CLINICAL STUDY

Failed Back Surgery Syndrome and Back Pain Patients: Medications They use and How They relate to Their Emotional and Physical Functioning

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ABSTRACT

Study Design: Retrospective analysis.

Objective: To test the hypothesis that failed back surgery syndrome (FBSS) patients and nonsurgical back pain (NSBP) patients respond differently on psychological measures and differ in pain medication usage.

Summary of background data: The study was part of an interdisciplinary outpatient functional restoration program. There were 121 participants—42 with FBSS and 79 with NSBP—who participated in a multidisciplinary pain evaluation.

Methods: A chart review was performed and interventions were not applicable. The outcome measures for the study include: the beck depression inventory (BDI), pain disability index (PDI), state-trait anxiety inventory (STAI), multidimensional pain inventory pain severity (MPI-PS) subscale and medication quantification scale III (MQS-III).

Results: Pearson's correlation analyses of all patients combined (28 FBSS and 39 NSBP) revealed significant relationships between MQS-III and BDI ($r = 0.388$, $p < 0.01$) and STAI ($r = 0.323$, $p < 0.05$). A significant correlation was found between MQS-III and STAI ($r = 0.536$, $p < 0.05$) among the NSBP patients. The MQS-III was significantly correlated with BDI ($r = 0.536$, $p < 0.05$) and MPI-PS t-scores ($r = 0.356$, $p < 0.05$) among the 40 NSBP patients. Independent t-tests of mean BDI, PDI, STAI, MPI-PS, and MQS-III scores revealed no significant group differences.

Conclusion: Results suggest that while there is differing correlation between FBSS and NSBP groups in pain medication use and psychometrics, the mean difference of quantity of pain medications used and scores on psychometric measurements in these groups are not different. While presurgical psychometrics and pain medication usage were not available for our FBSS patients, our results support that medication quantification with psychological prescreening before surgical intervention for back pain patients may help to limit the number of failed back surgeries. Thus, future research including pre- and postsurgical psychological functioning, physical functioning, and pain medication usage is suggested.

Keywords: Lower back pain, Failed back surgery syndrome, Analgesic drugs, Psychological measures.

INTRODUCTION

Failed back surgery syndrome (FBSS) is defined as 'a nonspecific term that implies that the final outcome of surgery did not meet the expectation of both the patient and the surgeon that was established before surgery.'[1] As early as 1975, psychological issues surrounding the patients of failed spinal surgeries have been described.[2] Twenty to 40% of patients who undergo back surgery obtain poor clinical outcomes.[3]

Four main areas of evaluation have been described in screening patients for back surgery. These include personality and emotional functioning, cognitive-behavioral perception of pain, environmental and history of the patient and medical risk factors. Personality and emotional psychometric tests, such as the Minnesota Multiphasic Personality Inventory (MMPI)[4-6] and the Beck's Depression Inventory (BDI),[7] have previously demonstrated that higher scores can potentially contribute to poor back surgery outcomes.

The cognitive-behavioral perception pain in back pain patients was first assessed in 1983 by Rosensteil and Keefe using the coping strategies questionnaire (CSQ).[8] Poor or maladaptive coping strategies can be captured by this measure and identify patients that may be more likely to have a poor surgical outcome.[9] Pending legal status, such as applying for disability, has also been prospectively linked to poor back surgery outcomes.[10] Previous historical and environmental influences have shown to

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lead to poor back surgery outcomes. Factors, such as previous psychological dysfunction,[11] marital dysfunction,[9] physical, sexual, or emotional abuse,[12] or substance abuse (e.g. opioid medications or alcohol), identify patients that tend to have poor back surgery outcomes.[9] Medical risk factors described by Epker and Block include, 'chronicity of pain, number of previous surgeries, destructiveness of the proposed surgery, nonorganic signs, a history of multiple prior medical problems and medical care use, smoking and obesity' contribute to a poor back surgery candidate.[9]

Attempts have been made to fine tune both the physiological and psychological parameters that may be used to help better define successful surgical outcomes in spinal surgery.[3,13,14] Unfortunately, limited research has been done in examining medication usage in FBSS.[15,16] Medical literature has focused on spinal cord stimulation *vs* the use of pharmacological therapies for relief of FBSS.[17] There has been limited research examining the relationships between surgically and nonsurgically treated back pain patients' psychological functioning in combination with pain medication usage.[18]

The following study retrospectively examines psychological characteristics and medication usage patterns, using the internally validated medication quantification scale III (MQS-III) of two patient population: FBSS and nonsurgically treated back pain (NSBP) presenting to an academic multidisciplinary pain center. The identification of medication usage and psychological characteristics may guide appropriate selection of patients for spine surgery.

