



ORIGINAL RESEARCH PAPER

Medical Science

Comparative study of degenerative lumbar disc lesions between conventional lumbar myelography and CT myelographic evaluation

KEY WORDS:

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ABSTRACT

Introduction: The syndrome of low backache with or without neurological deficit is a common diagnostic problem, an orthopedic surgeon faces in daily practice. Such patients attend the OPD with a variety of presentations and localization of lesion is too difficult at times. Such patients are subjected to lumbar myelography. If correct diagnosis is arrived at in proper time and with accuracy, the management of the case can be effectively achieved. Here comes the role of myelography, may it be conventional or with CT scanner. With this in mind the present study was planned to compare the degenerative lumbar disc lesions between conventional lumbar myelography and CT myelographic evaluation

Materials and Methods: The present study included 80 patients who clinically presented with complains ranging from low backache to paraplegia, with or without bladder involvement and who were clinically considered to have compressive myelopathy. All the above patients were subjected to conventional myelographic evaluation .Then the patient was subjected to CT scan evaluation of the lumbar spine by taking sequential sections on Spiral CT Scan unit,

Results: On Con.myelography, 31 patients were thought to have single disc involvement, but in 3 out of 31 were detected to have L5-S1 disc involvement on CTM which were missed on Con. myelo

Conclusion : CT myelogram was found to be as sensitive as conventional myelogram in the detection of lesions, additional information pertaining to vertebral bodies, their appendages, the soft tissues around is received on CT myelography, which may be missed on conventional myelography.

Introduction:

The syndrome of low backache with or without neurological deficit is a common diagnostic problem, an orthopedic surgeon faces in daily practice. Such patients initially are treated conservatively with analgesics, short wave diathermy, tractions and exercises. Such patients attend the OPD with a variety of presentations and localization of lesion is too difficult at times. Such patients are subjected to lumbar myelography.^{1,2}

Roomy lumbar canal may keep the lesion hidden for a long time, whereas, a congenital narrow canal may bring the patient of compressive myelopathy in a very early stage. Early detection helps in prompt surgical management thus preventing the agony and irreversible damage. A big class of patients do suffer from low back-ache and may be the victims of cord or nerve root compressions resulting in low backache, with or without neurological involvement.^{3,4} If correct diagnosis is arrived at in proper time and with accuracy, the management of the case can be effectively achieved. Here comes the role of myelography, may it be conventional or with CT scanner.

Both the methods have their own place in diagnostic radiology, but if compared, it becomes evident that both the approaches do have their own advantages over each other. Both the methods are invasive, expensive as well as expose the patient to radiation. The comparative efficacy, sensitivity, specificity and accuracy of the output of both methods should be studied in detail so that, in a given situation a particular method can be adopted as required.^{5,6}

The facility for examining the patient by CT scanner being available in the Institute, the study was taken for comparing the results of the routine conventional myelography with the myelographic CT evaluation of the patients presenting with compressive myelo/neuropathies.

With this in mind the present study was planned to compare the degenerative lumbar disc lesions between conventional lumbar myelography and CT myelographic evaluation

Materials and Methods

The present study included 80 patients who clinically presented with complains ranging from low backache to paraplegia, with or without bladder involvement and who were clinically considered

to have compressive myelopathy. All the above patients were subjected to conventional myelographic evaluation.

Detail clinical evaluation by noting the presentation of the patient's clinical examination, past history, and family history. CNS evaluation was performed in detail by evaluating sensory and motor systems. Bladder and/or bowel involvement was noted. Plain radiography of lumbar vertebral column was studied by carrying out antero-posterior and lateral views and if needed oblique views of lumbar spine were taken. In some cases the radiographs available with the patients were reviewed to avoid extra-radiation to the patient. Radiography was carried out on Siemen's 500mA X-ray unit on 12"x15" or 10"x12" size x-ray films.^{7,8}Wherein Kv ranging from 70 to 90 and mAs ranging from 80-125 depending on the thickness of the part of the patient to be examined, were applied. Bucky radiography with the tube distance of 100cms was used as the fixed parameter. Myelographic evaluation - The referred patients were advised the preparation for the abdomen. On prior day, at the time of giving the appointment for myelography patients were also evaluated by Ophthalmologist for signs of raised intra-cranial tension.

