Magnetic Resonance Imaging of the lumbar spine in people without back pain

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الرنين المغناطيسي للفقرات القطنية عند أناس غير مصابين بآلام الظهر

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العلاقة بين آلام الظهر والتغيرات التي تطرأ على شكل الغضاريف القطنية علاقة مثيره للجدل والخلاف، تبرز أهميتها عند المرضى الذين يحتاجون إلى تداخل جراحي ، فكان الهدف من الدراسة هو بيان مدى انتشار هذه التغيرات عند أناس لا يعانون من آلام الظهر.
أجريت الدراسة في قسم الرنين المغناطيسي في م.الزهراء (ع) التعليمي في النجف الاشرف للفترة من كانون الثاني ٢٠٠٨ إلى شباط ٢٠٠٩ وقد تم فحص ٢٠٠ شخص (١٣٠انثى٧٠ ذكر) تراوحت أعمارهم بين ٢٠ و٦٠ سنه .
أظهرت الدراسة أن ٣٢% غضاريف طبيعيه تماما بينما ٦٨ % غير طبيعيه منهم ٤٠% بأكثر من مستوى ، معظم التغيرات في شكل الغضروف كانت مابين انتفاخ ونتوء بسيط وليس نتوء معقد.
إن ايجادات مثل هذه التغيرات في شكل الغضروف عند المرضى الذين يشكون آلام الظهر كثيرا ماتكون صدفه متزامنة وليس سببا رئيسيا لالآم الظهر فمقارنة نتائج فحص الرنين المغناطيسي مع ألحاله السريرية ضروريا للوصول إلى طرق ناجعة للعلاج.

Abstract

Background The relation between abnormalities in the lumbar spine and low back pain is controversial ,incidental findings might lead to additional testing & the potential for unnecessary intervention.

Object We examined the prevalence of abnormal findings on magnetic resonance imaging (MRI) scans of the lumbar spine in people without back pain.

Patients& Methods We performed MRI examinations on 200 asymptomatic people (130 females &70 males), ages range 20 -60 yrs. We used the following standardized terms to classify the five intervertebral disks in the lumbosacral spine: normal, bulge, protrusion, and extrusion.

Results Thirty two percent of the 200 asymptomatic subjects had normal disks at all levels. Forty eight percent of the subjects had a bulge at least one level, 23 percent had a protrusion, and 2 percent had an extrusion. Forty percent had an abnormality of more than one intervertebral disk. The prevalence of bulges & protrusions increased with age.

Conclusions On MRI examination of the lumbar spine, many people without back pain have disk bulges or protrusions but not extrusions. Clinical correlation is essential to determine the importance of disk abnormalities on magnetic resonance images.

Introduction

The relation between abnormalities in the lumbar spines &low back pain is controversial , previous autopsy studies as well as myelography , CT & MRI have shown abnormalities in a substantial number of people without back pain [1,2,3,4,5,6,7] .

The role of imaging is to provide accurate morphologic information and influence therapeutic decision making [7].
A study done by Jensen et al. using MRI reported a high prevalence of disk herniation in people without symptoms & urged caution in relating symptoms to such lesions [7] .
While current diagnostic imaging technology enables remarkably detailed anatomic assessment , there is also the potential for identification of incidental findings , these incidental findings fall into two main groups : the first is finding that are morphologically abnormal but not responsible for the symptoms , the second is findings that are morphologically abnormal and possibly related to symptoms but not relevant to clinical decision making and outcome .Incidental findings might lead to additional testing & the potential for unnecessary intervention , increased cost of care and possibly worse outcome .The dilemma is particularly important in patients with low back pain with or without radiculopathy. In practice , the major decision that confronts clinicians is whether the condition will respond to conservative care or whether a more invasive intervention such as surgery is appropriate [8,9] .
The presence of degenerative changes is by no means an indicator of symptoms and there is a very high prevalence in asymptomatic individuals , however the sequelae of disk degeneration are among the leading causes of functional incapacity in both sexes and are common source of chronic disability in the working years .Using a well defined morphologic nomenclature we examined the prevalence of abnormal disks in MRI of the lumbosacral spines in people without back pain [10,11] .

Patients & Methods

This is a prospective study conducted through the period from January 2008 to February 2009 on 200 asymptomatic (no history of back pain) patients (130 female&70 male who were 20-60 years old) were referred to MRI unite at Alzahraa teaching hospital in Najaf to perform examination other than that of the lumbosacral spines (e.g. : brain ,abdomen), their permission was taken for doing magnetic resonance imaging of the lumbar spine for research purposes .
We excludes people with non intervertebral disk abnormalities .

MRI examination at Alzahraa teaching hospital with 0.2 Tesla imagers/ Siemens medical system / the studies consisted of four spine echo sequences : a coronal localizer , a sagittal T2 &T1weighted images , technical specifications included a slice thickness of 3-4 mm. for sagittal and axial sequences .

