Letter to the Editor

Response to "Editorial on pain following thoracic surgery"

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We appreciate Holm *et al.*'s interest in our paper (1). By design, our study was not powered to answer each secondary result. This point was already acknowledged in the limitations section. The primary outcome variable of our study was the incidence of chronic pain, at 6 months, for any patient undergoing thoracic surgery. We tested the primary hypothesis of whether variables from preoperative evaluation can predict chronic pain after thoracic surgery. Based on our data from 99 patients who were followed for 6 months, the answer was no. Acute postsurgical pain was the only covariate associated with the presence of chronic pain.

Different from many previous studies where the psychosocial measurements were assessed after surgery (2) or only a limited number of psychosocial assessments were conducted before surgery (references 4 and 5 of Holm *et al.*) (3,4), we assessed all relevant psychosocial measurements preoperatively in our study. For example, our lack of association of preoperative anxiety and depression with chronic pain after thoracotomy are consistent with the results of previous studies that Holm *et al.* mentioned (3,4); however, to the best of our knowledge, no other study assessed all the preoperative psychosocial factors for thoracic surgery patients prior to our study.

The first point made by the commentary was "*there being obvious problems with selection bias of both patients and surgeons in the study*". We do not agree with this comment. We worked with all the thoracic surgeons at our institution. We also approached all the patients meeting the broad inclusion criteria of our study. Because of the non-randomized nature of our study, patients were more inclined to be included in this prospective observational study. Patients converted from thoracoscopy to thoracotomy were followed. Similarly, patients likely to undergo thoracotomy but then were completed with VATS were also included. Therefore, we believe, the generalizability of the study is higher than a randomized clinical trial.

The second comment was "*a major problem regarding interpretation of chronic pain development when postoperative pain management differed between the two groups*." We agree with the comment that the postoperative pain management differed between the thoracotomy and VATS groups as it does in most practices. Even though we could not find a significant type of surgery effect, as we indicated in the Type of Surgery subsection of the Results, the surgery effect was examined in the final multiple logistic frequentist and Bayesian regression models. When type of surgery is added to the model, there was no increase on the AUC or differences on the inferences from the models compared to the model not including the type of surgery. Therefore, we do not agree with the comment that the differing postoperative pain management makes the meaningful comparison of chronic pain after thoracic surgery very difficult. In addition, there is little data to support that treatment of acute pain influences the development of chronic pain for thoracic surgery; rather,

the literature agrees on greater acute pain being associated with the development of chronic pain. This comment assumes acute treatment influences the development of chronic pain. High acute pain may be a marker for chronic pain.

Regarding the comment about disease stages for lung cancers not being specified, the patients were operative candidates for lung resection. Patients who were scheduled for lung resection, but did not undergo the procedure after lymph node biopsy, were enrolled but not followed.

There was no significant difference between the two study surgeons or the other surgeons regarding the distribution of thoracotomy *vs.* VATS. For the patients enrolling in the study, VATS percentages for the first, second and other surgeons were 62% (26/42), 78% (25/32) and 72% (18/25), respectively.

We agree continued research on this problem is needed.

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Footnote

Conflicts of Interest: The authors have no conflicts of interest to declare.

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