

## INTERACTION OF AGE AND OPIOID DEPENDENCE ON LENGTH OF HOSPITAL STAY FOR SPINE SURGERY PATIENTS<sup>1</sup>

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*Summary.*—Clinical information suggests that opioid dependence is a major contributor to poor outcomes involving health status and to increased length of stay in hospital settings. Before spine surgery, 150 patients who were using an opioid medication for pain relief were interviewed using the six World Health Organization (WHO) guidelines for the diagnosis of opioid dependence. Three groups were defined: opioid-dependent, nonopioid-dependent, and a subclinical group. Results revealed an average of 20% of patients ( $N=30$ ) who met the WHO criteria for the diagnosis of opioid dependence. There were significant positive correlations between age and number of positive WHO criteria, length of stay, and time under surgery. Length of stay was significantly higher for the older age group ( $>55$  yr.). ANCOVA analysis using two opioid dependence groups (+ and -) and age group as independent variables affecting length of stay, after controlling for type of surgery, pain intensity, and number of previous spine surgeries, revealed that effects of opioid dependence status and age were significant but their interaction was not. Age did add length of stay independently of opioid dependence status; older adults remain in the hospital longer for various reasons probably associated with comorbidities.

The medical community has established that opioid use among older adults is a problem (Simoni-Wastila & Yang, 2006). As chronic pain has become common in older adults, opioid dependence has become a concern for health care professionals (Fishbain, 1992; Compton, Darakjian, & Miotto, 1998). Back pain is especially noteworthy as it has a high prevalence among senior adults interfering with activities of daily living and negatively affecting their quality of life. Older adults who use opioids are said to show poorer adjustment, have more postoperative cognitive decline, and show less ability to perform activities of daily living (Brooks, Toole, Walid, Hyer, & Robinson, 2008). Opioids continue to be prescribed to older adults with pain, in spite of these poor outcomes.

Previously, we determined that 20% of prespine-surgery patients of all ages were on opioids and met the World Health Organization (WHO Expert Committee on Addiction-Producing Drugs, 1964) criteria for opioid dependence (Walid, Hyer, Ajjan, Barth, & Robinson, 2007). We found no significant correlation ( $r = 0.09$ ,  $p > 0.1$ ) between opioid dependence and

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length of stay. In this paper, we address age and opioid dependence, as well as length of stay, controlling for other relevant variables.

#### METHOD

After obtaining Institutional Review Board approval, 150 patients admitted for spine surgery during 2006–2007 who were using opioids for pain relief were identified and interviewed by hospital staff using the World Health Organization (WHO, 1964) guidelines for the diagnosis of “opioid dependence.” Both the WHO and DSM-IV–TR (American Psychiatric Association, 2000) require at least three of six criteria to be present: strong desire, uncontrolled use, withdrawal syndrome, drug tolerance, neglect, and use despite harm. The six-item WHO scale had an internal consistency reliability of .74.

Opioid dependence (OD) status was analyzed in two ways, as two groups (OD+ and OD) and as three groups (OD+, OD–, and OD-Subclinical), where OD+ had 3 or more criteria, OD– had 0, and OD-Subclinical had 1 or 2. This was due to the high percentage of patients meeting one or two criteria and the potential importance of the influence of these problems in patients who did not meet criteria for full opioid dependence. Age was divided into Younger and Older, using 55 years of age as cutoff. Length of stay in hospital was the outcome, as it has been used in numerous studies as a benchmark of cost (Walid, *et al.*, 2007). Demographics and related variables, age, sex, number of surgeries, and pain (based on intensity and length), were recorded. These designations and calculations were done *post hoc* and staff was blind to groups or analyses.

#### RESULTS AND DISCUSSION

Demographic markers revealed 71 men and 79 women, of whom 11 men and 19 women met opioid dependence criteria, respectively; 115 White and 35 Black, of whom 24 and 6 met opioid dependence criteria, respectively; 106 younger than 55 and 44 older, of whom 19 and 10 met opioid dependence criteria, respectively. When the subclinical group was included, 78% ( $n=117$ ) of all participants had problems and 91% ( $n=40$ ) of the Older group had problems. Percentages of patients endorsing a total of 0, 1, 2, 3, 4, or 5 WHO items were 18% (27), 27.3% (41), 34.7% (51), 15.3% (24), 4% (6), and .7% (1), respectively ( $M=1.6$ ,  $SD=1.1$ ).

