International Continence Society August 22-26, 1999 29th Annual Meeting Denver, Colorado USA

Category No. 1 | Video Demonstration | Ref. No. 317

Abstract Reproduction Form B-1

Author(s): N.T.M. Galloway, R.E.S. El-Galley

Institution City Country: Emory University, Atlanta, GA

Title (type in CAPITAL LETTERS): PATTERNS IN HUMAN ANATOMY AND THE CONTINENCE MECHANISM

Aims of Study Urological concepts have provided an isolated description of the Lower Urinary Tract as a unique system. There is an opportunity to apply a **Methodology of Pattern**, and to recognize the broad similarities that exist between the pulmonary and urinary systems. In particular, to compare the design and functions of the larynx and the urethra.

Methods We have traced their embryology from ventral outgrowths of the alimentary tract in the fourth week, the organization of the associated endocrine structures (thyroid and gonads), and the patterns of congenital anomaly which are not only similar in each system, but even coincident.

Results

There is remarkable homology between the pulmonary and urinary tracts. Both are systems of excretion, carbon dioxide and water from the lung and nitrogen and water from the kidney.

There is striking similarity in the design of the gateways between the internal and external environments (larynx and urethra). These midline structures share a complex design that includes elements that are visceral and somatic, sensory and motor, and from the right and left. The muscles include extrinsic mixed fiber types with stretch receptors and intrinsic homogeneous slow twitch elements

International Continence Society August 22-26, 1999 29th Annual Meeting Denver, Colorado USA

Category No. 1 | Video Demonstration | Ref. No. (Page 2) 317

Abstract Reproduction Form B-2

Author(s): N.T.M. Galloway, R.E.S. El-Galley

The myelinated **special efferents** of the intrinsic muscle of the larynx (posterior cricoaretenoid m.) arise in the nucleus ambiguus and travel with the autonomic fibers of the vagus. The course of these nerve fibers is into the visceral cavity of the thorax and then returning as the recurrent laryngeal nerves. The path of the nerves courses along the lateral surface of the gut in the esophagotracheal groove and finally into the posterolateral aspect of the larynx. The nerves are particularly vulnerable during radical dissection for cancer of the thyroid or cancer of the esophagus. In the same way, the myelinated **special efferents** of the intrinsic muscle of the urethra arise in the Onuf's nucleus and might travel with the autonomic fibers of the pelvic nerves. The course of these nerve fibers is into the visceral cavity of the pelvis. The path of the nerves courses along the lateral surface of the rectum and into the posterolateral aspect of the membranous urethra. The nerves are particularly vulnerable during radical dissection of the prostate or cervix for cancer or excision of the rectum for cancer.

Conclusion: We should re-examine the controversy of the continence mechanism from the perspective of the airway and larynx, about which there is a more complete understanding. This wider view might help to explain why radical dissection of the prostate or cervix can impact on the continence mechanism. It might point to new reasons why it is the actions of the larynx - coughing, sneezing or laughing - that are particularly likely to provoke symptoms of urinary incontinence.

The mechanism for closure of the airway is not a "sphincter" but rather a lever / hinge arrangement in which contraction of muscle creates a local change of angulation to snap closed the lumen. Cricopharyngeus muscle contracts to displace the epiglottis, posterior cricoaretenoids contract to displace the arytenoid cartilages and in turn open the cords of the larynx. It would not seem unreasonable to suggest that contraction of the urethral sphincter muscle would cause angulation of the bladder neck and effective.