On the day of examination, valid consent of the patient was taken. Blood pressure, pulse, status of hydration and sensitivity to the contrast were noted. Myelography was done under all aseptic precautions by doing lumbar puncture at L 2-3 or L3-4 level and using 8-10ml of inj. Omnipaque (300mg Iodine/ml). Then the patient was subjected to CT scan evaluation of the lumbar spine by taking sequential sections on Spiral CT Scan unit (Somatome Plus 4-A-Siemens make).

The CT scan examination of the lumbar spine (L-S) was performed by selecting 5mm thickness of a slice with 5mm feed. If required, slice thickness was reduced to 3mm. The gantry angulations was planned according to the level of lesion. Post processing of the images was done by using 3-D functions i.e. Multi-Planner Reconstruction (MPR) and Shaded Surface Display (SSD). The examination covered the adjoining area of the level of lesion, for example lower thoracic evaluation was carried out when the level of lesion was at L1. The images were documented by using the KODAK Laser Camera by observing the protocol of 20 or 25 cut on one film (14" x 17") and in different windows.

After the myelographic and CT evaluation procedure were over the

patient was hospitalized under the clinician's care for post-myelography observation. The data collection was done and analysed using appropriate statistical method.

Results:

Table no.1 Table showing degenerative disc lesions of the lumbar spine

Class showing working pattern	Male	Female	Total
Heavy work	14	3	17
Average work	11	-	11
House work	0	6	6
Sedentary work	6	1	7
Total	31	10	41

Table No. 2 Radiological features in 41 patients presenting with degenerative disc lesions in lumbar spine and their comparison between conventional lumbar myelography and CT myelographic evaluation

Radiological features	No. of cases	Detected on		Remarks
		Con Myelo	CT Myelo	
Anterior Osteophytes	26	23	26	CTM better
Posterior osteophytes	7	7	4	Con.myelo sensitive
Osteoporosis	3	3	3	Both methods equally sensitive
Reduced disc space	21	21	11	Con.myelo very much sensitive
Apophyseal joint Hypertrophy	7	3	7	CTM sensitive
Scoliosis	15	15	8	Con.myelo very much sensitive
Ligamentum flavum hypertrophy	6	-	6	CTM highly specific & sensitive
Vacuum sign	6	2	6	- do -
Disc (single) lesion	28	31	28	*
Multiple disc lesions	13	9	13	*
				Both methods are equally sensitive
				in detecting disc lesions
				CTM highly sensitive
Impression on contrast column	41	40	41	Both methods are equally sensitive
Complete block	3	4	3	CTM better depicts complete or partial block than con. myelo
Partial block	1	-	1	
Nerve root cutoff	1	-	4	Additignal findings
Lytic lesion	1	-	1	CTM better
Aortic calcification	1	-	1	CTM highly sensitive& specific
Canal stenosis	2	2	2	Equally sensitive

Ankylosis'of hip joint	1	1	-	Con.myelo could detect because, area covered is much larger
Sacralisation L5	4	4	4	-
# lamina S1	1	-	1	CTM specific & sensitive

On Con.myelography, 31 patients were thought to have single disc involvement, but in 3 out of 31 were detected to have L5-S1 disc involvement on CTM which were missed on Con. Myelo. Various lesions, the patients had were, disc lesions (41), lumbar canal stenosis (16), granulomatous lesion i.e. tuberculous (5), listhesis or retrolisthesis(5), primary neoplasm of spine and/or cord, nerve root (4), traumatic lesions (4), secondaries (4) and congenital malformation (1). **Of the lumbar lesions, the commonest found was degenerative disc lesions** and second commonest was canal stenosis. As a whole, in various clinical presentations males were larger in number. Similarly when various lumbar lesions were considered, the males were the predominant victims. Like in degenerative disc lesions, out of 41 patients, 31 were males. In canal stenosis out of 16, 11 were males. In fact, it is observed by many that sex does not offer bar for lumbar lesions.

