Peer Review File

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Reviewer A

Interesting study to predict the complexity of the surgical reconstruction of patients with posterior urethra injury after pelvic fracture using geometric parameters in the preoperative study with pelvic magnetic resonance imaging. The authors studied 43 such patients exploring various geometric measurements and found that both the gap between the ends of the urethra (GD) and the pubo-vertical urethral distance (PUVD) resulted predictors of a complex urethroplasty, that is requiring inferior pubectomy. According to their geometric measurements and statistical study, the authors found that a GD greater than 15.66 mm and a PUVD less than 10.83 mm were predictors of a complex urethroplasty.

This is certainly an interesting concept and I congratulate the authors on this contribution. Any tool helping the surgeon reconstructing these complex injuries is always welcome. However, before validating this methodology, very important clarifications are necessary.

Comment 1: The 2010 SIU-ICUD consensus consultation recommended abandoning the use of the term PFUDD as in many cases there is no real distraction from the extremes of the urethra. Instead, the term 'pelvic fracture urethral injury' (PFUI) is the

currently universally accepted nomenclature.

Reply 1: We have reviewed the recent articles about the urethral stricture. It is really true as reviewer suggested that the PFUDD had been deemed not capable of accurately describing this disease. Therefore, we have changed the PFUDD to PFUI as the reviewer recommended.

Changes in the text: We have modified our text as advised (see Page 1, line 5; Page 5, line 85-86; Page 7, line 114-115, 129, 133; Page 8, line 139; Page 12, line 223; Page 13, line 249, 265; Page 17, line 346, line 353; Page 25, line 457).

Comment 2: The distance between the ends of the urethra has always been estimated using the bipolar 'up and down' urethrography in which the gap is traditionally measured in centimeters, which certainly has a direct translation with the intraoperative findings. In this sense the use of a cut-off distance in millimeters with 2 decimals seems impractical. I truly do not see clearly the rationality and surgical application of a cut-off point in hundredths of a millimeter. From the surgical point of view there is no difference of 14 versus a 16 mm GD. The same applies for PUVD. Please comment.

Reply 2: Our original intention of using millimeters as the unit is to more accurately describe the relationship between the urethral ends and the inferior pubic margin. However, we are very sorry for our negligence of the number of decimal places. We corrected the expression of GD, PUVD and RUMD to centimeters with 1 decimal and re-analyzed the data. The significance remained. We believed this correction could make our research closer to clinical needs.

Changes in the text: We have modified our text as advised (Page 5, line 99, 101; Page 13, line 253, 254, 261-262; Page 25, line 475-476).

Comment 3: The validation of these geometric measurements and their cut-off points with such millimetric accuracy cannot be validated or universally applied as the authors fail to correct for four fundamental variables:

Comment 3-1: Body habitus. These measurements correspond to the Chinese population and in this series the median body mass index (BMI) was 22.5 which certainly does not correlate with the BMI of many other populations internationally. Thus, the indicated cut-off points could not be applied to an obese patient, for example.

Reply 3-1: As the reviewer mentioned, it is one of the limitations of our research. This study was conducted in a single institution. Our results did have some bias about the basic characteristic of patients. Actually, the range of our patients' BMI was from 16.6 to 26.7 which covered underweight, normal weight, and overweight Chinese people. Our data may have the ability to represent part of the yellow race. However, our sample size was not enough to support us to complete an effective subgroup analysis. Obese patients were also missing. Therefore, in the future, we are considering initiating a multi-center study and including more patients. It may help us propose different parameters for people of different races and different weights.

Changes in the text: We have modified our text as advised (Page 11, line 213-214; Page 17, line 334-338).

Comment 3-2: The size of the prostate is also not considered, as the patient may have varying degrees of benign hyperplasia that would obviously modify the geometry of the prostatic urethra, invalidating the proposed cut-off distances.

Reply 3-2: There is no doubt that the size of prostate will influence the position of urethral ends. We are sorry that we didn't compare the prostate volume of the patient specifically, which was our negligence. However, we compared the ages of patients. The mean ages of two groups were 45.4 and 39.2 without significant difference. Some research showed that the prevalence of prostatic hyperplasia increases at the age of 50. This is the main reason for the negligence. In addition, we included age and BMI as covariates into the logistic regression analysis, and the results remained as before. The subgroup analysis must be done in the future research.

Changes in the text: We have modified our text as advised (Page 11, line 213-214; Page 17, line 334-338).

Comment 3-3: It is necessary also to control for the time elapsed after the trauma since the reabsorption of the hematoma and maturation of the local fibrous tissue may take more than the 3 months established in the study group. Thus a patient with 12 months after the accident may have different degrees of architectural distortion of the pelvis than a patient who is only three months after the accident.

Reply 3-3: Injury time is also a problem which may influenced the pelvic anatomy. However, in our institution, the basic waiting-time from PFUI to urethroplasty is 3 months. In this research, we have compared the injury time. The data was significant

larger in inferior pubectomy group. However, we still could not explain the reasons. Maybe in the future, we should evaluate the accurate cut-off time which could help formulate more stringent including criteria.

Changes in the text: We have modified our text as advised (Page 17, line 334-338).

Comment 3-4: Finally, the type of pelvis fracture has not been considered either. Since one of the essential measurement points is the inferior edge of the pubis, the relative position of this point may be distorted by the type of fracture. For example, an open book fracture may have a relative position of the pubis different than a patient in whom the pubic symphysis is unaffected, without that being related to the position of the urethra in the pelvis.

