Journal of Investigative Surgery

ISSN: 0894-1939 (Print) 1521-0553 (Online) Journal homepage: http://www.tandfonline.com/loi/iivs20

Invited Brief Commentary on IUVS -2017-0216

John Vlot

To cite this article: John Vlot (2018): Invited Brief Commentary on IUVS -2017-0216, Journal of Investigative Surgery, DOI: 10.1080/08941939.2017.1383537

To link to this article: https://doi.org/10.1080/08941939.2017.1383537

Published online: 12 Mar 2018.

Journal of Investigative Surgery, 0, 1–2, 2018
Published with license by Taylor & Francis
ISSN: 0894-1939 print / 1521-0553 online
DOI: 10.1080/08941939.2017.1383537

Invited Brief Commentary on IUVS -2017-0216

John Vlot

Paediatric Surgery, Erasmus University, Rotterdam, Netherlands

There is an ever-increasing focus in modern-day surgery on minimization of invasiveness and scars. Technical developments in instruments and insufflation equipment, but also advances in anesthesia have made possible even the most complex operations through single-site or even natural orifice surgery. The easily quantifiable benefit for the patient is in his or her scar. The disturbance of body homeostasis by anesthesia and surgery is much less easily quantified.[1,2] The authors of this article describe an animal model using cytokines to measure the body's response to the trauma of surgery.[3] Although the use of cytokines is a well-known method, the true implications of minimal access surgery cover a vastly broader spectrum.[4] Pain, time-to-return-to-work and long-term effects on body-wall integrity cannot be measured in animals. However, the strength of an animal model lies in its reproducibility of conditions and surgical trauma, so comparisons between surgical techniques can actually be better assessed here than in the patient population. Using rats instead of larger animals greatly reduces the financial and logistic burden of experiments. There are however some caveats with the representability for laparoscopy of the proposed model.

Although conditions are comparable between the different study groups of rats, there are a few distinct differences between this model and actual laparoscopy. For one thing, spontaneous breathing against an intra-abdominal pressure of 10 mm Hg seems quite an effort for a 300 g rat. But more importantly, the effect of elevating the bowels outside the abdominal cavity and exposing them to a large volume of dry and cold CO_2 for 30 min greatly enhances the surgical trauma and does not accurately represent of the practice of laparoscopy. This might explain the high CRP-levels found in the control group in this study.

As said, there are a lot of factors contributing to the surgical trauma and stress response of the body undergoing surgery. The extra-corporeal suturing of bowels in this model is in my opinion the single biggest determinant of trauma. When you leave this out, very much more interesting observations using this small-animal model can be made on responses to, e.g., different intra-abdominal pressures, incision length and duration of pneumoperitoneum. Intubating and ventilating the rats would further add to the representability of the model. A model with small animals is not very well suited to study actual surgical procedures. It is however very useful to study the effects on cytokine-release of many other factors involved in the invasiveness of minimal access surgery.

With this study, the authors address a very interesting and relevant topic: the components of the surgical stress response of minimal access surgery. Determining the contribution of all separate factors to the invasiveness of the procedure has never been done systematically. Although the actual surgical procedure is usually more or less the same in open and laparoscopic surgery, the added burden of pneumoperitoneum or capnopneumothorax can be immense. This is most evident in the newborn undergoing often long reconstructive procedures shortly after birth.[6] With comprehensive knowledge on all the factors involved, a decision on the best surgical approach can be made based on accumulation of individual stress-response components. For example, one would be able to compare the effects of a

Received 19 September 2017; accepted 19 September 2017.

Address correspondence to John Vlot, Paediatric Surgery, Erasmus University, Rotterdam, Netherlands. E-mail john.vlot@erasmusmc.nl

minimal access approach taking, e.g., 120 min via three 1 cm incisions to an open procedure taking 30 min via a 10 cm incision.

Patients have shown a very high acceptance of added morbidity and even mortality when visible scars can be minimized.[7,8] It is an obligation of medical professionals here to use science to adhere to the '*do no further harm*' principle as closely as possible.

DECLARATION OF INTEREST

No conflict of interest or financial ties to disclose.

ORCID

John Vlot http://orcid.org/0000-0002-9235-7685

REFERENCES

1. Novitsky YW, Litwin DE, Callery MP. The net immunologic advantage of laparoscopic surgery. *Surg Endosc*. 2004;18(10):1411–1419. https://doi.org/10.1007/s00464-003-8275-x. PMID:15791361
2. Rosenthal RJ., et al. *The Pathophysiology of Pneumoperitoneum*. Berlin, Heidelberg:Springer;1998.
3. Murase N., et al., A novel laparoscopic surgery model with a device to expand the abdominal working space in rats: the influence of pneumoperitoneum and skin incision length on postoperative inflammatory cytokines. *J Invest Surg*. In press.
4. Murray A., et al. Clinical effectiveness and cost-effectiveness of laparoscopic surgery for colorectal cancer: systematic reviews and economic evaluation. *Health Technol Assess*. 2006;10(45):1–141. https://doi.org/10.3310/hta10450. PMID:17083853
5. Bishay M., et al. Hypercapnia and acidosis during open and thoracoscopic repair of congenital diaphragmatic hernia and esophageal atresia: results of a pilot randomized controlled trial. *Ann Surg*. 2013;258(6):895–900. https://doi.org/10.1097/SLA.0b013e31828fab55. PMID:23604057
6. Ure BM., et al. Physiological responses to endoscopic surgery in children. *Semin Pediatr Surg*. 2007;16(4):217–223. https://doi.org/10.1053/j.sempedsurg.2007.06.002. PMID:17933662
7. Bucher P., et al. Population perception of surgical safety and body image trauma: a plea for scarless surgery?. *Surg Endosc*. 2011;25(2):408–415. https://doi.org/10.1007/s00464-010-1180-1. PMID:20602141
8. Hagen ME., et al. Cosmetic issues of abdominal surgery: results of an enquiry into possible grounds for a natural orifice transluminal endoscopic surgery (NOTES) approach. *Endoscopy*. 2008;40(7):581–583. https://doi.org/10.1055/s-2008-1077363. PMID:18609452