Efficacy of noninvasive ventilation after planned extubation: A systematic review and meta-analysis of randomized controlled trials

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拔管後病人使用非侵入性呼吸器可以減少重新插管的機率嗎?

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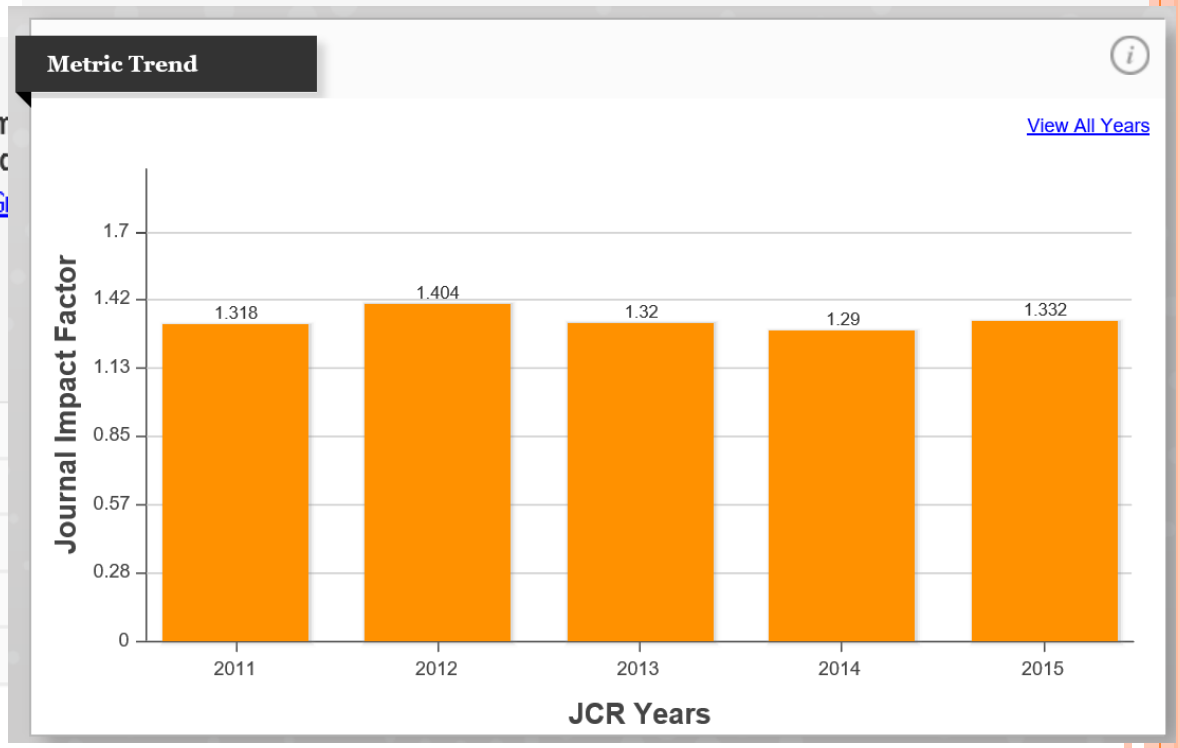
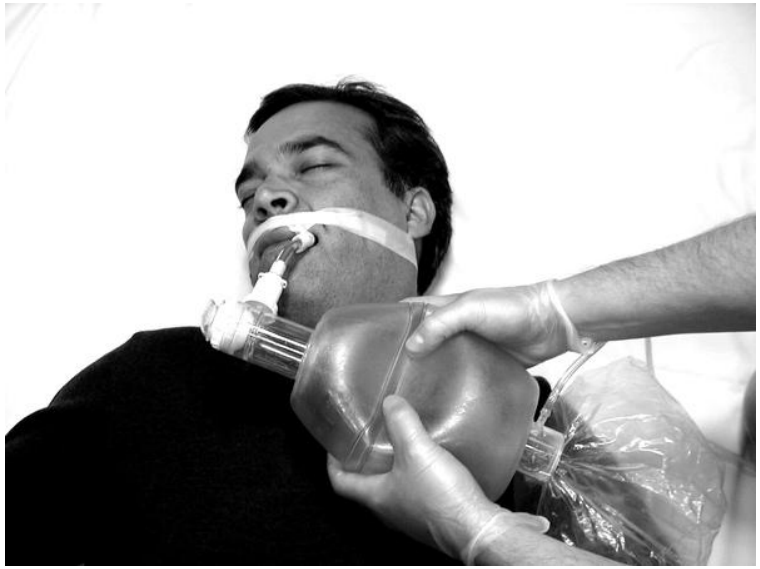
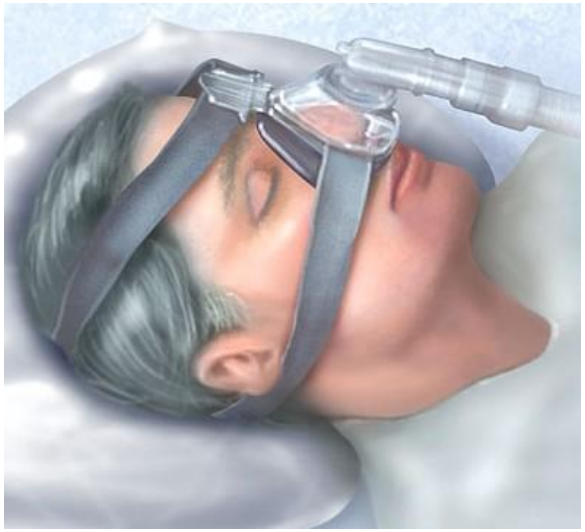
2015	1,859	1.332	1.239	1.531	
2014	1,710	1.290	1.180	1.521	
2013	1,715	1.320	1.193	1.585	
2012	1,645	1.404	1.301	1.519	
2011	1,563	1.318	1.116	1.423	



