

MR Imaging of the Brachial Plexus

Igor Mikityansky, MD, MPH^{a,*}, Eric L. Zager, MD^b,
David M. Yousem, MD, MBA^c, Laurie A. Loevner, MD^{b,d}

KEYWORDS

- Brachial plexus • Root avulsion • Radiation plexopathy • Parsonage-Turner syndrome
- Brachial plexitis • Thoracic outlet syndrome • Immune mediated neuropathy • Brachial plexopathy

KEY POINTS

- Sagittal imaging should be used to assess the relationship of the plexus lesion to the plexus components and subclavian and axillary arteries.
- The coronal images with a large field of view allow for comparison of signal intensity, size, and enhancement of the affected side with the contralateral control plexus.
- The appearance and orientation of the lesion may provide valuable diagnostic hints.
- Routine use of intravenous contrast is not required.
- MR imaging after brachial plexus injury should be delayed at least 3 weeks, unless the patient develops progressive neurologic deterioration or Brown-Séquard syndrome symptoms.
- However, this is now controversial—some surgeons are recommending ultraearly plexus exploration within the first or second week when multiple root avulsions are suspected, so that nerve transfers can be done as early as possible, and to avoid operating through dense scar.
- Even in the presence of a nerve root avulsion, the residual root within the pseudomeningocele should be identified because it may allow nerve grafting.
- Involvement of C7 spinal nerve may prevent patients with C5 and C6 avulsions from undergoing an Oberlin nerve transfer procedure and should be mentioned in the report.
- Vascular evaluation should be performed in trauma cases if there is a distal pulse deficit, local hematoma, bruit, or anatomically related nerve symptoms, because of possible delay in development of pseudoaneurysm.
- In cases of direct neoplastic invasion of the brachial plexus, obliteration of the interscalene fat determines surgical candidacy.
- Unlike extrapleural lesions, the interface of the Pancoast tumor and the lung is irregular.

INTRODUCTION

The interpretation of the images of the brachial plexus may be intimidating for a general radiologist. However, knowledge of anatomy, common pathology, direct and indirect imaging signs of diseases affecting the brachial plexus, the

patient's history and clinical presentation, and a systematic approach to the images will allow a radiologist to construct an anatomically correct limited differential diagnosis. Judicious use of contrast could help in classification of vascular lesions, delineation of infection, and in cases of radiation-treated tumors.

^a Windsong Radiology Group, 55 Spindrift Drive, Williamsville, NY 14221, USA; ^b Department of Neurosurgery, Hospital of the University of Pennsylvania, 3400 Spruce Street, Philadelphia, PA 19104, USA; ^c Department of Radiology, Johns Hopkins University, 600 N. Wolfe Street, Baltimore, MD 21287, USA; ^d Department of Radiology, Hospital of the University of Pennsylvania, 3400 Spruce Street, Philadelphia, PA 19104, USA

* Corresponding author.

E-mail address: imikitya@gmail.com

ANATOMY

The brachial plexus is a neural network responsible for both sensory and motor innervation of the ipsilateral chest, shoulder, arm, and hand. It is most commonly formed by the ventral rami of C5 through T1 spinal nerves as they exit the neural foramina (Fig. 1). There are multiple variations in anatomy of the brachial plexus.¹ However, from the perspective of a radiologist, the detectable variations are at the level of the roots. The most common variant at this level, the prefixed brachial plexus, includes only the C4 through C7 spinal nerves. The second-most common variant at this level, the postfixed plexus, receives contributions from the C6 through T2 levels. There are also rare cases of a combination of the two, with

contributions from C4 through T2.¹ These variants are important for predisposition to certain pathologic conditions, and need to be known for surgical planning.

