Block AR, Ohnmeiss DD, et al. The use of presurgical psychological screening to predict the outcome of spine surgery. Spine J 2001;1:274-282.

Reviewed, no change to conclusions, November 2016

Design: Prospective cohort study

Population/sample size/setting:

- 204 patients (100 men, 104 women, mean age 42) undergoing spine surgery in Plano, TX, referred by orthopedic surgeons for psychosocial screening
- Initially, 286 patients were referred for screening; 27 did not receive surgery, and 55 did not respond to postsurgical follow-up queries, leaving 204 with complete pre and postoperative data
- Operations performed were laminectomy/discectomy (n=118) or spinal fusion (n=86)

Main outcome measures:

- All participants were given a semi-structured interview to identify two categories of risk factor, medical and psychological
- Medical risk factors included chronicity (<6 mo, 6-12 mo, >12 mo), previous spine surgery, surgery type (laminectomy/discectomy=1 point; fusion=2 points), nonorganic signs, non-spine medical treatment (some treatment=1 point; multiple hospitalizations=2 points), smoking, and obesity
- Psychological factors included litigation, workers' compensation, job dissatisfaction, heavy lifting job demands, substance abuse, family reinforcement of pain, marital dissatisfaction, physical or sexual abuse, pre-spine injury psychological treatment, MMPI elevations >70 (hypochondriasis, hysteria, depression, psychopathic deviate, "psychosthenia"), and coping strategies
- For medical risk factors, the high risk threshold was 8, with a maximum score of 13; for psychological risk factors, the high risk threshold was 10, with a maximum score of 23
- Based on the risk factor scoring, participants were divided into 4 categories: low medical, low psychological risk (MED-PSY-, n=77), high medical, low psychological risk (MED+PSY-, 26), low medical high psychological (MED-PSY+, n=65), and high medical, high psychological risk (MED+PSY+, n=36)
- Three categories of prognosis were created based on the risk scores: good (PSY-MED-), fair (PSY+MED- and PSY-MED+), and poor (PSY+MED+)
- Three outcomes of surgery were measured: Oswestry Disability Index (ODI), pain VAS, and analgesic medication use (narcotic, nonnarcotic, none), ascertained from patient medical records
- The degree of improvement in ODI, VAS, and narcotic use was associated with the presurgical risk screening group
    - For the ODI, significant main effects were seen for PSY (less improvement for PSY+) and for MED (less improvement with

MED+); the PSY x MED interaction term was not statistically significant
        - ODI improvement was statistically significant for all groups except the PSY+MED+, for which it was too small to be statistically significant
    - For pain VAS, similar main effects were seen for PSY and for MED; the PSY x MED interaction term was statistically significant ($p<0.005$)
    - For medication use, the PSY+MED+ group had no reduction in narcotic use (26 used narcotics preop, 28 used postop), but the PSY-MED- group had reduction in narcotic use (42 preop, 29 postop)
    - For medication use, the PSY+MED- group had a reduction in narcotic use similar to that of the PSY-MED- group (57 used narcotics preop, 42 postop); the narcotic use in the PSY-MED+ group resembled that in the PSY+MED+ group (10 used narcotics preop, 11 postop)
- Thresholds for good or poor outcome were defined based on three measures: ODI less than 40, pain VAS less than 4, and no narcotic use
    - If 2 or 3 of these criteria were met, the outcome was good
    - If one criterion was met, the outcome was fair
    - If no criterion was met, the outcome was poor
    - If a good or fair outcome occurred, the patient was considered to benefit from surgery, if not, there was no benefit from surgery
- The good and fair prognosis groups were combined into one group which was expected to benefit from surgery, and the poor prognosis group was predicted to fail to benefit from surgery; the accuracy of the prediction was 82.8% prediction by prognosis—82.3% of patients expected to have a good outcome had benefit from surgery, and 83% of patients expected to have a poor outcome had no benefit from surgery

Authors' conclusions:

- Psychological and medical risk factors can be identified and quantified, and can correctly predict surgical outcome in 82% to 84% of patients
- Medical risk factors (in a separate hierarchical logistic regression model) contribute little to the overall predictive value of presurgical testing
- The results should be viewed with caution, since the outcome measures were entirely self-report
- The predictive value of the presurgical test is greatest in those with clearly good and poor prognoses; the accuracy for predicting outcomes in patients with a fair prognosis is somewhat less; the fair prognosis is the largest group
- Presurgical psychological testing should be included as a more routine component of the preoperative evaluation of patients in whom spine surgery is being considered

Comments:

- There is some confusion between Figure 1 and Tables 3 and 5
    - In Table 3, n=77 for the good prognosis, n=91 for the fair prognisis, and n=36 for the poor prognosis

    - In Table 5, n=31 for the good prognosis, 120 for the fair prognosis, and 53 for the poor prognosis
    - In Figure 1, which purports to be a 2x2 table, there are several sets of dividing lines, creating several possible sets of cells for the different classes of prognosis
    - However, from Figures 2 and 3, it appears that the PSY+MED+ group had no meaningful functional improvement and no pain relief
- Although the authors state in the discussion that all outcomes were self-report, the medication use was stated elsewhere to be taken from the medical records
    - For decreases in the use of narcotics (Table 4), it appears that the only groups of patients were the MED- groups (low medical risk), and that PSY+ and PSY- patients equally decreased their use of narcotics
    - However, both groups of MED+ patients had small increases in narcotic use
    - Therefore, the medical risk status did bear on one measure of successful outcome, and on the only one which does not depend on self-report; the authors' dismissal of its importance in their discussion is unwarranted
- There were reported main effects for MED and for PSY in the pain outcome, and their interaction was also significant in the two way ANOVA
    - An interaction between two variables means that the effect of one variable is different with different levels of the other
    - In these circumstances, main effects for the entire study population are generally not considered meaningful, and need to be reported separately for each level of the other variable

Assessment: Adequate for evidence that psychological and medical risk factor assessment prior to surgery can identify patients unlikely to benefit from surgery