高風險 OR COPD病人拔管後?





步驟 1：系統性文獻回顧探討的問題為何?

P	planned extubation in medical intensive care unit(ICU)
I	NIV (初始設定: IPAP:8-16 cm H2O/ EPAP:4-6 cm H2O)
C	Conventional oxygen therapy (face mask or venture mask)
O	Primary outcome : reintubation rate Secondary outcomes : 1. ICU mortality 2. Hospital mortality 3. ICU length of stay 4. Hospital length of stay

步驟 2：系統性文獻回顧的品質如何？(FAITH)

F - 研究是否找到 (Find) 所有的相關證據？

Methods

Data source and searches

A systematic search of Medline, EMBASE, Cochrane Database of Systematic reviews and Cochrane Central Register of Controlled Trials were performed. The following keywords were used in various combinations, "Noninvasive ventilation," "noninvasive positive pressure ventilation," "BiPAP," "CPAP and extubation." Additionally, references from previous trials, meta-analysis and the web base were searched to identify any relevant studies. No language restriction was enforced. The abstracts or manuscripts of all retrieved studies cited before February 2014 were reviewed [Fig. 1].

評讀結果：■是 □否 □不清楚

步驟 2：系統性文獻回顧的品質如何？(FAITH)

A - 文獻是否經過嚴格評讀 (Appraisal)？

Data extraction and validity assessment

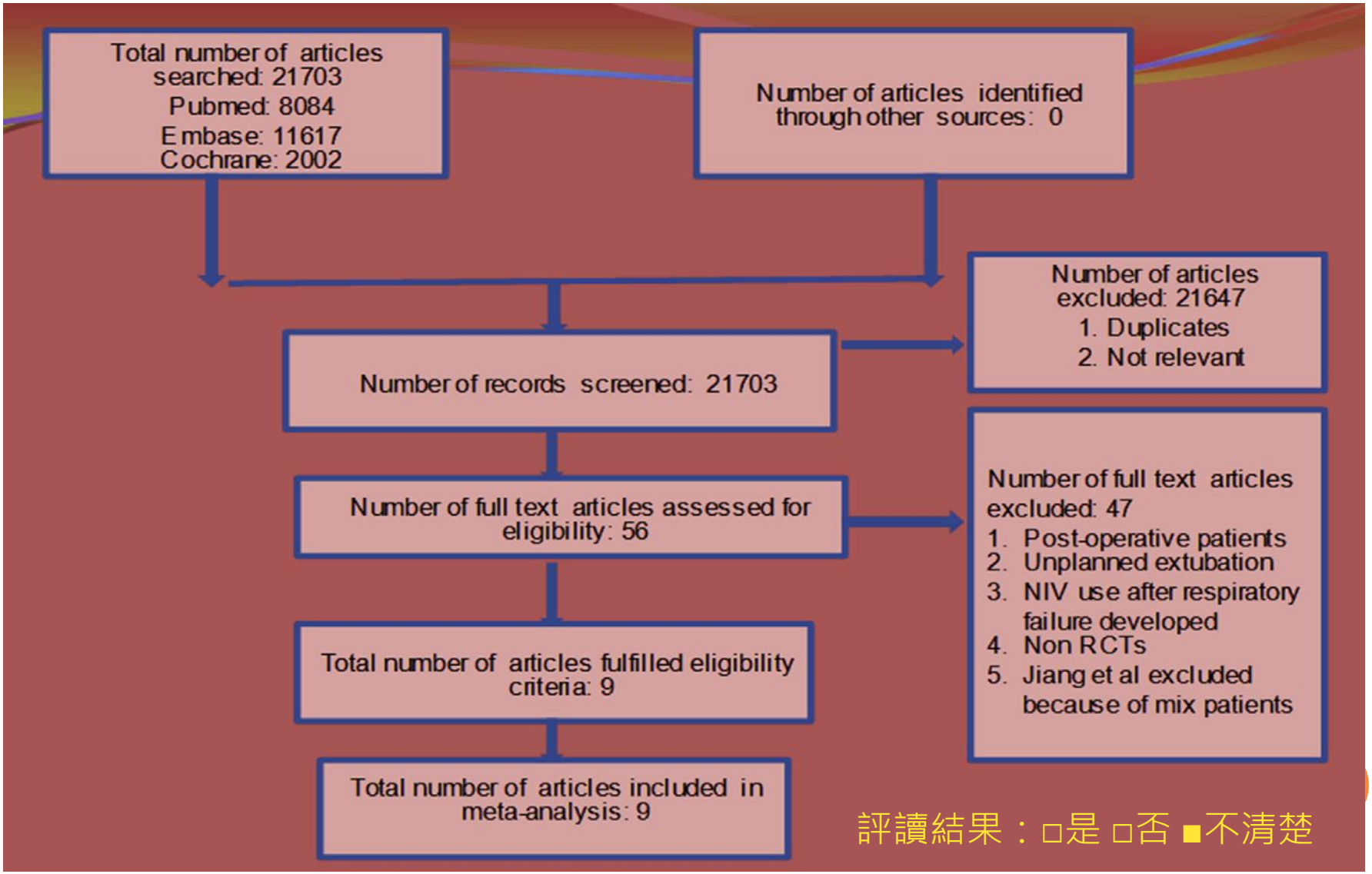
Two reviewers [AB and PR] independently performed the literature search and identified relevant studies. Relevant data on study design, patient population, inclusion and exclusion criteria, mean age, reintubation criteria, comparison and outcomes were extracted. A third investigator was available for arbitration in the event of discordance of the extracted data, but no significant disagreement was encountered.

Study selection

The inclusion criteria were based on the following attributes: 1) Design: randomized controlled trial; 2) Population: Adult patients admitted in medical ICU for acute respiratory failure and on mechanical ventilation for >48–72 h and electively extubated; 3) Intervention: Noninvasive ventilation versus conventional oxygen therapy post-extubation; 4) Outcomes: reintubation rate, ICU mortality, hospital mortality and ICU length of stay.

Exclusion criteria: 1) Informed consent not available, 2) gastric or esophageal surgery, 3) gastrointestinal bleeding, 4) pregnancy, 5) contraindications for NIV: facial abnormalities, upper airway obstruction, excessive amount of respiratory secretions, uncooperative state.

步驟 2：系統性文獻回顧的品質如何？(FAITH)



步驟 2：系統性文獻回顧的品質如何？(FAITH)

