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Title: Diagnostic delay of pulmonary embolism in primary and secondary care: A retrospective study

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Body: Objective To document and quantify the various stages of diagnostic delay of pulmonary embolism and to identify clinical factors associated with this delay. Design A retrospective cohort study, conducted in Zwolle and surroundings, the Netherlands. Participants 391 patients diagnosed with pulmonary embolism between 2008 and 2009 in the Isala klinieken, Zwolle, the Netherlands. 261 patients were included for analysis. Main outcome measures The diagnostic delay in days, subdivided in patient delay, delay in primary care, delay in secondary care, and total diagnostic delay. Secondary endpoints were the association between clinical variables and diagnostic delay expressed as odds ratio's. Results The 261 patients enrolled had an average delay of 8.6 days from symptom onset to diagnosis. Patient delay (4.2 days average) and delay in primary care (3.9 days) were the major. contributors to this delay. In secondary care there was a diagnostic delay of 0.5 days. Chest pain and symptoms of deep venous thrombosis were associated with an early diagnosis. Patient delay was shorter in patients with chest pain and longer in patients with dyspnea. In primary care, chest pain and rales were associated with an early referral, whereas co-morbidity led to a delayed referral. In secondary care dyspnea was the only parameter significantly associated with delay, leading to an earlier diagnosis. Conclusion and recommendations This study showed that the diagnostic delay of pulmonary embolism in daily practice is substantial, especially patient delay and delay in primary care. There is room to reduce this delay by increasing patient awareness and by developing practical diagnostic algorithms for primary care.