METHODS

This project used a retrospective chart review of 121 patients who participated in a multidisciplinary pain evaluation (pain medicine and pain psychology) which included patients with (FBSS, n = 42) and (NSBP, n = 79). This project complied with the Health Insurance Portability and Accountability Act (HIPAA) and requirements set forth by the Northwestern University Institutional Review Board.

Measures

Beck depression inventory (BDI):[19] The BDI is a well validated, self-reported measure in which respondents rate 21 items that deal with the severity of various symptoms of depression experienced over the preceding 2 weeks.

State-trait-anxiety inventory (STAI):[20] The STAI is a widely used, self-reported measure of general anxiety. It includes two subscales, each with 20 items (40 total). The state subscale assesses current anxiety symptoms, while the trait subscale evaluates longstanding symptoms of anxiety. For this study, only the trait subscale was used.

Pain disability index (PDI): [21] The PDI is a validated measure of perceived disability in seven areas of functioning, which include home responsibilities, recreation, social activities, occupation, sexual behavior, self-care and life-support activities. Each item is rated on a scale of zero (no disability) to 10 (total disability). The total score (0-70) was used in the study.

Multidimensional pain inventory pain severity subscale (MPI-PS):[22] The MPI-PS, which assesses pain intensity, is one of 13 empirically derived subscales of the MPI. The scale ranges from zero (no pain) to six (very intense pain). Patients are asked to rate the pain they are experiencing at that moment in time.

Medication quantification scale III:[23,24] The medication quantification scale is a method of quantifying different pain drug regimens evaluating 22 mechanistically distinct drug classes. Using a detriment weight, dosage and frequency of the type of medication, a score is calculated based on the formula set forth in the MQS-III publication and the detriment weights described in the internal validation of the MQS-III in chronic pain patients.

Medication quantification scale III scores were used as our primary variable of interest, which allowed for the examination of different classes and quantities of pain medication used. This instrument allows for the dosage, frequency, and perceived detriment of a chronic pain medication to be quantified numerically.[23]

STATISTICAL ANALYSES

Chi-square analyses were used to rule out potential confounding factors, including sex, workers' compensation insurance and use of state insurance. Independent sample t-tests were performed to determine any differences in psychological functioning between FBSS and NSBP

Table 1: Patient demographics

Demographic characteristics	FBSS patients (N = 42)	NSBP patients (N = 79)	Statistics*
Sex, n (%)			
Women	27 (64.3)	46 (58.2)	$\chi^2 = 0.420$,
Men	15 (35.7)	33 (41.8)	p = 0.517
Worker's compensation, n (%)			
Yes	10 (23.8)	9 (11.4)	$\chi^2 = 3.194$,
No	32 (76.2)	70 (88.6)	p = 0.074
State insurance			
Yes	18 (42.9)	25 (31.6)	$\chi^2 = 1.505$,
No	24 (57.1)	54 (68.4)	p = 0.220
Age			
Mean years ± SD	51.10 ± 14.37	51.80 ± 14.37	t (118) =
Range	25-80	22-91	− 0.244, p = 0.808

*No significant differences between the groups

subjects. Finally, Pearson's product-moment correlations were used to examine relationships between psychological characteristics and pain medication usage.

RESULTS

The FBSS patients did not differ from the NSBP patients on any of the demographic variables. Of note, not all measures were available for all outcome variables. Detailed demographic information is presented in Table 1.

Pearson's correlation analyses of 67 patients (28 FBSS and 39 NSBP) revealed significant correlations between MQS-III and BDI ($r = 0.388$, $p < 0.01$) and STAI ($r = 0.323$, $p < 0.05$). Correlations between the MQS-III and PDI and MPI-PS were nonsignificant ($p > 0.05$).