Included - 是否只納入具良好效度的文章

文章類型及族群

篩選條件

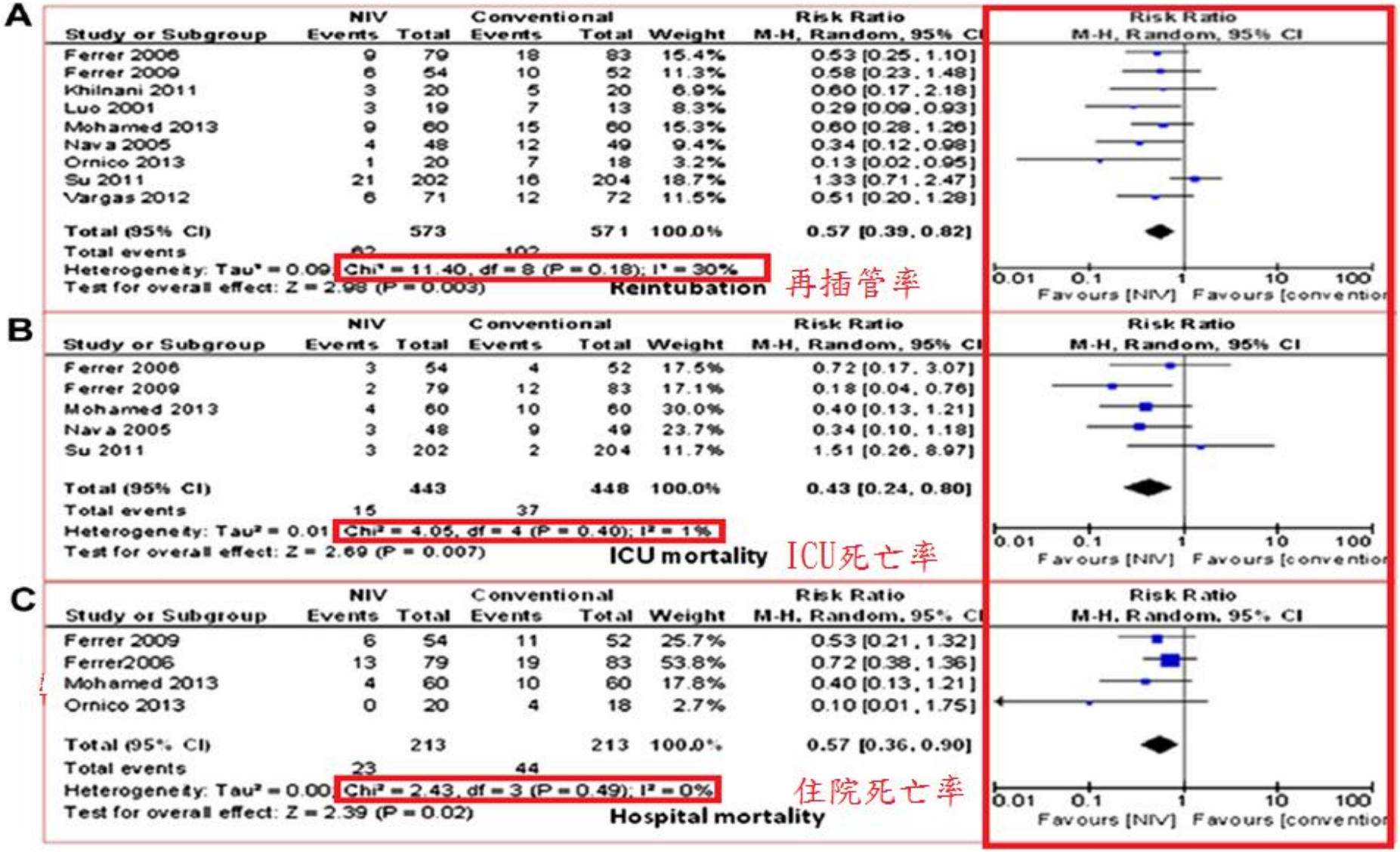
Table 1
Characteristics of included trials.

