Modeling the Effects of the Locked Pack Procedure to Prevent Guidewire Retention in a Clinical Setting

To the Editor:
We read with interest the study by Mariyaselvam et al. regarding the use of a locked pack (which required a guidewire to be inserted and lifted to open) to prevent guidewire retention after completion of central venous catheter insertion, and we commend them for their effort and this novel technique. The introduction of a locked pack will stimulate the search for a missed guidewire and, hence, its subsequent retrieval (if still inside the catheter). This will definitely reduce the occurrence of these rare events if the cause is retention of the whole guidewire, specifically due to operator distraction. From our experience of retained guidewires at our institution, a larger percentage of these incidents were due to other technical causes, such as breakage or inability to retract the guidewire.

In a retrospective study performed by our group, we reviewed 12,887 central venous catheter insertions over a 26-month period from 2011 to 2013. Of those insertions, eight involved guidewire retention. Of those eight cases, only two (25%) were caused by operator distraction. Five (63%) were due to retained fragment after guidewire breakage, and one case (12.5%) was due to inability to retract the guidewire because of impingement. Using our study data where the guidewire retention incidence was 1:6,611, we attempted to model the effects of the locked pack technique. If we remove two of the eight cases where guidewire retention was due to operator distraction, this yields a new incidence of guidewire retention: 1:2,148. Using a one-tailed z-ratio analysis, we can determine if this new ratio is significantly less. This new incidence rate is not significantly less than our initial rate of 1:6,611 (z = 0.204, P = 0.421).

Since our initial review, we have implemented an intense safety education program, and now immediate electronic confirmation of guidewire removal is required in patient charts. After reading the Mariyaselvam et al. manuscript, we reevaluated the incidence of retained guidewire through retrospective analysis of central venous catheter placements over a 26-month period from 2015 to 2017, and found three new instances of guidewire retention out of 7,558 insertions, yielding an incidence rate of 1:2,519. While this is still not a significant reduction (z = 0.319, P = 0.374), it is comparable to the reductions seen in our model implementation of the locked pack.

Competing Interests
The authors declare no competing interests.

References


(Accepted for publication May 14, 2018.)

Retained Central Venous Guidewires: Are We Flushing Them Out?

To the Editor:
We read with interest the article by Mariyaselvam et al. highlighting a unique human factors approach to retained guidewires with their WireSafe kit. While the reported incidence of retained guidewires appears to be on the rise, it is currently running at approximately 0.03%. The Seldinger technique is the worldwide standard for insertion, but has the potential to result in guidewire retention. Adherence to checklists and training have been mainstays in the prevention of this complication. While checklists ensure awareness that a guidewire has been retained, they do not prevent the incident from occurring. The new WireSafe kit, with procedure completion parts in a locked box that use the guidewire as its “key,” is a novel idea and forces the operator to remove the guidewire to secure the line. However, it does not actually prevent the guidewire from being retained.

While the literature offers multiple causes for retained guidewires, the most common being operator distraction, an inadvertent guidewire retention during a central venous line insertion at one of our hospitals demonstrated that guidewires went from being potentially removable to completely retained as a result of flushing the catheter lumens at the end of the procedure. The guidewire does not completely occlude the lumen it passes through. This allows for aspiration of blood, which confirms placement in a vascular structure albeit with resistance. Indeed, this resistance should be a trigger for the operator to consider that the guidewire may still be within the lumen. However, it is easy to understand how this could be overlooked in a busy environment. A false assurance that the lumen is fully patent means that the lumen is then flushed. The guidewire is then pushed further into the patient’s vasculature and becomes inaccessible.

Enrico Camporesi, M.D., Garrett Enten, B.S., Hesham R. Omar, M.D., Devanand Mangar, M.D. TEAMHealth Anesthesia and TEAMHealth Research Institute, Tampa, Florida (E.C.). enrico_camporesi@teamhealth.com

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