Is There a Correlation Between Lumbar Index and Pars Defects?

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OBJECTIVE

This study investigates the correlation between Lumbar Index and pars defects. The sensitivity and specificity of using Lumbar Index to diagnose pars defects on lateral radiographs is also explored.

INTRODUCTION

Low back pain is a leading cause of physician visits in the United States. Back pain has numerous etiologies which are often multifactorial. Among these factors is spondylolysis, or pars defects. Numerous studies suggest approximately twenty-five percent of patients with spondylolysis will develop low back pain (1, 2). The number can be as high as forty-seven percent in the adolescent athlete population (3). Additional symptoms include instability and radiculopathy (3.5, 7). If diagnosed early, conservative treatment is highly effective (1.4, 8).

Anecdotally, a decrease in the posterior vertebral body height compared to the anterior vertebral body height (a ratio defined as the Lumbar Index) was observed at the level of a pars defect on several lumbar spine CT exams. This observation led to the hypothesis that,LI exists between pars defects and the Lumbar Index (LI). The second hypothesis is the presence of a low LI could be used to diagnose a pars defect on a lateral lumbar radiograph. At our institution it is common to obtain a lumbar spine radiograph in evaluation of back pain, but in AP and lateral projections only. Unfortunately, diagnosis of pars defects on lateral radiographs can sometimes be difficult. Special techniques, including oblique and collimated views, CT and MRI are often required to make the definitive diagnosis. Improving the sensitivity of lateral radiographs for diagnosing pars defects could expedite diagnosis and subsequent treatment. Decreased medical costs and radiation exposure are also potential benefits.

METHOD AND MATERIALS

Following IRB approval, seventy-five reported cases of pars defects were retrospectively reviewed from January 1, 2007 to December 31, 2012. The diagnoses were made on either CT of the lumbar spine or CT of the same topogram image (right).

A Pearson correlation coefficient was calculated between pars defects and the Lumbar Index. An average LI was calculated for both the pars defect and control group was obtained. Statistical significance for the difference between the two groups.

RESULTS

Pearson r coefficient between pars defects and lumbar index is calculated at r = 0.58, a moderate correlation.

The average LI values for the pars group and control groups are 0.74 (STD ± .02) and 0.87 (STD ± 0.06) respectively. Independent T test demonstrates these differences to be statistically significant, p = < 0.0001.

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