Study	Type of study	Population characteristics	Duration of NIV	Inclusion criteria	Exclusion criteria
Ornico[18]	RCT	Mixed ICU	Nasal mask for 24 h	ARF, on MV for >48 h with successful SBT	Age < 18 years, pregnancy, refusal to participate, contraindications for NIV
Su[19]	RCT	Mixed ICU	Facial mask for 12 h	ARF, on MV for >48 h with successful SBT	Refusal to participate, incompetence, ineligible diagnosis, physician refusal, contraindications for NIV
Mohamed[20]	RCT	Mixed ICU	Facial mask for 12 h	ARF, on MV for >48 h with successful SBT	Age < 18 years, refusal to participate, recent abdominal surgery, contra-indications for NIV
Ferrer (2006)[21]	RCT	High risk	Facial mask for 24 h	ARF, on MV for >48 h with one of the following: Age > 65 years, cardiac failure, APACHE > 12 with successful SBT	Contraindications for NIV, recent gastric or esophageal surgery
Ferrer (2009)[22]	RCT	CRDs	Facial mask for 24 h	ARF on CRD, on MV for>48 h with successful SBT and hypercapnia during SBT	Contraindications for NIV, recent gastric or esophageal surgery
Nava[23]	RCT	High risk	Facial mask for 48 h	ARF, on MV for>48 h and passed SBT and one of the following: 1. More than one failure of weaning trial 2. Chronic heart failure 3. $PaCO_2$ > 45 mm Hg after extubation 4. More than one comorbidity 5. Weak cough 6. Upper airways stridor at extubation	Neuromuscular disease, sleep apnea, uncontrolled cardiac ischemia and use of NIV at home, failure of >2 organs, obesity, arrhythmias
Khilnani[24]	RCT	COPD	Facial mask for 7 h/day	ARF due to COPD exacerbation, on MV for >48 h with successful SBT or able to extubate on SIMV with rate <6 and Ps < 7cm H_2O	Contraindications for NIV, myocardial ischemia or arrhythmias, prior reintubation
Luo[25]	RCT	COPD	Facial mask for 12 h	ARF due to exacerbation of COPD on MV with successful weaning	Contraindications for NIV
Vargas[26]	RCT	CRDs	Nasal mask for 48 h[a]	ARF on CRD, on MV with successfu hypercapnia during SBT	

評讀結果：□是□否■不清楚

步驟 2：系統性文獻回顧的品質如何？(FAITH)

T - 作者是否以表格和圖表「總結」(total up) 試驗結果？
H - 試驗的結果是否相近 - 異質性 (Heterogeneity)？



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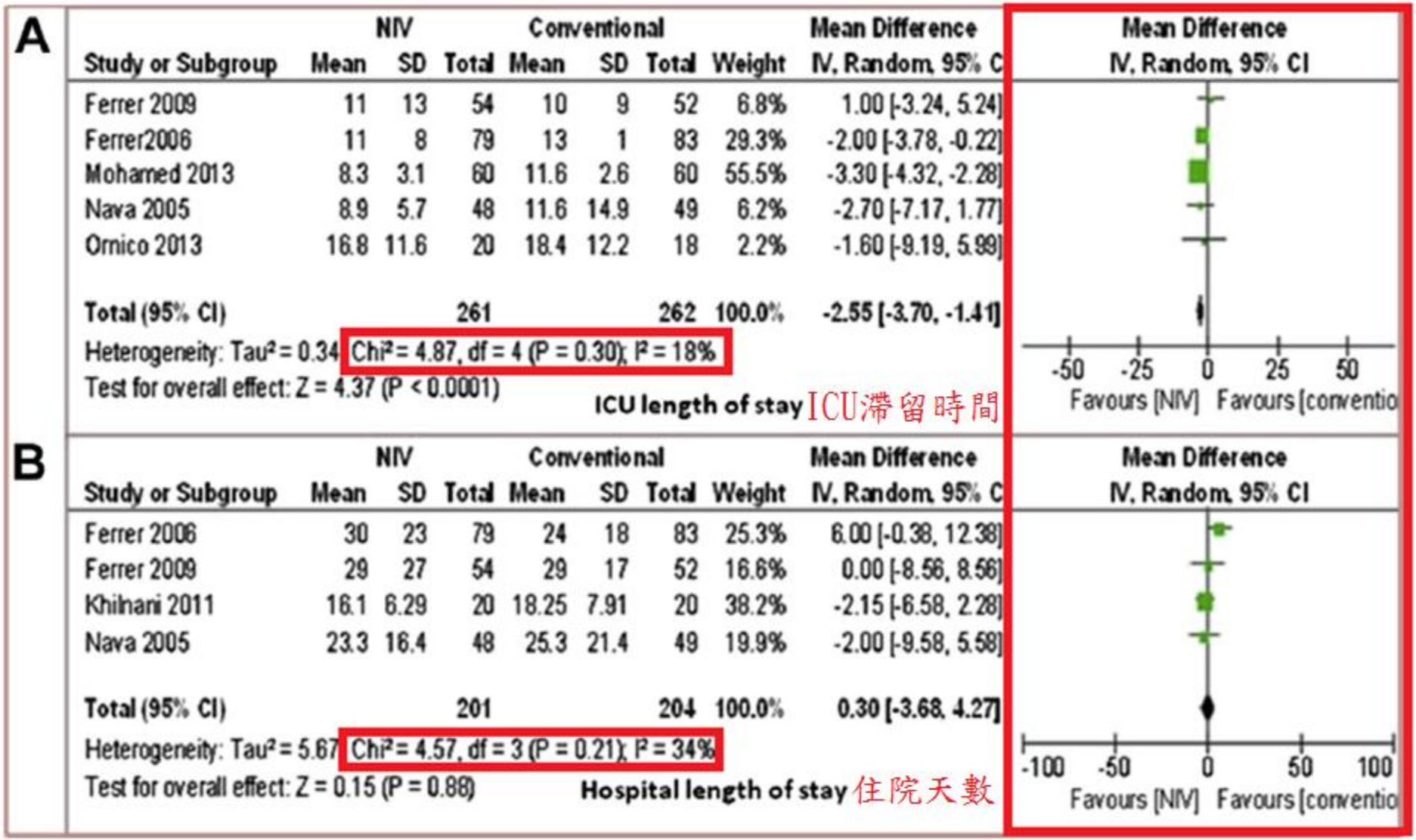


