NMR-CT FINDINGS OF BRAIN TUMORS.
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NMR-CT findings of more than 30 patients
with brain tumor were analyzed and compared
with the results of X-ray CT. NMR-CT was
performed with a Siemens superconducting
system (Somatom) operating at a field
strength of 0.35T and a SE (spin echo)
sequence was employed in most cases.
The multiplanar facility of NMR is seemed
to provide more anatomical information than
X-ray CT. The fact that the images of NMR-
CT are unaffected by artifacts from bony
structures is also considered to be of
great diagnostic value.
Although, the associated brain edema or the
cystic part was not
differentiated from the
tumor tissue in some cases. The inability
to show changes of bony structure and
calcifications clearly is also a drawback
of NMR-CT.

NMR-IMAGE vs ANATOMICAL FEATURE.
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Nuclear magnetic resonance provides a
great deal of information, in addition to
the indication of nuclei types and quanti-
ties according to signal amplitude. NMR
pixel value is governed by at least four
parameters, proton density, p, spin-lattice
relaxation time T1, spin-spin relaxation
time T2 and proton flow velocity, V. The
extent to which the signal is weighted
toward one or several of these parameters
is related to the sequence in which RF and
the gradient magnetic field pulses are
applied.

Hence the anatomical feature derived
from NMR image is strongly dependent on the
pulse sequence applied.

Are there any pulse sequence independent
structural parameters through the series
of NMR image obtained by different mode.

This problem was investigated based upon
the multi-Gaussian analysis of NMR signal
intensity histogram.

And the answer was "no".

NMR-CT IN DIAGNOSING SPINAL DISORDERS.
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In order to evaluate clinical utilities
of NMR-CT in diagnosing disorders of the
spinal cord and canal, 66 patients (30
tumors, 11 syringomyelias, 3 anomalies, 2
traumas, 1 AVM, 5 others) were performed
NMR-CT from April to October 1984. Surface
coll (15cm in diameter) designed for exami-
nation of the spinal disorders was applied
to 43 cases of them. Our using machine was
0.35T superconducting NMR-CT (Magneton).
Spin echo sequences (T1 weighted:400-600/
35; T2 weighted:1600-2600/60-120msec) were
mainly used.

NMR-CT is suitable for screening exami-
inations of the spinal disorders, because
it has two valuable advantages. One of them
is ability to obtain any optional plane
images particularly sagittal ones. And the
other is high contrast resolution, so the
spinal cord, cerebrospinal fluid, inter-
vertebral disc, and bone marrow of the
spine were easily distinguishable. Surface
coll was also useful for examinations of
the spinal disorders except limitations of the
imaging areas. It was also possible to
increase the spacial resolution as the
result of increasing S/N ratio during the
same acquisition time. Disadvantages of NMR-
CT in the spinal disorders were long
imaging time, low detectabilities of the
bony disorders and calcifications, and
difficulty to image the scoliotic patients.

Gray Scale Model to Diagnosis of NMR-CT
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The important point for clinicians to
interpret the pattern of diagnostic imaging
system is how to understand the principle
of image production mechanism. In the case
of NMR-CT, it is very difficult to inter-
prete the image contrast because there are
tissue specific parameters and operator
dependent parameters (intrinsic parameters
for example proton density, T1 and T2 and
pulse sequence timing parameters for exam-
ple recovery time, delay time and echo time)
respectively. When these understanding are
neglected, NMR-CT images can only be com-
pared with X-ray CT images in terms of
spatial resolution. Under these situation,
the important functional information which
can be obtained from NMR-CT imaging will
not be evaluated. In this report, we
demonstrated the various gray scale model
in which NMR signal intensity was measured
through theoretical equation with various
parameters and displayed visually. This
model will help clinician's understandings
about NMR-CT image and can be used for the
supplementary interpretative scale to
diagnose the NMR-CT images.