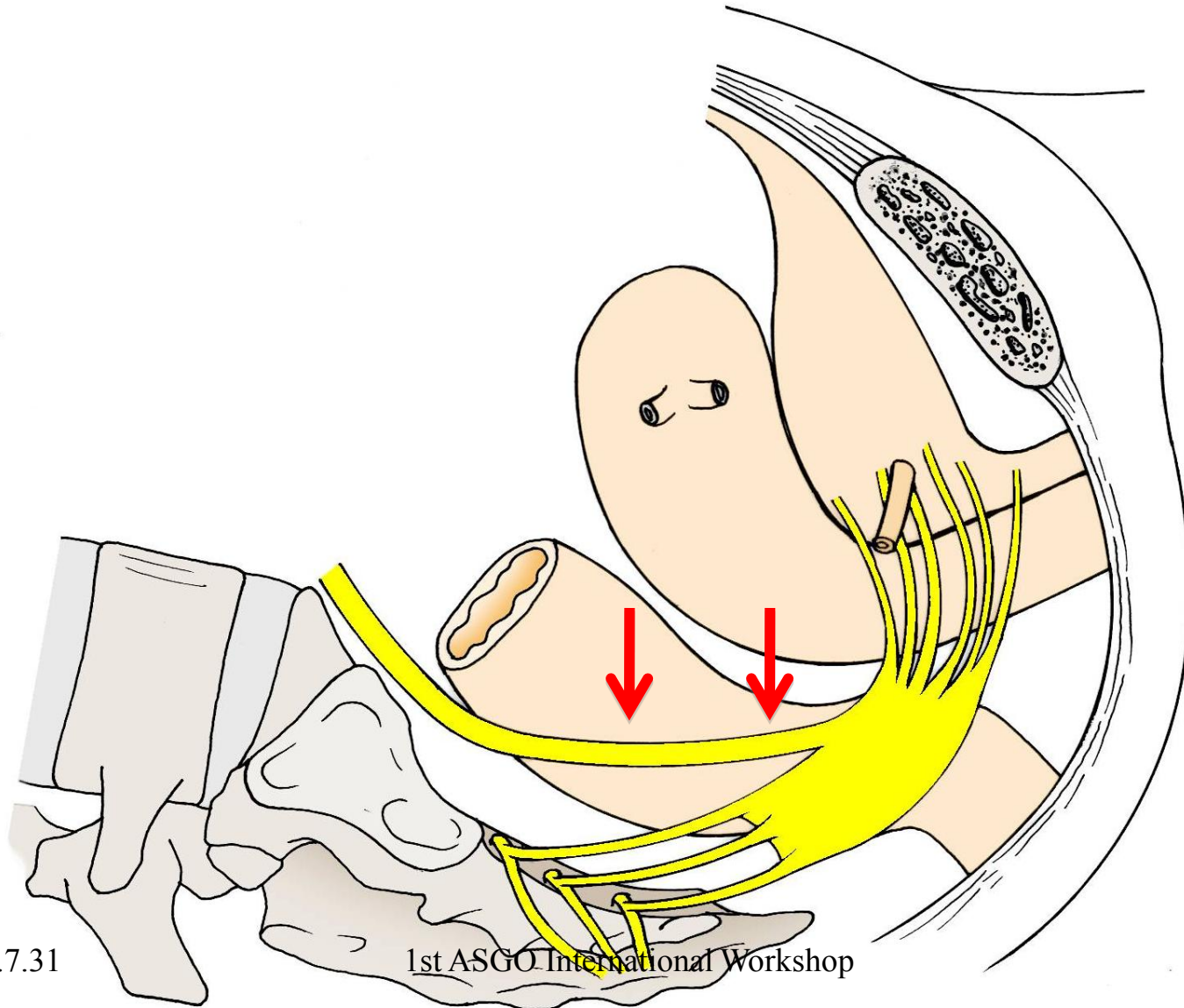
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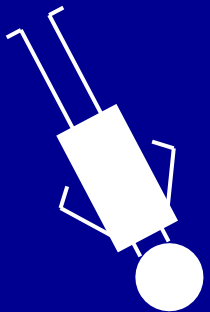
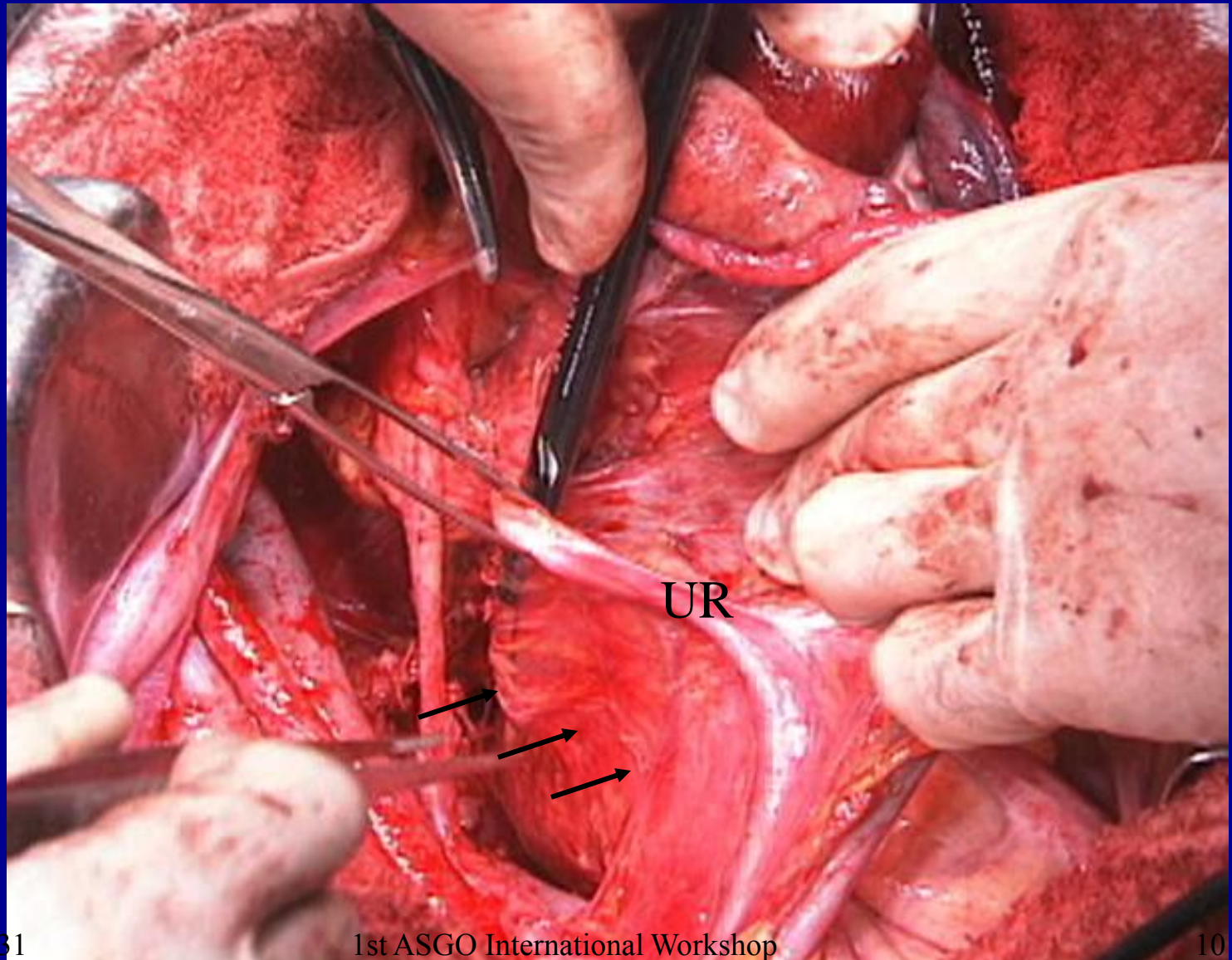
