Reviewer's report

Title: Abdominal Wall Activity Is Necessary for Normal Female Rat Voiding

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Reviewer: Margot Damaser

Reviewer's report:

General
The objective of this paper is to investigate the occurrence and determine the necessity of voiding-associated abdominal wall activity in urethane-anesthetized rats. This work has the potential to clarify the mechanism of voiding in anesthetized animals and therefore is of interest to those using this method to study the effects of various interventions on voiding. The manuscript is very well written and demonstrates the authors' considerable experience with these techniques. However, it seems to this reviewer that, had the authors chosen to use some different methods, they could have addressed the objective more completely (details below). Therefore, the paper as is seems incomplete and the conclusions that can be drawn are speculative.

Major Compulsory Revisions (that the author must respond to before a decision on publication can be reached)

1. What fluid was infused in the arterial line? How was the infusion rate selected? It is odd that this infusion rate produced a voiding frequency of approx. 1 void/hour: less than the natural voiding frequency of rats with no infusion. The authors need to provide some reasoning about why this might be and how it might have affected their results & conclusions.

2. How was the abdominal pressure recording validated? The authors need to provide the baseline values as well as the increase during voiding. Were the recorded pressures highly variable with amount of fluid injected? What happened to the fluid? Did it dissipate? What happened to the pressures over time? Did they decrease with time and no intervention (possibly as the fluid dissipated)? Were repeat infusions required to maintain the pressure? What positive control test was used to demonstrate that a strong enough abdominal muscle contraction could have significantly changed this pressure? This is not a trivial question since the rat abdomen is highly distensible and is not able to maintain high abdominal pressure the way humans can. The authors could consider a sneeze test (See Conway, et al. Int Urogynecol J Pelvic Floor Dysfunct. 2005; 16(5):359-63) to validate their abdominal pressure and abdominal EMG recordings.

3. Why was it that no method of urine collection and no blood pressure recordings were used in the transurethral cystometry group? Collection of voiding volume and blood pressure variables in that group would allow the authors to draw more complete and scientifically relevant conclusions from their study.

4. The Bonferroni correction for multiple comparisons should be used with the t-test in this case since multiple comparisons were made. Statistically significant differences may change as a result.

5. If abdominal pressure was studied in too few animals to draw conclusions from this data, then more animals ought to be studied. No abdominal pressure is reported for the free voiding group. Why was this?

6. The lack of a significant result in abdominal pressure is a major problem in the manuscript since the discussion in the Conclusions section presumes that abdominal pressurization is the end effect of the observed increase in abdominal EMG activity; however, the authors were unable to objectively demonstrate a significant pressurization of abdominal pressure. Unlike the human, the rat abdomen is highly distensible and therefore is not able to generate and maintain high pressures. In addition, the bladder is an abdominal, not a pelvic, organ in the rat. Therefore, a local small increase in abdominal pressure as observed here may not be transmitted effectively to the bladder. The Conclusions section needs to be reconsidered in light of the abdominal pressure results obtained.

7. It is presumed by the authors that the increase in EMG signal in cystometry is due to the noxious effects of the catheter. However, the bladder filling rates were dramatically different between the groups (it took an hour to fill the bladder in the free void group and less than 3 minutes to fill in the cystometry group). It is possible that the increase in abdominal EMG during cystometry had more to do with the high frequency of voids in that group. The conclusions section needs to be revised accordingly. The authors should consider inclusion of an additional experimental group with iv infusion instead of retrograde bladder filling in a group with a urethral catheter to address this concern.

Minor Essential Revisions (such as missing labels on figures, or the wrong use of a term, which the author can be trusted to correct)
1. The title should be changed to “Abdominal Wall Activity is Necessary for Normal Urethane-Anesthetized Female Rat Voiding”
2. There are too many abbreviations, making the manuscript difficult to understand at times. Since there is no length limit on manuscripts, most of these abbreviated terms need to be out in full.
3. P50 tubing (line 96) should be PE-50 tubing.
4. How is data presented? Mean +/- . . . ?
5. More methods details are needed on data collection rate and any filters used including those on the amplifier
6. More methods details are needed on insertion of the EMG needles: how was the rectus abdominis muscle located? How far apart were the electrodes?
7. A table of values (Table 1) is not needed if the values are in the text of the results section. However, the number of significant digits and values ought to be in complete agreement between the two methods of presentation. In addition, the units need to be identical as well.
8. Figures 1-3 ought not be presented as strip chart data if computerized data collection was done. The data could be presented in a more professional manner using the raw data in a graphing software program. Scaling volume to negative values (-1 in Fig. 2 and -3.28 in Fig. 3) makes little sense. Blood pressure ought to be displayed in Fig. 3.

Discretionary Revisions (which the author can choose to ignore)
1. The authors should consider using a relatively new device from Data Sciences International (http://www.datasci.com) to obtain EMGs and bladder pressures in awake animals during voiding. This would dramatically increase the impact of their study.
2. Most of the prior research done on EMG during voiding has been performed on urethral sphincter EMG, rather than on abdominal muscle EMG as in this manuscript. The authors should consider conducting the experiment with simultaneous urethral and abdominal EMG to distinguish the different participations of each to voiding. Could BoTox be delivered to each independently?

What next?: Unable to decide on acceptance or rejection until the authors have responded to the major compulsory revisions

Level of interest: An article whose findings are important to those with closely related research interests

Quality of written English: Acceptable

Statistical review: No

Declaration of competing interests:

I declare that I have no competing interests