Multi Planar Reconstruction and Maximum Intensity Projection: The Role of Reconstruction in Helical CT (FMPR and MIP), Special reference to FMPR.

K KHURSHID A SHAUKAT Y AMIN S AHMAD T QADEER M A J SIDIQUI
Department of Radiology , King Edward Medical College / Mayo Hospital , Lahore.
Correspondence to Dr. Khawaja Khurshid, Assistant Professor Radiology

The advent of multidetector CT has changed the way we interpret the CT. It has special roles in reconstruction to diagnose and evaluate the pathology in different planes. Helical CT, although is not as good as is the Multidetector, multislice CT, yet it is of immense help. We evaluated about 10 patients in the Department of Radiology Mayo Hospital, Lahore on the Helical CT and did FMPR (Multi planar Reconstruction) and MIP (Maximum Intensity Projection). The value interpreted is the hall mark of this study.
Key words: FMPR, MIP, reconstruction

The role of CT is increasing in diagnosing diseases day by day. And the invention of Multidetector CT has made life more machinery oriented. But still the Helical CT has a role in reconstruction CT especially in difficult and different regions such as Spine, evaluation of aneurysms at the level of arch of aorta, trauma evaluation, foreign body localization etc. In this study presentation we studied 10 patients who under went CT for various regions and did reconstruction, with special reference on FMPR.

Patients and methods

We did CT of 10 patients who underwent CT (Helical CT of Toshiba X vision/XP) for various regions, five for spine, three chest , and two for abdomen. The pathologies were as under

Spine. Two intradural extramedullary lesions. One extradural lesion, one congenital block vertebrae and one for trauma.

Chest. Two for aneurysm (Pulmonary trunk and arch of aorta), one for foreign body inhaled.

Abdomen. One an adrenal mass and the other for aneurysm. The scan were done as a standard protocol as specified in the table

Table 1. CT scan protocol

Region	Level	Slice thickness	Slice interval
Spine	Specified vertebral level	3mm	3mm
Chest	Root of neck till adrenals	7mm	7mm
Abdomen	Diaphragm till iliac crest	7mm	7mm

Table 2. Pathologies scanned and reconstructed

Spine	Chest	Abdomen
Intradural Lesion	Aneurysm arch	Aneurysm Aorta
Spine	Chest	Abdomen
Intradural lesion	Aneurysn arch	Aneurysm aorta
Intradural lesions	Aneurysm pulmonary trunk	Mass adrenal
Extradural lesion	Foreign body	
Congenital spine		
Trauma		

After the procedure multiple reconstructions were made in different planes of coronal and sagittal slices. Also MIP was attempted. In multiplanar reconstruction, the data is basically reconstructed by the CT, which is initially acquired only in the axial plane, into sagittal, coronal and oblique planes. In oblique reconstruction the angle of obliquity can be made according to the desire of reconstruction. The maximum intensity projection is the reconstruction in which the data which is maximally dense remains and other things are deleted to give Projection of maximum intensity. There is a definite role of reconstruction in spine, hip bones, aneurysms.

Results

Although the pathology is visible in the axial slices, but to clearly define the lesion and its extent sometimes the reconstruction is helpful to the radiologists and the referring consultant as is clearly seen in the slices seen in figure 1 and 2. which show the adrenal mass , in reconstruction the mass is clearly separated from the right kidney and the right lobe of the liver.

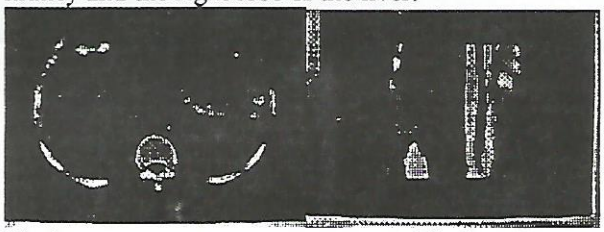

Fig 1. Fig.2

In another case the spine CT myelography Figure 3 and 4, clearly showed a disc bulge but on sagittal reconstruction the intervertebral foramina were clearly shown to be compressing the nerve outlets.