Pearson's analyses within groups revealed a significant correlation between MQS-III and STAI ($r = 0.536$, $p < 0.05$) for 39 FBS subjects (Graph 1). All other correlations (MQS-III and BDI, MPI-PS and PDI) were nonsignificant ($p > 0.05$) for the FBSS group.
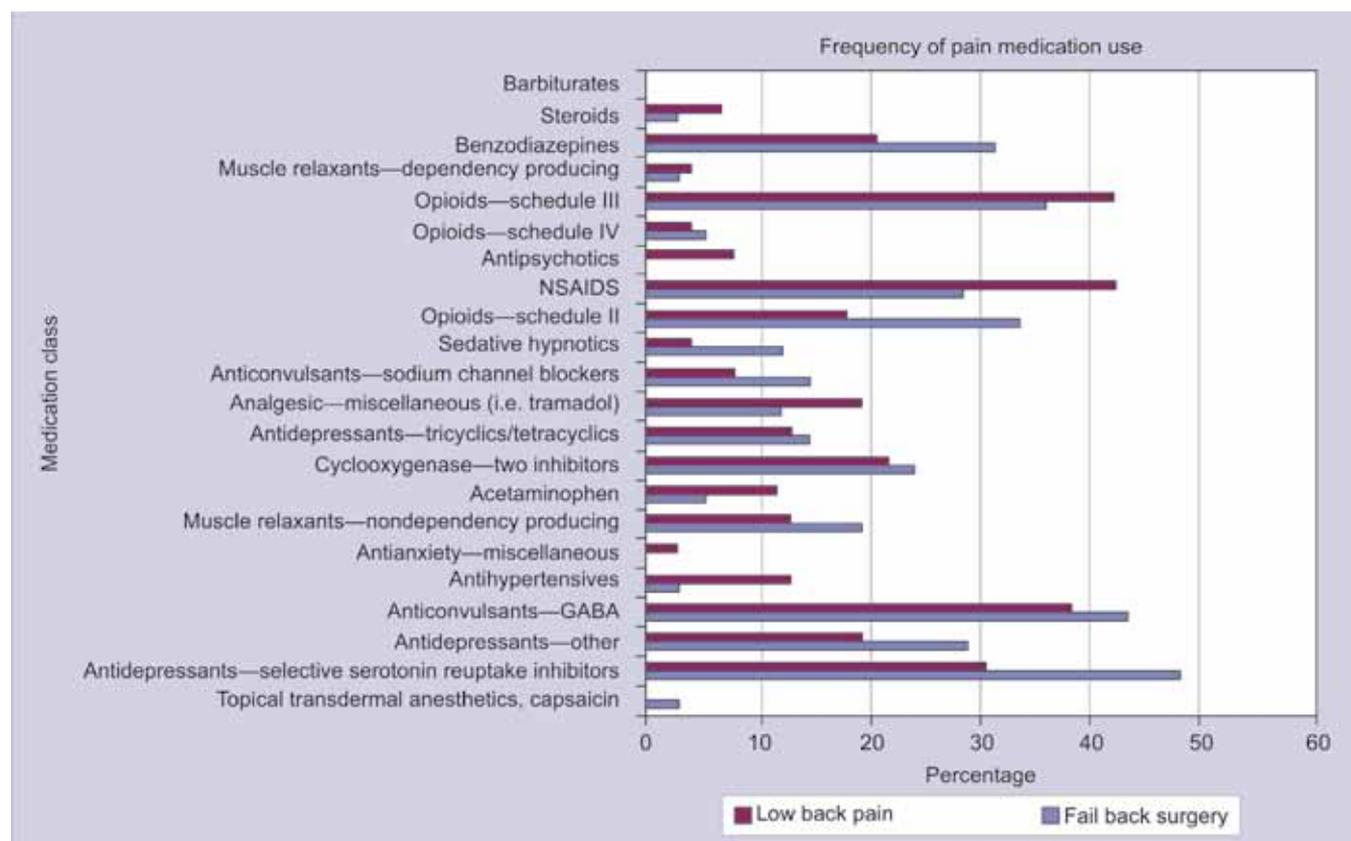
A significant correlation between the MQS-III and BDI ($r = 0.536$, $p < 0.05$) and MPI-PS t-score ($r = 0.356$, $p < 0.05$) among the 40 NSBP patients was demonstrated (Graph 2).
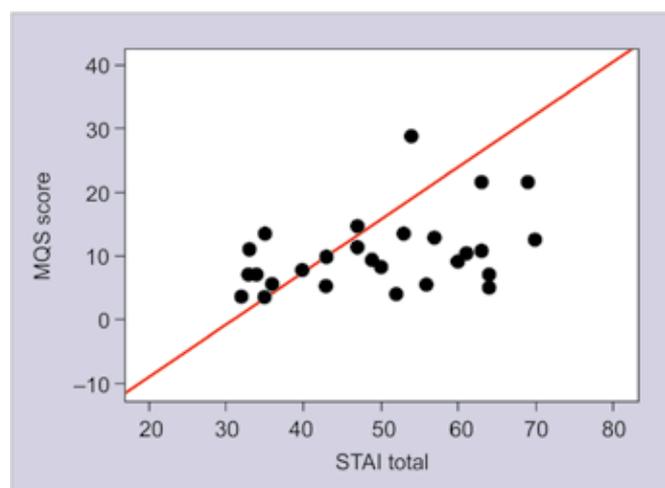
Graph 1: Correlation: MQS score with STAI total score for fail back surgery patients ($r = 0.536$)
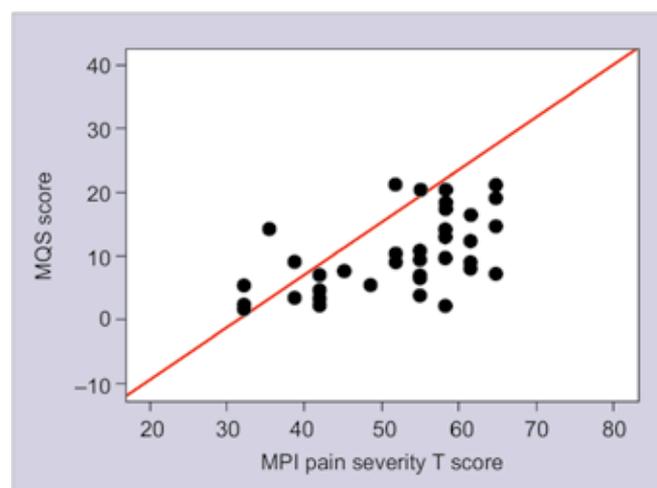
Graph 2: Correlation: MQS score with MPI pain severity T score for nonsurgical back pain patients ($r = 0.356$)

