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Original Contribution

RISK FACTORS FOR SERIOUS UNDERLYING PATHOLOGY IN ADULT EMERGENCY DEPARTMENT NONTRAUMATIC LOW BACK PAIN PATIENTS

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☐ **Abstract—Background: Nontraumatic low back pain (LBP) is a common emergency department (ED) complaint and can be caused by serious pathologies that require immediate intervention or that lead to death. Objective: The primary goal of this study is to identify risk factors associated with serious pathology in adult nontraumatic ED LBP patients. Methods: We conducted a health records review and included patients aged ≥ 16 years with nontraumatic LBP presenting to an academic ED from November 2009 to January 2010. We excluded those with previously confirmed nephrolithiasis and typical renal colic presentation. We collected 56 predictor variables and outcomes within 30 days. Outcomes were determined by tracking computerized patient records and performance of univariate analysis and recursive partitioning. Results: There were 329 patients included, with a mean age of 49.3 years; 50.8% were women. A total of 22 (6.7%) patients suffered outcomes, including one death, five compression fractures, four malignancies, four disc prolapses requiring surgery, two retroperitoneal bleeds, two osteomyelitis, and one each of epidural abscess, cauda equina, and leaking abdominal aortic aneurysm graft. Risk factors identified for outcomes were: anticoagulant use (odds ratio [OR] 15.6; 95% confidence interval [CI] 4.2–58.5), decreased sensation on physical examination (OR 6.9; CI 2.2–21.2), pain that is worse at night (OR 4.3; CI 0.9–20.1), and pain that persists despite appropriate treatment (OR 2.2; CI 0.8–5.6). These four predictors identified serious pathology with 91% sensitivity (95% CI 70–98%) and 55% specificity (95% CI 54–56%). Conclusion: We successfully identified risk factors associated with serious pathology among ED LBP patients. Future prospective studies are required to derive a robust clinical decision rule.** © 2014 Elsevier Inc.

☐ **Keywords—low back pain; emergency department; nontraumatic; outcomes; risk stratification**

INTRODUCTION

Low back pain is a common presenting complaint in the emergency department (ED). Literature shows that approximately 70–90% of adults will experience at least one episode of back pain during their lifetime (1,2). In the United States, low back pain is the fourth leading cause of ED visits, with 2.9 million visits in 2004 (3). The Saskatchewan Health and Back Pain Survey found that, at the time of the survey, 28.4% of adults were experiencing low back pain (4).

In the majority of cases, the low back pain is self-limiting and does not require emergent intervention. Among the patients presenting with back pain in a primary care setting, 5–10% will have serious underlying spinal or

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paraspinal pathology (fractures, abscesses, osteomyelitis, malignancies, cauda equina syndrome, and paraspinal visceral diseases such as abdominal aortic aneurysm), and many of them require immediate intervention (5). The prevalence of serious pathology in ED low back pain patients remains unknown. Few studies have identified predictors of such serious pathology (6–8). Deyo et al. identified predictors of cancer in low back pain patients in a primary care setting, Waldvogel et al. summarized 18 studies with vertebral osteomyelitis, and Domen et al. identified predictors of cauda equina in 58 ED patients who underwent magnetic resonance imaging (MRI) (6–8). There are no ED studies that aid emergency physicians in identification of patients with serious underlying pathology. The frequency of ED visits for nontraumatic low back pain, their outcomes, and the risk factors associated with serious underlying causes are also not known.

The primary goal of this study is to identify risk factors associated with serious pathology in adult nontraumatic ED low back pain patients.

METHODS

Design and Setting

This study was a health records review of consecutive nontraumatic low back pain patients presenting to the two tertiary care EDs of the Ottawa Hospital, with over 130,000 ED visits annually. We conducted the study over 3 months, from November 2009 to January 2010. The hospital research ethics board approved the protocol without the need for informed consent.

Study Population

We identified potentially eligible patients by searching The Ottawa Hospital health records database. This database uses the Canadian National Ambulatory Care Reporting System (NACRS) to capture data on patients visiting Canadian EDs. We searched for the following terms in the presenting complaint, and the primary and secondary discharge diagnoses fields of the database: "low back pain," "back pain," "radiculopathy," "sciatica," "dorsalgia," "back ache," "pain in the lower limb," and "lumbago." We also screened patients with the International Classification of Diseases codes M54.1 (radiculopathy), M54.2 (cervicalgia), M54.3 (sciatica), M54.4 (lumbago with sciatica), M54.5 (low back pain), M54.8 and M54.9 (dorsalgia), M51.1 (lumbago with sciatica due to intervertebral disc disorder), G57.0 (lesion of the sciatic nerve), and M79.61 (lower extremity pain). We included patients who were $\geq$ 16 years old, who had a local residential address, had a chief complaint of nontraumatic low back pain (defined as back pain below the costal margins and above the buttocks), and who were assessed by an emergency physician. We excluded patients who had a history of nephrolithiasis confirmed by imaging and who presented with typical signs and symptoms consistent with renal colic. However, patients with flank pain with no prior documented nephrolithiasis were included. We excluded patients with history of back trauma immediately preceding the onset of the symptoms. We included patients regardless of whether they were admitted to the hospital or discharged home.

Study Protocol and Data Abstraction

The initial visit was defined as the first visit during the study period and the return visit as any visit within 30 days of the initial visit. We included each patient only once during the study period to avoid double counting.

We selected variables for data abstraction based on published literature and recommendations by five experienced emergency physicians (6–13). We photocopied the ED records of treatment (physician, nurse, consultant, and paramedic notes), and one of two investigators (E.T. or D.A.) used these copies to assess the patient's eligibility for the study. The final diagnosis, imaging results, and other portions of the chart indicating any outcome were blinded prior to data abstraction by a second investigator (E.T. or D.A.), different from the one assessing eligibility. The first 10% of the charts and, subsequently, another 10% of a random sample of the charts were reviewed by the principal investigator to standardize data abstraction and ensure data abstraction accuracy, respectively. We designed and piloted standardized data abstraction forms prior to conducting the study. The data abstraction form had a provision to document if data were missing for any variable. In total, we abstracted 56 predictor variables (two demographic, 28 historical including medications, 15 clinical examination, eight investigation, and three disposition variables). Among the variables abstracted, 47 were categorical and nine were continuous variables. The list of variables collected is detailed in Appendix I.

We designed SAS (Statistical Analysis System; SAS Institute Inc., Cary, NC)-based data entry screens with built-in range and logic checks. We assessed the accuracy of data collection and data entry by regular frequency reports.

Outcomes

We defined a serious outcome as the identification of any one of the following underlying pathologies within 30 days of the index visit: compression fracture,