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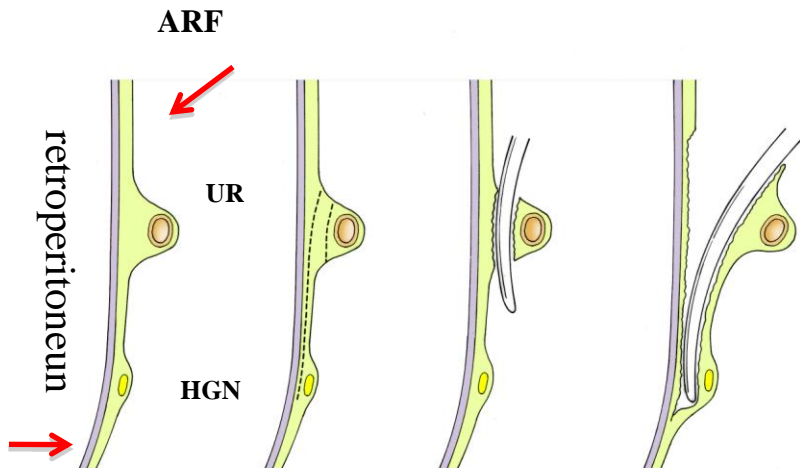
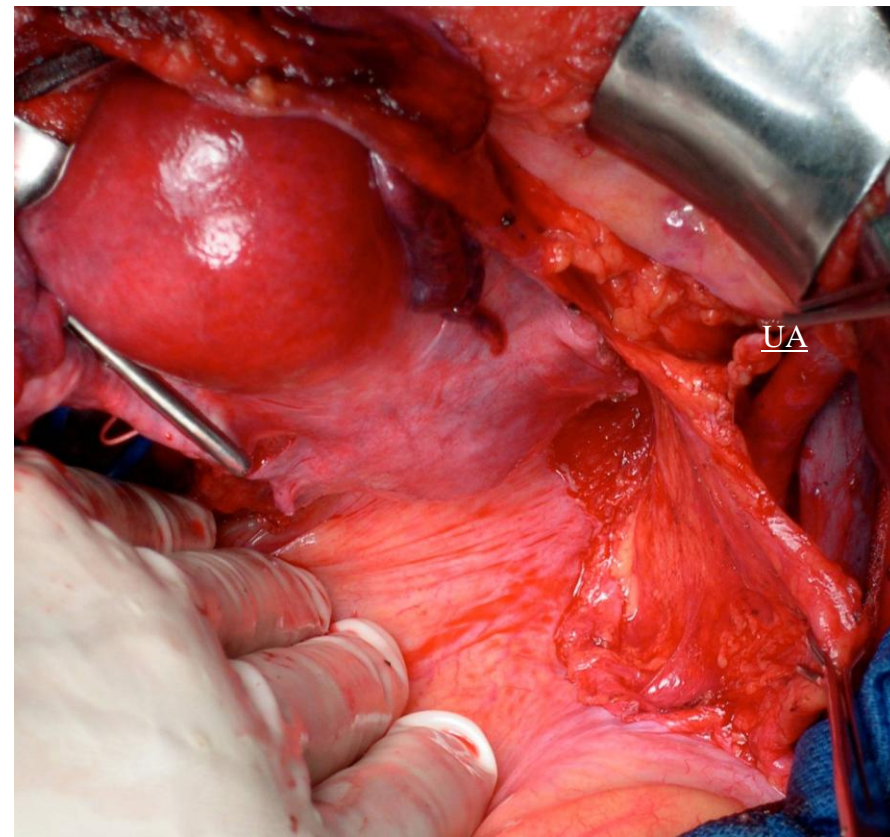
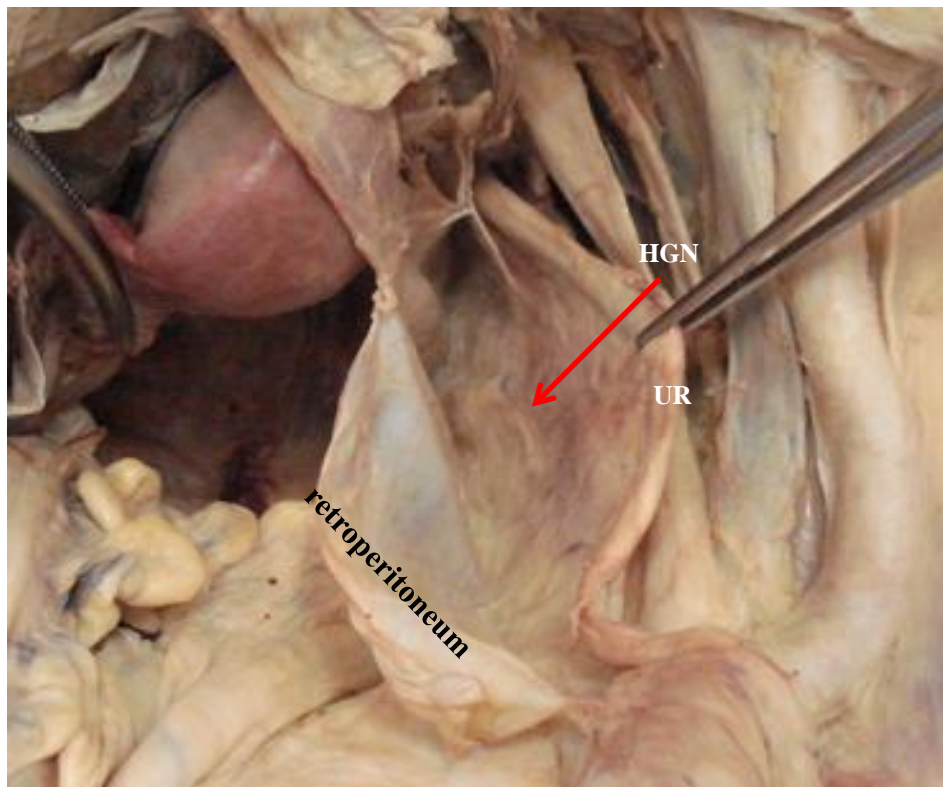


