Proton density image

The two variables of interest in spin-echo sequences is the repetition time (TR) and the echo time (TE).

A short TR an short TE will give a T1-weighted image, a long TR and short TE (first echo) will give a proton density image, and a long TR and long TE (second echo) will give a T2-weighted image.

When an MRI sequence is set to produce a PD-weighted image, it is the tissues with the higher concentration or density of protons (hydrogen atoms) which produce the strongest signals and appear the brightest on the image.

Proton density images were extensively used for brain imaging, however they have largely been replaced by FLAIR. PD however continues to offer excellent signal distinction between fluid, hyaline cartilage and fibrocartilage, which makes this sequence ideal in the assessment of joints.

Three-dimensional proton density-weighted turbo spin-echo magnetic resonance imaging (PD MRI) could provide excellent diagnostic accuracy and better information in distinguishing a junctional dilatation from a true saccular aneurysm of the PcomA compared with TOF MRA.