From the imaging perspective, the brachial plexus can be divided into the supraclavicular, retroclavicular, and infraclavicular portions. The supraclavicular plexus contains the spinal nerves (incorrectly called roots in some anatomic textbooks) and the trunks. After they exit the neural foramina, behind the vertebral arteries, the spinal nerves are located in the interscalene space (Fig. 2), between the anterior scalene muscle anteriorly, middle and posterior scalene muscles posteriorly, and first rib and subclavian artery inferiorly. At the lateral border of the middle scalene muscle, the C5 and C6 spinal nerves form the

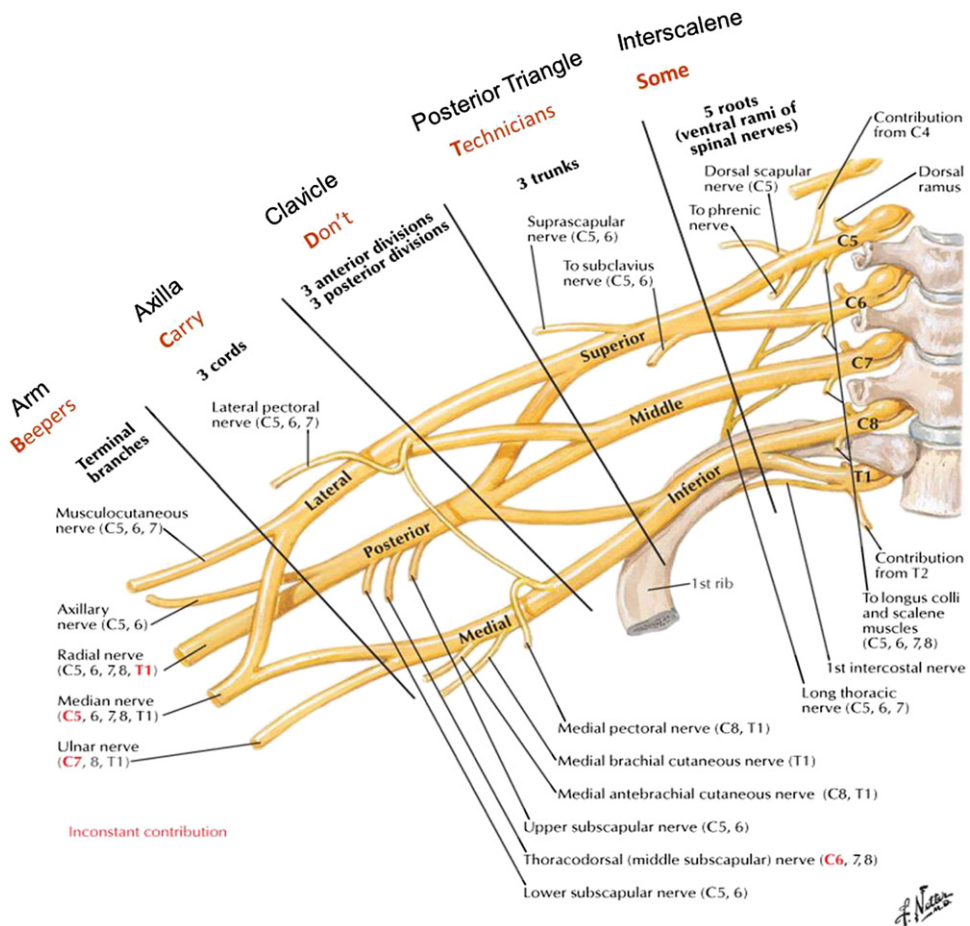


Fig. 1. Spinal nerves (sometimes incorrectly called roots), trunks, divisions, cords, and branches. To avoid including an alcoholic beverage as a part of a commonly used mnemonic of the brachial plexus components, there is an alternative mnemonic provided at the left upper aspect together with anatomic location of each component. Note that the spinal nerves and trunks could be grouped into the supraclavicular, and cords and branches into the infraclavicular brachial plexus, with the divisions representing the retroclavicular portion of the plexus. (Netter illustration from www.netterimages.com. © Elsevier Inc. All rights reserved.)

Download English Version:

<https://daneshyari.com/en/article/4242794>

Download Persian Version:

<https://daneshyari.com/article/4242794>

[Daneshyari.com](https://daneshyari.com)