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The brachial plexus is the neural highway to the upper limb. It extends from the ventral rami of the cervicodorsal roots to the terminal branches in the axilla. The brachial plexus is amiable to ultrasound examination in most patients. As clinical localisation of symptoms to the brachial plexus is difficult, ultrasound is a good means of screening for brachial plexus pathology. Ultrasound is as accurate as MRI in the detection of most brachial pathologies but tends to be underutilized in clinical practice, compared to MRI. The main reason for this under-usage is a relative lack of knowledge regarding how to perform brachial plexus ultrasound and a lack of awareness of the ultrasound appearances of brachial pathologies. This lecture will provide a practical overview on how to perform brachial plexus ultrasound as well as highlighting the ultrasound appearances of common pathologies likely to be encountered in everyday clinical practice. Do not be perplexed by the plexus! Remember that there are 5 roots, 3 trunks, 6 divisions, 3 cords and 5 terminal branches. Finding these different components on ultrasound examination is not difficult. Plexal anatomy varies considerably from one patient to the next though there is very good side-to-side symmetry, so aways start with examination of the contralateral asymptomatic or less symptomatic side.

The most common indications are unexplained shoulder or upper limb pain, suspected radiation plexopathy or metastatic infiltration, trauma, or tumour. A negative ultrasound examination effectively excludes most brachial plexus pathology. The likelihood of finding an abnormality on MRI when ultrasound examination is negative is extremely low. Ultrasound can be performed relatively quickly compared to MRI and allows ready comparison of both sides. Also, high quality ultrasound of the brachial plexus is not usually affected by body habitus. Standard ultrasound of the brachial plexus, which involves examination of both sides, can be completed in 10 minutes. The main limitations of ultrasound are an inability to see the intra-foraminal or intra-spinal portions of the nerve roots though these, in essence, are not part of the brachial plexus, which starts at the level of the ventral rami. Also, a small number of patients cannot fully abduct the arm limiting ultrasound examination of the axillary region. The most difficult pathologies to detect on ultrasound are muscle denervation in neuralgic amyotrophy (though neural swelling or either the variably affected suprascapular nerve or extraplexal nerves is a key), inflammatory polyneuropathy, thoracic outlet syndrome, or minimal/mild brachial plexopathy – most of which are also difficult to delineate with other imaging. Although brachial plexus ultrasound is not perfect it is very useful and, as such, the main goal of this lecture is to encourage radiologists to do more brachial plexus ultrasound.