1. The hypogastric nerves



Left hypogastric nerves





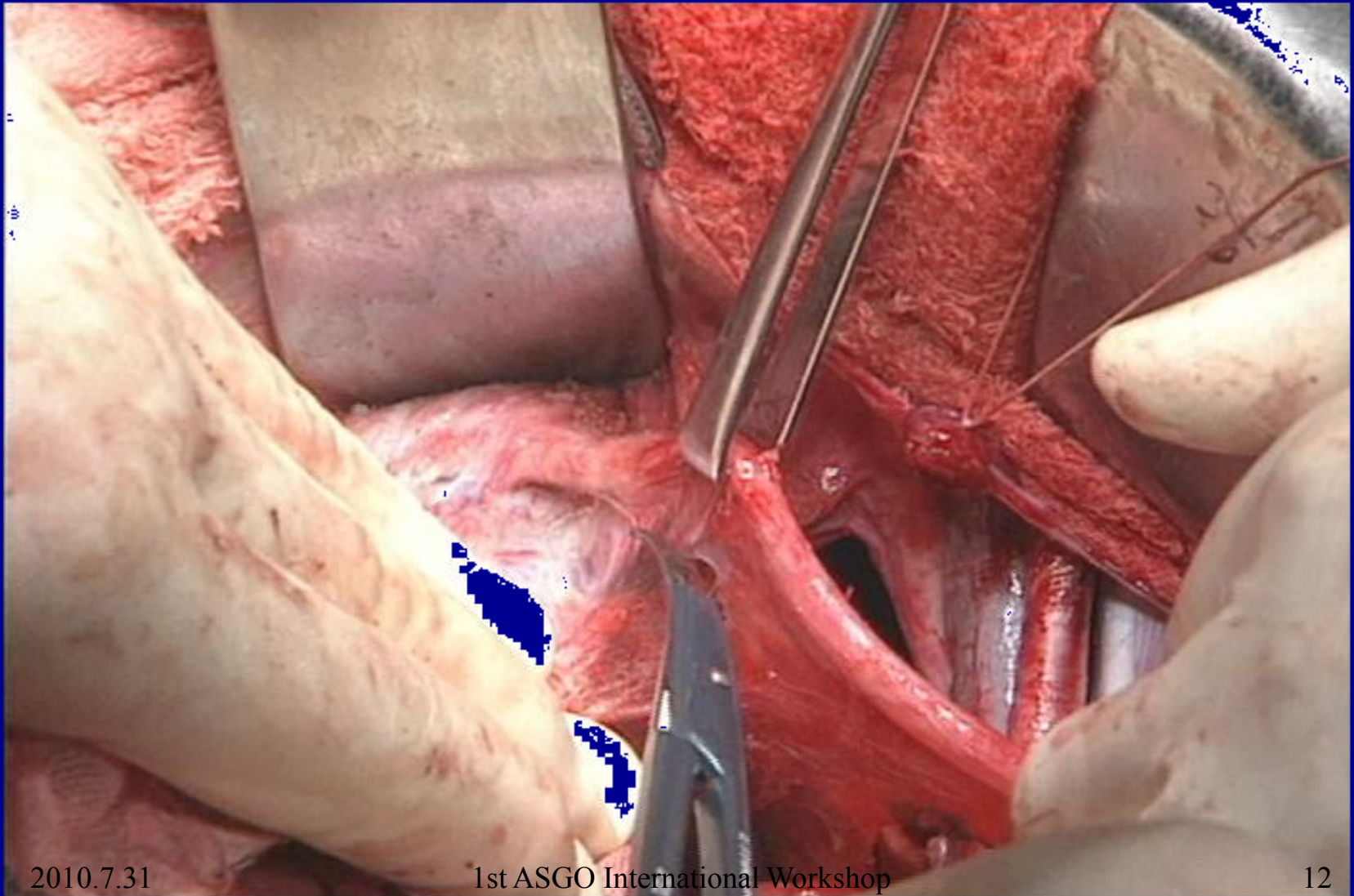
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wrong

