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Q. 1. Write down MR Spectroscopy - Its usage in Clinical Practice?

Ans

MR Spectroscopy :-

↳ MR Spectroscopy provide a measure of brain chemistry. It is the most common nuclei that are used are.

• ^1H (Proton)

^{23}Na (Sodium)

^{31}P (Phosphorus).

↳ The Proton Spectroscopy is easy to take and provide much higher signal-to-noise than other Sodium or Phosphorus.

↳ MRS can be performed by 0.5 tesla or above.

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- ↳ MR spectroscopy has been in use for a long time long before. MRS was used for the imaging.
- ↳ The metabolite information used for diagnose disease.
- ↳ The procedure used for the analytical tool.
- ↳ These are numerous metabolites found in the human brain.
- ↳ Fortunately, only several of them are ~~used~~ useful in spectroscopic studies.
- ↳ The changes are most noticeable during the first three years of life.
- ↳ This would enable us to obtain in vivo information about the chemistry and metabolism in specific locations.
- ↳ The example may be useful in the evaluation of many diseases and the effect of therapy.
- ↳ Some ~~sew~~ several metabolites of metabolism can be measured to distinguish among tumor types.
 - Amino acid
 - Lactate
 - Choline
 - Creatine
 - ↳ Lipid.

Use in Clinical Practice.

Role of MRS in few common conditions will be discussed here.

Stroke

MRS is used of the stroke in the MRI.

- ↳ stroke or other causes of neurological disability.
- ↳ The outcome measure of stroke clinical trial.

Brain tumor

MRS is an important modality in evaluating and the stage of brain tumor

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- ↳ Identified and the localization of the tumors.
- ↳ And the biopsies were routinely required to diagnose tumors.

Glioma:

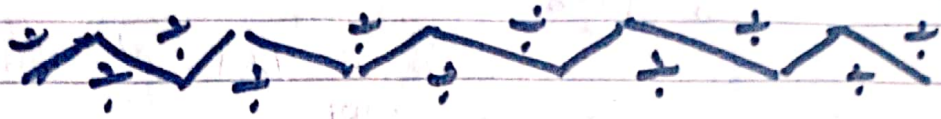
MRSpectroscopy can be help rise our capability to predict the predict the situation.

- ↳ The grade rise NAA and creatine less and choline > lipids and lactate rise.

Glioma: Radiation effect:

- ↳ Differsence radiation change and p-t-o

and tumor recurrence can be problematic
 ↳ In previous tumor choline
 will be the decrease.



Q 2

Write a details note on contrast media and how it effect Image details?

Ans

Contrast Media:

- ↳ The Contrast is show in the black and white.
- ↳ It is the also called Contrast Agent or contrast material.
- ↳ It is used to improve Image quality inside of the body.
- ↳ The Contrast medium show and the deep Pathology.
- ↳ The Contrast agent or used in the normal and abnormal.
- ↳ Two types of the Contrast Media.

(1) Positive Contrast media:-

- ↳ Positive contrast agent have high -

P-T-0

↳ Positive Contrast media is Radio-opaque -
 ↳ It is the ^{show} white on film.

(2) Negative Contrast media

↳ Negative contrast is low atomic numbers -

↳ It show on black the film.

↳ Negative Contrast media is Radio-~~opaque~~ Lucent.

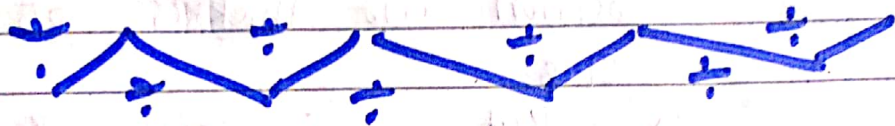
↳ Contrast Media effect in Image.

↳ It is also called Paramagnetic substance have the short local magnetic fields which causes a shortening of relaxation times of the surrounding Proton.

↳ The effect is named Proton relaxation enhancement. The body contains Paramagnetic substances. Examples are degradation products of hemoglobin.

↳ The effect of the contrast medium is a change of the signal intensity by shortening T_1 and T_2 in its surroundings.

- ↳ more the signal the TR.
- ↳ less signal TE.
- ↳ signal intensity of two tissue is illustrated.
- ↳ The T₁ tissue become shorter and T₂ curve is shifted to the left.
- ↳ IR is stronger.
- ↳ The two tissue can be better differentiated.
- ↳ The contrast media improve the lesion charactrs.



Q 3

Ans

Determine or select a certain slice thickness.

↳ select a different slice thickness in two ways:

↳ one solution is sent is not only one specific frequency.

↳ The lesser the range of frequency, the thicker the slice in which proton will be excited.

↳ when RF Pulse with frequency from 64 to 65 MHz, we will get a slice like this -

↳ The another way of to select a various slice thickness.

↳ The some range of radio frequencies, the same band width, as it is called, slice thickness can be identified by the slope of the gradient field.

↳ Used a an gradient field.

↳ Signal come from?

↳ After, Now we have selected position and thickness of our slice.

↳ But how can we find out, from what point of our slice a certain signal is coming from information that we must have to extract on image.

↳ This technique is similar to the slice selecting gradient which is turned on only during application of the RF pulse.

↳ Nine Proton in the slice selected.

↳ so the apply another gradient field which in our example decreases from left

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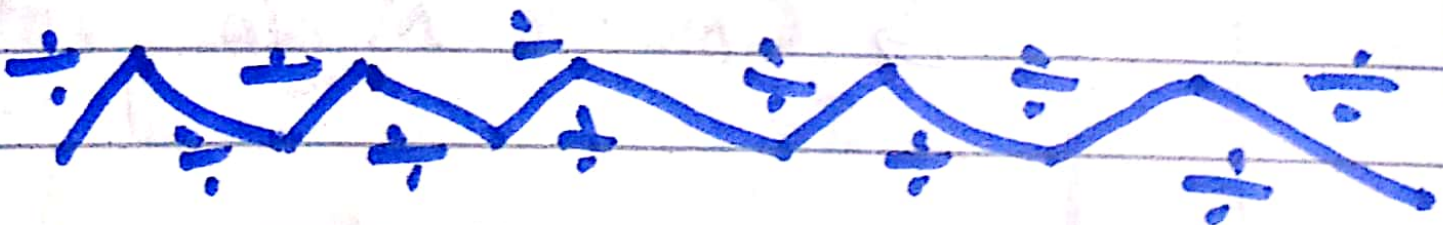
to right.

↳ All Protons have the same frequency.

↳ Then become exposed.

↳ After the all RF Pulse the protons are in phase is "whipping".

↳ So the Precession frequency of the protons will also decrease from left to right.



The End