Fig. 3. Forest plot of pooled analysis comparing NIV and conventional treatment for the following: A) ICU length of stay, and B) Hospital length of stay.

步驟 2：系統性文獻回顧的品質如何？(FAITH)

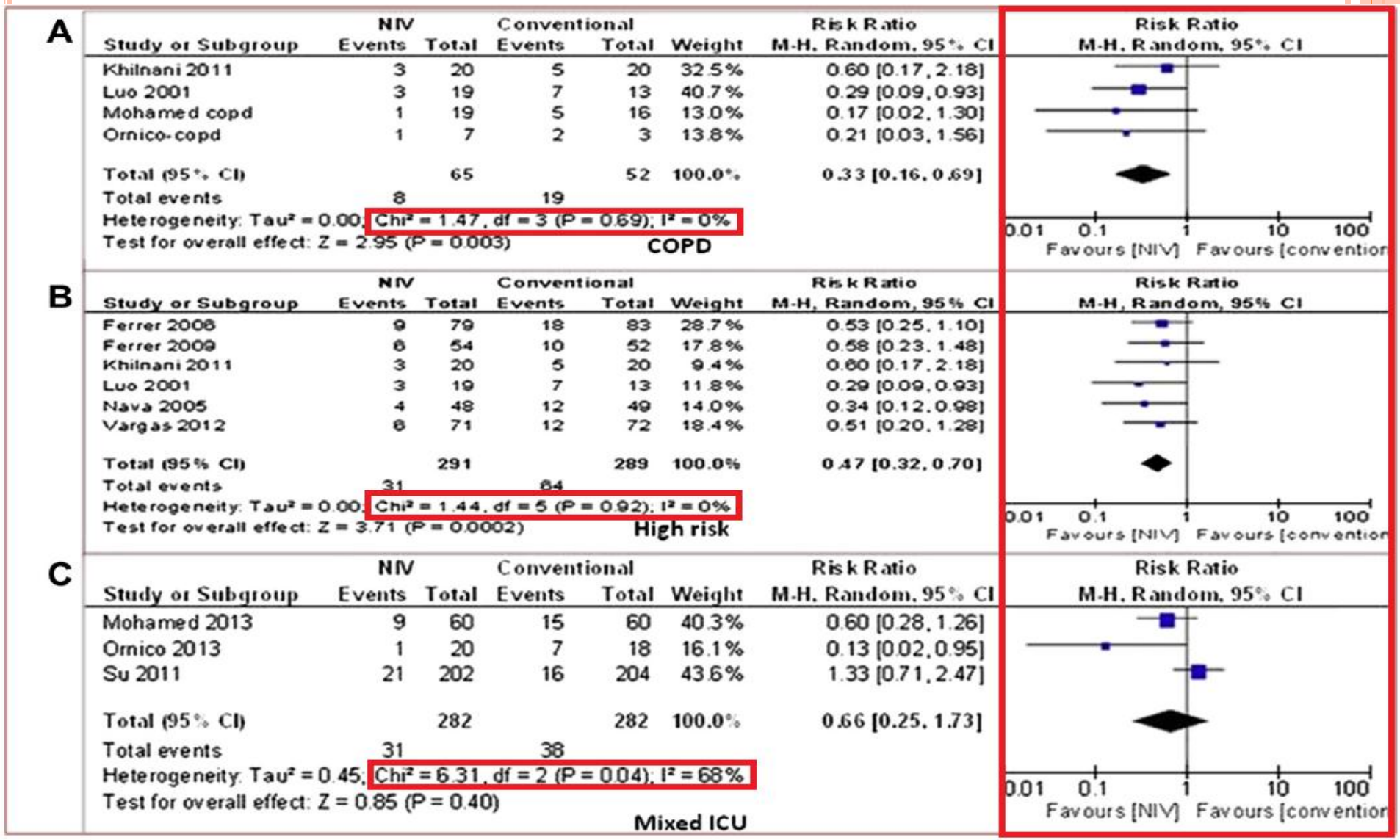


Fig. 4. Forest plot comparing reintubation rate in NIV and conventional treatment for the following subgroups. A) COPD, B) At high risk population, and C) Mixed ICU population.

評讀結果：■是□否□不清楚

結果為何?使用何種評估方式,療效有多大?

Primary outcome

All nine studies reported reintubation rate; overall, the rate was 10.8% in the NIV group as compared to 17.8% in the conventional group. The reintubation rate was significantly lower in the NIV group as compared to the conventional group (RR = 0.57 [CI: 0.39–0.82]). There was mild statistical heterogeneity among studies [I^2 = 30%]. Analysis done after excluding the study of Vargas et al (only non-full text study) showed similar result (RR = 0.56 [CI: 0.37–0.86], I^2 = 38%).

Secondary outcomes

ICU mortality: Five trials reported ICU mortality[19–22,24]; it was 3.3% in the NIV group as compared to 8.2% in the conventional group and the difference was statistically significant (RR = 0.43 [CI: 0.24–0.80]). There was very minimal statistically heterogeneity among studies [I^2 = 1].