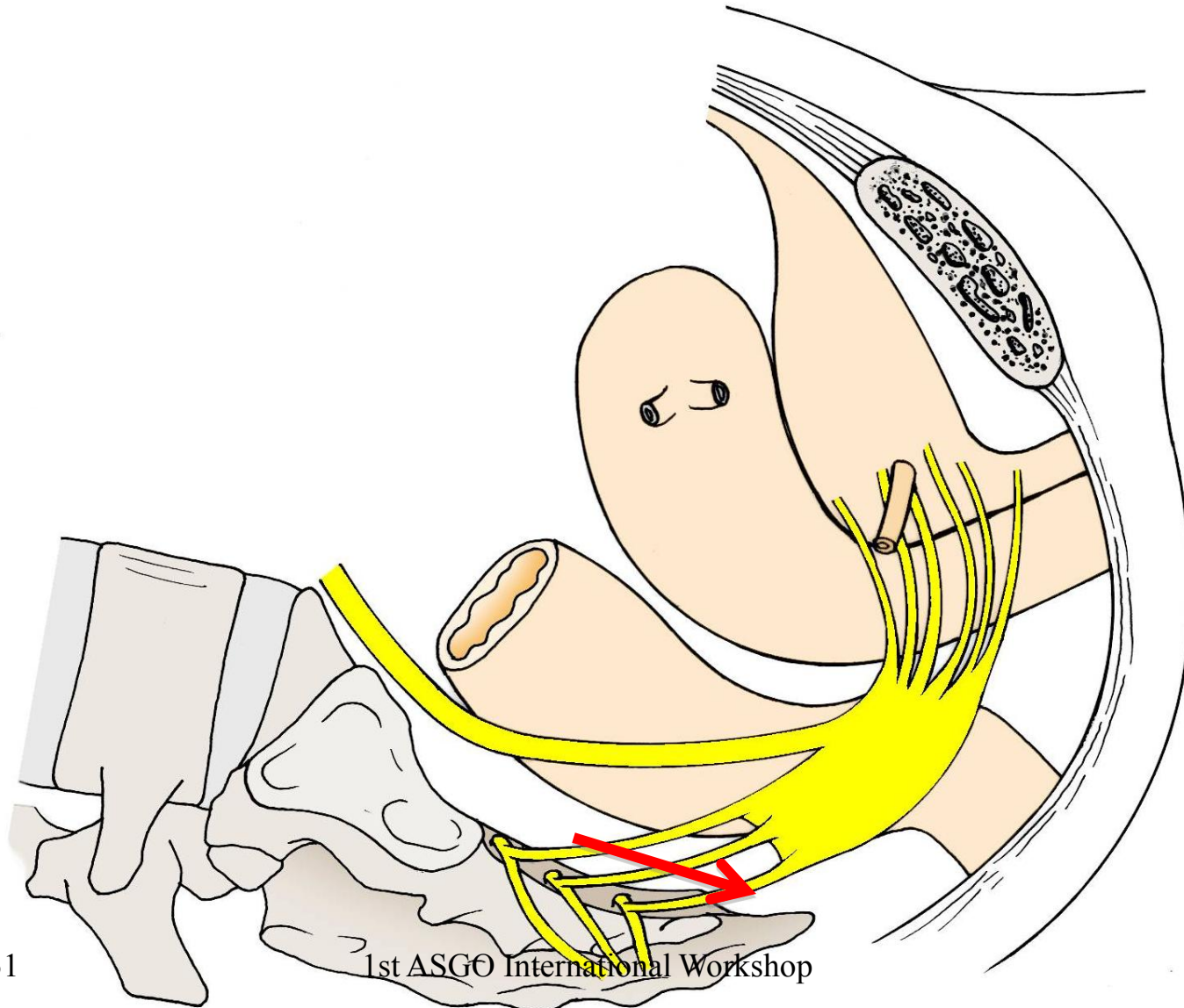
correct

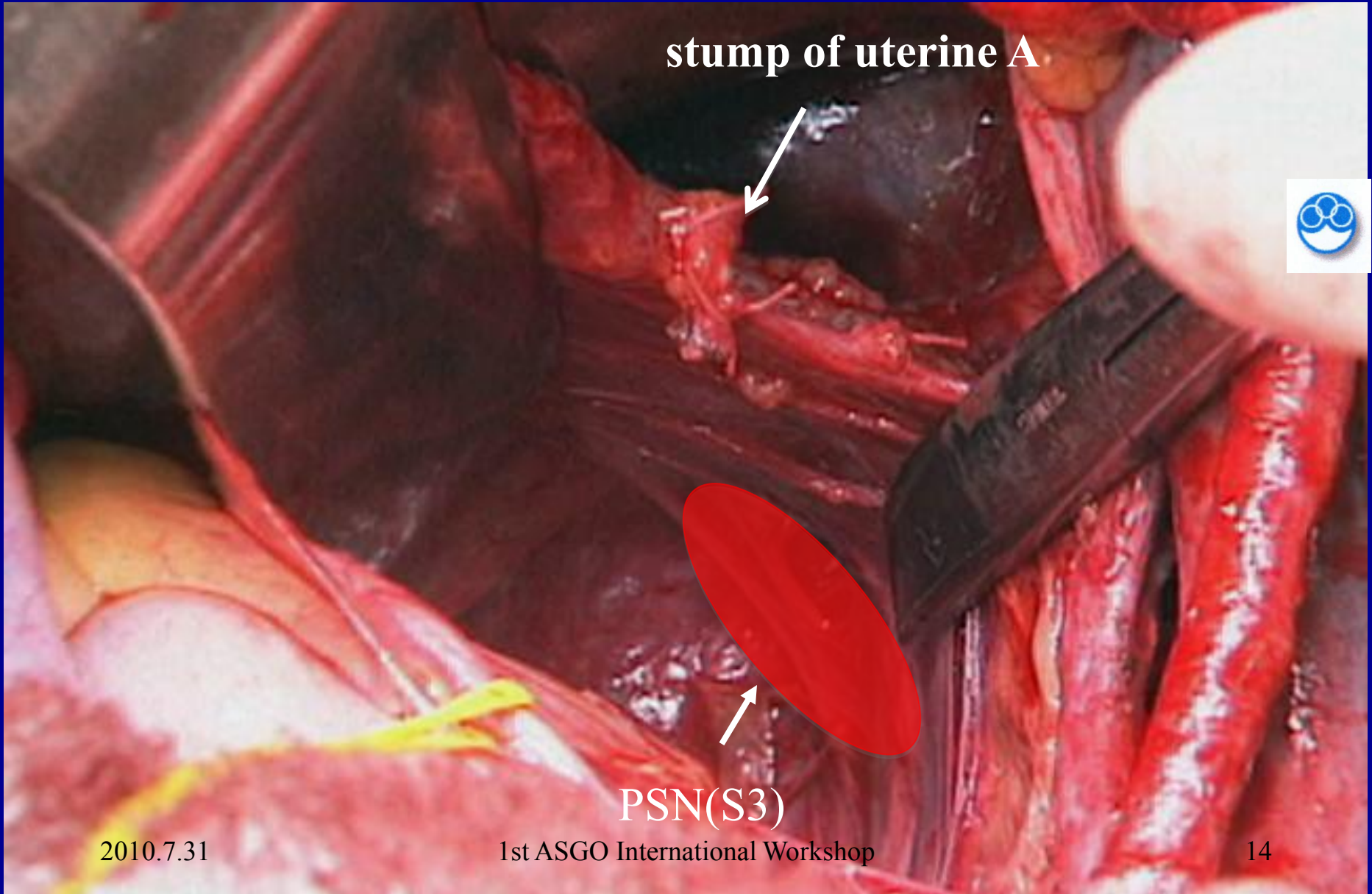
This tissue plane is corresponded to the anterior renal fascia, which includes the HGN and the pelvic plexus (PP).

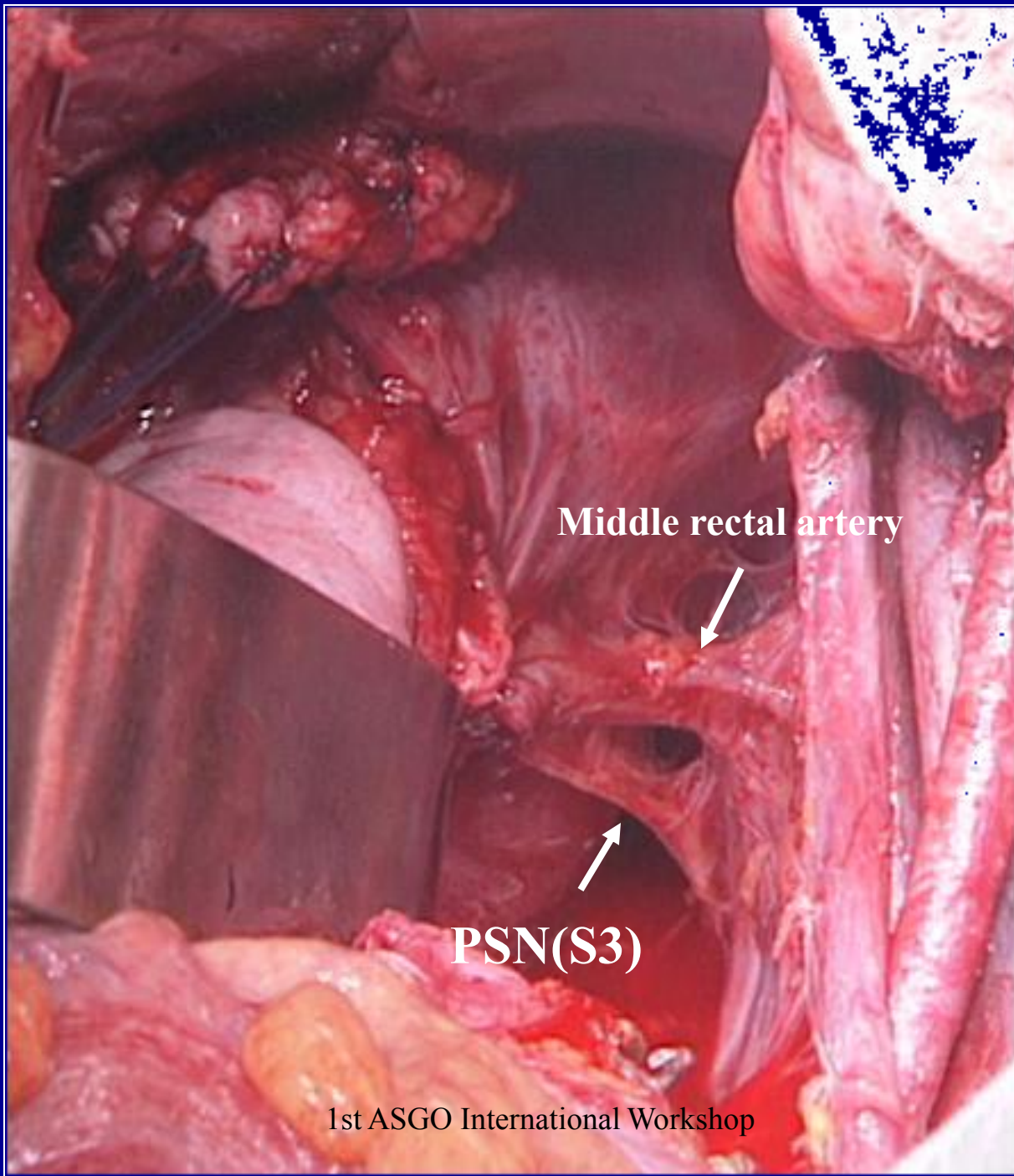
Anterior layer of the vesicouterine ligament



