

Diagnostic Accuracy of Pulmonary Embolism Rule-Out Criteria:
A Systematic Review and Meta-analysis

Balwinder Singh, MBBS, Ajay K. Parsaik, MBBS, Dipti Agarwal, MBBS, Alok Surana, MBBS, Soniya S. Mascarenhas, RN, Subhash Chandra, MBBS

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INTRODUCTION

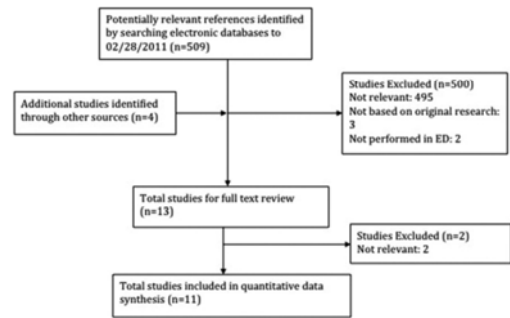
- Pulmonary embolism: 非特異性臨床症狀
- 急診醫師為了避免漏掉這life-threatening診斷，花更多高價的診斷工具

Kline et al (2004)	Patients meeting all 8 PERC
< 50 y/o	PR<100 bpm
SpO2 > 94%,	no unilateral leg swelling
no hemoptysis	no surgery or trauma within 4 weeks,
No previous deep venous thrombosis or pulmonary embolism	No oral hormone use

MATERIALS AND METHODS

- Database:
 - EMBASE, MEDLINE, SCOPUS, Web of Knowledge, Cochrane Database of Systematic Reviews
 - major emergency medicine organizations
 - PubMed

Result



Result

- 12 cohorts 13,885 patients from 6 countries
- 56% women, with a mean age of 52.9 years
- Follow-up ranged from 14 to 90 days
- PERC were highly sensitive (97%) in excluding pulmonary embolism but were nonspecific (23%).
- No significant association between pulmonary embolism prevalence and PERC diagnostic performance on meta-regression analysis

Result

- Sensitivity: 0.97
- Specificity: 0.23
- Positive likelihood ratio (真陽性率 / 假陽性率): 1.24
- Negative likelihood ratio (假陰性率 / 真陰性率): 0.18

Likelihood Ratio	Interpretation
> 10	Strong evidence to rule in disease
5-10	Moderate evidence to rule in disease
2-5	Weak evidence to rule in disease
0.5-2.0	No significant change in the likelihood
0.2-0.5	Weak evidence to rule out disease
0.1-0.2	Moderate evidence to rule out disease
< 0.1	Strong evidence to rule out disease

LIMITATIONS

- Small number of studies (<20) → publication bias
- Low specificity

DISCUSSION

- LEVEL 2 EVIDENCE: PERC are highly sensitive in predicting pulmonary embolism, and D-dimer testing is thus unnecessary.
- Use of PERC could thus avoid the frequent expensive diagnostic imaging
- high sensitivity and negative predictive value of PERC, with missed pulmonary embolism in just 0.5% of patients.

DISCUSSION

- Hugli et al and Righini et al:
 - a higher frequency of missed pulmonary embolism and have raised concern about the reliability of PERC.
 - Due to the higher pulmonary embolism prevalence

Editor's Capsule Summary

What is already known on this topic

The pulmonary embolism rule-out criteria (PERC) are commonly used to identify patients for whom D-dimer or other testing can be deferred.

What question this study addressed

Are the PERC reliable?

What this study adds to our knowledge

In this meta-analysis of 11 studies from 6 countries, the PERC were highly sensitive (97%) in excluding pulmonary embolism but were nonspecific (23%).

How this is relevant to clinical practice

This pooled analysis strongly corroborates the safety of using PERC to defer D-dimer testing.