ELECTRONIC SUPPLEMENT MATERIAL

Lung Imaging during Acute Chest Syndrome in Sickle Cell Disease: Computed Tomography Patterns and Diagnostic Accuracy of Bedside Chest Radiograph

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RESULTS

Sensitivity analysis.

In order to test the robustness of our study, we verified the main findings while restricting the analysis to the first ACS episode. All main results were similar to those obtained while considering all ACS episodes (see below).

Among the 118 CT scans obtained during the first ACS episode, 116 (98%) CT scans were identified as positive for ACS according to the liberal definition (a new pulmonary opacity) whereas 74 (63%) were identified as positive according to the conservative definition (a new complete lung segment consolidation).

Lung parenchyma was increasingly consolidated from apex to base; the right and left inferior lobes were involved frequently in patients with a new opacity on CT scan (86% and 82% of cases respectively), and almost always in patients with a new complete lung segment consolidation on CT scan (97% and 95% of cases respectively). Consolidations were predominant as compared to ground-glass opacities and atelectasis (48%, 24% and 7% of lobes involved respectively in patients with a new opacity on CT scan; and 58%, 26% and 6% of lobes involved respectively in patients with a new complete lung segment consolidation on CT scan).

Patients with a new complete lung segment consolidation on CT scan had a more severe presentation and course as compared to others, with higher respiratory rate (28 [26-30] vs. 26 [24-28] breaths/min, $p<0.01$) and heart rate (110 [100-120] vs. 100 [99-118] beats/min, $p=0.03$) during ACS; higher C-reactive protein concentration at time of diagnosis of ACS (122 [73-216] vs. 79 [20-177] mg/L, $p=0.03$); higher white-cell count at time of diagnosis of ACS (16.9 [13.6-20.7] vs. 13.3 [11.1-17.4] 10^9/L, $p<0.01$) and during hospital stay (17.7 [15.1-] vs. 15.6 [11.8-19.6] 10^9/L, $p<0.01$); higher maximal nasal oxygen flow (6 [4-10] vs.3 [4-6], $p<0.01$); more need for antibiotic treatment [68 (93%) vs. 22 (52%), $p<0.01$] and more need for ICU admission [54 (73%) vs. 10 (24%), $p<0.01$] during ACS.

Raw agreement between the two reviewers of bedside CR was substantial (0.78 for the liberal definition and 0.80 for the conservative definition) whereas chance corrected-agreement was fair to moderate (0.17 for the liberal definition and 0.47 for the conservative definition) and chance-independent agreement was substantial (0.61 for the liberal definition and 0.73 for the conservative definition).

Among the 118 CT scans performed, a bedside CR was available within 24 hours of CT scan during 99 episodes. The value of the bedside CR for the diagnosis of ACS using CT as a reference could not be assessed for the liberal definition because all analyzed 99 CT scans were positive for that definition. For the conservative definition, the sensitivity of bedside CR was good for both readers (86% and 92%) whereas the specificity was weak (42% and 58%).

Table S1. Capacity of bedside chest radiograph for the diagnosis of acute chest syndrome.

Computed tomography was used as reference and acute chest syndrome was radiologically defined as a new pulmonary opacity involving at least one complete lung segment that was consistent with the presence of alveolar consolidation, but excluding atelectasis.

	Reader 1	Reader 2
Sensitivity, %	86	93
Specificity, %	51	56
Positive predictive value, %	76	79
Negative predictive value, %	68	82
Diagnostic accuracy, %	74	80
LR for the positive test	1.77	2.12
LR for the negative test	0.27	0.12
Youden's index	0.38	0.49

LR=likelihood ratio