



Original Research Article

INCIDENTAL FINDINGS IN MAGNETIC RESONANCE IMAGING IN PATIENTS PRESENTING WITH BACK PAIN

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Abstract: **OBJECTIVE** To assess how often extraspinal incidental findings appear on MRI scans in individuals reporting back pain.

METHODOLOGY A descriptive cross-sectional study was conducted at Postgraduate Medical Centre (JPMC), Karachi, involving 171 patients aged 18–60 years with back pain ≥ six weeks. Using non-probability consecutive sampling, lumbar spine MRIs were performed. Consultant radiologists identified extraspinal incidental findings based on defined imaging criteria. Data were analysed using SPSS 26.0, with chi-square tests applied at a 0.05 significance level. **RESULTS** In this study involving 171 participants (mean age 43.25 ± 12.46 years; 82 males and 89 females), lumbar MRI scans revealed extraspinal findings in several cases. Renal cysts emerged as the predominant incidental abnormality, identified in 70 individuals (40.9%). Among women, their occurrence increased significantly with age, being more frequent in those above 45 years ($p = 0.005$). **CONCLUSION** The present study identified that extraspinal incidental findings are a frequent occurrence in lumbar MRI scans performed for back pain evaluation, with renal cysts representing the predominant finding. This observation emphasizes the need for radiologists to assess surrounding structures carefully during spinal imaging to ensure early detection of clinically meaningful abnormalities that may influence patient management and outcomes.

Keywords: Lumbar MRI, Back pain, Extraspinal incidental findings, Renal cysts, Incidental findings.

INTRODUCTION

Back pain is a highly prevalent incapacitating condition which is the leading cause of disability and work absenteeism worldwide [1]. The global age standardized incidence rate of back pain is reported to be 2748.90 per 100,000 population [2]. While musculoskeletal disorders are mostly associated with back pain, it can also result from variety of conditions including nephrolithiasis, endometriosis or tumors [3]. Magnetic resonance imaging (MRI) of lumbar

spine is important in diagnostic workup of back pain as it can easily identify structural abnormalities of spine like lumbosacral disc herniation or end plate fracture [4].

Extraspinal incidental findings (ESIF) on MRI are those pathologies which don't correlate with patient's symptoms of back pain and in MRI of lumbosacral spine, are commonly seen within abdomen or pelvis relating to genitourinary tract or gastrointestinal tract [5]. While some findings may be of little clinical

importance, others may allow earlier diagnosis and management of significant pathology [7]. ESIFs range from benign pathologies like simple renal cysts to life threatening conditions requiring immediate attention like malignant lesions [7]. Few studies have attempted to assess the prevalence of ESIFs in lumbosacral MRIs.

Komut et al, studied the frequency of extraspinal incidental findings on MRI in their retrospective study. Mean age of participants was 48.25 ± 15.92 . 41% patients were males while 59% patients

were females. The prevalence of extraspinal incidental findings on MRI was 29%. Common incidental findings detected on MRI were unilateral renal cysts (19.26%), single uterine myoma (9.11%) and ovarian cysts (8.7%) [8]. Zidan et al, studied the frequency of extraspinal incidental findings on MRI in their prospective study. 49% patients were males while 51% patients were females. Prevalence of extraspinal incidental findings on MRI was 23.7%. Most common incidental finding detected on MRI was renal cysts seen in 10.3% patients [9]. In another study, Quattarocchi et al, studied the frequency of extraspinal incidental findings on MRI in their retrospective study. Mean age of participants was 59.3 years with 48.4% patients' males and 51.6% patient's females. Prevalence of extraspinal incidental findings on MRI was 68.7%. Common incidental findings detected on MRI were renal cysts (42.5%), ovarian cysts (12.8%) and uterine myoma (12.7%) [10]. It is evident from literature that besides identification of causative factors for lower back pain, MRI may also help in early recognition of asymptomatic yet clinically significant pathologies like obstructive uropathy or malignancies. Therefore, it is important for radiologists to actively look for these pathologies in abdomen and pelvis in addition to detailed assessment of lumbosacral spine. The rationale of our study will be to determine the prevalence of ESIFs on MRI in local population in a prospective cross-sectional study, as most of the previously conducted studies are retrospective and none, to the best of our knowledge, has been conducted in local hospital setting.

