



Letter to the Editor: Refining the double-loop drainage catheter

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Dear Editor,

We read with great interest the article by Kim et al.¹ evaluating a novel double-loop drainage catheter for prolonged pleural and intra-abdominal drainage. The authors should be congratulated for addressing an important cause of long-term drainage failure: catheter dysfunction. Nevertheless, several aspects of the study design and the proposed mechanism merit further discussion.

In our opinion, the principal innovation of the presented catheter is not the addition of a second pigtail loop itself, but rather the elimination of drainage side holes from the proximal loop, assigning this segment an exclusively mechanical anchoring function. Double-pigtail drainage catheters have previously been shown to reduce dysfunctional retraction compared with conventional single-pigtail catheters while preserving drainage side holes in both loops.² Interestingly, the authors of that study proposed that restricting drainage side holes to the distal pigtail loop might further reduce catheter-related complications.² Notably, the present catheter incorporates this key design modification.

From this perspective, the choice of the control group deserves consideration. Although comparison with a conventional single-loop catheter establishes superiority over the current standard, it does not isolate the incremental benefit of the design modification under investigation. A direct comparison with the previously described double-pigtail catheter retaining proximal drainage side holes would have provided a more rigorous assessment of whether the improved outcomes resulted from the established mechanical advantage of the double-loop configuration or specifically from eliminating the proximal drainage side holes.

The proposed mechanism also remains insufficiently supported. The authors hypothesize that removing the proximal side holes prevents obstruction of the terminal drainage hole against the pleural or abdominal wall. However, no objective biomechanical validation is provided. Pull-out testing, mechanical characterization, flow analysis, or imaging-based evaluation could have strengthened the proposed anchoring mechanism. Objective mechanical assessment has become increasingly important in the evaluation of newly introduced medical devices and provides valuable evidence supporting proposed design advantages.^{3,4} Therefore, attributing the improved clinical outcomes solely to elimination of the proximal drainage side holes should be interpreted with caution.

Finally, several technical aspects of the device remain unclear. Although the proximal loop contains no drainage side holes, an external suture appears to be associated with this loop in Figure 2. However, the manuscript does not explain the mechanism by which the proximal loop is created and stabilized. Although the device appears to incorporate a locking mechanism only in the proximal loop, this is not explicitly clarified in the manuscript. Consequently, it remains uncertain how loop geometry is maintained after full deployment and how both loops are straightened during catheter exchange or removal. These technical details are important not only for understanding the device mechanics but also for ensuring procedural reproducibility by other operators.^{3,5}

We congratulate the authors for presenting an elegant refinement of the double-pigtail drainage catheter concept. Further mechanical validation, together with direct comparison with the previously reported double-pigtail design, would better define the true incremental

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value of eliminating proximal drainage side holes and strengthen the translational impact of this promising catheter.

Footnotes

Conflict of interest disclosure

The authors declared no conflicts of interest.

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