


17. Hogan QH: Phrenic nerve function after interscalene block revisited: Now, the long view. Anesthesiology 2013; 119:250–2

(accepted for publication November 25, 2013.)

Interscalene Brachial Plexus Blocks and Phrenic Nerve Palsy

To the Editor:

We were interested to read Kaufman et al.'s article on the surgical treatment of 14 cases of permanent diaphragm paralysis after shoulder surgery, but dismayed to read the editorial that accompanied it, in which it was stated that the diaphragmatic paralysis was “clearly due to phrenic nerve damage after interscalene brachial plexus block.” This assertion is open to question and is not supported by the data presented by Kaufman et al.1

There is a remarkable similarity between this assertion and that made for many years that the ulnar neuropathy suffered by some patients after surgery was clearly due to errors in on-table positioning that resulted in external nerve compression. The finding that there was a preponderance of obese male patients suffering ulnar nerve neuropathy led to a view that although direct compression may be a factor, other factors such as ulnar nerve stretching and inadequate blood supply to the ulnar nerve were more likely to be of significance.2–8 All Kaufman’s patients were male; all were overweight or obese; their mean age was 58 yr. Phrenic nerve lesions may be associated with degenerative cervical spine disease, trauma, and compression,9–13 and it is possible that these factors played a significant part in the cases described by Kaufman. Rotator cuff repairs are now commonly performed arthroscopically—these are often lengthy procedures performed with the patient in the lateral position and with traction applied to the arm, and in which swelling in the neck commonly results from saline infused under pressure into the joint for prolonged periods. It may well be that the combination of obesity, degenerative spine disease, nerve traction, and nerve compression were therefore significant factors in these cases.

We agree that the performance of an interscalene block may have been a factor (all 14 had blocks), but details of the approach used would have been informative, as a standard lateral, that is, modified Winnie, technique or out-of-plane ultrasound-guided approach brings the needle tip closer to the phrenic nerve compared with the currently popular in-plane ultrasound-guided needle approach through the middle scalene muscle. It may well be that the use of a Tuohy needle and a catheter (the majority of cases) were also factors. However, it is incorrect to assume that the block was the only factor—statistical association does not imply causation. Furthermore, if local anesthetic-induced myotoxicity is implicated as an important cause of nerve damage, why do we not see it more regularly around the many other small nerves that we regularly block?

Hogan’s conclusion that the cause of the phrenic nerve damage is local anesthetic injection is premature, and his suggestion that interscalene block be replaced for these procedures by “Peripheral application of local anesthetic” is not supported by the data presented. As ever, we need to know more before we reach conclusions.

Competing Interests

The authors declare no competing interests.


References


Postsurgical Inflammatory Neuropathy Should Be Considered in the Differential Diagnosis of Diaphragm Paralysis after Surgery

To the Editor:
We read with interest the article by Kaufman et al. on the development of phrenic neuropathies after intraoperative scalene block. Although these cases are well described and instructive in the role of adhesions contributing to phrenic neuropathy, this is but one potential mechanism by which inflammation may contribute to the development of perioperative neuropathies. Local or generalized inflammation of the microvessels in nerve and subsequent ischemic injury are observed in a variety of neuropathic conditions, including diabetic and nondiabetic asymmetrical neuropathies and idiopathic and hereditary brachial plexus neuropathy, the latter of which is also reported to have a predilection for the phrenic nerve. These conditions may first become symptomatic perioperatively and can have significant medicolegal implications.

We have previously reported on patients who developed a variety of neuropathies, including phrenic neuropathy, after surgeries. In 21 of the 33 patients, a biopsy of the superficial sensory nerves distant from the site of surgery was done, and we observed abnormal amounts of nerve inflammation in all of these and signs of nerve microvasculitis in 71% of these. Our study found that immunotherapy with steroids often can improve the pain and weakness associated with these neuropathies. In summary, although Kaufman et al. have reported localized adhesions as one important cause of postsurgical phrenic neuropathy, clinicians should consider diverse potential etiologies of postsurgical neuropathies, including nerve microvasculitis.

Acknowledgments
This work was supported by the National Institutes of Health, CA169445 (to Dr. Staff), Bethesda, Maryland.

Competing Interests
The authors declare no competing interests.

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References

In Reply:
Bellew et al. take issue with my statement that the patients reported by Kaufman et al. developed “chronic diaphragmatic paralysis that was clearly due to phrenic nerve damage after ISB [interscalene blockade].” However, there was obvious phrenic nerve damage sufficient to cause diaphragmatic paralysis, which usually recovered with treatment of that nerve, and a block had been performed. My statement is a correct summary of the report boiled down to its scientific bare bones. This statement was immediately followed by my comment regarding the Kaufman data that “Few conclusions can be made from a case series with certainty, but their observations support several preliminary hypotheses.” Because I offered only hypotheses on this matter, I suspect that it is actually with these hypotheses that Bellew et al. are uncomfortable. Yet it is established that local anesthetic reaches the phrenic nerve and anterior scalene muscle, that local anesthetic damages nerves and especially muscle, and that muscle damage leads to scaring. Given what is known, it would be surprising if phrenic nerves were not damaged by interscalene local anesthetic injection.