Totally, 20% ( $n=30$ ) of patients met the WHO criteria for the diagnosis of opioid dependence but 23% ( $n=10$ ) of patients 55 years of age and older were opioid dependent compared to 18% ( $n=20$ ) in the Younger group. A  $\chi^2$  test showed no significant difference between age groups ( $\chi^2=1.3$ ;  $p=.46$ ).

Correlation coefficients were calculated among variables. Significant correlations were found between age and a number of variables, includ-

ing the number of WHO criteria ( $r = .23, p = .004$ ), number of past surgeries ( $r = .21, p = .009$ ), pain ( $r = .21, p = .008$ ), and length of stay ( $r = .40, p = .001$ ). This last correlation was reduced to  $.37$  ( $p < .001$ ) when pain intensity was partialled out, and to  $.37$  ( $p < .001$ ) when number of previous surgeries was partialled out. The correlation was not significant between length of stay and opioid dependence status ( $r = .07, p > 0.1$ ).

Finally, independent analyses of covariance (ANCOVA) on the two opioid dependence groups and age with sex, number of surgeries, and pain intensity as covariates, showed that age contributed to length of stay ( $F = 5.7, p = .01$ ). There was no significant interaction between age and opioid dependence status ( $F = 2.1, p = .15$ ). Age did add length of stay independent of opioid dependence status (average 3.02 days vs 1.38;  $t = 3.1, p < .001$ ). The Older group also had more previous surgeries (average .52 vs .30) and met more WHO criteria for opioid dependence (average 1.95 vs 1.49).

This is the first study on age as it relates to opioid dependence and length of hospital stay after spinal surgery, while controlling for pain and other variables. No positive or negative effect was found regarding opioid dependence status in spine surgery patients, many of whom were older, on postoperative length of stay. Almost one-fifth ( $n = 30$ ) of patients met criteria for opioid dependence, and more than three-fourths ( $n = 117$ ) of all patients had subclinical or clinical opioid dependence, more in the Older group (91 vs 78%). Despite this, the time in hospital from operation until discharge was not dependent on preadmission opioid dependence status and age together. The Older group had a longer length of stay, had more previous surgeries, and met a greater number of WHO criteria for opioid dependence. Older people who have elective spine surgeries, however, may remain in the hospital longer as a result of factors other than opioid dependence.

This study has several limitations. Use of the WHO criteria on this pain population can be problematic, as the physical dependence criterion can be unduly restrictive. Other limitations of this study include the sample of convenience, without accounting for covariance of potential variables of influence like medical comorbidities and absence of use of post-surgical factors such as the use and amount of postoperative analgesia. Despite this, the conclusion that older adults are not remaining in the hospital longer due to opioid dependence is noteworthy, as prescription opioids are virtually universal among this group. Interestingly, a very recent publication recommended that doctors have their patients avoid NSAIDs (nonsteroidal anti-inflammatory drugs) and COX-2 inhibitors and consider the use of low-dose opioid therapy instead (Rauscher, 2009). Ultimately,

whether a patient uses pain medication is best decided on an individual basis.

## REFERENCES

- AMERICAN PSYCHIATRIC ASSOCIATION. (2000) *Diagnostic and statistical manual of mental disorders*. (Rev. ed.) Arlington, VA: Author.
- BROOKS, A., TOOLE, M. R., WALID, M. S., HYER, L. A., & ROBINSON, J. S. (2008) Influence of anesthesia on postoperative cognitive decline in adults over 50 who have undergone spinal surgery. Oral presentation at the American Association of Neurological Surgeons meeting 2008 in Chicago, Illinois.
- COMPTON, P., DARAKJIAN, J., & MIOTTO, K. (1998) Screening for addiction in patients with chronic pain and "problematic" substance use: evaluation of a pilot assessment tool. *Journal of Pain and Symptom Management*, 16, 355-362.
- FISHBAIN, D. A. (1992) Drug abuse, dependence, and addiction in chronic pain patients. *Clinical Journal of Pain*, 8(2), 77-85.
- SIMONI-WASTILA, L., & YANG, H. K. (2006) Psychoactive drug abuse in older adults. *American Journal of Geriatric Pharmacotherapy*, 4, 380-394.
- WALID, M. S., HYER, L. A., AJJAN, M., BARTH, A. C. M., & ROBINSON, J. S. (2007) Prevalence of opioid-dependence in spine surgery patients and correlation with length of stay. *Journal of Opioid Management*, 3, 127-132.
- WHO EXPERT COMMITTEE ON ADDICTION-PRODUCING DRUGS. (1964) Thirteenth report of the WHO Expert Committee. Geneva, Switz., World Health Organization (WHO Technical Report Series, No. 273).

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