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# Incidental Gynecological Findings in Lumbar Spine MRI: The Prevalence of These Findings and Their Importance For Patient Management

## Lomber MRG'de Saptanan Rastlantısal Jinekolojik Bulgular: Bulguların Prevalansı ve Hasta Yönetimi İçin Önemi

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### Abstract

**Objective:** To assess the prevalence of incidental gynecological findings in lumbar magnetic resonance imaging (MRI).

**Methods:** We evaluated 299 patients who underwent lumbar MRI in consideration of lumbar discopathy. Lumbar MRI was reported by an experienced radiologist. Ovarian cysts, endometrioma, uterine leiomyoma, adenomyosis, endometrial thickening, and nabothian cysts were included, in addition to gynecological malignancies.

**Results:** Of the 299 patients scanned, 43 had incidental extraspinal gynecological findings, and in four of these 43 patients, the findings had malignant potential.

**Conclusion:** It is recommended that radiologists give more attention to extraspinal gynecological findings in lumbar spine MRI, as the detected pathology can provide explanations for pain or can signal potentially life-threatening conditions.

**Keywords:** Lumbar, myoma, MRI, ovarian cyst, spine

### Öz

**Amaç:** Lomber Manyetik rezonans görüntüleme (MRG) rastlantısal jinekolojik bulguların prevalansını değerlendirmek.

**Yöntem:** Lomber diskopati düşünülerek lomber MRG yapılan 299 hastayı değerlendirdik. Lomber MRG'ler deneyimli radyolog tarafından rapor edildi. Jinekolojik malignitelere ek olarak over kistleri, endometrioma, uterin leiomyom, adenomyozis, endometriyal kalınlaşma ve nabothi kistleri dahil edildi.

**Bulgular:** Taranan 299 hastanın 43'ünde rastlantısal ekstraspingal jinekolojik bulgular vardı ve bu 43 hastanın dördünde bulgular malignite potansiyeli taşıyordu.

**Sonuç:** Tespit edilen patolojiler hastanın ağrısını veya potansiyel olarak yaşamı tehdit eden durumlara işaret edebileceğinden, radyologların lomber omurga MRG'de ekstraspingal jinekolojik bulgulara daha fazla dikkat etmesi önerilir.

**Anahtar Kelimeler:** Lomber, miyom, MRG, yumurtalık kisti, omurga



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## Introduction

Low back pain is a common complaint<sup>(1)</sup>. The prevalence of chronic low back pain is approximately 23%, and the lifetime prevalence of low back pain is approximately 60-70%<sup>(2)</sup>. Recently, advances in digital evaluation of radiological imaging (e.g., high-magnification zoom, the ability to focus on individual images, and digital archiving) have dramatically improved the detection limit of incidental lesions<sup>(3)</sup>. Gynecologic cancers are a leading cause of morbidity and mortality for female patients. Therefore, patients with masses that have the risk of malignancy should be referred to a gynecological oncology department, to receive specialist care, as per the definitions of the European Society of Gynaecological Oncology<sup>(4)</sup> and national and international recommendations and guidelines. Patients with benign gynecological lesions may be followed up and treated conservatively or may be suitable for less radical surgical treatment, depending on the clinical context<sup>(5,6)</sup>.

In this study, we investigated gynecological lesions in magnetic resonance imaging (MRI) images of female patients who had undergone lumbar MRI to diagnose low back pain; we examined the distribution and frequency of these lesions in the field of view (FOV).

## Materials and Methods

In this study, MRI data from 299 female patients who had undergone lumbar MRI with a pre-diagnosis of lumbar discopathy were evaluated retrospectively. The MRI examinations were performed between January and May 2021. The evaluation was carried out by a radiologist with significant experience in the field of spinal lumbar MRI and pelvic MRI. "Incidental finding" was defined as any abnormal gynecological finding that entered the imaging field. Benign conditions, such as ovarian cyst, endometrioma, uterine leiomyoma, adenomyosis, endometrial thickening, and nabothian cyst were included in the study, in addition to gynecological malignancies. All Image data were acquired with the same MR device (Avanto 1.5 Tesla, Siemens, Germany).

The Ethical Committee of University of Health Sciences Turkey, İzmir Tepecik Education and Research Hospital (decision no: 2020/13-14, date:16.11.2020) approved this study.

## Statistical Analysis

Statistical analyses were performed using the SPSS version 17.0 software. The normal distribution of the variables

was determined using analytical methods (Kolmogorov-Smirnov/Shapiro-Wilk tests). Descriptive analyses were given using mean  $\pm$  standard deviation for normally distributed variables. Descriptive statistics were performed by giving frequency and percentage values in categorical data. In continuous data, t-tests were used in independent groups in a normal distribution to compare paired groups. Pearson's chi-square test was used in the analysis of categorical data. The cases where the p-value was below 0.05 were considered statistically significant.