Out of 80 patients examined, the predominant class presented between the age group of 31-40 years. Many of the studies do support it. In addition, it is observed in our present study and also observed by many, that the victims of the disc lesions range between 31-50 years of age.^{4,7,9} In the present study, 41 patients presented with disc lesions, out of which males were 31 & females were 10. The age group ranged between 11 to 80 and above, but the large group i.e. 22 patients were between 41-60 years of age, and out of which 15 were males and 7 females.

In respect with disc lesions, the occupation of the victim also plays role. Out of 41 patients a big group i.e. 17 were occupied where heavy working was the occupational requirement. The disc lesions were not common in the group of patients disposing house work or sedentary work. (Victor M Haughton et al)¹⁰

Discussion : The radiological features of the disc lesions seen were anterior osteophytes (26), post-osteophytes (7), osteoporosis (3), reduced disc space (21), apophyseal joint hypertrophy (7), scoliosis (15), ligamentum flavum hypertrophy (6), vacuum sign (6) single or multiple disc involvements (41), complete block (3), partial block (2) and nerve root cut off (18). The comparison between conventional myelography versus CT myelography revealed that –

The detection of posterior-osteophytes is better done by conventionalmyelography, as in the present study, 7 patients presented with posterior osteophytic growths and they all were detected on conventional myelography but only 4 on CT myelography. The detection of reduction in disc space is better done on conventional myelography. In 21 patients, it could be appreciated in all patients on conventionalmyelography but only in 11 on CT myelography.

Scoliosis even to a small extent is better appreciated on conventional myelography than on CT myelography. Conventional myelo revealed scoliosis in 15 patients as against 8 patients on CT myelography. Multiple disc involvement is better detected on conventional myelography than on CT myelography even at a glance. Detection of additional lesions like involvement of hip joints is possible on conventional myelography as the hips are covered in the film at the time of radiography.

CT myelography was found to be superior in detecting even minor impressions on the contrast column. CT myelography detected impression on contrast column In 41 patients whereas conventional myelography revealed in 40. Even though CT myelography stands superior to conventional for the detection of individual herniated disc, still it is observed in present series and

also supported by observations made by Philip that the conventional myelography stands superior when multiple discs are involved. 3-D post processing like, Multi-Planner Reconstruction (MPR) is required as CT myelography to visualise multiple disc herniations.^{12,13,14}

The contrast which traverses through the root sleeves of meninges traversing along with the nerve root show cut off when their is nerve root edema or postero-lateral herniation of the disc. The root cut off sign is picked up best on CT myelography (18 patients) as against conventional myelography (12 patients).^{15,16,17} Conventional myelographic evaluation in patients having complete block may sometimes proved to be wrong, because the severity of the occlusion may allow very little of contrast to pass through and then it may be difficult to pick up the same on conventional myelography as against CT myelography which picks up the little contrast passed through the severe block. In the present series, 4 patients were detected to have complete block on conventional myelography, CT myelography proved one of them as partial.

CT myelogram was found to be as sensitive as conventional myelogram in the detection of lesions like bony canal stenosis (2 patients), sacralisation L5 (4 patients). CT myelography detected lytic lesion in the vertebral body (1 patient), aortic calcifications (2 patients), fracture of S1 lamina (1 patient) which were missed on conventional myelography.^{18,19} Therefore, additional information pertaining to vertebral bodies, their appendages, the soft tissues around is received accurately on CT myelography, which may be missed on conventional myelography.

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