Glossary

Axial plane: horizontal transverse plane.

Black Blood Imaging: MR sequence in which blood does not generate signal, such as spin-echo sequences.

Breath-hold: voluntary interruption of the respiration necessary for the correct acquisition of fast sequences.

Cine MR: series of gradient-echo images obtained in consecutive phases of the cardiac cycle and displayed in a continuous loop sequence.

Coil: element of the MR system that generates the radiofrequency pulses used to excite the study subject (transmitting antenna), or that also receives the echoed pulses returned by tissues (receiving antenna). The same coil can act as both transmitter and receiver, or there can be two independent coils, one for each function.

Contrast: The difference in signal intensity between tissues in an image.

Contrast agent: A substance administrated to the patient in order to change the contrast between tissues (gadolinium-based contrast agents are used in clinical practice).

Coronal plane: vertical frontal plane.

Delayed contrast-enhanced imaging: CMR method that, by using Inversion-Recovery sequences, allows the identification of myocardial scar tissue due to the persistence of the contrast agent in areas of myocardial fibrosis up to 30 minutes after its administration, while it is washed-out from the normal myocardium, this resulting in a high signal intensity of the scarred tissue.

Echo planar imaging (EPI): technique enabling the obtention of an image by means of a single radiofrequency excitation in a time on the order of milliseconds.

Echo time (TE): time interval between the radiofrequency pulse emission excitation and the reception of the radiofrequency signal emitted by the tissues.

Fast low-angle shot: gradient-echo sequence that uses short repetition times and reduced matrix, thus allowing the acquisition of images in less than a second.

Fast SE sequence: A multiple echo spin-echo sequence which allows the acquisition of several lines of k-space within a repetition time.

Field strength: degree of intensity of the magnetic field generated by the system magnet (measured in Tesla units).

Field of view (FOV): dimension of the study window.

Flip angle: value reached by the precession angle when stimulated by a specific radiofrequency pulse.

Free induction decay (FID): name given to the radiofrequency signal emitted by the protons of tissue during relaxation after having been submitted to radiofrequency excitation at resonance frequency in the presence of an intense, external magnetic field.

Frequency encoding: a process which enables the location of a point along one of the axes of the study plane: along with phase encoding, it defines the position of this point in the study plane.

Gadolinium (chelated): paramagnetic contrast agent of intravascular and extracellular distribution that produces a change in T1 and T2 relaxation times of the tissues this improving their contrast in the images.

Gating: coupling between slice acquisition of a sequence and any cyclical physiological signal: ECG; respiration, peripheral pulse.

Gradient echo (GE): MR technique by which adequately contrasted images are obtained of dynamic structures and of blood flow. Due to the short repetition times employed, it is possible to include various excitations in one cardiac cycle time, which enables the obtention of dynamic cine MR sequences.

Interslice gap: distance, which does not appear in the image, that separates contiguous slices of a sequence.

Inversion Recovery sequence: MR sequence in which, by applying a 180: inversion RF pre-pulse, signal intensity and contrast between tissues is modified.

Inversion time: Time interval between the inversion pre-pulse and the acquisition of the echo in an Inversion-Recovery sequence.

K-space: Numerical matrix containing the information needed to produce an image. The Fourier transform (mathematical method) of k-space results in an image.

Magnetic resonance angiography (MRA): Contrast-enhanced MR technique that provides a 3D imaging of the vessels.

Matrix: number of information units (voxels) that constitute the image.

Multi-phase: any sequence in which each slice is obtained in multiple phases of the cardiac cycle.

Multi-slice: any sequence in which multiple contiguous slices are obtained during one acquisition.

Oblique plane: plane with a certain degree of angulation over any one of the standard planes (axial, coronal or sagittal).

Parallel imaging: Imaging technique that allows reconstruction of an image in less than the time required for conventional imaging by using the spatial information related to the different coils of the receiver array.

Phase encoding: a process which enables the location of a point along one of the axes of the study plane: along with frequency encoding, it defines the position of this point in the study plane.

Pixel size: dimensions (in mm) of the information unit in the two-dimensional representation of the image on the screen. Image resolution depends on pixel size, which varies according to field of view and matrix.

Precession angle: angle between the vector axis of the external magnetic field and the rotation axis of the hydrogen proton.

Pulse sequence: series of consecutive excitations and receptions, its analysis resulting in the acquisition of images with any one of the MR techniques.

Radiofrequency: fragment of the electromagnetic spectrum that includes waves with frequencies under 10^{12}. The radiofrequency waves used in MR have frequencies of 10 to 100 MHz.

Radiofrequency pulse: brief radiofrequency signal emitted to excite the protons of the hydrogen atoms of the study subject.

Relaxation time: time required for the returning to a resting state of the hydrogen protons after a radiofrequency pulse excitation. Longitudinal relaxation or T1 is the time it takes them to return to the basal precession angle. Transversal relaxation time or T2 is the time elapsed until the energy acquired by phase coherence, in which protons are under the influence of an external radiofrequency pulse, is lost.

Repetition time (TR): interval between the emission of two radiofrequency pulses.

Sagittal plane: vertical antero-posterior plane.

Scout image: initial planes of rapid acquisition used to locate the next sequences.

Segmented-K-space: fast imaging technique based on the obtention of grouped lines of information (segments) instead of the line-by-line method used in conventional techniques, this reducing the acquisition time of an image to a matter of seconds.

Signal void: area of absent signal due to the flow characteristics in a specific region of the slice plane: it appears in instances of high flow rate or of turbulence in gradient-echo sequences.

Signal averaging or number of excitations (NEX): number of repeat measurements required for a sequence to be obtained with adequate definition of the images.

Signal-to-noise ratio (SNR): relation between the signal intensity from tissue structures and the background image noise, upon which image quality depends.

Single phase: any sequence in which one or various slices are obtained, each one in a different phase of the cardiac cycle.

Single slice: any sequence in which the images are obtained from a single slice.

Slice thickness: width of the slice.

Slice: section of the study subject which is imaged.

Spatial resolution: ability to discriminate between two different structures in the image, depending on the field of view and the matrix size.

Spectroscopy: technique that permits the acquisition, in an area of a specific tissue displayed in the MR image, of the spectrum of concentrations of an element (usually phosphorus) according to the different chemical compounds in which it is present.

Spin echo (SE): MR sequence that provides images of adequate contrast between tissues and blood flow, as no signal is elicited by rapidly moving structures.

Steady state free precession imaging (SSFP): GRE sequence that provides faster acquisition times with a higher contrast between tissues than conventional sequences.

Tagging: MR technique in which equidistant crossing lines are magnetically preselected in the ventricular myocardium, allowing to track dynamic myocardial wall changes during the cardiac cycle.

Tesla: standard unit of magnetic field strength.

T1-weighted image: MR image in which the signal intensity of the tissues is predominantly dependent on T1.

T2-weighted image: MR image in which the signal intensity of the tissues is predominantly dependent on T2.

Ultrafast sequences: techniques applying information acquisition strategies designed to reduce the total time spent in the process of imaging.

Velocity-encoded MR imaging: MR sequence which permits flow measurements through a particular vessel by providing both, the area and mean velocities of the blood flow, of the vessel studied.

Voxel: tridimensional unit of the MR matrix that integrates the two dimensions constituting the pixel with the thickness of the slice.

Wash-out effect: effect by which the blood flowing in a direction perpendicular to the slice plane produces a characteristic absence of signal (signal void), in the spin-echo technique, due to the fact that the excited blood leaves the slice plane well before the echo signal is read.