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The Association between Urinary Incontinence and Low Back Pain and Radiculopathy in Women

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Abbreviations: Urinary Incontinence (UI); Low Back Pain (LBP); Radiculopathy (RP); Oswestry Disability Index (ODI).

Abstract

AIM: Urinary incontinence (UI) is a common dysfunction, affecting especially women of all ages. The terminology of low back pain (LBP) and radiculopathy (RP) may be misused interchangeably with each other. There are many reports of the association with LBP and incontinence but those involving compression of nerve root(as RP), has not been distinguished from isolated low back pain. This study was structured to analyse the association of UI, LBP and RP.

METHODS: One hundred twenty patients were included in the study. Patients with spinal or urinary infection, tumour (spinal or others), cauda equine, pelvic operation, spinal trauma, spinal surgery, urogenital pathology were not accepted for this study. Age and weight of all patients were determined. Oswestry Disability Index (ODI) was utilised for assessment of loss of function and SEAPI incontinence index was used for urinary incontinence. All patients were examined for neurological pathology to differentiate between the LBP and RP by department of neurosurgery. Student t-test and Mann-Whitney-U tests were used for statistical significance.

RESULTS: There was no statistical significance between low back pain with overall urinary incontinence (p = 0.131), urge (p = 0.103) or stress incontinence (p = 0.68), respectively. However; The statistical aspects were identified relationship between overall (p = 0.026) and urge (p = 0.001) urinary incontinence with radiculopathy. The association of urge incontinence and radiculopathy seems to show a more significant relationship. Yet there was no correlation between radiculopathy and stress incontinence (P = 0.062).

CONCLUSION: Low back pain should not be regarded as a predisposing factor for urinary incontinence; however, radiculopathy has a statistically positive correlation between overall incontinence and urge incontinence.

Introduction

Urinary incontinence (UI) is a common dysfunction, affecting especially women of all ages. The terminology of Low Back Pain and Radiculopathy may be misused interchangeably with each other. The terminology needs to be enlightened.

Low Back Pain (LBP); seems complicated and many individual, psychosocial and workplace associated factors may play a part [1-3]. LBP refers to a more wide description of pain patients feel on the dorsal aspect of the vertebral bodies which may be due to nerve involvement or simply dorsal muscle contractions. Reported lifetime prevalence varies from 49% to 70% and point prevalences from 12% to 30% are reported in Western countries. About 90% of all patients with LBP will have non-specific LBP, which, in essence, is a diagnosis based on the exclusion of specific pathology [4]. A recently published systematic review of prospective cohort studies found that distress, depressive mood and somatization are associated with an increased risk of chronic LBP [1-3, 5].

Radiculopathy (RP)*;* covers a more specific clinical picture describing a problem in which one or more nerves are affected and do not work properly, thus showing signs such as ischiatic pain or claudication. The most common symptom of radicular pain is sciatica pain that radiates along the sciatic

nerve; down the back of the thigh and calf into the foot. The nature of the patients pains its quality, intensity, location and profile over time is an important guide in the evaluation. A careful but directed physical examination is necessary for the clinical evaluation of patients with lumbar spine disease. Evaluation of the patient involves; inspection of the back and legs, palpation and observation. A careful neurological evaluation, examination of strength, deep tendon reflexes, sensation and muscular function is necessary. The most commonly involved nerve roots are L3, L4, L5 and S1. Lesions of each produce distinct symptoms and other conditions can mimic the radiculopathies. The specific investigation is necessary for an accurate diagnosis. Some of the major causes of acute and chronic LBP are associated with RP. However, RP is not a cause of LBP; rather, nerve root impingement, disc herniation, facet arthropathy and other conditions are causes of LBP.

Likewise, incontinence also covers a wide range of underlying pathology, all of which results in involuntary loss of urine. To appreciate the association between incontinence and LBP as well as RP, the types of incontinence that are relevant should also be established. In Western societies; approximately 40% of women have occasional incontinence and a further 8% have regular incontinence episodes. Risk factors for incontinence include multiparity and infection of the lower urinary tract, older age, obesity, previous surgery for incontinence and neurologic disorders [2, 6-9].

