MR Neurography of Pelvis and Lower Extremity (case based)

PURPOSE

High-field strength MR imaging of the peripheral nervous system is growing in clinical importance. These examinations may be used to localize sites of nerve abnormality and contribute to therapeutic decision making. This presentation is case based discussion of 3-Tesla MR imaging of several clinically relevant branch nerves in the pelvis and lower extremity.

EDUCATIONAL GOALS

* Review techniques for 3T MR imaging of peripheral nerves in the pelvis and lower extremity.
* Discuss the normal MR appearance along with several relevant anatomic landmarks. Describe seven key morphologic factors pertaining to peripheral nerve MRI.
* Present the MR appearance of several peripheral nerve pathologies occurring in this region.

KEY ISSUES

Technique: Fat suppression, matrix size, field of view, 3D acquisition, diffusion-weighted imaging, and gadolinium-enhanced imaging all play a role in 3T MR neurography in the pelvis and thigh.

Normal anatomy, and morphologic factors: The organization of the pelvic and lower extremity nerves is reviewed, and important landmarks discussed. Nerve-related findings are presented, consisting of nerve size, signal, course, perineural fat and fascicular pattern, as well as muscle denervation changes, and in selected circumstances nerve-related enhancement.

Specific nerve pathologies: Case material illustrating several nerve pathologies will be shown.

CONCLUSION

This presentation provides an approach to 3T MR imaging of the pelvic and lower extremity nerves, encompassing imaging technique, normal anatomy, and a range of nerve pathologies.
Outline

1. Technique
   a. Pulse sequences ➔ Anatomic (T1-weighted), Fluid sensitive (T2-fat sat, STIR, SPAIR), Diffusion (DWI, DTI)
   b. 3T ➔ increased SNR
   c. 3D pulse sequences ➔ isotropic volumetric MPRs
   d. Contrast material ➔ post operative, neoplasm, inflammatory

2. Normal Anatomy
   a. Lumbosacral Plexus
   b. Femoral nerve
   c. Lateral femoral cutaneous nerve (LFCN)
   d. Sciatic nerve
   e. Tibial nerve
   f. Fibular (common peroneal) nerve
   g. Medial plantar nerve
   h. Lateral plantar nerve

3. Pathology
   a. Lumbosacral Plexopathy
   b. Femoral Mononeuropathy
   c. Piriformis syndrome
   d. Post arthroplasty sciatic neuropathy
   e. Meralgia Paresthetica
   f. Soleal Sling
   g. Tarsal Tunnel
   h. Baxter Neuropathy
References


