To avoid these serious complications there are some preventive measures; (1) Exact median sternotomy should be performed. (2) Caudal localization of the retractor should be attempted. (3) Constant traction on the sternal halves should be reduced. (4) Asymmetric traction should be avoided when possible. (5) Retractors designed for symmetric traction should be used with extreme caution.

Postoperative neurologic assessment should be performed in every patient to allow early detection and therapy of nerve lesions [11, 15, 18].

In conclusion, increasing use of internal mammary artery grafts in coronary artery bypass demands measures to protect the brachial plexus. The most important measure for the low incidence and benign course of brachial plexus problems in these patients resulted from careful sternal retraction and use of the hands-up positions. Inappropriate sternal retraction during preparation of internal mammary artery should be avoided.

References


ICVTS on-line discussion A

Title: Brachial plexus injury following median sternotomy

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eComment: Congratulations to Unlu et al. for their excellent work [1]. Post-sternotomy brachial plexus injuries are annoying, common complications, whose incidence has always been underestimated. The symptoms often manifest as a variety of upper extremity neuropathies, such as pain, numbness, dysesthesia, or loss of motor function in the hand, forearm, or arm. And, in the vast majority of these patients, the neurological symptoms are transient and usually resolved within six months.

We experienced several patients who presented with transient brachial plexus neuropathies with full recovery in our practices. And, we had one reported patient on whom we performed coronary artery bypass surgery with left internal mammary artery harvesting also who experienced persistent, unrecoverable brachial plexus injury [2]. One recent experienced permanent brachial plexus injury patient who received aortic graft transposition operation for his acute aortic dissection was concluded to be related to nerve injury during brachial cannulation procedure.

We are interested in the mechanism of brachial plexus injury related to surgical procedures. The constituent nerve roots of the plexus are fixed proximally at their points of exit from the vertebral canal, and distally the nerves are tethered to the axillary fascia. Excessively spreading the sternal retractor will increase the distance between these fixation points and thus stretch the brachial plexus. A downward-pushed clavicle with an upward-rotating first rib by asymmetrical sternal retractor will also compress the upper extremity nerves. By yet another stretching of the proximal end of the plexus, its branches may more often affect upper trunk (C5-C7) rib fractures near costotransverse articulation or punctures for the internal jugular vein. Where the lower trunk (C8-T1) of the plexus lies immediately medial to them, they might often affect the lower trunk.

We agree with the preventive measures proposed by Unlu et al., we cautiously use the asymmetric sternal retractor, put a lower position and the smallest possible opening for sternal retractor, and prevent the prolong traction on the sternal halves to minimize the brachial plexus injury following median sternotomy.

References
