



Treatment of ipsilateral shoulder pain after thoracic surgery—time for comparative studies?

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Provenance: This is an invited Editorial commissioned by the Section Editor Laura Chiara Guglielmetti (Cantonal Hospital Winterthur, Kantonsspital Winterthur, Switzerland).

Comment on: Woo JH, Kim YJ, Kim KC, *et al.* The effect of interscalene block on ipsilateral shoulder pain and pulmonary function in patients undergoing lung lobectomy: A randomized controlled trial. *Medicine (Baltimore)* 2018;97:e11034.

Submitted Oct 18, 2018. Accepted for publication Nov 08, 2018.

doi: 10.21037/jtd.2018.11.91

View this article at: <http://dx.doi.org/10.21037/jtd.2018.11.91>

Ipsilateral shoulder pain (ISP) is a common complication to thoracic surgery with an incidence between 37–97% depending on the study population and type of thoracic surgery (1–4). In many cases, the pain resolves or minimizes after the first few days, but has been reported to last up to 4 days and becomes chronic in a subset of patients (5,6). The cause of ISP is multifactorial and involves a visceral component originating from irritation of the diaphragm and mediastinal pleura, mediated via the phrenic nerve, and a somatic component originating from the shoulder, caused by strain during surgery and positioning (7–10). Historically ISP has been difficult to treat because it is relatively resistant to pharmacological agents. Also common types of regional anesthesia used to treat the incisional pain such as epidural, paravertebral or intercostal blocks are ineffective because these blocks don't cover the area relevant to ISP which is the ipsilateral shoulder and the phrenic nerve (1,2,11,12). Several studies, however, have demonstrated significant effect of regional anesthesia of the shoulder area such as the interscalene (13) and suprascapular (14,15) blocks and significant effect of phrenic nerve blocks at the supraclavicular (16) or diaphragmatic level (17–19).

In the study by Woo *et al.* (20) it was demonstrated that the incidence of ISP could be effectively reduced by performing a preoperative, ipsilateral, interscalene block. Although the result should be interpreted with caution since the patients were not blinded to the intervention and the sample size was relatively small, the result is comparable

to a previous study of interscalene block for ISP (13). Interestingly, dexamethasone was used as an adjuvant to prolong the effect of the block. This is particularly relevant regarding ISP as the pain intensity usually decreases considerably after 1–2 days (6) and prolonging the effect of the block to last during this period could potentially prevent repeated nerve blocks or additional pharmacological treatment. Unfortunately the study design did not allow any conclusions about the effect of the additional dexamethasone even though the authors argue that they previously demonstrated that dexamethasone can prolong the median time of sensory blockade by the interscalene block during shoulder surgery for up to 24 hours (21). Another interesting finding was that the postoperative pulmonary function did not differ between the intervention group and the control group meaning that the concomitant phrenic nerve block which usually is the consequence of an interscalene block did not compromise the postoperative pulmonary function beyond what was already caused by the operation, chest tube and anesthesia. Although the sample size was too small to make any final conclusions about the safety of the block, the result is similar to the findings in a recent study where a phrenic nerve block was performed to prevent ISP in patients for major thoracic surgery (16). In both cases all patients suffered from reduced pulmonary function after lobectomy regardless of whether they had an intervention directed at blocking the phrenic nerve or not, suggesting that the combined effect of surgery, chest tube

and anesthesia is compromising the immediate pulmonary function of the operated lung to an extent that an additional phrenic nerve block doesn't change the pulmonary function significantly. It is however important to note that both studies involved patients who had preoperatively been considered eligible to one-lung ventilation during major pulmonary surgery, which excludes a group of patients with very compromised preoperative pulmonary function. In this group of patients, blocking the phrenic nerve might have more deleterious effects on the pulmonary function.

Where ISP historically has been considered difficult to treat, we now have evidence for several effective options for treatment via regional anesthesia of the relevant body region, including interscalene, suprascapular and phrenic nerve blocks. The 2 first options primarily address the musculoskeletal component of ISP but most often also results in a phrenic nerve block. A major side effect to these methods is the full motor block of the ipsilateral arm. The phrenic nerve block primarily addresses the visceral component of ISP but will, if performed at the supraclavicular level, regularly also result in some, at least sensory, block of the shoulder but will less often result in motor block of the ipsilateral arm. Comparative studies between these three different possible approaches are warranted. Future studies should not only compare the effects but also focus on possibilities to extent the effect beyond the first 48 hours and minimizing side effects such as irrelevant motor blockade.

Acknowledgements

None.

Footnote

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

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Cite this article as: Blichfeldt-Eckhardt MR, Toft P. Treatment of ipsilateral shoulder pain after thoracic surgery—time for comparative studies? *J Thorac Dis* 2019;11(Suppl 3):S417-S419. doi: 10.21037/jtd.2018.11.91