

Routine daily chest x-ray in the ICU. *Time to cut down*

*Mariam A. Alansari, MD FRCSI,
Khalid A. Maghrabi, FCCP, MRCP*

Routine daily chest radiography (CXR) is common in intubated and mechanically ventilated patients. A key justification is the belief that routine chest radiographs allow prompt detection of problems that could be missed by clinical evaluation, such as early pneumothoraxes, or malpositioned endotracheal tubes. Results of a previous study¹ suggested that these abnormalities are relatively minor and unlikely to alter major clinical outcomes of intensive care unit (ICU) patients. Thus, the practice of daily routine CXR has been scrutinized. However, the practice of daily routine CXR in the ICU continues. In a randomized clinical trial, Hejblum et al² found that an on-demand approach reduced CXR by 32% for ICU patients ($p < 0.0001$). They demonstrated that the on-demand approach produced the same number of diagnostic or therapeutic interventions as the routine approach. It also did not increase the duration of mechanical ventilation, length of ICU stay (LOS), or mortality. These findings provide good evidence that routine daily chest radiographs are unnecessary in most intubated and mechanically ventilated patients.

In a meta analysis by Oba and Zaza,³ pooled analysis of on-demand and daily routine CXR in 7,078 patients

revealed that the elimination of daily routine CXR did not affect hospital or ICU mortality, ICU LOS, or ventilator days. This study was conducted by the Division of Pulmonary and Critical Care Medicine, University of Missouri, Columbia on 2010. The regression analyses failed to identify any subpopulation that would benefit from daily routine CXR in the ICU. However, previous studies have identified 2 subpopulations that might benefit from daily routine CXR.³ These are: unstable pulmonary and cardiac patients; and patients with pulmonary artery catheters. Moreover, Graat et al⁴ conclude in his study that the therapeutic and diagnostic values for on-demand CXR's was higher compared to daily routine ones. Similarly, Clec'h et al⁵ have demonstrated that restrictive use of CXRs in mechanically ventilated patients is associated with better diagnostic and therapeutic efficacies without impairing outcome. Alternative techniques to CXRs like ultrasonography and capnography have less cost than CXR, and have less time to performance compared to CXR study. They could be used to ensure correct position of enteral feeding tubes, diagnosing and monitoring pulmonary conditions, as well as post insertion of central venous catheter.⁶

Variability of clinical situations (with each situation possibly requiring a specific CXR-ordering strategy) in the ICU is a major obstacle to analysis of data from previous studies.⁷ In addition, the definitions of terms, such as routine and clinical significance may vary across studies. Such facts make multicenter prospective study on the efficacy of performing routine CXRs in different

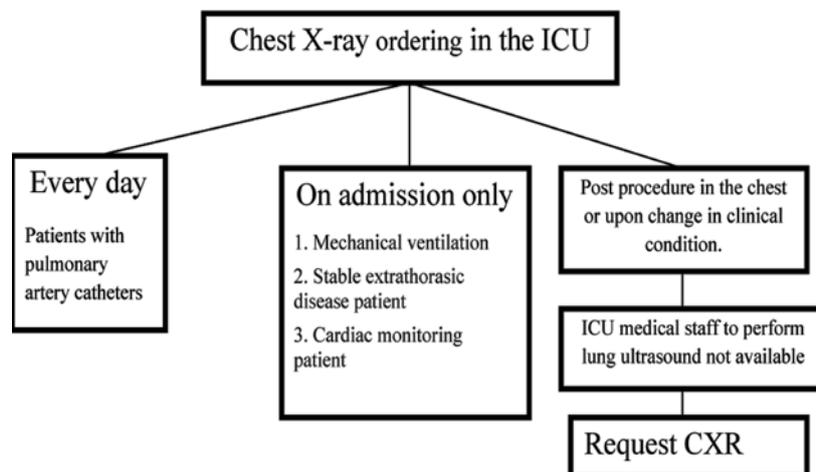


Figure 1 - Chest x-ray ordering strategy in the intensive care unit (ICU). CXR - chest x-ray

situation in adult ICUs not feasible. Until such study is available, and based on our review of current best available evidence, we can summarize the acceptable indications for ordering chest x-ray in the ICU as in **Figure 1**.

Received 15th August 2012. Accepted 28th October 2012.

From the Department of Adult Critical Care Medicine, King Faisal Specialist Hospital and Research Centre, Riyadh, Kingdom of Saudi Arabia. Address correspondence and reprints request to: Dr. Mariam Alansari, Department of Adult Critical Care Medicine (MBC 94), King Faisal Specialist Hospital and Research Centre, PO Box 3354, Riyadh 11211, Kingdom of Saudi Arabia. Tel. +966 (1) 4424464. Fax. +966 (1) 4424184. E-mail: icu_mariam@yahoo.com

References

1. Graat ME, Choi G, Wolthuis EK, Korevaar JC, Spronk PE, Stoker J, et al . The clinical value of daily routine chest radiographs in a mixed medical-surgical intensive care unit is low. *Crit Care* 2006; 10: R11.
2. Hejblum G, Chalumeau-Lemoine L, Ioos V, Boelle PY, Salomon L, Simon T, et al. Comparison of routine and on-demand prescription of chest radiographs in mechanically ventilated adults: a multicentre, cluster-randomised, two-period crossover study. *Lancet* 2009; 374: 1687-1693.
3. Oba Y, Zaza T. Abandoning daily routine chest radiography in the intensive care unit: meta-analysis. *Radiology* 2010; 255: 386-395.
4. Oba Y, Zaza T. Abandoning daily routine chest radiography in the intensive care unit: meta-analysis. *Radiology* 2010; 255: 386-395.
5. Graat ME, Kroner A, Spronk PE, Korevaar JC, Stoker J, Vroom MB, et al. Elimination of daily routine chest radiographs in a mixed medical-surgical intensive care unit. *Intensive Care Med* 2007; 33: 639-644.
6. Clec'h C, Simon P, Hamdi A, Hamza L, Karoubi P, Fosse JP, et al . Are daily routine chest radiographs useful in critically ill, mechanically ventilated patients? A randomized study. *Intensive Care Med* 2008; 34: 264-270.
7. Ioos V, Galbois A, Chalumeau-Lemoine L, Guidet B, Maury E, Hejblum G. An integrated approach for prescribing fewer chest x-rays in the ICU. *Ann Intensive Care* 2011; 1: 4.

Illustrations, Figures, Photographs

Four copies of all figures or photographs should be included with the submitted manuscript. Figures submitted electronically should be in JPEG or TIFF format with a 300 dpi minimum resolution and in grayscale or CMYK (not RGB). Printed submissions should be on high-contrast glossy paper, and must be unmounted and untrimmed, with a preferred size between 4 x 5 inches and 5 x 7 inches (10 x 13 cm and 13 x 18 cm). The figure number, name of first author and an arrow indicating "top" should be typed on a gummed label and affixed to the back of each illustration. If arrows are used these should appear in a different color to the background color. Titles and detailed explanations belong in the legends, which should be submitted on a separate sheet, and not on the illustrations themselves. Written informed consent for publication must accompany any photograph in which the subject can be identified. Written copyright permission, from the publishers, must accompany any illustration that has been previously published. Photographs will be accepted at the discretion of the Editorial Board.