Reply 3-4: We have evaluated the pelvic fracture type according to the Reviewer's suggestion. We divided the fracture into 4 grades - single ramus fracture, ipsilateral both pubic rami fracture, bilateral two or more rami fracture, and furtherly with disruption of ipsilateral sacrum, sacroiliac joint or femur neck (Koraitim, 2012 and 2014). We also compared the numbers of pubic symphysis diastasis. Neither of them showed significance. We hope this modification can make our research more validated.

Changes in the text: We have modified our text as advised (Page 9-10, line 175-183; Page 12, line 232-233).

Reviewer B

This very interesting article evaluates the utility of pre-operative MR urethrography in

determining surgical approach for urethroplasty in patients with traumatic pelvic fracture urethral injuries.

Comment 1: Did every one of the 43 included patients have an MRI? Want to make sure that the exposure is consistent in all included patients.

Reply 1: Dear reviewer, each patient included in our research have undergone a MR urethrography. The exposures of included patients were consistent. We measured and analyzed all the MRI parameters.

Changes in the text: N/A

Comment 2: The authors state that 6 geometric parameters were evaluated. I see 4 in Table 1 (although all 6 appear to be defined in Figure 1). Would be nice to explain all 6 in the methods when referencing Figure 1, as well as including all in the table.

Reply 2: It is true that we only listed 4 MRI parameters in Table 1. The distance from the proximal/distal urethral ends to the inferior pubic margin were omitted because we measured them for calculating the PUVD parameter. Considering the integrity of data, we added these two parameters into the Table 2 as reviewer recommended.

Changes in the text: We have modified our table as advised.

Comment 3: Consider whether inclusion of a multivariate model is appropriate.

What variables were included in your multivariate model? Although there are 43 patients, you only had 16 events (patients who got inferior pubectomy), which would

generally suggest attempting a multivariate analysis would result in "overfitting" and would make the results of this model not generalizable to other samples/populations

Reply 3: As the reviewer's comments, the sample size of our research was relatively small. We only had 16 patients who underwent an inferior pubectomy with MR urethrography which did not meet the requirements of Event Per Variable. The results of multivariate logistic regression analysis may not be robust enough. However, MR urethrography was still not a routine examination. The inferior pubectomy was also the last option for a tension-free anastomosis. Besides, the results of multivariate analysis showed a certain interpretability. Considering these reasons, the multivariate model was still displayed. The reliability of this result needs further research to confirm.

As for the included variables, in the initial version, we included 4 variables in the multivariate model: injury time, GD, PUVD and proximal horizontal angle because they showed significant correlation with the surgical approaches. The results show the GD and PUVD were two independent factors. However, considering the influence of confounding factor, we added the age ang BMI after last correction. The GD and PUVD still showed significance. But the 95%CI of the OR were definitely expanded. Therefore, we did a univariate regression analysis which excluded the injury time. So, as reviewer suggested, referring to our sample size and the results of univariate analysis and in order to avoid "overfitting", we finally decided to include GD, PUVD and proximal horizontal angle these 3 variables in our multivariate model.

Changes in the text: We have modified our text as advised (Page 11, line 215-216; page 13, line 249-251). We also modified table 2.

Comment 4: I would recommend splitting the data in Table 1 into two tables: one with demographic information and a second with radiographic parameters

Reply 4: It is true that the current table is somewhat complex which included all the results of univariate analysis and multivariate logistic regression analysis. Therefore, we managed to split the table into 2 tables: one with univariate analysis of demographic information, and a second with univariate analysis and multivariate logistic regression analysis of radiographic parameters.

Changes in the text: We have modified our text and table as advised (Page 12, line 228; page 13, line 248).

Comment 5: You comment on the "difficulty and damage caused by the inferior pubectomy" and how this may be associated with ED. Can you comment on this further in the discussion?

Reply 5: Inferior pubectomy can help to provide satisfied surgical view and operation space. However, it may increase the surgical complexity and damage the patients erectile function. Anatomic research has proved that cavernous nerves could be easily injured when doing inferior pubectmy. Therefore, inferior pubectomy should be prudently considered and implemented.

Changes in the text: We have modified our text as advised (Page 14, line 282-286). Besides, we added a reference (reference 23)

Comment 6: the authors regularly use the term "stricture" throughout the article. By definition, we should likely refer to these areas as either "stenosis" or "distraction defects"

Reply 6: It is our negligence to use an inappropriate term “stricture” which is more frequently used in describing the anterior urethral disease. We have changed this term to “stenosis” as the reviewer recommended.

Changes in the text: We have modified our text as advised (Page 6, line 108; page 8, line 147-148; page 15, line 299-300;).

Comment 7: the proportion of patients with rectal injury is much higher than seen in the US. Do we have information on mechanisms of injury and/or injury patterns in these patients? I am interested if these are significantly different than others previously reported in the literature

Reply 7: We could not deny that the proportion of rectal injury in our included patients is relatively high. Due to the selection criteria, our included patients were initially considered complex posterior urethral stenosis which may increase the proportion of rectal injury history. Besides, most of the patients recovered spontaneously with or without a cystostomy. Only 5 patients were confirmed the recto-urethral fistula intraoperatively which have been sutured to close. In the future research, more non-complex posterior urethral stenosis patients will be included which may show a percent of rectal injury close to previous researches.

Changes in the text: We have modified our text as advised (Page 13, line 264).