Editorial

Video assisted thoracic surgery *vs.* thoracotomy regarding postoperative chronic pain

Aris Koryllos, Erich Stoelben

Lungclinic, Hospital of Cologne, Chair of Thoracic Surgery, Private University Witten/Herdecke, Cologne 51109, Germany

Correspondence to: Dr. med. Aris Koryllos. Lungclinic, Hospital of Cologne, Chair of Thoracic Surgery, Private University Witten/Herdecke, Cologne 51109, Germany. Email: koryllosa@kliniken-koeln.de.

Provenance: This is an invited Editorial commissioned by Section Editor Dr. Gang Shen, MMSC (The Second Affiliated Hospital Zhejiang University School of Medicine, Hangzhou, China).

Comment on: Bayman EO, Parekh KR, Keech J, *et al.* A Prospective Study of Chronic Pain after Thoracic Surgery. Anesthesiology 2017;126:938-51.

Submitted Aug 16, 2017. Accepted for publication Aug 24, 2017.

doi: 10.21037/jtd.2017.08.160

View this article at: http://dx.doi.org/10.21037/jtd.2017.08.160

Postoperative pain after major thoracic surgery still continues to be a main clinical issue for surgeons and patients. Advances in operative techniques and medical care show an obvious shift towards minimal invasive thoracic surgery (1). Faster recovery and reduction of operative trauma are the key factors pushing surgeons towards minimal invasive procedures (2). Nevertheless, the scientific proof regarding the benefits of video assisted thoracic surgery (VATS) for anatomical lung resections is still limited undoubtedly.

Therefore, we read the prospective study of Bayman *et al.* (3) with great interest. In a prospective, observational, 2-institutional study the colleagues investigated chronic pain after open and VATS. Primary outcome of the study was the presence of chronic pain at 6 months after thoracic surgery. The hypothesis of the study relied on the assumption that postoperative pain after thoracic surgery is also associated with psychosocial factors assessed prior to surgery.

As results of the study the authors stated, that there is no difference in chronic pain after thoracotomy and VATS, that acute pain is associated with chronic pain and that preoperative psychosocial measures did not predict the incidence or severity of chronic pain.

Due to strong limitations of the study, most of the results presented by the authors are not acceptable without relevant restrictions.

(I) The definition of the primary endpoint (chronic pain after 6 months in relation to what?), the operative procedures and the indication for the operations were not well defined. The underlying disease and the procedure have a strong influence on acute and chronic pain (4). VATS surgery for anatomical lung resection is usually performed in one, two or three port manor using one 2–4 cm accessory port for instrumentation and lung-specimen extraction. The use of a small rib retractor for such a port could lead to operative trauma equivalent to thoracotomy (1). Therefore, further information about the thoracoscopic technique would be mandatory. In addition, 11 out of 30 patients in the thoracotomy group were converted from initially scheduled VATS operations. A high rate of VATS conversion could be an extra limitation of the study depicting unexpected tumor burden or inadequate experience with VATS techniques for major anatomical lung resections. In case of thoracotomy no data are available regarding technique (anterolateral, posterolateral or lateral) and length of the incision as well as the use of rib spreader or not. The different approaches for open thoracic surgery are important factors for postoperative pain intensity (4).

The authors discussed and compared their results with those of Bendixen *et al.* (5). The strict inclusion criteria of Bendixen *et al.* were considered to be a negative factor for generalizability of the trial according to Bayman *et al.* On the other hand, pain and especially postoperative pain following

© Journal of Thoracic Disease. All rights reserved.

thoracic surgery for major lung resections is extremely variable and multifactorial (6). In order to explore possible effects of different surgical approaches on postoperative chronic pain it is essential eliminating or reducing possible variables between groups. Diagnosis, inclusion criteria and surgical technique should be strictly described and different surgical accesses (in this case open *vs*. VATS) should be randomly assigned before conclusions are to be made. In an observational study this cannot be mandatory but it should be the fundament for every result interpretation.

(II) The sample size of the study was "assessed based on the logistical challenges instead of an a priori power calculation" (3). In consequence, the difference between the VATS group (69 patients, incidence ratio of chronic pain of 29% after 3 and 25% after 6 months, respectively) and the Thoracotomy group (30 patients, incidence ratio of 47% after 3 and 33% after 6 months, respectively) was not statistically significant (P=0.09 and 0.37 after 3 and 6 months, respectively), although the reduction of the number of patients with chronic pain by 38% after 3 months and by 24% after 6 months using minimal invasive procedures would be clinically relevant. The main conclusion of the authors, the lack of difference between the two groups, is due to the small number of patients included in the study.

(III) The numeric rating scale (NRS) was used for preoperative pain-assessment (7). Patients with chronic pain in the chest area were excluded but patients with chronic pain in other body regions were included in the study. Inclusion of chronic pain patients in an observational chronic pain study could pose a severe limitation (7). The results of the above trial clearly come in contrast with the general opinion of reduced acute and chronic pain following VATS in comparison to open surgery and in contradiction with the excellent results favoring VATS deriving from the prospective, randomized study of Bendixen *et al.* in 2016 (5). The authors indicate 25% of all patients in the trial having NRS score >0 preoperatively in non-chest sites without detailed information about this particular subgroup. Although this could be assumed to be a positive factor, depicting generalizability of the study, it could also be considered to be an adverse variable. Considering the small in number patient groups (especially the thoracotomy group) this subgroup of patients could play a significant role for false interpretation of the above results.

