

## C.T. or (N.) M.R. for Bahrain

---

Najeeb Jamsheer

---

Chairman of Radiology,  
Salmaniya Medical Centre,  
State of Bahrain

---

BY THE END of this year (1984) Bahrain will have the services of one (maybe two) C.T. scanner(s). This may represent a late addition to the clinical imaging facilities on the island, concentrated at Salmaniya Medical Centre, but perhaps a well-timed acquisition! Yet, someone protested: Why not an N.M.R. unit instead? The protest could have echoed and mattered more were we in the '90s or even the late '80s, but not in 1984, and not in Bahrain. This editorial, addressing the question "C.T. or M.R.?", hopes to clarify some of the ambiguities.

Computed tomography (C.T.) and "Nuclear" Magnetic Resonance (N.M.R. or just M.R.) are both new diagnostic modalities. C.T. has at least 10 years clinical experience to boast of. M.R. is a newcomer: it's an '80s "baby".

C.T. technology uses ionizing radiation, but has rapidly developed over the last ten years. There has been great improvement in the image quality, faster scanners, significant reduction in radiation dose to the patient, and higher diagnostic accuracy and specificity. The wealth of the clinical experience gathered since the early '70s is vast, and the field of applications has become very wide indeed. Expertise in performing C.T. studies, interpreting the images and maintaining the equipment is available almost world-wide. Almost any room in a hospital can be modified to accept C.T. equipment. The cost of C.T. equipment and its maintenance has appreciably come down over the last 5 or 6 years. This can not be said for Magnetic Resonance.

M.R. imaging is still in its infancy, largely experimental, and has to use C.T. as a standard of reference. The availability of trained staff to operate M.R. equipment is limited, as is clinical experience of its use. Although published reports have shown potential for this non-invasive imaging technique, and in certain applications its superiority to C.T., the experience of major investigators is limited.

The addition of an M.R. unit to a hospital poses many unique and serious health and safety considerations, yet no ionizing radiation is involved. The environment of large magnetic field is a hostile one, and radio frequency shielding is necessary, to eliminate background electromagnetic signals that would interfere with patients examination. Metallic objects become potential projectiles in the magnetic room, and patients with cardiac pacemakers must be excluded from it.

Medical equipment (e.g. ECG machines) are rendered useless in the M.R. room. A 35-foot free zone in all directions is required to avoid the fringe fields effects of the superconducting magnets; metallic objects (e.g. lifts) can cut through the lines of the magnetic force and degrade the M.R. image, and the cathode ray tubes of X-ray machines, magnetic tapes and computer terminals will suffer interference if they lie within this zone. The use of superconducting magnets requires provision for replenishment of liquid nitrogen ( $-196^{\circ}\text{C}$ ) and liquid helium ( $-269^{\circ}\text{C}$ ) — a very costly procedure. Further, the accumulation of such gases in the room can cause asphyxiation. Some manufacturers, however, claim to have solved some of these environmental problems, and the next few years will certainly bring solutions to most if not all of them, so much so that M.R. units will be as commonplace as C.T.s are now.

Let me suppose that you can afford to buy an M.R. unit. Will you be able to run it at maximal capacity? Do you have enough material (patient's volume/input) to keep it fully operational? Do you have skilled personnel for its operation, and can you locally train and keep skilled personnel for this purpose? Even if the answer to all these questions is in the affirmative, pause and CONSIDER alternative imaging modalities that are as or more accurate and cheap. For, in making a decision to provide a diagnostic imaging modality, clinical "relevance" is the parameter that must be addressed first. To address a real need in patient's management is the main, if not the only, justification in deciding whether to buy C.T. or M.R. (C.T. and /or M.R.), not hospital decoration, not personal prestige and not money-making (usually from ill-informed patients).