METHODOLOGY

This descriptive cross-sectional study was conducted in the Radiology Department of JPMC, following approval from the institutional ethics review committee. The aim of the study was to determine the frequency of extraspinal incidental findings (ESIFs) observed in patients undergoing magnetic resonance imaging (MRI) of the lumbosacral spine for the evaluation of back pain. Utilizing the World Health Organization's sample size calculator and considering a prevalence rate of uterine myomas at 12.7%, alongside with a 5% margin of error and a 95% confidence level, the requisite sample size was ascertained to be 171. Participants were selected

through non-probability consecutive sampling. Individuals of either gender, aged between 18 and 60 years, presenting with chronic back pain lasting six weeks or longer were included, provided they met the predefined operational criteria. Exclusion criteria comprised patients with contraindications to MRI, such as the presence of metallic or electronic implants, history of claustrophobia, chronic renal impairment with estimated glomerular filtration rate (eGFR) below 60 ml/min or confirmed pregnancy. Before participating, each patient was briefed in detail about the nature and purpose of the study and gave informed written consent. Demographic and clinical details, including age, gender, residential background, pain intensity, and symptom duration, were documented using a structured proforma developed for this study. All participants underwent MRI scans using a standardized lumbosacral protocol, which included sagittal T1-weighted, T2-weighted, short tau inversion recovery (STIR), and T2-weighted myelographic sequences, along with axial reformats extending from the T12 vertebral level to the S1 segment. The images were reviewed by consultant radiologists who had over five years of post-fellowship experience to ensure consistency and diagnostic accuracy. Extraspinal incidental findings were identified and recorded based on specific MRI characteristics as outlined in the operational definitions of the study. The findings of interest included renal cysts, ovarian cysts, and uterine myomas, among other relevant abnormalities not related to the primary complaint of back pain. The data were collected and entered by the principal investigator into a preformatted, secure data sheet with access restricted to authorized research personnel, ensuring data confidentiality and integrity. The methodology was designed to minimize bias and maintain diagnostic uniformity by strictly applying the inclusion and exclusion criteria and adhering to a consistent imaging protocol. Data was analyzed using SPSS 26.0. Demographic and clinical variables were computed using descriptive statistics computed using means, SD, and frequencies. The statistical significance would be determined at the $p\text{-value} \leq 0.05$ using the Chi-square test.

RESULT

A total of 171 patients were included in the study. The mean age of the participants was 43.25 ± 12.46 years, with a 95% confidence interval ranging from 41.37 to 45.13 years. The average pain score among the participants was 7.10 ± 2.04 , and the 95% confidence interval was 6.79 to 7.41. The mean duration of back pain was 28.29 ± 13.88 weeks, with a 95% confidence interval of 26.20 to 30.39 weeks. Among the study participants, 82 (48.0%) were males and 89 (52.0%) were females (Table I).

Table II shows the comparison of incidental findings among male and female patients according to age

groups. Among male patients, renal cysts were observed in 19 (46.3%) individuals aged 18–45 years and 21 (51.2%) individuals aged above 45 years, with no statistically significant difference ($p = 0.659$). In contrast, among female patients, renal cysts were detected in 11 (23.4%) females aged 18–45 years and 19 (45.2%) aged above 45 years, showing a

significant association with age ($p = 0.005$). Ovarian cysts were more frequent in the younger age group, seen in 17 (36.2%) females aged 18–45 years compared to 6 (14.3%) in those above 45 years. Similarly, uterine myomas were reported in 15 (31.9%) younger females and 7 (16.7%) older females.

Table I: Demographic and Clinical Characteristics of Study Participants (n=171)		
Mean $\pm$ Standard Deviation		95% Confidence Interval
Age in years = 43.25 $\pm$ 12.46		41.37---45.13
Pain Score = 7.10 $\pm$ 2.04		6.79---7.41
Duration of Back Pain in weeks = 28.29 $\pm$ 13.88		26.20---30.39
Frequency (%)		
Gender	Male	82 (48.0)
	Female	89 (52.0)