Graph 3: Medication usage: Nonsurgical back pain patients *vs* fail back surgery syndrome patients

Correlations between the MQS-III and PDI and STAI were all not statistically significant ($p > 0.05$).

Independent t-tests of mean of BDI, PDI, STAI, MPI-PS, and MQS-III scores revealed no significant group differences (all p-values > 0.05).

The frequencies of medication usage are displayed in Graph 3 for each drug class by patient type (FBSS *vs* NSBP).

DISCUSSION

Although mean MQS-III medication score did not differ between FBSS and NSBP patients, important differences in relationships between medication use measured by the MQS-III and psychological factors were found. The MQS-III correlated best with the anxiety measure among the FBSS patients and with depression and reported pain severity among the NSBP patients. Interestingly, perceived disability, anxiety and depression did not vary between the two groups. Limitations in this study were that presurgical psychometrics and pain medication usage were not available. This restricts the quantification of the relationship between medication used with anxiety scores in FBSS subjects, limiting its utility as a measure of prognostic indicator of poor surgical outcomes. This may be explained by persistent pain following surgery with concomitant prescribing of pain medications. By adding the MQS-III to preoperative surgical screening—which provides a quantification of medication used in the chronic pain population to the current psychometric scales used in presurgical screening of spine surgery candidates—patients destined to have poor surgical outcomes may become more easily identified.

Future studies would include prospective data collection observing favorable back surgery outcomes to failed back surgeries to further evaluate the predictive effect of presurgical pain medication usage to postoperative usage.

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