(IV) The study is also limited in its observational character regarding also postoperative pain management. For VATS procedures patient were assigned for controlled analgesia. For thoracotomy thoracic epidural anesthesia at T5–T6 was used. In case of VATS to thoracotomy conversion, epidural anesthesia was offered as possible pain treatment at postoperative day one. Different postoperative pain management could be a considerable factor which turns the results to be not comparable.

(V) Bayman *et al.* could demonstrate a higher distribution of chronic pain in both thoracotomy and VATS groups in case of severe or extreme pain in the first 3 postoperative days. The study data shows high NRS results for both groups on postoperative day one (>5.5) which do not correlate with other similar prospective studies, for example from Bendixen *et al.* (5) or Rizk *et al.* (8). NRS rates over 5 for patients with epidural anesthesia or minimal invasive thoracic surgery and patient controlled analgesia has to be considered as extraordinarily high and further explanation in terms of operative technique or epidural anesthesia would be helpful.

(VI) The goal of the study was to detect the predictors of chronic pain after thoracic procedures. Two attempts, the psychosocial evaluations and the preoperative pain threshold to cold, failed to predict the incidence of chronic pain although the tests would allow selecting patients who tend to chronic pain after surgical procedures (9). Based on the strong limitations of the study mentioned above, we cannot assess to what extent these results are valuable.

The study of Bayman *et al.* successfully demonstrated the crucial problem of acute postoperative pain after thoracic surgery regardless of operating access. NRS scores over 5 in the first postoperative phase could play a significant role for development of chronic pain regardless of sex, age or psychosocial criteria. This should be the initiating point for standardized postoperative analgesia in thoracic surgery to achieve a minimal pain score for operated patients in the early postoperative period. VATS surgery can only be the corner stone for such a goal. Its benefits in terms of recovery, postoperative lung function and perioperative morbidity are broadly investigated in

© Journal of Thoracic Disease. All rights reserved.

numerous observational, prospective or retrospective studies (2,4,10,11). The relevance of minimal invasive surgery like VATS for chronic pain should be investigated in a randomized, prospective well powered study resembling the trial of Bendixen *et al.* (5).

Acknowledgements

None.

Footnote

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

References

1. Perna V, Carvajal AF, Torrecilla JA, et al. Uniportal video-assisted thoracoscopic lobectomy versus other video-assisted thoracoscopic lobectomy techniques: a randomized study. Eur J Cardiothorac Surg 2016;50:411-5.
2. Pages PB, Delpy JP, Orsini B, et al. Propensity Score Analysis Comparing Videothoracoscopic Lobectomy With Thoracotomy: A French Nationwide Study. Ann Thorac Surg 2016;101:1370-8.
3. Bayman EO, Parekh KR, Keech J, et al. A Prospective Study of Chronic Pain after Thoracic Surgery. Anesthesiology 2017;126:938-51.
4. Tsubokawa N, Harada H, Takenaka C, et al. Comparison of Postoperative Pain after Different Thoracic Surgery Approaches as Measured by Electrical Stimulation. Thorac Cardiovasc Surg 2015;63:519-25.
5. Bendixen M, Jorgensen OD, Kronborg C, et al. Postoperative pain and quality of life after lobectomy via video-assisted thoracoscopic surgery or anterolateral thoracotomy for early stage lung cancer: a randomised controlled trial. Lancet Oncol 2016;17:836-44.
6. Koryllos A, Althaus A, Poels M, et al. Impact of intercostal paravertebral neurectomy on post thoracotomy pain syndrome after thoracotomy in lung cancer patients: a randomized controlled trial. J Thorac Dis 2016;8:2427-33.
7. Rothaug J, Weiss T, Meissner W. How simple can it get? Measuring pain with NRS items or binary items. Clin J Pain 2013;29:224-32.
8. Rizk NP, Ghanie A, Hsu M, et al. A prospective trial comparing pain and quality of life measures after anatomic lung resection using thoracoscopy or thoracotomy. Ann Thorac Surg 2014;98:1160-6.
9. Hopkins KG, Hoffman LA, Dabbs Ade V, et al. Postthoracotomy Pain Syndrome Following Surgery for Lung Cancer: Symptoms and Impact on Quality of Life. J Adv Pract Oncol 2015;6:121-32.
10. Nakano T, Endo S, Endo T, et al. Surgical Outcome of Video-Assisted Thoracoscopic Surgery vs. Thoracotomy for Primary Lung Cancer >5 cm in Diameter. Ann Thorac Cardiovasc Surg 2015;21:428-34.
11. Palade E, Guenter J, Kirschbaum A, et al. Postoperative pain in the acute phase after surgery: VATS lobectomy vs. open lung resection - results of a prospective randomised trial. Zentralbl Chir 2014;139 Suppl 1:S59-66.

Cite this article as: Koryllos A, Stoelben E. Video assisted thoracic surgery *vs.* thoracotomy regarding postoperative chronic pain. J Thorac Dis 2017;9(10):3498-3500. doi:10.21037/jtd.2017.08.160

© Journal of Thoracic Disease. All rights reserved.