## Results

Data from 299 patients were taken in the study. Cases with any incomplete or poor-quality images were excluded. The average age of the patients was  $48.5 \pm 15.3$  years, with the minimum age being 14 and the maximum age 80. When the pathology data were examined, the data of 299 patients were included; 43 patients had pathology, whereas 256 patients had no pathology. The mean age of the group with pathology was  $44.0 \pm 13.9$  years, and the mean age of the group without pathology was  $49.2 \pm 15.4$  years. Statistically, there was a mean age difference between these two groups ( $p=0.039$ ). Of these 299 patients, 43 had information regarding the benign or malignant nature of the incidental findings and regarding the organs affected (ovary, uterus, or cervix). For 43 of the patients, there was information regarding the condition of the findings (cystic, solid, or mixed-type). Only 26 patients had information on mass size. Of the 43 patients who had information on benign or malignant status, 39 had benign findings and four malignant (Table 1). In a comparison of masses according to condition, no significant difference in the proportion of benign to malignant masses was found cystic, solid, and mixed-type masses (Table 2). In a comparison of masses according to size, no significant difference in the ratio of benign to malignant masses was found among the three size groups ranging from  $<1$  cm to

**Table 1. Benign/malignant comparison by organs**

Organ	Benign	Malignant	Total	P-value
Ovary	15	1	16	0.557
Uterus	11	3	14	
Cervix	8	0	8	
Ovary + uterus	2	0	2	
Ovary + cervix	1	0	1	
Uterus + cervix	2	0	2	
Total	39	4	43	

Pearson's chi-square test was used,  $p < 0.05$  was considered significant

>3.1 cm (Table 3). A significant difference was found when comparing the organs according to the conditions of the masses ( $p < 0.0001$ ). Cyst formation in the ovary and cervix was significantly higher, and the solid mass formation in the uterus was significantly higher (Table 4). A significant difference was found when comparing the organs according to the size of the masses ( $p = 0.002$ ). The number of masses greater than 3.1 cm was significantly higher in the ovary than the other organs the number of masses less than 3 cm

was significantly higher in the uterus, the number of masses less than 1 cm was significantly higher in the cervix (Table 4). A significant difference was not found when comparing mass condition types according to size ( $p = 0.0115$ ) (Table 5).

### Discussion

Low back pain is one of the most common reasons for admission to an outpatient clinic. Low-back pain can be acute, subacute, or chronic. Although multiple risk factors have been identified, such as occupational posture, sedentary lifestyle, obesity, height, and age, the causes of the onset of low back pain remain obscure and diagnosis difficult. Therefore, the evaluation of low back pain should involve comprehensive investigation of medical history<sup>(7)</sup>. Incidental imaging findings in lumbar MRI are not uncommon and may lead to further evaluation<sup>(8)</sup>. In daily practice, doctors frequently have recourse to lumbar MRI, and they should be well aware of any incidental extraspinal abnormalities for their clinical significance and for potential legal issues that may arise from these cases. There have been multiple investigations into extraspinal incidental abnormalities in lumbar MRI, but incidental gynecological abnormalities have not been sufficiently studied. We know of only one such study in the literature, which was carried out in Poland. We detected incidental extraspinal gynecological pathologies in lumbar MRI; we assessed the prevalence, organ of origin,

**Table 2. Benign/malignant comparison by condition**

Mass	Benign	Malignant	Total	P-value
Cystic	22	1	23	0.116
Solid	10	3	13	
Mixed	7	0	7	
Total	39	4	43	

Pearson's chi-square test was used,  $p < 0.05$  was considered significant

**Table 3. Benign/malignant comparison by mass size**

Size	Benign	Malignant	Total	P-value
<1 cm	9	2	11	0.940
1.1-3.0 cm	7	1	8	
>3.1 cm	6	1	7	
Total	22	4	26	

Pearson's chi-square test was used,  $p < 0.05$  was considered significant

**Table 4. Comparison between organs according to mass condition and mass size**

Mass	Ovary	Uterus	Cervix	Ovary + uterus	Ovary + cervix	Uterus + cervix	Total	P-value
Cystic	13	1	8	0	1	0	14	<0.0001
Solid	1	12	0	0	0	0	13	
Mixed	2	1	0	2	0	2	7	
Total	16	14	8	2	1	2	30	
Mass size	Ovary	Uterus	Cervix	Ovary + uterus	Ovary + cervix	Uterus + cervix	Total	P-value
<1 cm	1	3	6	0	0	1	4	0.002
1.1-3.0 cm	1	5	0	1	1	0	6	
>3.1 cm	6	0	0	1	0	0	6	
Total	8	8	6	2	1	1	16	