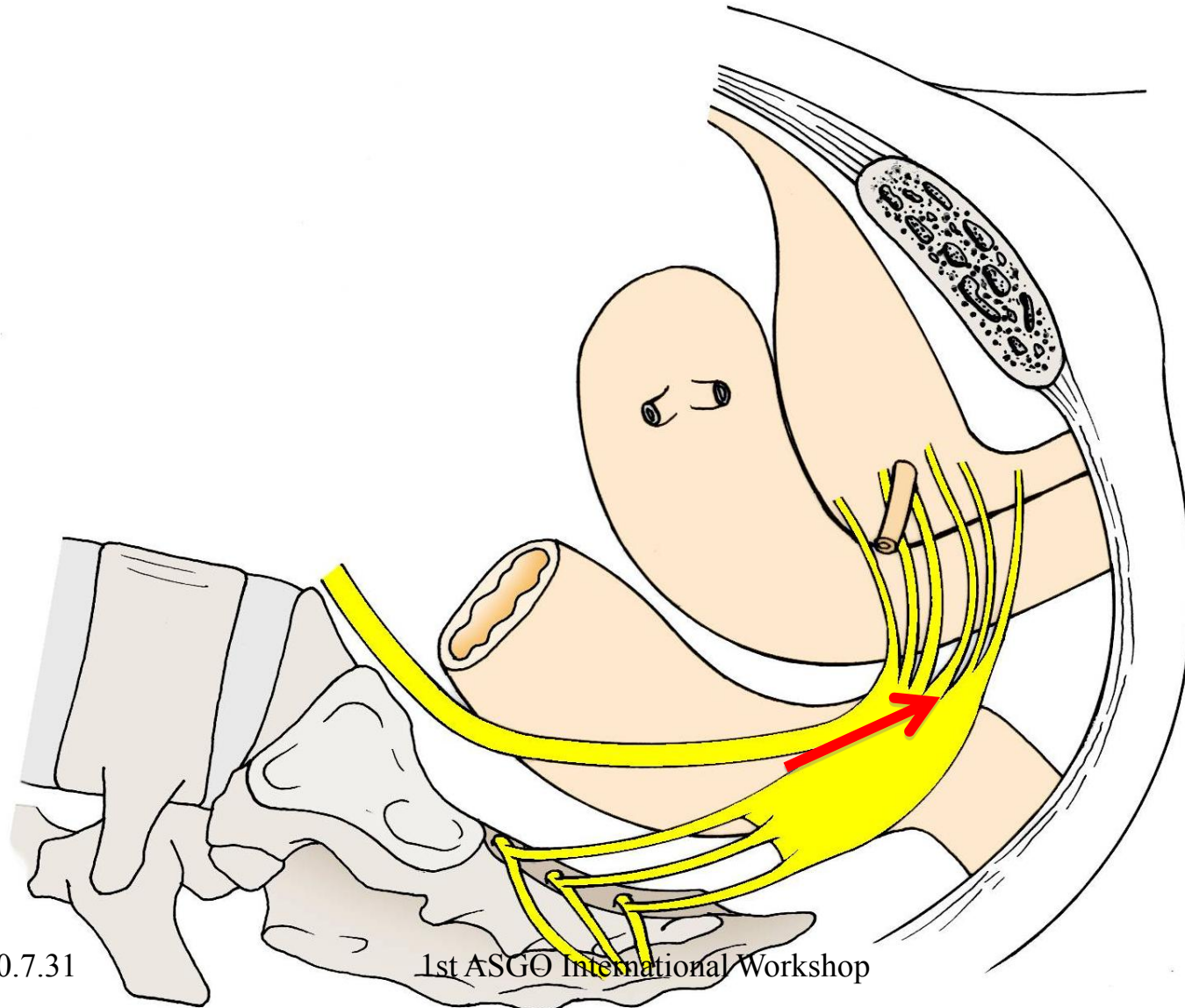
2. the pelvic splanchnic nerves



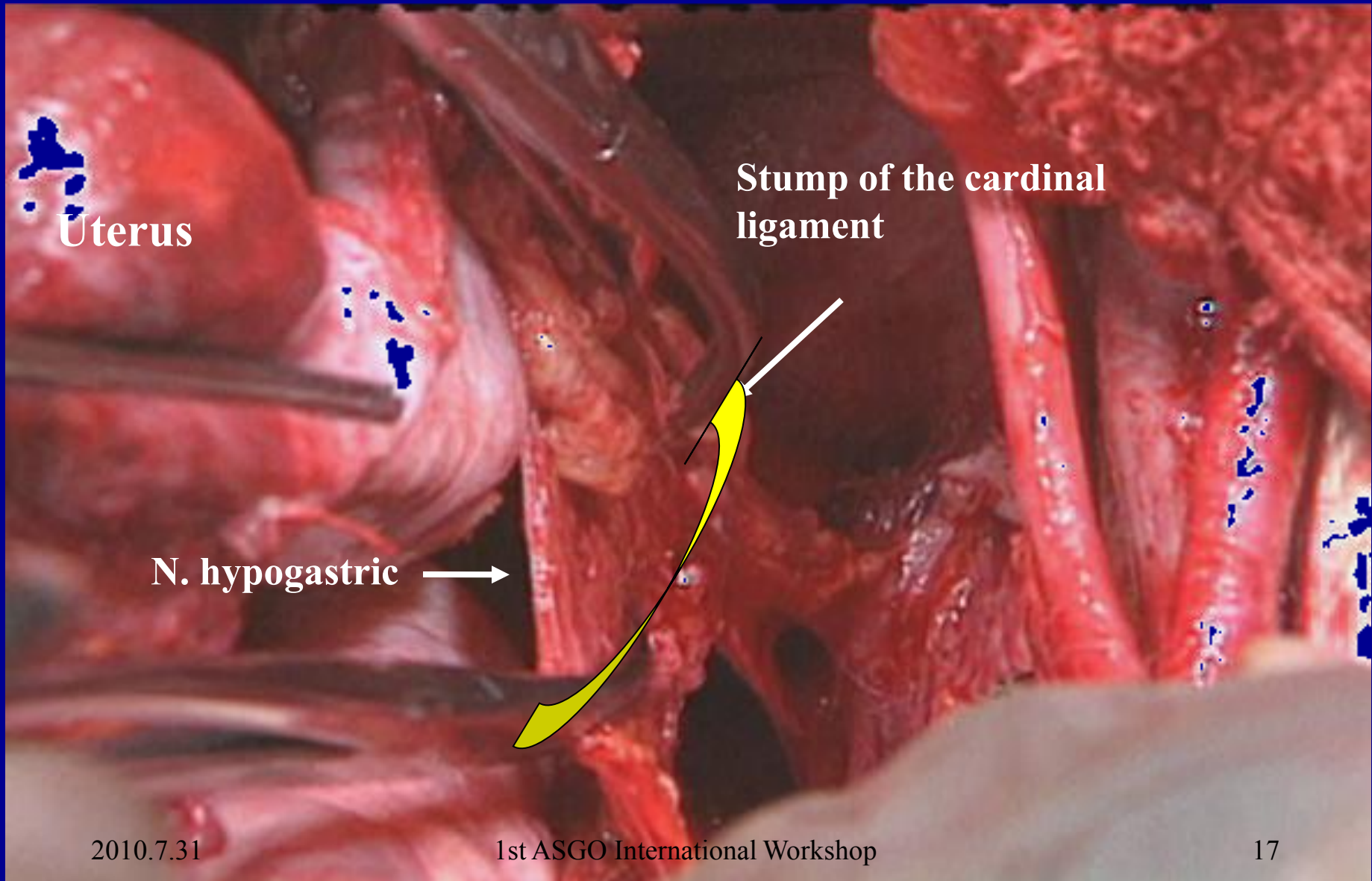




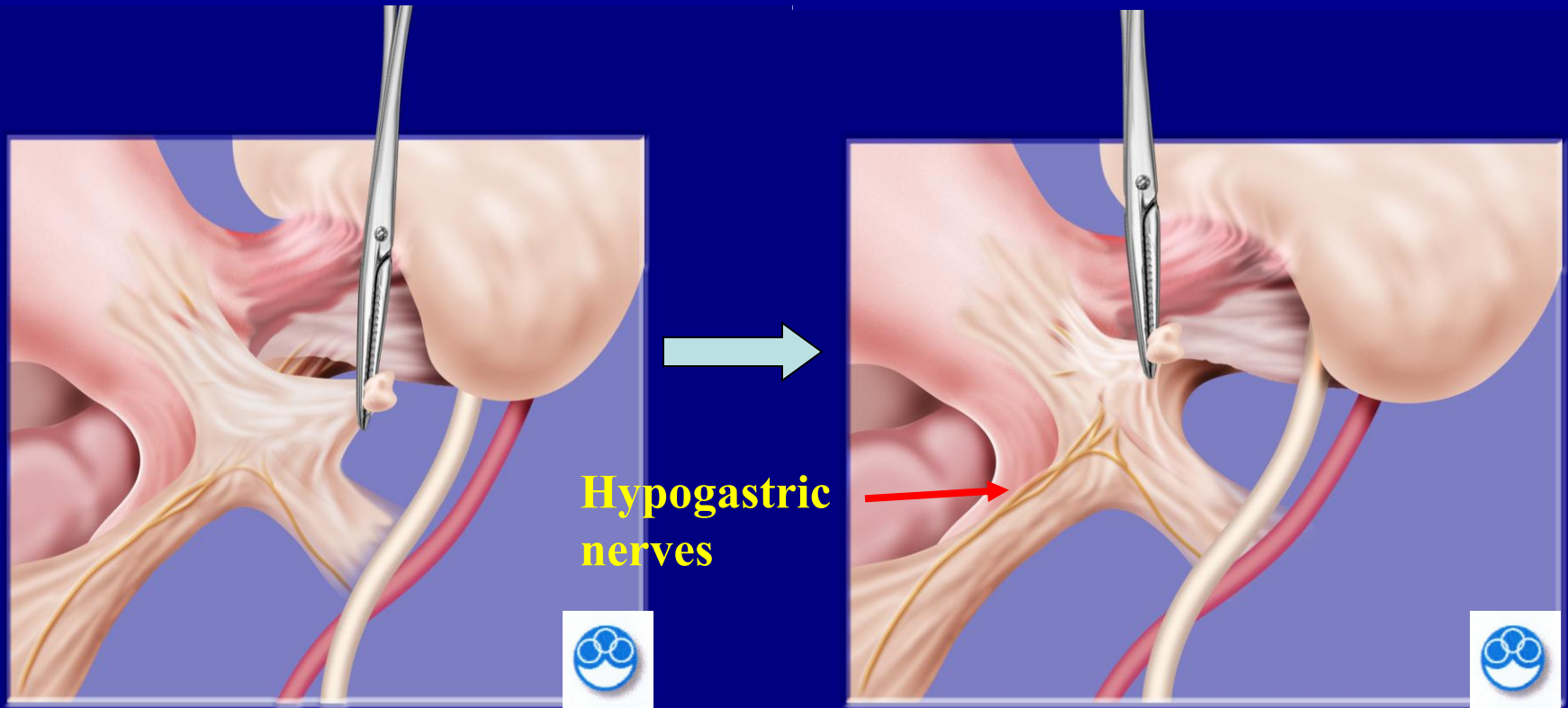
3. The pelvic plexus