Hospital mortality: Four trials reported hospital mortality[18,20–22]; it was 10.7% in the NIV group as compared to 20.65% in the conventional group and the difference was statistically significant (RR = 0.57 [CI = 0.36–0.90]). There was no statistically heterogeneity among studies [I^2 = 0].

ICU length of stay: Five trials reported ICU length of stay,[18,20–23] which was significantly decreased by 2.5 days in the NIV group as compared to the conventional group (mean difference [MD] = −2.55 [CI: −3.70 to 1.41]). There was some statistically heterogeneity among studies [I^2 = 18%].

Hospital length of stay: Four trials reported hospital length of stay.[21–24] NIV didn't decrease hospital length of stay as compared to conventional group (MD = −0.30 [CI: −3.68 to 4.27]). There was no statistically heterogeneity among studies [I^2 = 0].

DISCUSSION

證據與實證照護(Evidence) (GRADE評分系統)

–此篇文章: 考慮影響證據品質的升降級因素

證據品質 ：**高(A)**、中(B)、低(C)、極低(D)

建議強度：強(1)-明確顯示介入措施利大於弊或弊大於利

弱(2)-利弊不確定或無論品質高低的證據均顯示利弊相當

臨床專家意見(Expertise)

☆胸腔內科醫師

☆呼吸治療師

期望(Expectation)

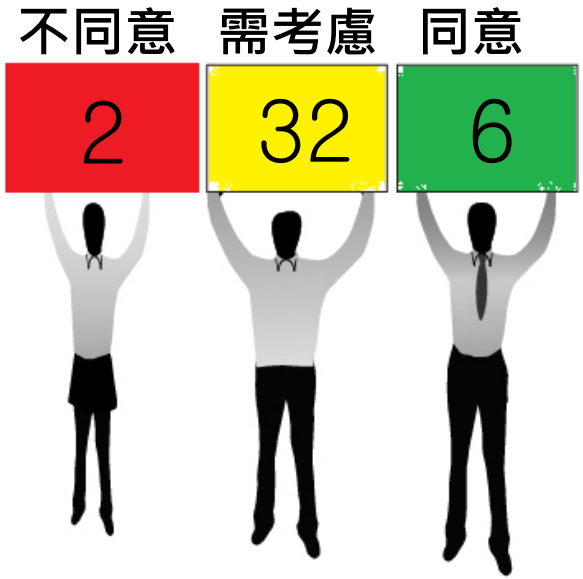
☆家屬關心

病人何時可以順利脫離呼吸器

使用呼吸器的舒適度

Q&A 交流與討論時間

針對拔管後重新插管的高風險病人是否建議拔管後使用非侵入性呼吸器?

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