Pearson's chi-square test was used,  $p < 0.05$  was considered significant

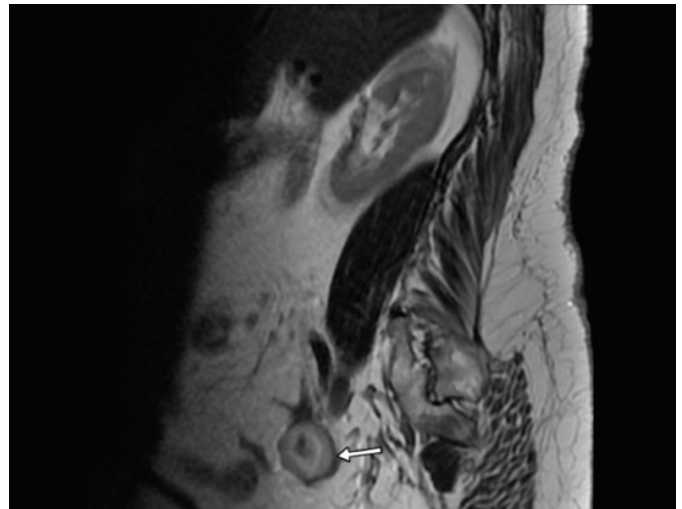
**Table 5. Comparison between mass types according to size**

Mass size	Cystic	Solid	Mixed	Total	P-value
<1 cm	7	3	1	10	0.115
1.1-3.0 cm	2	5	1	7	
>3.1 cm	6	0	1	6	
Total	15	8	3	23	

Pearson's chi-square test was used,  $p < 0.05$  was considered significant.

and probable malignancy of the detected abnormalities. The Polish study reported that these cases had a prevalence of 38% in routine lumbar MRI<sup>(9)</sup>. In our study, the incidental gynecological findings were detected in 14.4% of cases submitted to lumbar MRI for low back pain. The difference may be attributed to technical factors, such as FOV and the use of picture archiving and communication systems for interpretation. The majority of our findings were ovarian in origin, with uterine pathologies second in prevalence (Table 1); in the work of Bekiesinska-Figatowska et al.<sup>(9)</sup> most of the findings were uterine in origin. In the work of İbrahim et al.<sup>(10)</sup>, which was not a specifically gynecological study, most of the findings were also ovarian in origin, with uterine pathologies second in prevalence. Of our patients, 14 had ovarian cysts, either simple, complicated, or dermoid. The simple cysts represented most of the ovarian lesions; they displayed homogenous hypointensity on T1WI and hyperintensity on T2WI, with no wall thickening or solid component. Complex cysts were mostly hemorrhagic; they were bright on T1WI, indicating either fat or blood content. On fat-suppressed T1WI, they remained bright, ruling out fatty lesions. Postcontrast images there were no enhancing nodules or solid masses (Figure 1). Six of our cases had uterine myomas, the most common being benign gynecologic tumors. These primarily affect women of reproductive age, and the estimated incidence of fibroids is over 70% by 50 years of age<sup>(11)</sup> (Figure 2). Although submucosal leiomyomas are the least common type, they are the most commonly symptomatic; moreover, pedunculated subserous leiomyomas may undergo torsion, which results in an infarction accompanied by pain<sup>(12)</sup>. One of our cases also had adenomyosis, which commonly causes dysmenorrhea and bleeding<sup>(13)</sup> (Figure 3). Generally, endometrial glands lying deeper than one-fourth of the thickness of the myometrium or deeper than one-half of a low-power field (about 2.5 mm) are defined as adenomyosis<sup>(14)</sup>. However, these criteria actually vary among pathologists. According to differences in diagnostic criteria and the thoroughness of the pathologic examination, the reported prevalence of adenomyosis in hysterectomy specimens varies from 5% to 70%<sup>(15)</sup>. The most easily diagnostic criteria is thickening of the junctional zone  $\geq 12$  mm, either diffusely or focally (normal junctional zone thickness is up to  $\sim 5$  mm)<sup>(16)</sup>. We found four patients to have gynecologic malignancies; one of them was ovarian in origin and three uterines (Tables 1, 2). Bekiesinska-Figatowska et al.<sup>(9)</sup> found one case of ovarian origin. With ovarian cancer, there is no effective strategy for early detection, and early scanning modalities have limitations<sup>(17)</sup>. If the patient is of postmenopausal age