Partial preservation of the pelvic plexus in case of deep myometrial or parametrial invasion



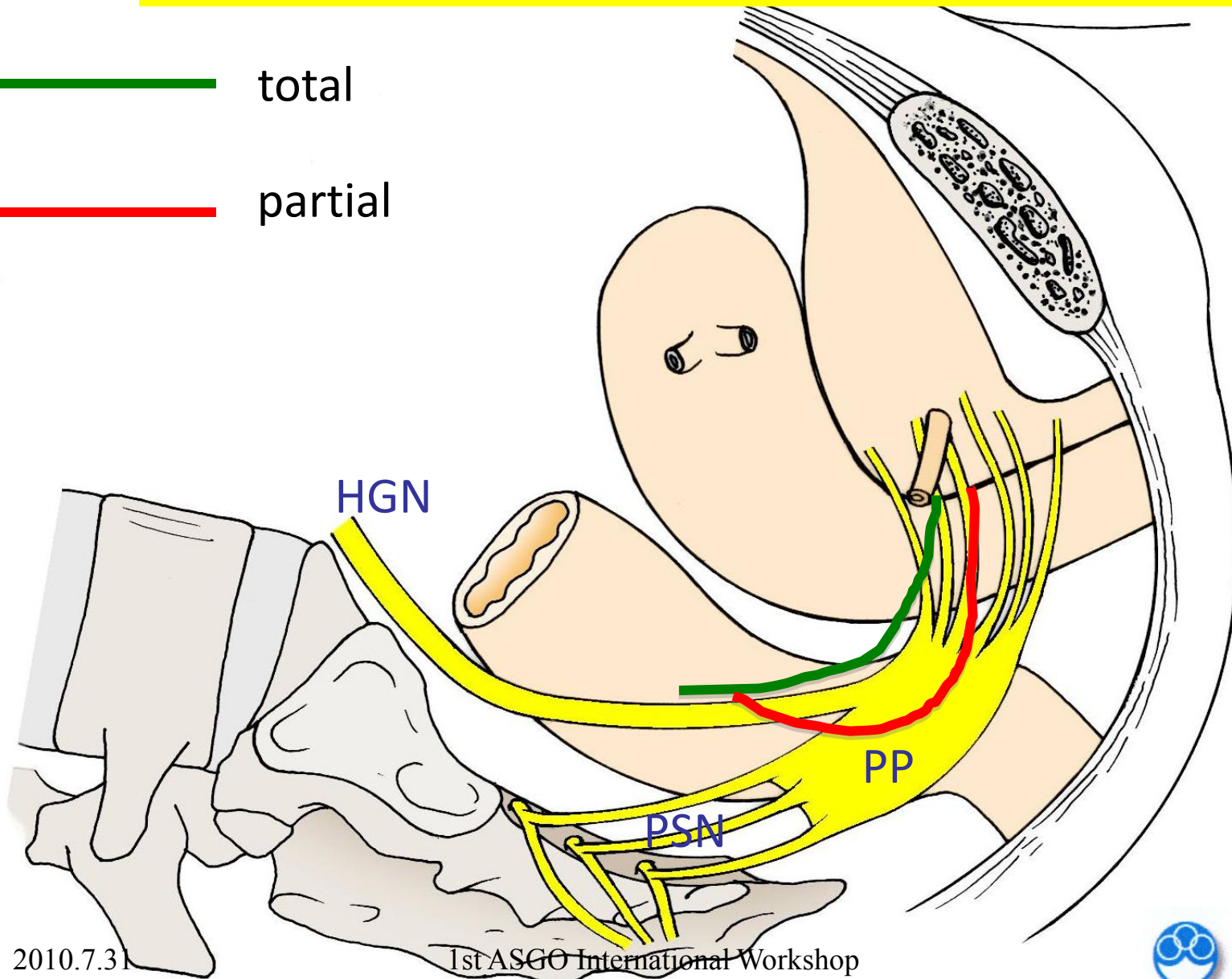
Mobilization of the visceral stump of the cardinal ligament



