Pelvic Neuroanatomy: An Overview of Commonly Encountered Pelvic Nerves in Gynecologic Surgery

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ABSTRACT
Objective: This video tutorial identifies key anatomic landmarks useful in identifying the path of the most commonly encountered pelvic nerves in benign gynecologic surgery.

Design: This is a narrated overview of commonly encountered pelvic nerves during benign gynecology, their origin, sensory, and motor function, as well as sequelae related to injury.

Setting: The unintended injury of pelvic neural connections can be a complication of any pelvic surgery, however, surgery for malignancy or endometriosis may increase the likelihood of encountering these nerves. The majority of focus surrounding surgical nerve injury, however, relates to patient positioning [1]. Injury to the pelvic nerves can lead to lifelong sexual, bladder, and defecatory dysfunction [2].

Interventions: We review the Genitofemoral, Lateral Femoral Cutaneous, Ilioinguinal, Obturator, Superior and Inferior Hypogastric nerves, Pelvic Splanchnic nerves, and the Sacral nerves. Surgical illustrations are used (Fig. 1) alongside real-time narrated video to help viewers recognize the normal course of commonly encountered pelvic nerves at the time of gynecologic surgery (Figs 2–3).

Conclusion: The surgical management of complex pelvic disease can unfortunately carry significant patient morbidity [3]. The neural pathways traveling through the pelvis via the hypogastric nerves are responsible for proprioception, vaginal lubrication, and proper functioning of the urethral and anal sphincters [4]. Sparing these nerves during pelvic surgery, and especially when anatomic planes are distorted by pelvic disease, requires surgical expertise and an immense understanding of pelvic neuroanatomy [4,5]. Preservation of the pelvic neural pathways is necessary to deliver the best patient outcomes while minimizing unwanted surgical complications. This video tutorial also highlights the origin of these nerves, their anatomic location, procedures in which these nerves may be encountered, and what sequelae occur from their unintended injury. Journal of Minimally Invasive Gynecology (2021) 28, 178. © 2020 Published by Elsevier Inc. on behalf of AAGL.

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Supplementary materials
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References
5. Charoenkwan K. A simplified technique for nerve-sparing type III radical hysterectomy: by reorganizing their surgical sequence, surgeons...