Analgesic Techniques for a Thoracic Enhanced Recovery Pathway: Intercostal Blocks Provide Equivocal Analgesia and Shorter Length of Stay Compared to Thoracic Epidurals

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Background

A key component of Enhanced Recovery After Surgery (ERAS) clinical pathways is opioid-sparing multimodal analgesia. A variety of different techniques have been described for ERAS pathways including the use of regional and neuraxial anesthesia, NSAIDS, and gabapentanoids.[1]

Historically, analgesic approaches to cardiothoracic surgical patients are widely heterogeneous and dependent upon surgical approach and institution experience.[2-3] We sought to incorporate opioid-sparing analgesic techniques as part of an ERAS clinical pathway for thoracic surgical patients undergoing video-assisted thoracoscopic surgery (VATS) for wedge resection to evaluate their effect on pain control, opioid consumption in the early post-operative period, and hospital length of stay.

Methods

This was a retrospective review of 58 patients who underwent VATS for wedge resection at a single institution and were managed using an ERAS pathway for thoracic surgery between 9/11/2015 through 8/12/2016.

Electronic medical records were reviewed for use of a perioperative thoracic epidural, intraoperative placement of an intercostal block, medication used for the block and postoperative opioid use.

Pain scores in the PACU and on postoperative day (POD) zero to three, as well as hospital length of stay (LOS) were also recorded.

General linear models were used with various predictors to assess contributors to variability for both LOS and pain scores, while a Student's t-test was used to analyze post-op opioid use with a Satterthwaite adjustment of degrees of freedom.

Results

A total of 58 VATS wedge resection cases were included. Three distinct analgesic techniques were identified: intraoperative intercostal block with plain bupivacaine (ICB-P) (n=25), intraoperative intercostal block with liposomal bupivacaine (ICB-L) (n=19), and thoracic epidural (EPI) (n=14).

FIGURE 1: Mean Peak Pain Score Comparison, POD#0-3

	POD #0 MEAN PEAK PAIN SCORE (p=0.0063)	POD #1 MEAN PEAK PAIN SCORE (p=0.6162)	POD #2 MEAN PEAK PAIN SCORE (p=0.5580)	POD #3 MEAN PEAK PAIN SCORE (p=0.6333)
ICB WITH PLAIN BUPIVACAINE	6.6	5.7	5.9	6.8
ICB WITH LIPOSOMAL BUPIVACAINE	6.7	5.8	4.6	5.3
THORACIC EPIDURAL	3.6	4.7	4.6	4.0

While average peak pain scores on POD 0 were lowest among the EPI group (average pain score=3.6, p=0.0063) compared to the ICB groups (average pain score for ICB-L=6.7; average pain score for ICB-P=6.6), on POD 1-3, there was no difference in pain scores between any of the groups (p>0.05) nor in opioid consumption (p>0.05).

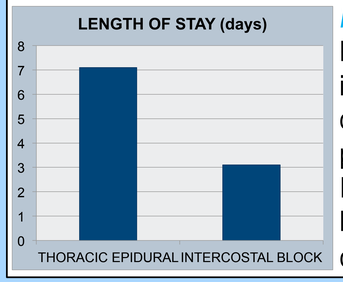

FIGURE 2: Length of stay comparison
Patients in the EPI group had an increased LOS compared to ICB-L (7.1 days compared to 3.1 days, respectively; p=0.0311), while secondary analysis of ICB-P and ICB-L showed no difference in LOS, pain scores, and opioid consumption between these groups.

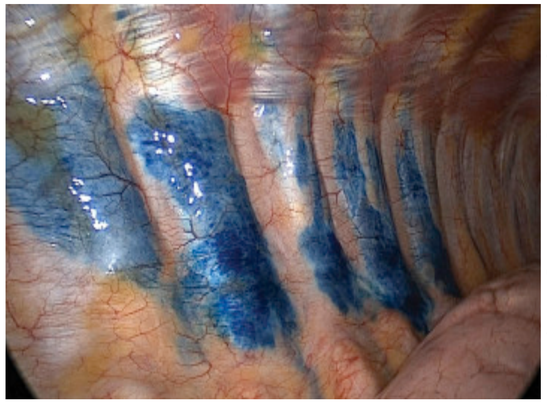

FIGURE 3:
Thorascopic visualization demonstrates accurate injection of liposomal bupivacaine (with methylene blue dye) in the intercostal space without violation of the parietal pleura.[5]

Conclusion

Our results show that thoracic epidurals may contribute to an increased LOS and provide equivocal pain control for VATS wedge resection compared to intercostal blocks as part of an ERAS clinical pathway.

The results also suggest that pain control with intercostal blocks with plain bupivacaine and liposomal bupivacaine are equivocal. Larger sample size is needed to further evaluate these observed differences.

References

1) Can J Anaesth. 2015 Feb;62(2):203-18
2) Cochrane Database Syst Rev. 2016 Feb 21;2:CD009121
3) Anesth Analg. 2008 Sep;107(3):1026-40
4) Ann Thorac Surg. 2015 Jun;99(6):1953-60. doi:10.1016/j.athoracsur.2015.02.074. Epub 2015 Apr 23.