Table II: Comparison of Incidental Findings Among Male and Female Patients According to Age Groups				
Gender	Incidental Findings	Age Group		P-Value
		18---45	>45	
Male	Renal Cyst	19 (46.3)	21 (51.2)	0.659
Female	Incidental Findings	Age Group		P-Value
		18---45	18---45	
		11 (23.4)	19 (45.2)	
		17 (36.2)	6 (14.3)	
	Uterine Myoma	15 (31.9)	7 (16.7)	0.005

DISCUSSION

This prospective study explored the frequency and distribution of extraspinal incidental findings (ESIFs) in individuals undergoing lumbar MRI for back pain. The patient cohort, composed of adults aged between 18 and 60 years, exhibited a notable range of incidental findings unrelated to spinal pathology, including renal cysts, ovarian cysts, and uterine myomas. These findings, while asymptomatic, have implications that may extend beyond the initial clinical presentation. Notably, renal cysts were the most prevalent ESIF among both sexes. In women over 45, the occurrence of renal cysts was significantly higher than in their younger counterparts (45.2% vs. 23.4%), highlighting a probable age-related increase in detection rates. The presence of uterine myomas and ovarian cysts was more prominent in the 18–45 age group, a finding that may be influenced by the demographic makeup of the population studied or variations in

reproductive health profiles.

These results align with prior reports that have emphasized renal cysts as the most frequent incidental abnormality. Komut et al. [8] and Zidan et al. [9] also observed renal cysts as the leading ESIF in their respective cohorts, although the overall prevalence differed. Komut reported an ESIF rate of 29%, while Zidan's study showed 23.7%. In contrast, Quattrocchi et al. [10] documented a substantially higher prevalence of 68.7%, which might be attributed to retrospective data gathering or differences in MRI protocols and imaging sensitivities. Such discrepancies across studies underscore the need for methodological consistency in identifying and reporting these findings.

While some incidental discoveries, such as simple renal cysts, may hold limited clinical consequence, others warrant close surveillance or immediate evaluation. For instance, large uterine myomas or

complex adnexal lesions can pose health risks if left undetected. As emphasized by Broadhurst et al. [5] and Khasawneh et al. [7], a subset of incidental findings may significantly influence patient outcomes, either by facilitating early intervention or by alerting clinicians to potentially serious underlying conditions. Therefore, incidental findings represent not merely diagnostic byproducts but valuable insights into coexisting pathologies that may otherwise go unnoticed.

One of the key strengths of this investigation is its prospective design, which enabled structured patient selection and real-time data capture. Standardized MRI protocols and the involvement of seasoned radiologists enhanced the reliability of findings. The inclusion criteria were narrowly defined to focus on individuals with chronic back pain, improving the specificity of the results. However, the study was limited to a single tertiary care center, which may restrict broader applicability. Additionally, the absence of follow-up imaging or clinical correlation for ESIFs means that the actual clinical significance of these findings remains speculative. Another potential limitation is that MRI protocols were primarily targeted toward spinal assessment, potentially underrepresenting small or subtle extraspinal abnormalities.

The broader literature supports the importance of systematic evaluation and documentation of incidental findings during lumbar MRI. For example, Clayman ML et al. [12] reported that approximately one-third of such findings prompted further investigation or intervention. Kızılgöz V et al. [13] demonstrated a measurable impact of ESIFs on clinical decision-making in routine imaging settings. As the global utilization of diagnostic imaging continues to rise, Lumbieras et al. [14] cautioned that incidental findings may introduce both ethical and economic considerations in clinical practice. Standardized reporting strategies, as proposed by Kahn et al. [15], can play a crucial role in ensuring that such findings are not overlooked and are appropriately managed, thereby enhancing patient care pathways.

The current findings reinforce the value of a comprehensive imaging approach, encouraging radiologists to extend their scope of review during lumbar MRI beyond the vertebral column. This vigilance enables early detection of clinically relevant conditions that may benefit from timely intervention. Recognizing the dual utility of MRI in diagnosing spinal disorders and unveiling asymptomatic but potentially significant extraspinal pathologies supports the growing emphasis on holistic imaging evaluation in routine practice.

CONCLUSION

The present study identified that extraspinal incidental findings are a frequent occurrence in lumbar MRI scans performed for back pain evaluation, with renal cysts representing the predominant finding. This observation emphasizes the need for radiologists to assess surrounding structures carefully during spinal imaging to ensure early detection of clinically meaningful abnormalities that may influence patient management and outcomes.

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