

## Vagal Stimulation as Result of Pleural Stretch Secondary to Retraction during Internal Mammary Anastomosis

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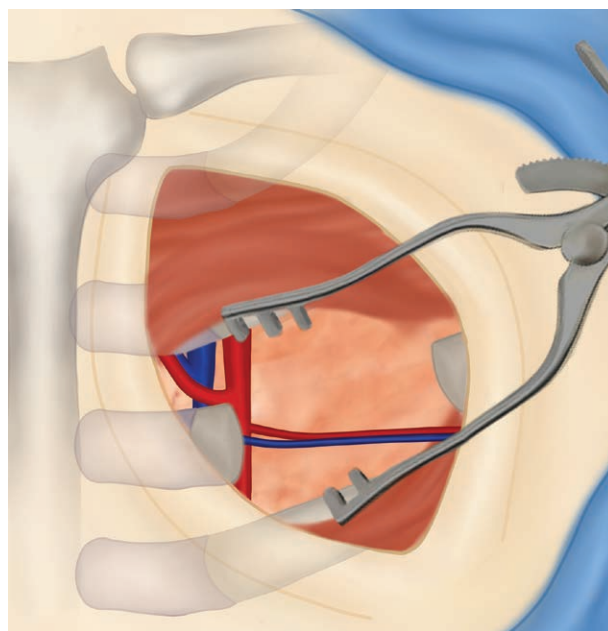
Intraoperative fluid management is paramount and may be precarious in microsurgery. The primary object was to maintain oxygenation of the tissues and flap perfusion through adequate cardiac output. Much of the arguments against vasopressors is based on anecdotes and a few level V studies.<sup>1</sup> Higher levels of evidence have suggested vasopressors do not lead to increased incidence of flap failure. Regardless, there is some unease when vasopressors need be given intraoperatively. The alternative, over resuscitation, should be cautioned against, as increased rates of thrombosis have been also documented in the literature, potentially due to edema and extravasation of fluid in the microvasculature.<sup>2</sup> Optimal crystalloid resuscitation in the perioperative period has been defined, taking on a parabolic shape with increased flap complications at the extremes of under and over resuscitation.<sup>3</sup> Instead, careful control of measures, such as positioning and minimizing surgical blood loss, are all crucial methods of maintaining homeostasis.

We performed a unilateral deep inferior epigastric artery perforator flap reconstruction to a left unilateral immediate mastectomy defect on an otherwise healthy female with a surgical history of a laparoscopic hysterectomy and breast cancer. The flap was placed in to the chest defect with internal mammary artery exposure after third rib removal in standard fashion. To expand the intercostal interspace during the anastomosis, dull Wheatlander self-retaining retractors were placed against the second and fourth ribs (Fig. 1). Patient became hypotensive and bradycardic based on arterial line and lower extremity blood pressure cuffs (see figure, Supplemental Digital Content 1, which displays intraoperative anesthesia records, <http://links.lww.com/PRSGO/A872>). Phenylephrine was administered throughout ischemia time with minimal effect. However, patient maintained good urine output throughout. Upon completion of microsurgery, the retractor was released, resulting in immediate increase in MAPs and heart rate. Intraoperative testing with positive pressure and irrigation indicated no pleural air leak at the recipient site.

Postoperatively, strong Dopplerable signals and 100% saturation on room air were obtained.

Irritation of the parietal pleura after internal mammary artery harvest has been documented in large series to result in otherwise asymptomatic tachycardia lasting on average until POD3.<sup>2</sup> Classic examination of lung innervation have indicated that the majority of the nerve fibers end in the subpleural space, without the same sensory innervation to the visceral pleura as seen in the parietal pleura.<sup>4</sup> However, afferent fibers from the vagus nerve are present in the visceral pleura sensitive to stretch. Manipulation and puncture of this pleura may result in vasovagal reactions, occurring in 1–5% of pleural biopsies.<sup>5</sup> Accordingly, mechanical traction of the visceral pleura to widen the interspace from either a deeply placed retractor or rib displacement may result in activation of stretch receptors and vagal stimulation, as seen in this case.

This is the first report to describe intraoperative vagal reaction as a result of self-retaining retractors during microsurgical anastomosis. While maximizing the interspace is a common practice, it is critical the astute microsurgeon be aware of such occurrences to avoid a counterproductive situation where reflexive actions, such as fluid over-



**Fig. 1.** Schematic of self-retainer position to widen the rib interspace resulting in stretch of the visceral pleura.

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load or pressor administration, may occur, resulting in adverse outcomes.

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**DISCLOSURE**

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