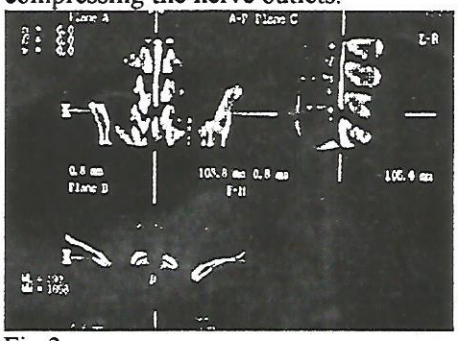

Fig.3

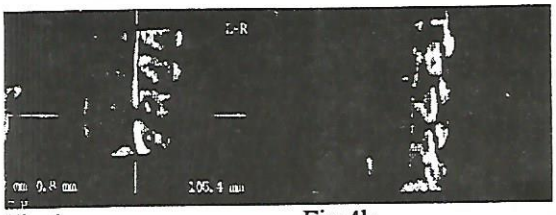

Fig 4 a

Fig.4b

The aneurysm of arch of aorta in figure 5 and 6 were clearly demarcated in the oblique reconstruction done at the level of arch of aorta at 20 degree angle.

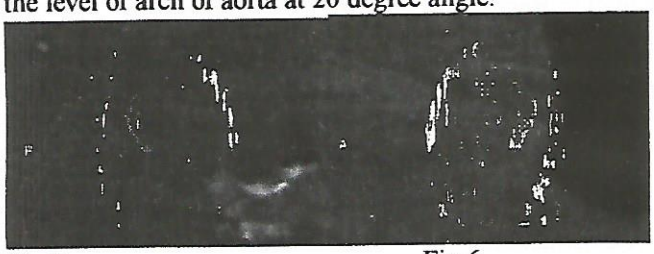

Fig 5

Fig.6

The intradural extramedullary meningioma also was clearly separated in the sagittal reconstruction in figure 7 and 8.

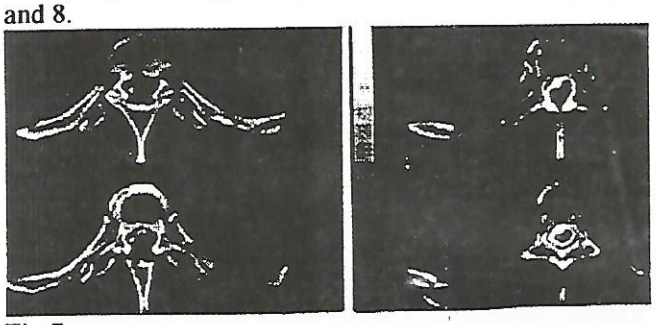

Fig 7

Fig.8

Fig 8a . MIP

Hence the reconstruction, although not mandatory is yet very condusive and helpful to the radiologist in defining the lesion and characterizing the lesion.

Discussion

It is concluded that the multiplanar reconstruction is helpful in diagnosing and knowing the extent of the disease. This is especially true for the cases in which the spine is evaluated and also some chest disorders. The recent advent of multidetector CT is much more helpful and is real state of art as far as the reconstruction is seen.

References

1. Thorsen M K, San Dretto M A, Lawson T L, Foley W D, Smith D F, Berland L .Dissecting aortic aneurysms: accuracy of computed tomographic diagnosis. Radiology 1983 148:773–777
2. Napel S A, Marks M P, Rubin G D, et al. CT angiography with spiral CT and maximum intensity projection. Radiology 1992 185:607–610
3. Ambrose J, Hounsfield G Computerized axial tomography. Br J Radiol 1973 46:148–149 Fry I K
4. Who needs high technology? Br J Radiol 1994 57:765–772