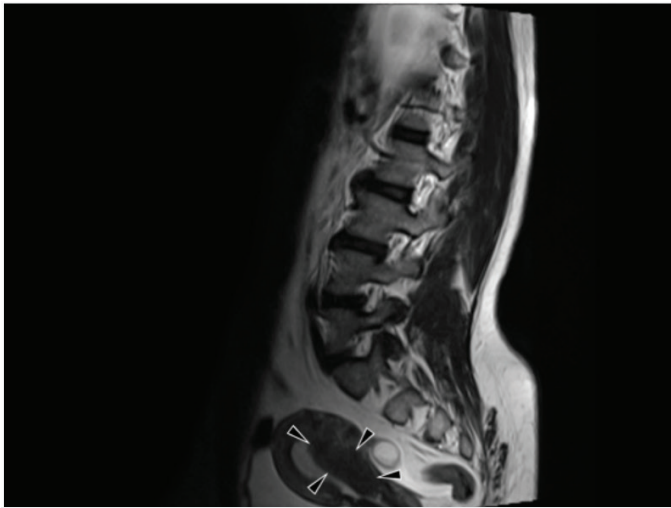
and there is any cyst larger than 7 cm (Figure 4), further MRI or surgical evaluation is required<sup>(12)</sup>. Similarly, we found that three patients had endometrial hyperplasia (Figure 5); they were also in the postmenopausal age, which carries a very high risk of endometrial malignancy. Postmenopausal age a thickness  $>5$  mm is considered abnormal. In T2-weighted MRI images, endometrial hyperplasia is often hypointense or isointense to the normal myometrium. MRI findings of T2-weighted sagittal images are the main sequence to detection of endometrial hyperplasia in this study. These



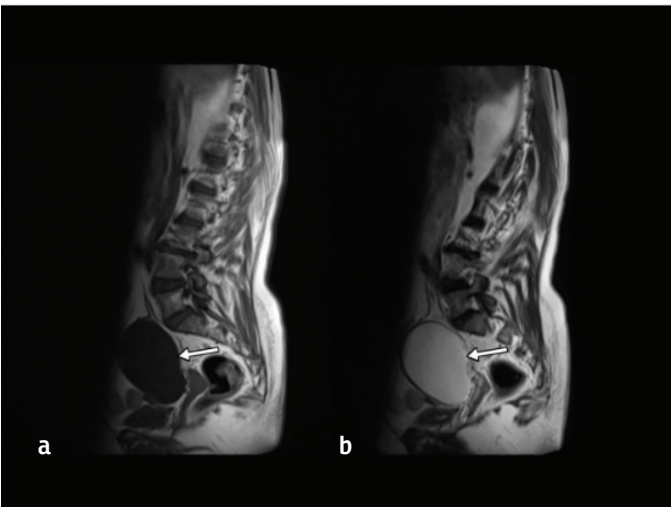
**Figure 1.** Sixty-five years old woman with low back pain. In the right ovary there is centrally T1 weighted hyperintense lesion with a thick wall. The lesion could be a hemorrhagic cyst but the patient age required further evaluation.



**Figure 2.** Forty-seven years old female with low back pain. Sagittal T2 weighted image showing multiple uterine myomas seen in arrows.



**Figure 3.** Adenomyosis 44 years old female. Sagittal T2 weighted image arrowheads showing thickening of the junctional zone anterior part of the uterine corpus.



**Figure 4.** Forty-five years old female. T1 weighted (a) and T2 weighted (b) sagittal images showing an ovarian cyst. The lesion sizes are 8.5x5.5 cm. This patient requires complementary imaging to exclude malignancy.

findings show that careful observation of anatomic structures outside the region of interest creates opportunities for early detection of potentially life-threatening conditions such as malignancies<sup>(18)</sup>. Another concern is that failure to report some issues, such as potentially life-threatening lesions, may lead to medicolegal problems.

### Study Limitations

Our study has some limitations. First, this was a single center retrospective study. A further limitation is that we did



**Figure 5.** Sixty-three years old female T2 weighted image showing endometrial thickening with 14 mm. This patient requires gynecological evaluation.

not evaluate the contribution of each MRI sequence to the detection of incidental findings.

### Conclusion

Extraspinal gynecologic findings in lumbar MRI are not uncommon, and our main purpose is to recommend that radiologists closely observe extraspinal internal genital organs in lumbar MRI, as this observation can crucially alter patient management.

### Ethics

**Ethics Committee Approval:** The Ethical Committee of University of Health Sciences Turkey, İzmir Tepecik Education and Research Hospital (decision no: 2020/13-14, date: 16.11.2020) approved this study.

**Informed Consent:** Retrospective study.

**Peer-review:** Externally peer-reviewed.

### Authorship Contributions

Surgical and Medical Practices: E.H., M.S., Concept: E.H., M.S., Design: E.H., M.S., Data Collection or Processing: E.H., Analysis or Interpretation: E.H., M.S., Literature Search: E.H., Writing: E.H.

**Conflict of Interest:** No conflict of interest was declared by the authors.

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