Urinary incontinence (UI): A useful framework for considering continence problems is to view them as being associated with either the urethra or the bladder. In the urethra, there can be a decrease in outlet resistance associated with urethral hypermobility, as occurs in stress urinary incontinence or a functional failure at the bladder neck-proximal urethra, which underlies intrinsic sphincter deficiency. Bladder problems most often resulting in incontinence include detrusor overactivity or poor bladder compliance [1, 10-13]. Spinal cord injury and any neurologic lesion are potential causes of severe incontinence. When a neurologic disorder is a basis for incontinence, management will probably require the care of a specialist. In this study overall, urge and stress type incontinence was analysed as different entities [13, 14].

The association between LBP and UI may not be explained by conventional neurologic or genitourinary pathology. There are reports of the association of LBP and UI but those involving a nerve root, so to say RP have not been distinguished from general LBP.

Neuropathophysiology: Innervation of the lower urinary tract with both somatic and autonomic nervous system takes place. Parasympathetic pelvic nerves, the spinal cord is divided into branches of the second and fourth sacral. Parasympathetic pelvic nerves are mainly responsible for bladder excitatory effect. Third and fourth sacral segments of the somatic nervous interests and provide innervation to the external sphincter and other pelvic floor muscles. Sympathetic nerves, the lower thoracic and upper lumbar segments of the interests. Sympathetic nerves have inhibitory effects on the bladder. The sacral segments in adults, the level of first and second lumbar vertebrae, 1-15% cases, and the resulting pressure on the central disc prolapse impairs parasympathetic and somatic innervation [4].

This study was structured to analyse the association of UI, LBP and RP. The results of this study will highlight the significance of proper neuro-urological evaluation of patients with LBP and co-exist UI.

Material and Methods

The study cohort was derived patients referred to our neurosurgery department for LBP and UI. Patients with spinal or urinary infection, tumour (spinal or others), cauda equine, pelvic operation, spinal trauma, spinal surgery, urogenital pathology were not accepted for this study. Age and weight of all patients were determined. After initial evaluation and physical examination 60 patients with RP and 60 with LBP were included in the study. The types of UI were stratified with a detailed history. The diagnosis of LBP and RP were made with history, neurological examination and neuroimaging when RP was suspected. Oswestry Disability Index (ODI) was utilised to assess pain and associated quality of life deterioration and SEAPI incontinence index for UI. Those patients with severe pain that affected the quality of life were included in the study. Student t-test, Mann-Whitney-U tests were used for statistical significance. Exclusion criteria were: *i) existing pregnancy; ii) presence of orthopaedic or neurological diseases that may affect the evaluation of the patients; and iii) treatment for psychological pathologies.*

In the group of patients with radiculopathy, those with pathology at the surgical border were removed.

Oswestry Disability Index (ODI): Consisted of the assessment of pain level, personal care, object lifting, walking, sitting, standing, sleeping, social activities, and travelling and Changing Degree of Pain (a total of 10 items). ODI is an extremely important tool that researchers and disability evaluators use to measure a patient's permanent functional disability and is considered the "gold standard" of pain functional outcome tools [15].

SEAPI Scoring: The SEAPI-QMM Incontinence Classification System [Raz and Erickson, 1992] was developed in the early 1990s as a system that could quantify UI and its impact without special equipment or time-consuming procedures [16]. It is a standardised classification system for incontinence. The system is analogous to the TNM system for tumour staging. Each letter of SEAPI QMM represents an aspect of incontinence, and each factor is assigned a number grade. SEAPI is the acronym for incontinence factors of (S) Stress-related leakage, (E) Emptying ability, (A) Anatomic, (P) Protection, (I) Instability. Zero represents no symptom, problem, or abnormality while 1, 2, and 3 represent mild, moderate, or severe problems, respectively. It is patient filled the questionnaire and has been validated in Turkish.

