

## Surrogates or Outcomes: What Should We Measure?

To the Editor,

I read with great interest the article by Girsberger and colleagues in a recent issue of *ANESTHESIOLOGY*.<sup>1</sup> The authors investigated 36 patients and concluded that postvoid residuals were significantly lower using ropivacaine compared with bupivacaine for thoracic epidural analgesia reflecting less impairment of detrusor function with ropivacaine. The authors should be congratulated for performing a well-designed randomized trial on an important topic in perioperative medicine. One may argue that by using ropivacaine for thoracic epidurals, the risk of urinary tract infection may be reduced with important consequences for patients and healthcare systems.<sup>2,3</sup>

Although the authors performed a well-conducted study, some concerns require clarification to further establish the clinical importance of the study. The authors identified a significant mean difference (95% CI) in postvoid residuals between groups of -175 ml (-295 ml to -40 ml). I wondered why the authors did not measure or report the need for postoperative bladder catheterization, given that this has been more directly related to poor outcomes. It is possible that a large proportion of patients had small postresidual differences and did not require bladder catheterization.<sup>4</sup> In addition, I could not determine whether the intraoperative management of these patients was standardized for anesthetics and analgesic agents, given that many of these agents (*e.g.*, opioids, volatile anesthetics) can potentially alter the primary outcome.<sup>5,6</sup>

I welcome some clarifications from the authors that could further confirm the validity of this important study.

### Competing Interests

The author declares no competing interests.

**Mark C. Kendall, M.D.**, Warren Alpert Medical School, Brown University, Providence, Rhode Island. mark.kendall@lifespan.org

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(Accepted for publication July 30, 2018.)

### In Reply:

We thank Dr. Kendall for his repeated interest in our investigations and his valuable comments.

Dr. Kendall's first concern was our choice of primary outcome (*i.e.*, differences in postvoid residual urine volume rather than the need for bladder catheterization), arguing that the need for bladder catheterization is related to poor outcome.<sup>1</sup> Indeed, bladder catheterization is linked with urinary tract infections and patient discomfort.<sup>2</sup> We chose a change in postvoid residual because elevated postvoid residuals are a common reason for bladder catheterization. Therefore, postvoid residual is not only a surrogate of voiding dysfunction, but also directly linked to poor outcomes. Our study was underpowered to assess significance in the rate of urinary tract infections, but this was not the focus of our study. Changes in postvoid residual, however, are a very sensitive value for lower urinary tract function in general and an acknowledged sign of its dysfunction, which was the target of assessment in this randomized clinical trial. The International Consultation on Benign Prostatic Hyperplasia defines a postvoid residual of 50 to 100 ml as abnormal.<sup>3</sup> Based on precedent observations<sup>4</sup> the primary endpoint, change in postvoid residual, indicates a relevant change in lower urinary tract function.

Dr. Kendall also pondered the lack of reporting the need for postoperative bladder catheterization. In the study setting the bladder catheter always was left in place until the postoperative urodynamic investigation. However, we did report that 4 of 19 patients (21%) in the bupivacaine group and 2 of 17 patients (12%) in the ropivacaine group had a maximum flow rate of 0 ml/s postoperatively and were unable to void, which is an absolute indication for catheterization. It is of utmost importance to avoid urinary retention postoperatively because this is a bladder distension beyond the maximum capacity and is associated with bladder ischemia and the resulting bladder dysfunction.<sup>5</sup>

Dr. Kendall's second concern was the lack of information concerning intraoperative pain management. General anesthesia was induced with fentanyl 2 µg/kg and propofol 2 mg/kg. Orotracheal intubation was facilitated with rocuronium 0.6 mg/kg and boluses were given for intraoperative muscle relaxation to maintain no response to