Letter to the Editor

Understanding risk factors and predictive model for pediatric laparoscopic pyeloplasty: responding to commentaries and advancing towards individualized outcomes

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We would like to express our gratitude to Pérez-Bertólez *et al.* (1) for their valuable comments on our study (2). We appreciate their insightful observations and would like to address the points they raised while providing further clarification.

We acknowledge the importance of identifying the true risk factors for complications following primary laparoscopic pyeloplasty (LP) in children and appreciate their suggestion to include additional potential risk factors, such as the preoperative obstruction presentation or intraoperative problems. Our study identified low weight, increased preoperative anteroposterior pelvic diameter (APD), and difficulty in inserting double-J (DJ) stents as risk factors for negative outcomes after LP (2). On one hand, we hypothesized that younger children with lower body weight may have a reduced tolerance to the effects of LP. Factors such as tissue fragility, delicate anatomical structures, and limited intra-abdominal space for manipulation could contribute to negative outcomes in younger children. On the other hand, we believed that higher APD values may indicate more severe hydronephrosis, and laparoscopy might not be able to detect easily the lowest anastomotic lesions. However, our findings were in contrast to the findings of the Hospital Sant Joan de Déu (3). Their experience with 340 pyeloplasties, including 197 open, 30 LP, and 113 mini-LP procedures, demonstrated that LP, higher differential renal function, and older age in children were independent risk factors for surgical complications. LP and longer surgical time were independent risk factors for urinary leaks, while higher APD and the use of externalized pyeloureteral (EPU) stents were independent protective factors against urinary leaks (3). After carefully reviewing their study, we hypothesized that the collinearity among LP, age, and weight might be one potential reason for the opposite results. The age and weight in the LP group were significantly higher than those in the open and mini-LP groups. Since LP is an independent risk factor for surgical complications and urinary leaks, older age was identified as an independent risk factor for surgical complications.

Regarding the comparison of catheters, we agree that our study did not directly compare the outcomes of EPU stents and DJ drainage under the same conditions. According to the experience of the Hospital Sant Joan de Déu, the use of EPU stents was a protective factor against postoperative urinary leaks, as EPU stents have the advantage of allowing for the checking of suture tightness, thereby significantly reducing the possibility of urinary leaks (3). In a meta-analysis conducted by Liu *et al.* (4) involving 839 children from eight studies, the mean success rates in the DJ stent group and the EPU stent group were 93.2% (range:

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88–95%) and 92.6% (range: 86–94.7%), respectively, with no significant difference. In our department, the decision to use an external catheter was made when the DJ stent did not progress adequately to the bladder. We considered the difficulty of inserting the DJ stent as an intraoperative complication. It is possible that this subgroup of patients had associated uretero-vesical junction obstruction (UVJO) or experienced iatrogenic injury during the attempted placement of the DJ stents, which could have affected the prognosis. For children who failed to have a DJ stent inserted, suspicion of concurrent UVJO was necessary. At our institution, retrograde ureteropyelography is not routinely performed, as we believe that most cases of UVJO can be diagnosed through preoperative ultrasound and intraoperative water injection tests. Furthermore, retrograde pyelography may yield undesired results in some normal patients without UVJO, apart from the risk of urinary tract infection. Although the occurrence of both ureteropelvic junction obstruction (UPJO) and UVJO in children is relatively rare, we speculated that the failure to insert a DJ stent without UVJO may be related to intraoperative manipulations. Inadequate sizing or inappropriate placement of the DJ stent could result in minor damage to the distal ureter, leading to transient distal ureteral edema, which could hinder our operation. Additionally, repeated attempts of DJ stent placement may further exacerbate the process.

We acknowledge the limitation of having multiple surgeons perform the operations separately, as it may introduce bias due to differences in preferences. Our intention was to develop a predictive model that could be applicable to a broader range of surgeons worldwide in their own centers. However, it should be noted that this nomogram was developed only for research purposes and should not be used in clinical setting until further validations are performed. We recognize the need for larger series and multicentric randomized prospective studies to obtain a more comprehensive understanding of risk factors and their impact on outcomes. We provide the formula of the model to ensure that other researchers can independently validate it and further improve and refine the model using external data (2). The total points are calculated as follows: *Total points* = 15.95008 × difficulty in inserting DJ stent (0 or 1) + 10 × APD (cm) − 0.846 × weight (kg) + 63.413. The negative outcome rate = 0.001 × *Total points*^{2} − 0.044 × *Total points* + 0.965. We believe the nomogram is the first step toward an objective, individualized prediction of negative outcomes after LP, which can be further improved and refined through the collaborative efforts of the worldwide pediatric urology community.

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Footnote

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Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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