



# Digital drainage systems: reminding what is important

Nuria M. Novoa<sup>1,2</sup>, Marta G. Fuentes<sup>1,2</sup>

<sup>1</sup>Thoracic Surgery Department, Salamanca University Hospital, Salamanca, Spain; <sup>2</sup>Salamanca Institute of Biomedical Research (IBSAL), Salamanca, Spain

*Correspondence to:* Nuria M. Novoa. Thoracic Surgery Department, Salamanca University Hospital, Paseo de San Vicente 58-182, 37007 Salamanca, Spain. Email: nuria.novoa@usal.es.

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In this issue of the journal, Geraci *et al.* (1) present their experience with a new digital system (Thoraguard<sup>®</sup>) that shows improved accuracy detecting air-leaks and clearer information display according to the authors' conclusions. The paper is interesting as it shows the new system to be safe, to reduce chest tube duration and final hospital stay. No cost evaluation was provided.

The results of the current series are based on a comparison with a previous retrospective cohort of patients managed with a generic analogue drainage system. Despite demographics are well matched between groups, several confounders are present in the series resulting in a conflicting situation because it is not totally clear what are the clinical advantages of the new digital system. And this fact makes me to think about what is relevant and what is not when studying new drainage systems.

The main objective of any pleural drainage system is to disclose what is happening inside the pleural cavity after whatever surgical procedure or pleural pathology. A good interpretation will determine a proper patient management and a safe chest tube removal. For most of our patients, chest tube removal is an important milestone because it will mark the moment for hospital discharge. Therefore, drainage systems must be as accurate as possible to what is happening within the chest, and it must be easily understood for safe patient management. According to the results of the current study, the new device satisfies the two premises. Nevertheless, satisfying those premises does not mean this system (Thoraguard<sup>®</sup>) is better than other ones.

Since 2009 (2), it is known that digital systems are helping doctors to make better decisions decreasing variability in the clinical management of chest tubes

compared to analogue devices. No doubt that increasing the accuracy detecting air-leaks improves the daily management of chest tubes which is a great clinical advantage. However, in this series, no patient in either group (digital or analogue) had any clinically relevant pneumothorax requiring chest tube reinsertion making the increased detection capacity not so relevant except for the fact that chest tubes were removed one day in advance. According to a recent meta-analysis cited by the authors (3), generic digital systems significantly reduce chest tube duration by 0.68 days (MD: -0.68; 95% CI: -1.32 to -0.04). It seems clear that digital systems are beneficial for patients. But, is this drainage better than others?

As in other studies (3), in this series authors stressed that patient on digital systems were discharged one day before (as a median) than those with an analogue system. In this study, as in others, differences in postoperative complications between cohorts can explain some of these results. Besides, length of stay is a very complex variable that can be influenced by multiple elements making it a non-reliable variable although easy to measure and relevant for the patient. In the end, probably this is not a relevant outcome to measure when developing this type of studies. Probably, here the cost-effective analysis is key because we have to balance the costs of the device against the cost of the last day in hospital which is the cheapest one.

Another important element of the chest tube management is reading and understanding of what is happening inside the pleural cavity. Analogue systems posed two problems: one is related to the lack of previous information further of the moment we are looking at the water-sealed column and, second, the empty space effect

that is difficult to identify forcing to tentative tube clamping or prolonging chest tube duration. These problems are clearly sorted out using a digital system that displays the trends of the air-leak during all the time the chest tube is in and providing changes in pressures during the respiratory cycle useful to clarify any possible empty space effect. What is interesting and not always analyzed, is the users' degree of satisfaction. I think this is a relevant variable. In this series, doctors and nurses are very satisfied with the device although nurses to a lesser extent. And the new device seems to be better to other previous digital systems used in the same unit. Another positive result favoring this new drainage system.

Pleural drainage systems have improved because air-leaks and prolong air-leaks are frequent complications that affect our patients. Current digital systems have evolved since 2008 when the first prospective analysis using digital devices was published (4). Despite all these advances, we cannot forget that the key aspect benefiting our patients is a careful surgical procedure. Current data agrees that generic digital devices benefit our patients. The rest seems to be of commercial interest.

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