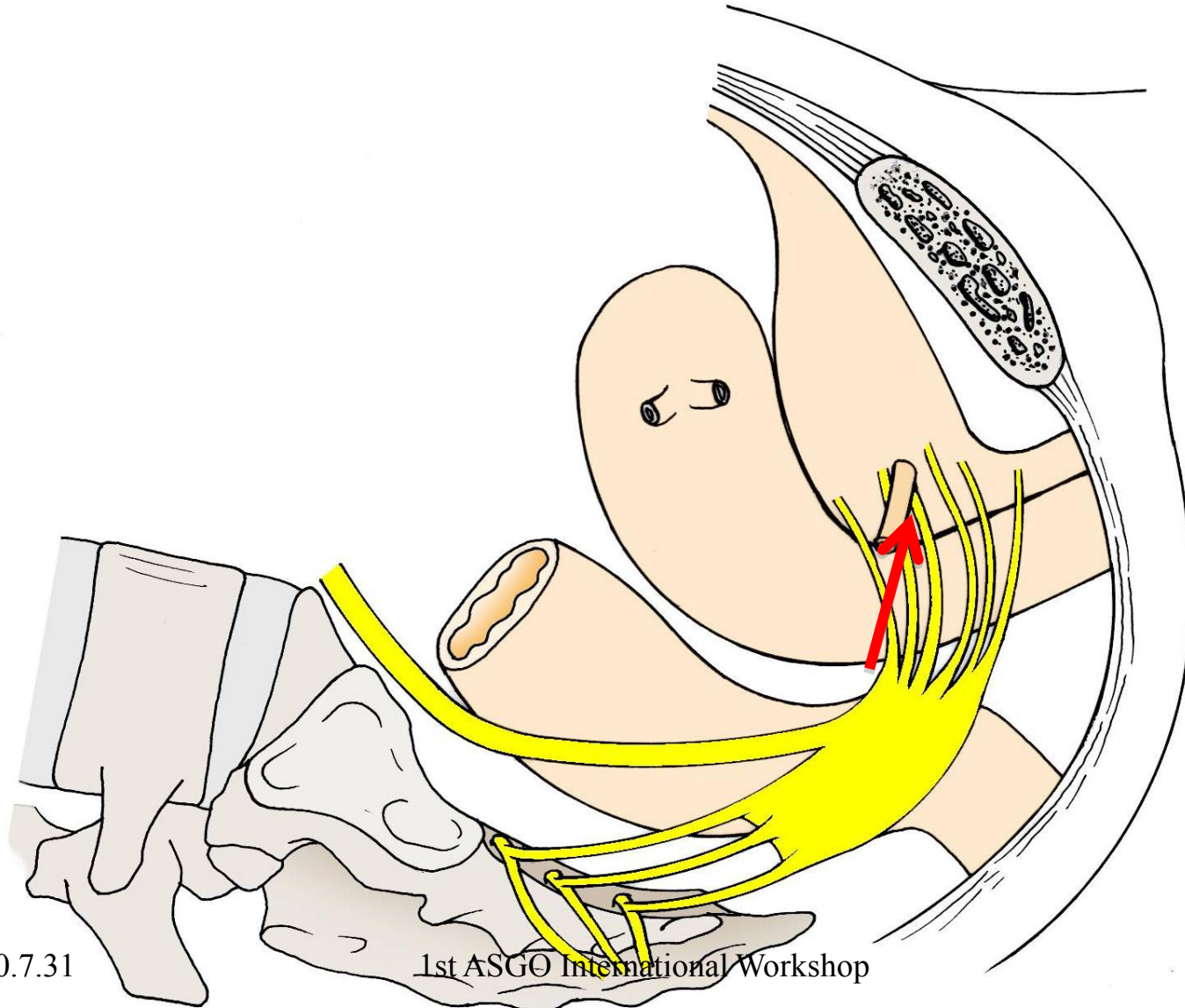
For total preservation of the pelvic plexus, this stump should be mobilized ventrally above the hypogastric nerves before dissection of the uterosacral and rectovaginal ligaments.

Different dissection line of pelvic plexus

- total
- partial



4. bladder branches



Lateral aspect

R

UT

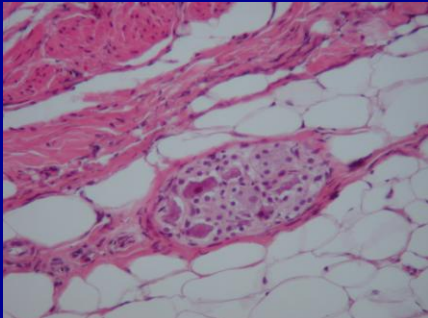
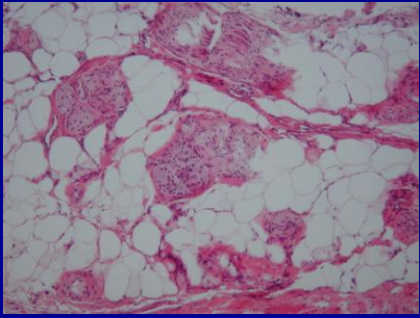
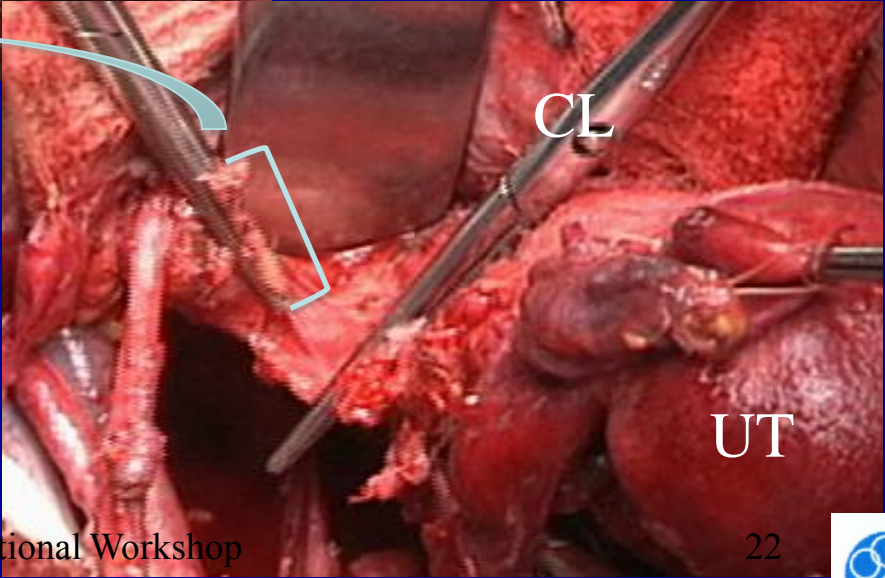
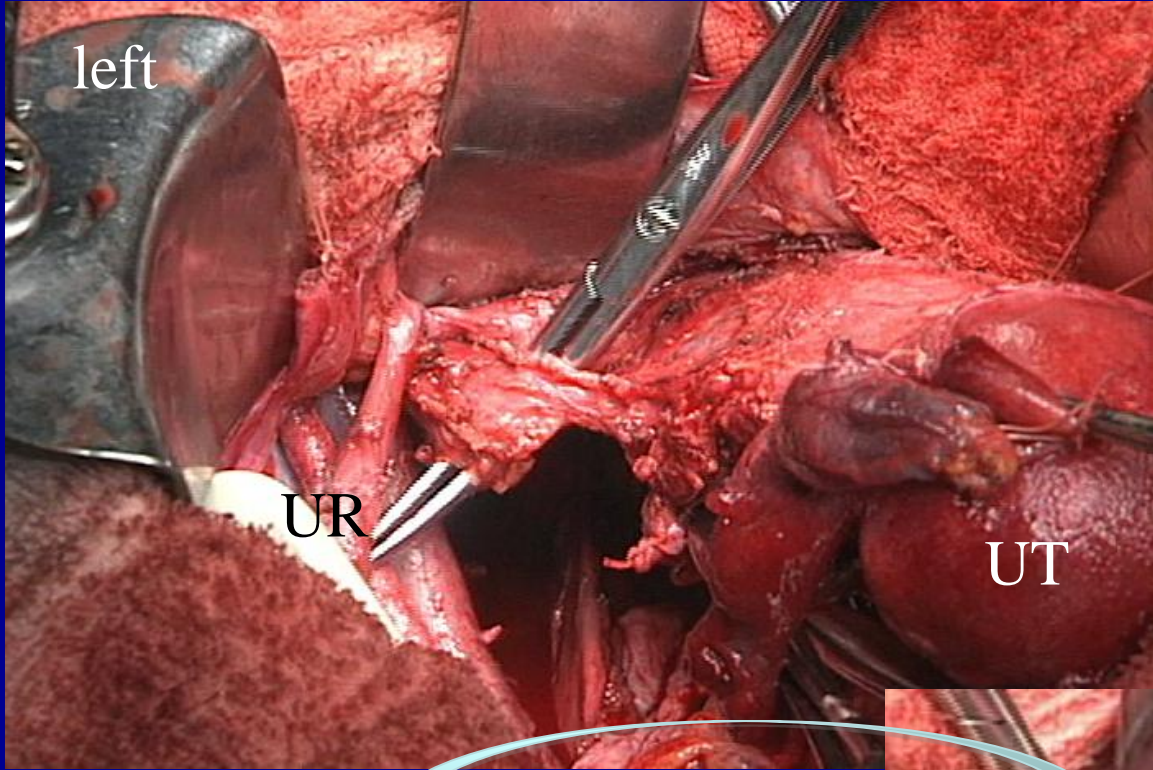
UB