The terms used to classify disks were defined as follows [7] :

1- Normal : no disk extension beyond the interspace .
2- Bulge : circumferential symmetric extension of the disk beyond the interspace .
3- Protrusion : focal or asymmetric extension of the disk beyond the interspace .
4- Extrusion : more extreme extension of the disk beyond the interspace.

Results

In the 200 asymptomatic people who underwent MRI of the lumbosacral spines , 48 % had a bulge at at least one intervertebral disc ,23% had a protrusion & 2% had an extrusion (table 1).

Table 1 : Prevalence of bulge , protrusion & extrusion on MRI scans in 200 asymptomatic subjects .

MRI Findings	Subjects no. (%)
Bulge	96 (48%)
Protrusion	46 (23%)
Extrusion	4 (2%)

Sixty eight percent of those asymptomatic subjects had an intervertebral disk abnormality , Forty percent had an abnormality at more than one level.
Thirty two percent of the 200 asymptomatic subjects had normal disc at all levels (table2).

Table 2: Distribution of the study sample according to MR findings.

MR Finding	Subject no. (%)
Normal discs	64 (32%)
Abnormal discs	136 (68%)

The prevalence of bulge and protrusion according to the age of the subject and the location of the abnormalities in the intervertebral disc space are presented in table 3 and table 4.

Table 3: Number of subjects with bulges , according to the age of subjects &location of bulge.

AGE (years) no. of subjects	LOCATION OF BULGE no. of subjects					Bulge at least at one level no. of subjects(%)
	L1-2	L2-3	L3-4	L4-5	L5-S1	
20-29(n=54)	0	0	8	10	8	14 (26%)
30-39(n=60)	4	2	8	12	8	22 (36%)
40-49(n=50)	2	2	6	14	10	28 (56%)
50-60(n=36)	6	12	28	28	32	32 (88%)
Total (n=200)	12	16	50	64	58	94 (48%)

Table 4: Number of subjects with protrusion , according to the age of subjects & location of protrusion .

AGE (years) no. of subjects	LOCATION OF PROTRUSION no. of subjects					Protrusion at least at one level ,no.(%)
	L1-2	L2-3	L3-4	L4-5	L5-S1	
20-29(n=54)	0	0	0	6	4	8 (14%)
30-39(n=60)	2	2	2	10	4	10 (16%)
40-49(n=50)	0	0	2	10	8	11 (22%)
50-60(n=36)	0	6	6	12	10	17 (47%)
Total (n=200)	2	8	10	38	22	46 (23%)

The prevalence of bulge & protrusion was highest at L4-5&L5-S1 discs.
There were few abnormalities at L1-2 disc.
The prevalence of disc bulge & protrusion increased with age (table3 &4).

Table 5 : Correlation between the results of the present study & other's studies.

Study	Total subject no.	Normal subject no.(%)	Abnormal no.(%)
Present study (Najaf)	200	64(32%)	136 (68%)
Jensen et al [7] (California)	98	35(36%)	63 (64%)
Boden et al [4] (Washington)	67	44(66%)	23(34%)

The current study showed low prevalence of disc extrusion in asymptomatic people 2%, this is comparable to Jensen et al.[7] study who reported that the majority of asymptomatic abnormalities on MRI were bulges & protrusions but not extrusions.
Given the high prevalence of back pain in the population , the discovery of a bulge or protrusion on an MRI scan in a patient with low back pain may frequently be coincidental, therefore the clinical picture should be correlated with MR results.

Discussion

The role of diagnostic imaging in patients with back pain is an important one in today's health care environment .Previous studies have demonstrated a high prevalence of morphologic abnormalities in both symptomatic and asymptomatic individuals [9] .
Correlation between the symptoms and signs and the MRI findings is necessary to determine the clinical importance of anatomical abnormalities identified by this radiographic technique [12] .
We found a high prevalence of abnormalities in the lumbar disks on MRI examination of people without back pain .
Only 32% of those examined had a normal disk at all levels .
These results are similar to results obtained by Jensen et al.[7] ,they reported that only 36% of 98 normal subjects had a normal disk at all level .
In this study about 48% had a bulge at at least one intervertebral disk & about 23% had at least one disk protrusion & the prevalence of these findings (bulge &protrusion)

increased significantly with higher age groups . Our results is in agreement to a study done by Boden et al.[4] who reported that 14% of patient aged younger than 40 years & 28% of patients aged older than 40 years have major disc abnormalities while
Jensen et al.[7] reported that there was significant relation between age & the prevalence of disc bulge but not of disc protrusion ..

The difference between our results & those of other investigators may be related to selection of patients ,their number, age & life style (table 5) .

Conclusion

On MRI examination of the lumbar spine ,many people without back pain have disk bulges or protrusions but not extrusions .Because bulges and protrusions on MRI scans in people with low back pain or even radiculopathy may be coincidental ,a patient's clinical situation must be carefully evaluated in conjunction with the results of MRI studies.

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