Statistical Analysis: Student t- test was used to for ODI and SEAPI test results. Mann-Whitney-U tests were used to compare different types of UI with LBP and RP. All statistical analyses were carried out using SPSS 11.5 software (SPSS İnc. USA). Calculated p-value was considered statistically significant if smaller than 0.05.

Results

The mean time from the initial onset of LBP and to diagnosis was 16.2 $\pm$ 2.4 months; whereas for RP corresponding mean time was only 4.1 $\pm$ 1.2 months. When the correlation of incontinence to the initial onset of LBP and RP was asked, the patients reported almost simultaneously with the RP and but 60% of the LBP patients reported having UI even before the LBP, 30% almost at the same time with LBP and 10% over the last couple of months.

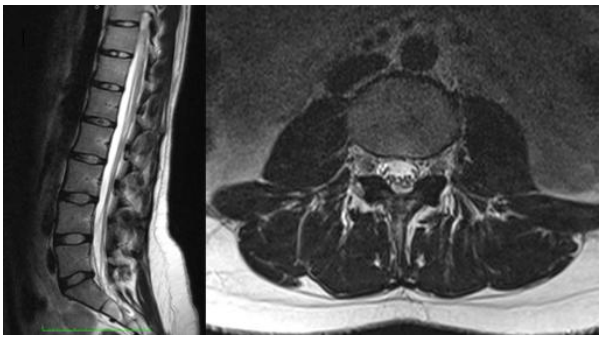

Figure 1: Lumbar MR images of the patient was evaluated by reason of LBP

The mean age and weight of the LBP and RP groups were 36.6 ± 12.8 years, 76.5 ± 10.2 kg and 38.50 ± 8.5 years and 77.67 ± 13 kg, respectively. There was no statistical difference between the two groups in terms of demographics.

There was no statistical difference between the two study groups in terms of ODI scores ($p > 0.05$); the mean ODI score for the LBP was 27.51 ± 18.31 and 26.33 ± 19.23 for the RP group. The mean SEAPI scores of the LBP and RP were 3.98 ± 6.621 and 5.28 ± 8.852, respectively.

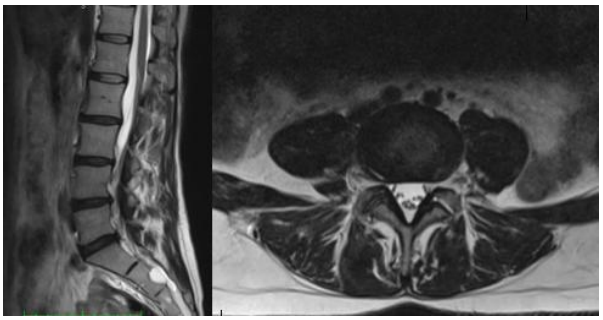

Figure 2: Lumbar MR images of patient was evaluated due to RP

The RP group was more compromised in terms of quality of life for urinary symptoms than the LBP group ($p < 0.05$) (Table 1).

Table 1: Mean age, mean weight, mean ODI score, mean SEAPI scores, mean time from the initial onset of low back pain and radiculopathy

	Low Back Pain	Radiculopathy
Duration Mean Time	16.2 $\pm$ 2.4	4.1 $\pm$ 1.2
Mean Age	36.6 ± 12.8	38.50 ± 8.5
Mean Weight	76.5 ± 10.2	77.67 ± 13
Mean ODI Score	27.51 ± 18.31	26.33 ± 19.23
Mean SAPI Scores	3.98 ± 6.621	5.28 ± 8.852

When stratified according to different types of UI using the Mann-Whitney U test analysis, p values of $p = 0.131$, $p = 0.103$, $p = 0.68$ are calculated between LBP and overall incontinence, incontinence due to overactive bladder (OAB) and stress urinary incontinence (SUI), respectively, showing no statistical correlation. When the same analysis was carried out for RP and different types of UI, there appears to be a strong correlation between overall incontinence and incontinence due to OAB ($p = 0.026$ and $p = 0.001$, respectively), but no correlation with SUI ($p = 0.62$). The correlation between RP and incontinence due to OAB seems to be stronger than overall incontinence rates (Table 2).