UR →



Bladder branches
ventral to bladder body
dorsal to bladder base

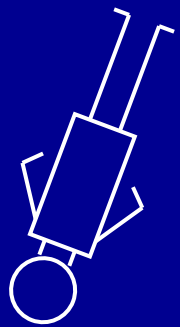
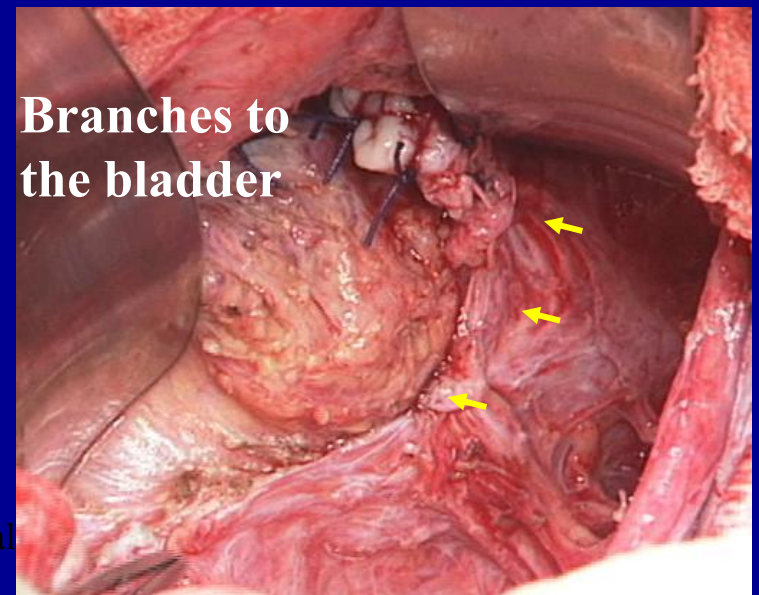
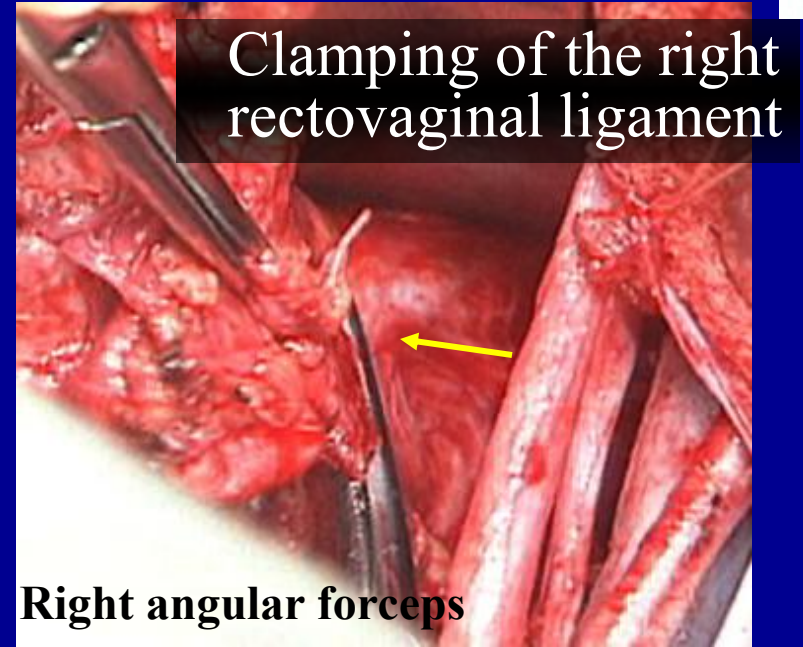
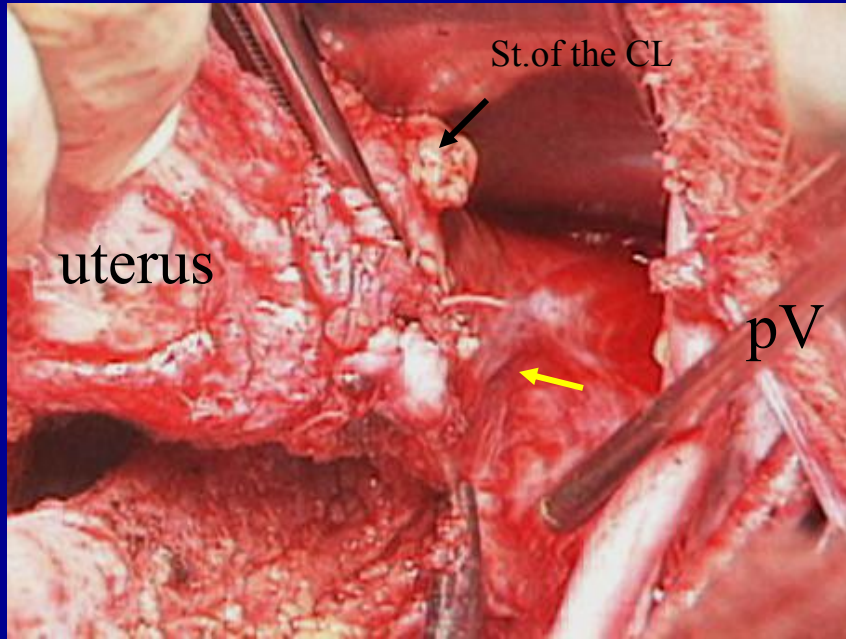
Ventral branches were sacrificed during the dissection of the vesicouterine ligament



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Preservation of dorsal branches to the bladder



Yellow arrow:
Branches to the bladder



Factors of injury to autonomic nerves

- Drying along the surgical margin
- Hypoxia in venous bleeding
- Pressure from surgical retractors
- Extension stress or excess traction with taping
- Direct injury with electrical scaples
- Thermal injury by power source such as ligasure and harmonic scaples

Conclusion

- Both an understanding of the precise neuroanatomy and a gentle handling of the autonomic nerves are important to obtain a good balance between oncologic outcome and QOL after nerve-sparing radical hysterectomy.

Thank you for your attention

