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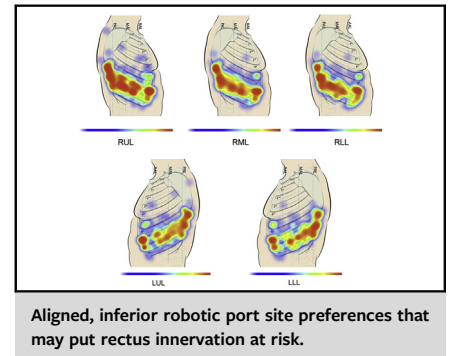
Commentary: Did you leave a ball inside me?

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The article by Wildemeersch and colleagues¹ serves as a warning regarding a complication that probably is more common than their title suggests. The authors documented their case well, with findings extreme enough to be visible on physical examination and imaging. However, it is likely that less severe (partial or temporary) denervation occurs more frequently and may be hidden by adiposity, general rectus muscle underdevelopment, and stoic patient behavior. In my practice, patients occasionally complain of persistent fullness in the same area and wonder whether I might have left a “ball” inside their body.

Beside characteristics already mentioned, there may be anatomic variations, like a dominant neural dermatome, that make some patients more vulnerable to this event. Yet, there are probably many things we can do better as surgeons to prevent neural injury. For instance, we may wish to avoid liberal cautery dissection during port creation and find other ways, like miniature wound protectors, to prevent camera smudging from oozing.

As the authors note, it is also possible that the choice of approach may be a factor. These surgeons noticed this complication during their transition to robotic surgery. Port-site selection varies among surgeons for all types of minimally invasive surgery, including robotic lobectomy.² Unlike other video-assisted thoracoscopic surgery approaches, there is the practical need to keep ports relatively low in the target body cavity to facilitate robotic instrument



CENTRAL MESSAGE

While complete paralysis may be uncommon, rectus muscle nerve function studies may reveal sub-clinical injuries useful in understanding post-thoracotomy pain syndromes better.

movement (Figure 1). This places ports in the range of the intercostal nerves affecting the recti. There is also the tendency to align them within one interspace. While this may keep intercostal neuralgia down to one vulnerable nerve, it also amplifies its incremental risk for damage.

Another anesthetic practice used by these surgeons routinely was the use of cryoanalgesia. While this was associated with delayed neuralgia when first introduced, modern delivery systems may be less likely to cause this.^{3,4} In fact, the authors did not notice this complication for many non-robotic case approaches. Yet, there may be an additive effect on injury in the same way as iced slush used in cardiac surgery increased the risk of phrenic nerve injuries from the devascularization caused by internal mammary harvest.⁵ Unfortunately, it is difficult to attribute the effects of additive injuries on the causation of infrequent events.

While this complication may be uncommon, it is likely that methods introduced to study and prevent it will be good for our understanding of post-thoracoscopic and thoracotomy pain. Pain management varies widely between institutions because of the many permutations of interventions used to deal with its multifactorial etiology. It would be interesting to map rectus innervation to prevent injury. However, if we detect postoperative dysfunction, then it may correlate with chronic pain and the relative trauma of our surgical techniques. Much pain research has focused on nociceptive afferent pathways, which are hard to monitor

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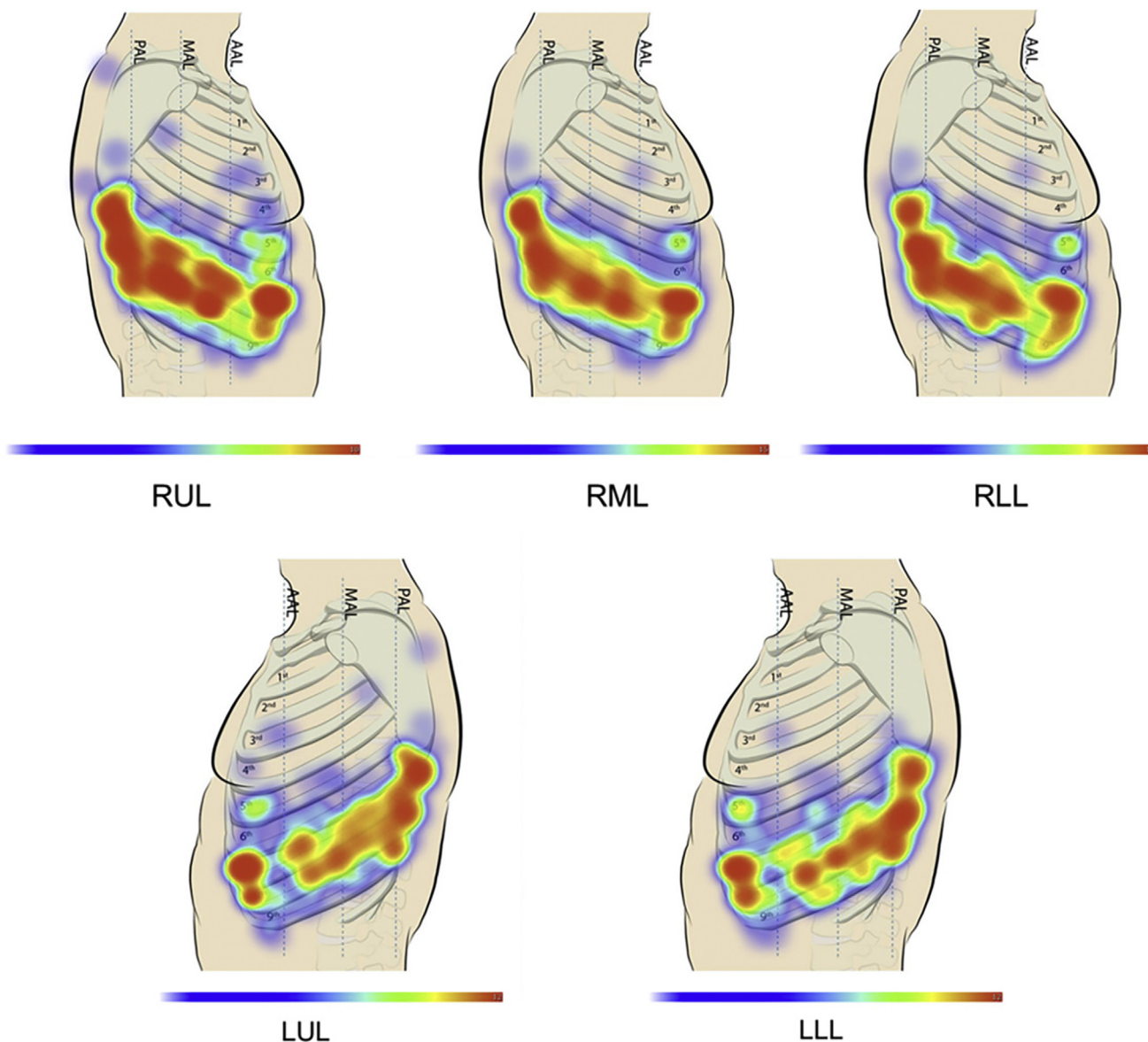


FIGURE 1. Heat map of robotic port site preference from a sample of robotic thoracic surgeons. Notice how the ports tend to converge along inferior interspaces responsible for superior rectus innervation. Reprinted with permission from Oh and colleagues.² *RUL*, Right upper lobe; *RML*, right middle lobe; *RLL*, right lower lobe; *LUL*, left upper lobe; *LLL*, left lower lobe.

under anesthesia. Perhaps muscle relaxant avoidance and serial rectus (efferent) testing while we perform our operations will tell us if port incisions are likely to trigger post-operative pain or rectus dysfunction.

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