Table 2: When stratified according to different types of continence using the Mann-Whitney u test analysis of low back pain and radiculopathy

	Low Back Pain	Radiculopathy
Overall Incontinence	P = 0.131.	P = 0.026
Over Active Bladder	P = 0.103	P = 0.001
Stress Urinary Incontinence	P = 0.68	P = 0.62

Discussion

The terminology “LBP” is a very nonspecific symptom analogy. It should be differentiated from those pain conditions involving one or more nerve

roots. Nerve root involvement should be named as RP. LBP can be caused by a wide variety of factors. These include structural problems of the back, inflammation, muscle and soft tissue injury, a secondary response to other diseases or conditions, imbalances in body mechanics, and psychological/social factors, among others. There are the vast majority of data in the literature regarding the coexistence of LBP and UI [1, 2, 6-9]. Eliasson K et al reported; 77% of the women with LBP reported UI, of whom 73% occasionally, 23% several times and 4% often. 23% of the women could be classified as having ‘‘significant UI’’. Nineteen percent used sanitary pads because of the leakage. 32% percent were affected in their daily life, and 45% were psychologically affected [9]. 72% reported SUI, 1% UUI (Urge urinary incontinence) and 27% MUI (Mixed urinary incontinence). They have postulated that LBP increased the risk for UI almost three times for parous women and even more for nulliparous women [11].

However, Einstein *et al.*, in an afford to explain the relationship have concluded that the unusual association of LBP alone with UI, should be brought to the attention of clinicians, in the search for neurologic mechanisms to explain the phenomenon [17]. However, the term of LBP is a vague description of a symptom complex. In an effort to enlighten the association with lumbosacral pathologies and incontinence, the symptom spectrum should be stratified. Little is known about the relationship between UI and LBP. The relationship between UI and demographic factors such as age, weight and height is still controversial. Kim et al. acknowledged that little attention has been given to UI-related factors including LBP, static balance and demographic factors. Kim et al. hypothesised that a more severe UI condition results in more intense LBP and functional disability and in lower static balance ability may be relating the pelvic floor musculature. This logical approach could not be supported by evidence-based findings [12].

Our findings show that there is no correlation between lumbosacral pathologies and SUI. However, OAB symptoms and UUI is predominantly associated with lumbosacral pathologies. When subcategorized into those with LBP and those with RP, the pattern suggests that this relationship can only be established between RP. This actually provides a more explanation that relationship between LBP and UI.

There is actually no previous data that incorporates RP and UI in the literature. In a series by Einstein et al. reported that surgical approach for lumbosacral pathologies associated LBP has also cured urological symptoms of the patients [17]. In this report, one patient who’s RP did not respond to surgery due to pseudarthrosis in the fusion mass, continued to experience urinary symptoms. As a similar finding, De Riggo J. et al. reported degenerative spinal disease (LBP and RP) can result in acute or chronic UI. Surgical treatment improved or eliminated the symptoms of UI in more than half of the patients affected. They did not come up with an explanatory relationship [18]. Both results can be explained by our finding that only radicular involvement actually results in urinary symptoms and preoperatively may suggest possible improvement of UI.

This is a unique study that explains the possible neurological correlation between UI, LBP and RP. However, it is obvious that a larger study may yield other aspects of the correlation between UI types and pain syndromes. The surgical outcomes of RP in terms of UI would be another endpoint to explore.

In conclusion, not all lumbosacral pain syndromes are the same. Those patients, who report UI, should be carefully examined neurologically to stratify between LBP and RP as the lumbosacral surgery may be warranted for a cure. On the other side, neurologists, neurosurgeons and all specialities dealing with lumbosacral diseases should also be warned about possible co-existing UI since urinary symptoms are major factors in decreased quality of life.

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