



A novel solution to detect pleural adhesions pre-operatively

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Watanabe and colleagues recently published a study in the *Journal of Thoracic Disease* (1) which describes the use of dynamic chest radiography (DCR) to detect pleural adhesions pre-operatively prior to thoracic surgery. In a prospective study of 120 consecutive patients operated in majority for lung cancer, they were able to perform DCR in all patients but one and demonstrated good specificity of the technique for pleural adhesions (91%) but only fair sensitivity (65%). The performance was similar in patients with emphysema although severity of emphysema was not specified and emphysema may become a limitation only when severe. False negative cases occurred mainly with adhesions in areas where the lung's physiologic movements are less pronounced such as the paramediastinal and apical areas. This weakness of DCR was partially compensated by the use of the low motion (LM)-mode which allowed to identify low-motion areas.

DCR is a simple, low-cost and low-radiation technology that has not been previously used in prospective studies for the described indication, detection of pleural adhesions, to our knowledge. Pleural adhesions are of clinical interest as they have been shown to predict conversion to thoracotomy during video-assisted thoracoscopic surgery (VATS) (2,3) and a higher risk of adverse surgical outcomes as well as a higher pleural morbidity (4).

Two main elements, which could be the subjects of future studies, are missing from this study to justify expending clinically the use of DCR for the detection of pleural adhesions: (I) demonstration of the clinical impact of the pre-operative detection of pleural adhesions and (II) a head-

to-head comparison of DCR with chest ultrasound.

The clinical impact of DCR will depend on how its results will be integrated into clinical care. The authors suggest DCR may assist thoracic surgeons in selecting patients for uniportal VATS or robotic-assisted thoracic surgery (RATS). The use of DCR hence would be limited to cases for which the surgeon intends to use one of these approaches. The authors also do not justify a key element of their study design: their definition of the presence of significant pleural adhesions (spreading to more than 20% of the thoracic cavity and/or taking more than five minutes to dissect). Are such adhesions a relative contraindication to uniportal VATS or RATS? The answer to this question may vary from a surgeon to another. The authors' work is a step in the good direction, we now know that DCR performs reasonably to detect pleural adhesions, but it will be important to determine which threshold should be used to redirect patients towards VATS or open thoracotomy. Once this threshold is established, it can be demonstrated that the application of pre-operative DCR improves surgical outcomes or reduces conversion rates to a more invasive surgical approach.

As mentioned by the authors, another imaging modality is simple, low-cost and is not associated with radiation exposure: chest ultrasonography (US). The performance of chest US to detect pleural adhesions pre-operatively has never been compared directly with that of DCR to our knowledge but an imperfect and indirect comparison through the results of chest US studies looking at the detection of pleural adhesions (5-7) suggests a superior

performance to DCR. Chest US has blind spots behind bone structures and in the paramediastinal area but despite these blind spots it can detect clinically significant adhesions. Chest US also does not provide evaluation of the whole pleural surface in a single image but through a systematic approach of key points of the chest. Chest US is more operator dependent than DCR but does not require extensive training or experience to detect signs of pleural adhesions at pre-selected key points of the chest. Chest US is readily available in likely all centers performing this type of surgery and does not require the acquisition of software for DCR image analysis. A study providing direct comparison of both imaging modalities is warranted to help the clinician select the best modality to evaluate pre-operatively pleural adhesions.

In this innovative study, Watanabe and colleagues provide evidence that DCR is a simple and valid option to detect pleural adhesions pre-operatively and may draw more interest to this seldom used technic which may have found a new indication.

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References

1. Watanabe T, Suzuki E, Yoshii N, et al. Preoperative detection of pleural adhesions using dynamic chest radiography: prospective analysis. *J Thorac Dis* 2023;15:1096-105.
2. Li SJ, Zhou K, Wu YM, et al. Presence of pleural adhesions can predict conversion to thoracotomy and postoperative surgical complications in patients undergoing video-assisted thoracoscopic lung cancer lobectomy. *J Thorac Dis* 2018;10:416-31.
3. Puri V, Patel A, Majumder K, et al. Intraoperative conversion from video-assisted thoracoscopic surgery lobectomy to open thoracotomy: a study of causes and implications. *J Thorac Cardiovasc Surg* 2015;149:55-62.e1.
4. Kouritas VK, Kefaloyannis E, Tcherveniakov P, et al. Do pleural adhesions influence the outcome of patients undergoing major lung resection? *Interact Cardiovasc Thorac Surg* 2017;25:613-9.
5. Shiroshita A, Nakashima K, Takeshita M, et al. Preoperative Lung Ultrasound to Detect Pleural Adhesions: A Systematic Review and Meta-Analysis. *Cureus* 2021;13:e14866.
6. Sasaki M, Kawabe M, Hirai S, et al. Preoperative detection of pleural adhesions by chest ultrasonography. *Ann Thorac Surg* 2005;80:439-42.
7. Wei B, Wang T, Jiang F, et al. Use of transthoracic ultrasound to predict pleural adhesions: a prospective blinded study. *Thorac Cardiovasc Surg* 2012;60:101-4.